

INDIAN ASSOCIATION FOR RESEARCH

Indian Association for Research in National Income and
Wealth. Indian Conference on research in national income
5th conference, 1966. Papers.

Preliminary & Confidential

IARNIW/66/1-b

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INDIAN ASSOCIATION FOR RESEARCH IN NATIONAL INCOME AND WEALTH

FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME

AN ARTICULATED SYSTEM OF NATIONAL ACCOUNTS
AT CONSTANT PRICES FOR INDIA

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AHMEDABAD

9-11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily
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INDIAN ASSOCIATION FOR RESEARCH

AN ARTICULATED SYSTEM OF NATIONAL ACCOUNTS AT CONSTANT PRICES FOR INDIA*

S. Chattopadhyay

Presentation of national accounts at current prices within a comprehensive and integrated framework offers major advantages in the compilation of macro-economic data and their interpretation. But the aggregates in the national accounts are greatly affected by the vagaries of price fluctuations over a period of time and the comparison of the aggregate output of goods and services for a particular point of time with the output for another point of time becomes difficult to a great extent. It is, therefore, necessary to get the picture in real terms, i.e., to express the figures of the national accounts in constant prices.

2. In recent years a few attempts have been made to present the national accounts of India in current prices within an integrated framework.⁽¹⁾ These attempts are no doubt valuable additions in the field of research in National Income. But another field of research still remains to be explored. We have no national accounts for India in real terms presented within a comprehensive framework. In the present paper an attempt will be made to do so based largely on work done by others. As a preliminary study, we will concentrate here only on methodological discussions covering a short time horizon (1951-52 to 1954-55), for which estimates at constant prices will be given. Real estimational work covering a longer time horizon will be left for future.

3. Fully articulated system of national accounts at current prices, designed to show how the economic systems work in displaying the intersectoral flows, have been developed in many countries. These are based upon balancing function to ensure internal consistency. Geary advanced one such articulated system of five accounts consisting of eight variables in terms of current prices.⁽²⁾ This system is represented below:

The author is indebted to Prof. M. Mukherjee for his valuable suggestions. Remaining errors are the author's sole responsibility.

(1) M. Mukherjee : The Technique of Social Accounting in a Pre-industrial Economy, Sankhya, Vol.14, Parts 1 & 2, 1954.

B.K. Barpujari : The National Accounts of India, 1951-52 to 1955-56, Papers on National Income and Allied Topics, Vol.1, Indian Conference on Research in National Income.

K.L. Narang : National Accounts of the India Union, 1948-49 to 1953-59: Paper presented at the Third Indian Conference on Research in National Income, Nov. 1961.

(2) R.C. Geary : Introduction to Problems in the Deflation of National Accounts, Income and Wealth, Series IX, International Association for Research in Income and Wealth.

accounts	at current prices
(1)	(2)
1. Domestic product account	$P = C + I + E - M$
2. National income account	$Y = P$
3. Consumer's account	$C + S = Y$
4. Capital account	$I + N = S$
5. External account	$E - M = N$

For simplicity he ignored transfers, indirect taxation and factor incomes from abroad. In these accounts C denotes gross domestic consumption, S is gross saving, I is gross investment and E and M are gross exports and gross imports respectively. Gross domestic product is denoted by P and gross national income by Y. N denotes trade balance.

4. On the basis of Geary system the national accounts of India in current prices may be presented in the form of accounting identities. Statement I, which is largely based on Barpujari's estimates shows such accounting identities for the period 1951-52 to 1954-55. For the sake of convenience, we have used Barpujari's estimates of gross domestic product, gross domestic capital formation and current expenditure on commodities and services in the government sector only. As the exports and imports of services are negligible in comparison with other components of the national accounts, they have been ignored to simplify the methodological discussion. We have replaced Barpujari's data on external transactions by more recent estimates on commodity trade taken from the Reserve Bank of India's statement of overall balance of payments.⁽³⁾ From these estimates consumers' current expenditure on commodities and services are obtained as residuals. Then the estimates of gross domestic consumption are obtained by lumping up the current expenditures by consumers and the government.

5. Now the problem is how the national aggregates given in Statement I can be expressed in real terms? The solution also lies in the constant price system of national accounts as conceived by Geary. This system is given below:

accounts	at constant prices
(1)	(2)
1. Domestic product account	$P' = C' + I' + E' - M'$
2. National income account	$Y' = P' + T'$
3. Consumers' account	$C' + S' = Y'$
4. Capital account	$I' + N' = S'$
5. External account	$E' - M' + T' = N'$

(3) Reserve Bank of India : India's balance of payments, 1948-49 to 1961-62.

Statement I
The National Accounts of India at current prices 1951-52 to 1954-55

Expenditure					Receipt					(Rs. crores)			
										1951-	1952-	1953-	1954-
										52	53	54	55
1. Domestic Product Account													
Gross domestic product	(P)	11026	10832	11547	10745	Current expenditure on commodities and services	(C)	10110	9846	10528	9574		
						Gross domestic capital formation	(I)	1149	1017	1071	1264		
						Exports, f.o.b.	(E)	730	602	540	597		
						Less Imports, c.i.f.	(M)	- 963	- 633	- 592	- 690		
P	=	11026	10832	11547	10745	C + I + E - M	=	11026	10832	11547	10745		
2. National Income Account													
National income	(Y)	11026	10832	11547	10745	Gross domestic product	(P)	11026	10832	11547	10745		
Y	=	11026	10832	11547	10745	P	=	11026	10832	11547	10745		
3. Consumers' Accounts													
Current expenditure on commodities and services	(C)	10110	9846	10528	9574	National income	(Y)	11026	10832	11547	10745		
Savings	(S)	916	986	1019	1171								
C + S	=	11026	10832	11547	10745	Y	=	11026	10832	11547	10745		
4. Capital Account													
Gross domestic capital formation	(I)	1149	1017	1071	1264	Savings	(S)	916	986	1019	1171		
Trade balance	(N)	- 233	- 31	- 52	- 93								
I + N	=	916	986	1019	1171	S	=	916	986	1019	1171		
5. External Account													
Exports, f.o.b.	(E)	730	602	540	597	Trade balance	(N)	- 233	- 31	- 52	- 93		
Less Imports, c.i.f.	(M)	- 963	- 633	- 594	- 690								
3 - M	=	- 233	- 31	- 52	- 93	N	=	- 233	- 31	- 52	- 93		

The constant price values of this system are given by $C' = C/P_C$; $I' = I/P_I$ etc., where the P's are the appropriate price indexes. The system contains an additional variable T' , the external trading gain, for which there is no correspondence in the current price system. The appearance of this variable in the national income account and the external account of the constant price system requires some explanation. Let us consider the latter account in the current price system:

$$E - M = N$$

where N is the trade balance. In the deflated system, N' could be easily arrived at by calculating the difference between deflated E and M but the difficulty is that when $E - M$ is positive, $E' - M'$ may be negative (or vice versa). This change of direction may be due to the fact that the constant price account $E' - M' = N'$ possibly involves a negative price deflator $P_N = N/N'$ for N . For this reason the view taken is that N should be deflated separately. In the base period, where all price indexes are taken as 100 and in some exceptional cases when the price indexes of exports and imports and the price index used as the deflator of N are found to be equal, $E' - M'$ will be equal to N' . In all other cases

$$E' - M' \neq N'$$

Therefore, a balancing item is required to be introduced to make both sides of the deflated account equal. Thus we get the fifth account in the constant price system;

$$E' - M' + T' = N' \quad \dots \dots (1)$$

To complete the articulation, T is added to account 2.

6. There is the consensus that N should be deflated by some positive price index. But no unanimity exists about the deflator to be used. J.L. Nicholson⁽⁴⁾ suggested that the deflator should be the import price index. G. Stuväl⁽⁵⁾ argued in favour of the implicit gross domestic product price index as the deflator of N . To Fabricant⁽⁶⁾ gross capital formation price index was the appropriate deflator. Burge and Geary⁽⁷⁾ contributed to the idea that for $E > M$, the deflator should be an export price index and for $M > E$ an import price index should be used. Thus for $M > E$ Nicholson's method coincides with the Burge-Geary method. Geary⁽⁸⁾ also cogently argued in favour of the formula

$$P = \frac{1}{2} (P_E + P_M)$$

(4) Attribution by A.L. Bowley in Studies in National Income 1924-38, 1944.

(5) 'Asset Revaluation', Economic Journal, June 1959.

(6) S. Fabricant : Notes on the Deflation of National Accounts.

(7) Introduction to Problems in the Deflation of National Accounts, Income and Wealth, Series IX.

(8) Ibid, P.5.

as the deflator of N. Following Fabricant the present author holds that for developing countries like India where M is invariably greater than E, the deflator of N should be the price index of imported capital goods, as the government imports are mostly constituted of capital goods and a considerable portion of private imports is meant for domestic capital formations.

7. One can rewrite the equation (1) as

$$\frac{E}{P_E} - \frac{M}{P_M} + T' = \frac{N}{P} \quad \dots\dots(2)$$

where P represents different price indexes appropriate for different methods of deflating N as mentioned in para 5. In Nicholson's method and Burge-Gear method for $M > E$, relation (2) can be reduced to

$$T' = E \cdot \left(\frac{1}{P_M} - \frac{1}{P_E} \right)$$

and in Burge-Gear method for $E > M$ to

$$T' = M \cdot \left(\frac{1}{P_M} - \frac{1}{P_E} \right)$$

8. The solution of the system in constant prices requires that C, I, E, M and N of the current price system should be directly deflated by the appropriate indexes for obtaining C', I', E', M' and N' respectively. The remaining four variables P', Y', T' and S' are obtained as residuals given the accounting identities.

as

9. So far the constant price estimates of national aggregates of India are concerned very little attention has been drawn to exports and imports. But the foregoing discussion indicates that exports, imports and trade balance play a significant role in the methodological discussion undertaken. We have, therefore, used in the external accounts at constant prices, all the methods of deflating N (except Burge-Gear method), which have been mentioned earlier.

10. For the deflation of expenditure on commodities and services (C) and gross domestic capital formation (I) we have split each of these components of the gross domestic product into two groups viz., (i) private and (ii) government. Although further refinements could be attempted, we have ignored them to simplify the methodological discussion. Obviously, the results have been crude to a large extent.

11. The price indexes which have been used for deflation are shown in Table 1.

Table 1: Price indexes used to deflate various components of the national accounts of India (1951-52 to 1954-55)

variables deflated (1)	deflators used (2)	1951-52 (3)	1952-53 (4)	1953-54 (5)	1954-55 (5)
1. Expenditure on commodities and services (C) :					
(i) private	Index of private consumption expenditure	100.0	92.4	91.6	83.1
(ii) government	Index of government consumption expenditure	100.0	100.0	102.4	102.6
2. Gross domestic capital formation (I) :					
(i) private sector	Price index of private capital formation	100.0	82.6	110.6	93.2
(ii) government sector	Price index of government capital formation	100.0	33.5	41.3	80.6
3. Exports, f.o.b. (E)	Price index of exports	100.0	70.4	64.8	69.1
4. Imports, c.i.f. (M)	Price index of imports	100.0	99.0	91.0	88.1
5. Trade balance (N) :					
(i) In Nicholson's method	Price index of imports	100.0	99.0	91.0	88.1
(ii) In Stuvell's method	Price index of gross domestic product	100.0	94.7	95.3	85.3
(iii) In Fabricant's method	Price index of gross domestic capital formation	100.0	76.1	101.4	91.6
(iv) In Geary's method	Arithmetic mean of price indexes of exports and imports	100.0	84.7	77.9	78.6
(v) In our method	Price index of imported capital goods	100.0	123.9	118.6	126.8

Note : Since $M > E$ in all the years covered, the Burge-Geary method requires no separate treatment. The results would be the same as in Nicholson's method.

The price indexes of private and government consumption expenditure, price indexes of exports and imports and price indexes of imported capital goods given in Table 1, have been computed on the basis of the indexes used by S.M. Kansal⁽⁹⁾ for the estimation of national income of India at 1948-49 prices. The price indexes of private and government capital formation have been computed from C. S. O.'s estimates of gross capital formation.⁽¹⁰⁾ For the price index of gross domestic product, we have used the ratio Y_i/Y_1 , where Y_i and Y_1 are the estimates of national income⁽¹¹⁾ at current and 1948-49 prices in the i th year. From these ratios we have computed the index with base year as 1951-52.

12. The national accounts at 1951-52 prices based on Geary's constant price system and using our method of deflating N have been presented in Statement II. The constant price estimates of trade balance of India for 1951-52 to 1954-55, deflated by different methods and the corresponding estimates of T' , which, for the period covered, may be better termed as external trading losses of India (since M has been consistently greater than E), have been given in Table 2.

13. Since a short-time horizon has been covered in our study, it is not possible to advance a satisfactory interpretation of the results obtained from our constant-price national accounts. For such interpretation a longer time horizon is required. Nevertheless, we may attempt to give some tentative interpretation of the results. It is revealed that the variables C' , I' , E' , M' , P' , Y' and S' show more or less an increasing trend over the years covered, whereas the corresponding variables in the current price accounts are more erratic. N and N' (both are negative in the present case) also show increasing trend, while T' gives us a better understanding of the real position in the foreign trade of India. The export-import situation has been showing a favourable trend over the years. It will be seen from Table 2 that this is true for all the methods used for deflating N . In this connection it should be mentioned that Geary set four algebraic conditions to be satisfied by the formula of trading gain :

(9) S.M. Kansal : On the deflation of the National Income in India by the final expenditure approach, papers on National Income and Allied topics, Vol. 1, Indian Conference on Research in National Income.

(10) C.S.O., Government of India : National Income Statistics, Estimates of Gross Capital Formation in India for 1948-49 to 1960-61, 1961.

(11) India, a reference annual, 1960. Ministry of Information and Broadcasting, Government of India, Ch. XVI.

Statement II
The National Accounts of India at 1951-52 prices* - 1951-52 to 1954-55

Expenditure					Receipt						
					(Rs. crores)						
	1951-52	1952-53	1953-54	1954-55		1951-52	1952-53	1953-54	1954-55		
1. Domestic Product Account											
Gross domestic product	(P')	11026	12422	13017	12885	Expenditure on commodities and services	(C')	10110	10499	11419	11368
						Gross domestic capital formation	(I')	1149	1707	1416	1436
						Exports f.o.b.	(E')	730	855	833	864
						Less Imports c.i.f.	(M')	- 963	- 639	- 651	- 783
P'	=	11026	12422	13017	12885	C' + I' + E' - M'	=	11026	12422	13017	12885
2. National Income Account											
National income	(Y')	11026	12181	12791	12731	Gross domestic product	(P')	11026	12422	13017	12885
						Trading loss	(T')	0	- 241	- 226	- 154
Y'	=	11026	12181	12791	12731	P' + T'	=	11026	12181	12791	12731
3. Consumers' Account											
Expenditure on commodities and services	(C')	10110	10499	11419	11368	National income	(Y')	11026	12181	12791	12731
Savings	(S')	916	1682	1372	1363						
C' + S'	=	11026	12181	12791	12731	Y'	=	11026	12181	12791	12731
4. Capital Account											
Gross domestic capital formation	(I')	1149	1707	1416	1436	Savings	(S')	916	1682	1372	1363
Trade balance	(N')	- 233	- 25	- 44	- 73						
I' + N'	=	916	1682	1372	1363	S'	=	916	1682	1372	1363
5. External Account											
Exports f.o.b.	(E')	730	855	833	864	Trade balance	(N')	- 233	- 25	- 44	- 73
Less Imports, c.i.f.	(M')	- 963	- 639	- 651	- 783						
Trading loss	(T')	0	- 241	- 226	- 154						
E' - M' + T'	=	- 233	- 25	- 44	- 73	N'	=	- 233	- 25	- 44	- 73

* The estimates are based on our method of deflating N.

Table 2: External trading losses of India, estimated by different methods
1951-52 to 1954-55

(Rs. crores)

Year	Ex-ports E	In-ports M	Trade balance E - M = N	E P _E	M P _M	Trade balance (N) deflated by					Trading loss (T') estimated by				
						Nichol-son's method	Stu-ral's method	Fabri-cant's method	Geary's method	Our method	Nichol-son's method	Stu-ral's method	Geary's method	Our method	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1951-52	730	963	-233	730	963	-233	-233	-233	-233	-233	0	0	0	0	0
1952-53	602	633	- 31	855	639	- 31	- 33	- 41	- 37	- 25	-247	- 249	-257	-253	-241
1953-54	540	592	-52	833	651	- 57	- 55	- 51	- 67	- 44	-239	-237	-233	-249	-226
1954-55	597	690	- 93	864	783	-106	-109	-102	-113	- 73	-187	-190	-183	-199	-154

(1) The trading gain should be nil when export and import price indexes are equal.

(2) In the two-country case (or one country and rest of the world) the sum of the trading gains should be nil.

(3) Two countries on amalgamation should have a trading gain with the rest of the world equal to the sum of the trading gain of each country. (This condition was advanced by A.L. Gaathon at the Fortoroz Conference of the International Association for Research in Income and Wealth in the year 1959).

(4) The surplus of exports over imports, if positive, should be regarded as part of exports or, if negative, part of imports.

14. Geary indicated that Burge-Geary method satisfies (1), (2) and (4) but not (3). Nicholson's method satisfied (1) and (3) but not (2) and (4). Geary's own method satisfies (1), (2) and (3) but not (4). Since Gaathon's condition is satisfied, Geary was emphatic about his method. In Fabricant's and our methods, neither export price index nor import price index is used for the deflation of N. Hence these two methods are not comparable with the other methods on the basis of Geary's conditions. However, it will be seen from Table 2 that the estimates of T' obtained from the different methods follow more or less a set pattern. Geary's method gives the upper limit (with one exception) and our method, the lower limit of the estimates of T'.

15. The effect of different methods of deflating N on some of the components of the national accounts of India at constant prices can be seen from Table 3. The first five components viz., C', I', E', M' and P' are independent of the methods of deflating N. But Y', T' and S' are dependent on N'. The estimates of N' by different methods and the corresponding estimates of T' have already been given in Table 2. These estimates are also presented in this table for ready reference. The effects of calculating N' by different methods on gross national income (Y') and gross savings (S') will be seen to be the reverse of the effects on T' i.e., Geary's method giving the lower limit (with one exception in each set of estimates) and our method, the upper limit.

Table 3: Estimates of various components of the national accounts of India at constant prices - 1951-52 to 1954-55.

(Rs. crores)

Sl. No.	Components of national accounts	1951-52	1952-53	1953-54	1954-55
1.	Expenditure on commodities and services (C')	10110	10499	11419	11368
2.	Gross domestic capital formation (I')	1149	1707	1416	1436
3.	Exports f.o.b. (E')	730	855	833	864
4.	Less Imports c.i.f. (M')	- 963	- 639	- 651	- 783
5.	Gross domestic product (1+2+3-4) (P')	11026	12422	13017	12885
6.	Trading loss : (T')				
	(i) From Nicholson's method of deflating N	0	- 247	- 239	- 187
	(ii) From Stuyel's method of deflating N	0	- 249	- 237	- 190
	(iii) From Fabricant's method of deflating N	0	- 257	- 233	- 183
	(iv) From Geary's method of deflating N	0	- 253	- 249	- 199
	(v) From Our method of deflating N	0	- 241	- 226	- 154
7.	Gross national income (Y')				
	(i) Involving Nicholson's method of deflating N $\sqrt{5+6(i)}$	11026	12175	12778	12698
	(ii) Involving Stuyel's method of deflating N $\sqrt{5+6(ii)}$	11026	12173	12780	12695
	(iii) Involving Fabricant's method of deflating N $\sqrt{5+6(iii)}$	11026	12165	12784	12702
	(iv) Involving Geary's method of deflating N $\sqrt{5+6(iv)}$	11026	12169	12768	12686
	(v) Involving Our method of deflating N $\sqrt{5+6(v)}$	11026	12181	12791	12731
8.	Trade balance (N')				
	(i) Nicholson's method	- 233	- 31	- 57	- 106
	(ii) Stuyel's method	- 233	- 33	- 55	- 109
	(iii) Fabricant's method	- 233	- 41	- 51	- 102
	(iv) Geary's method	- 233	- 37	- 67	- 118
	(v) Our method	-233	- 25	- 44	- 73
9.	Savings (S')				
	(i) Involving Nicholson's method $\sqrt{2+3(i)}$	916	1676	1359	1330
	(ii) Involving Stuyel's method $\sqrt{2+3(ii)}$	916	1674	1361	1327
	(iii) Involving Fabricant's method $\sqrt{2+3(iii)}$	916	1666	1365	1334
	(iv) Involving Geary's method $\sqrt{2+3(iv)}$	916	1670	1349	1318
	(v) Involving Our method $\sqrt{2+3(v)}$	916	1682	1372	1363

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AN ARTICULATED SYSTEM OF NATIONAL ACCOUNTS FOR INDIA AT
CONSTANT PRICES

Mahfooz Ahmed

The subject "deflation of national income and its components" is rather intriguing because it is here, due to inherent difficulties,¹ both theoretical and practical research is at a very fragmentary stage especially in the developing countries like India. In this country, for example, the method followed is first to deflate the gross value of output of different sectors, where physical output data are available, and then to estimate the required value added by applying the value-added-to-gross-output-ratio. In those sectors where output figures are not found the base year values are extrapolated by reference to certain indicators.² This may be compared with the 'double deflation method'³ under which both the gross output and inputs are separately deflated and the difference of the two forms the required value added at constant prices. Estimates on the basis of the former obviously run the risk of going quite off the mark on at least two accounts, viz., (a) constancy of the value-added-to-gross-output-ratio and (b) constancy of the relative prices of output and inputs.⁴ This is besides the inaccuracy arising due to changes in quality and product-mix.⁵ Though it is difficult to measure the discrepancy as a result of these assumptions, yet some doubts are created about the accuracy of the Indian estimates of national income at constant prices.

It would appear to be going too far in this state of affairs yet an attempt to deflate various components of national income under a unified or articulated accounting system would be worthwhile. Aside from being of great practical and analytical value such a system is measurable rather conveniently, because some items which conceptually cannot be deflated such as, national income, saving, profits etc., appear as residual entries. Further, the approach under such a system is basically the "expenditure approach", which is regarded by many as relatively more practical.⁶

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1. For an interesting discussion on the problems of deflation see Nicholson J.L., 'Some problems in the measurement of real income', Income and Wealth Series, IV, pp. 45-66.
 2. The Final Report of the National Income Committee, Appendix I, pp. 42-4.
 3. Also called the Geary Method; first presented in 'The concept of net volume of output with special reference to Irish Data', Journal of the Royal Statistical Society, 1944.
 4. David P.A., 'The deflation of value added', Review of Economics and Statistics, Vol. XLIV, May 1962.
 5. Kuznets S., 'Long term changes in the national income of the U.S.A. since 1870', Income and Wealth Series, II, pp. 44-47.
 6. David, op. cit., pp. 154-5; Nicholson op. cit., pp. 157-9; Derksen J. B.D., 'Intertemporal comparisons of real national income..', Income and Wealth Series, I, p. 260.

Though there are more than one ways in which this system in constant prices can be worked out, we have followed the lines adopted by Burge and Geary,⁸ Their method is based primarily on the generally accepted concepts of national income.⁹ On the aggregate level various components in their system are fairly conveniently measurable.

The articulated system at constant prices would naturally be different from that at current prices especially when it is for an open economy. In fact, the major hitch in deflation within an accounting framework has been due to the problems associated with the deflation of entries in the external transactions account. Most workers in the field, for instance, reject the possibility of deflating the negative surplus of the nation at current account.¹⁰

However, the five accounts governing the present estimates are: (i) domestic product account, (ii) national income account, (iii) capital formation account, (iv) consumption account and (v) external transactions account. All these accounts are based on the international conventions and definitions for national accounts at current prices. The structure of these accounts are based on the following relationships:

$$\begin{aligned}
 O + t - s &= C + I + E - M \dots\dots\dots(1) \\
 W + H + P - r &= O + f - T \dots\dots\dots(2) \\
 I + N &= S \dots\dots\dots(3) \\
 C + S &= W + H + P + t - s - r \dots\dots\dots(4) \\
 E + f + T &= M + N \dots\dots\dots(5)
 \end{aligned}$$

Where O stands for net domestic product at factor cost, t for indirect taxes and fees, s for subsidies, C for private consumption, I for net domestic capital formation, E for exports of goods and services, M for imports of goods and services, W for compensation of employees (wages and salaries), H for income from self employment, P for income from business and property, r measures the transfer effect of indirect taxes and subsidies, f stands for net factor income from abroad, T for trading gain or loss, N for the surplus of the nation at current account and S for net saving.

It may be noted that each of the symbols appears twice and hence the system is articulated. The relationship between the systems at current and constant prices is very close, for all but two balancing entries — trading gain and transfer effect of indirect taxes and subsidies — appear in the former. Among the similar items in the two accounts the relationship is through the price index. Thus, for instance, consumption at constant prices, C_c is equal to $\frac{C_c}{P_c}$, where C_c is consumption at current prices and P_c the appropriate price index.

7. Flexner W.W., 'An analysis of the nature of aggregates at constant prices', Review of Eco. & Stat., Vol. XLI, Nov. 1959; Stuvell G., 'Asset revaluation', Economic Journal, 1959.

8. Burge R.W., 'Deflation within an accounting framework'; and Geary R.C. 'Introduction', and 'Productivity aspects of accounts deflation', Income and Wealth Series, IX.

9. Geary, op. cit., p. 3.

10. ibid, pp. 17 and 45.

For detailed explanation of the properties of each item and its conceptual validity vis-a-vis the articulated system reference may be made to the works of Burge and Geary.¹¹ The balancing entries in the deflated accounts are taken to measure the changes in the relative prices which lead to a transfer of real income between sectors.¹² In the present instance only two such items are taken though many other transfer entries may be included with a view to improving the ultimate outcome.

Of these five accounts only four are to be used, for any one of them is redundant. Among the variables C, I, W, H, E, and M have their usual meaning and would have to be deflated in a certain given way. P and S cannot be conceptually deflated and hence are taken as balancing or residual items. The deflation of t and s though very much labour consuming, yet is subject to suitable measurement. The deflation of remaining items presents real difficulties. But here also workable methods can be devised to appropriately deflate them as has been suggested by many workers. The remaining items are N, f, T and r.

Accounts for India

Because deflation within an accounting framework is fraught with numerous problems and assumptions the present attempt is in the form of an exercise where estimates of some of the components are of a very approximate character. The exercise is limited to the period 1955-6 to 1960-1, which incidentally is also the II Plan period. The accounts are drawn at 1960-1 prices.

As a first step we have compiled the five accounts at current prices. These are based on the national income data available from the 'Estimates of National Income, 1943-9 to 1962-3', of the Central Statistical Organisation (hereafter called the white paper) and other sources. Thus, all items on the left-hand side of the domestic product account are available from the white paper. Similarly, data on general government consumption, exports and imports are available from the above mentioned paper. The net capital formation figures separately for construction, machinery and equipment and stocks are taken from a paper by Tiwari, Baldev Kumar and Jagdish Kumar.¹³ These estimates are an improvement over those available from the C.S.O.¹⁴ Further, these estimates are latest and the method followed is in line with that of the earlier estimates by the C.S.O. As no independent estimates of private consumption are available this item is taken as a residual entry. Though treating private consumption as a residual item is an incorrect procedure because all other items including the net domestic product at factor cost are calculated on similar considerations. Moreover, the residual figures compare with other estimates made independently.¹⁵

11. Burge and Geary, op. cit., pp. 3-45; see also 'A system of price and quantity indexes for national accounts', U.N. 1957.

12. Burge, op. cit., p. 18.

13. 'Estimates of Capital formation in India, 1950-1 to 1960-1', presented at the Fourth Conference on Research in National Income, 1963.

14. 'Estimates of Capital Formation, 1948-9 to 1960-1', 1962.

15. Dhar S.P., 'Private consumption expenditure in India, 1955-6 to 1960-1', Fourth Conference on Research in National Income, 1963; see also Reserve Bank of India Bulletin, September 1962.

AN ARTICULATED SYSTEM OF NATIONAL ACCOUNTS FOR INDIA

For the national income series, the estimates are those from the white paper. No CONSTANT PRICES estimates of the distributive income shares are available from official sources. Such estimates for a relatively long period, i.e., from 1948-49 to 1957-58, are available from a paper by Narayanan and Bina Roy.¹⁵ Manopz have used the percentage shares of the wage and salary earners, self-employed persons and entrepreneurs and property holders. work out later in combined income and its components is rather intriguing because due to inherent difficulties, both the required percentage shares for 1950-51 are extrapolated. Theoretical and practical research is at a very fragmentary stage especially in the developing countries like India. In this country, for example, the method followed is first to deflate the gross value of output of different sectors, where physical output data are available, and then to estimate the again those from the white paper. The total of the value added to gross output as net saving on the right. Similarly, the consumption account is also repeated from the earlier white accounts. Finally, the base year values in the external transactions account are also obtained from the white paper without any adjustment. All accounts containing these figures for gross output and to 1950-51 are presented in Tables IV to VI at the end of the paper, forms the required value added at constant prices. Estimates on the basis of the former obviously run the risk of going quite off the mark on at least two points, viz., (a) constancy of the value-added-to-gross-output-ratio and (b) constancy of the relative prices of output and inputs. This is besides the inaccuracy arising due to changes in quality and product-mix.⁵ Though it is difficult to measure the discrepancy as a result of these assumptions, yet some doubt is created about the accuracy of the Indian domestic product is computed at a special entry covering the Indian estimates of national income at constant prices, including the final expenditure items, indirect taxes and subsidies.

It would appear to be going too far in this state of affairs yet an attempt to deflate the components of national income under a unified or articulated accounting system would be worthwhile. The side-fracturing of great practical and analytical value such a system is desirable rather on the basis of separate volume indices for commodities which are conceptually convertible as national income saving, profits of the gross as in the industries. Further, the approach under such a system is beset with the expenditure deflated. The remaining of the indirect taxes (goods besides the expenditure total) are then deflated by applying the implicit price deflator for private consumption.

1. For an interesting discussion on the problem of price index for private consumption, see the problems in the 'Measuring of real income', Income and Wealth Series, IV, pp. 55-66.

2. The Final Report of the National Income Committee, Annex D, For deflating private consumption separate indices are obtained for commodities and services consumed. The index for the former is based on the wholesale price indices of consumer goods, combined by using weights (per capita expenditure) from the U.S. 1947-48. The price index of net services is obtained from the white paper by dividing the real G.D.P. of net services by the price figures for all other services. The two indices are then combined by using the proportion of each in the total expenditure in 1960-1 as weights. ⁵ David, op. cit. pp. 15-5. Nechelson, op. cit. pp. 157-196. Darsen J. B.D., 'Intertemporal comparisons of real national income..', Income and Wealth Series, I, p. 260.

- 16. The Manopz of distributive shares in India, 1948-9 to 1957-8. Third Conference Research, Income and Wealth Series, 1961.
- 17. By drawing free-hand curves on a double log. paper.
- 18. All figures are taken from the Monthly Bulletin of Statistics, 1962.
- 19. Dhar and Aggarwal, op. cit.

General government expenditure is split into (a) wages and salaries payment and (b) expenditure on goods and services. The wages and salaries component is taken to be 57 per cent of the total.²⁰ To get the estimates at constant prices the figure for 1960-1 is extrapolated by reference to the index of government employees. The other component is deflated by the Economic Adviser's wholesale price index (general).

Net capital formation is divided into (i) construction (ii) machinery and equipment and (iii) stocks. The first is deflated by a combined whole sale price index for cement, iron and steel, logs and timber, bricks and tiles, sand and the index number of wage rate for rural skilled workers, after appropriately weighting them. This is done for the urban residential and non-residential buildings and government construction. For rural construction again the combined wholesale price index for logs and timber, bricks and tiles and index of wages of rural skilled workers has been used. For deflating the machinery and equipment component the wholesale price index for machinery and transport equipment is used. Similarly, wholesale price indices are used to deflate stocks, in particular, the stocks of foodgrains, livestock, coal, iron ore, factory establishments etc. In all cases, price indices used are those of the Economic Adviser's. The estimates of capital formation both at current and constant prices are, however, available from the paper by Tiwari and others.²¹

Exports and imports are deflated by the official export and import price (unit value) index respectively.

Compensation of employees (income from wages and salaries) has been deflated on the basis of the all-India consumer price index (working class). The deflated figure includes the employee increment which can be obtained by first deflating the compensation of employees by the monthly wage and salary index and subtracting it from the figure arrived on the basis of consumer price index. The productivity increment or deflation defect²² also is included in the net domestic product at factory cost and can be separated. No attempt is, however, made to estimate the employee increment or the productivity increment because they do not effect the accounting framework.

The general wholesale price index (Economic Adviser's) has been used to deflate the income from self employment. This is done because a major part of this income originates in agriculture. The alternative would have been to extrapolate the base year figures by suitable volume indices. This procedure is better than the former but is less practical especially in case of such activities as trade, commerce, etc.

Income from business and property is treated as residual entry partly because there apparently is no correct way to deflate this item.

On the deflation of net factor income from abroad and surplus at current account there is least agreement.²⁴ We have followed the Burge and Geary line and have deflated the two with the help of import or export

20. Report of the Working Group on Flow-of-Funds, 1963 - p.37

21. Op. cit.

22. Geary, op. cit., pp. 31-35.

23. Flexner, op. cit., pp. 400-402.

24. Op. cit., p. 17, fn. p. 18 and p. 36.

price index as the case may be.²⁵ As there had been import surplus in all the years under consideration in this country, the second item is deflated on the basis of the official import price index. Similarly, as the factor income receipts were used to finance import surplus they are also deflated by the import price index.

Net saving is not subject conceptually to deflation and hence is taken as the residual entry.

The two balancing items viz., trading gain and transfer effect of indirect taxes and subsidies may now be considered. Trading gain is defined as the real gain or loss resulting from changes in the terms of trade since the base year. It measures the change in the distribution between countries of the total gain resulting from international specialisation in production. The measurement of trading gain again has been subject of considerable discussion. Various view points have been forwarded as to the type of price index to be used for its deflation and its suitability with reference to the concept.²⁶ In the present case because there has been import surplus throughout, the Geary formula used to deflate trading gain²⁷ meets some of the interesting objections²⁸ against its measurement.

The transfer effect on the other hand, represents the difference between the deflated figure of indirect taxes and subsidies by the method indicated in the earlier paragraphs and the one computed on the basis of implicit price index²⁹ relating to the general government expenditure.

All remaining entries in other accounts are similar to those mentioned above.

It may be noted that various price indices used in this work are obtained as far as possible with the base year 1960-1. Yet in some cases the original base was different and in all such cases it is converted into the desired base by simple arithmetical process without necessary adjustments for changes in the implicit weights of each index number. Such cases where the original base was very far are few.³⁰

25. Nicholson suggests import price index irrespective of the positive or negative value of the surplus; Stuvell (op. cit.) recommends the implicit gross domestic product price index. Fabricant S., in Notes on the deflation of national accounts', suggests the use of the capital formation price index.

26. Geary, op. cit., pp. 7-8 and Burge, op. cit., 17-18, see also Stuvell, 'A new approach to the measurement of terms of trade effects', Review of Economics and Statistics, Vol. XXXVIII, August 1956.

27. The formula is ; export $(\frac{I}{P_M} - \frac{I}{P_E})$, where P_M and P_E are the import and export price indices respectively.

28. Geary, op. cit., pp. 7-8.

29. For further explanation see Burge, op. cit., pp. 18 and 23.

30. Notable examples are the consumer price index with base year 1950-1 and the wholesale price index with base year 1952-3.

Most of the price indices used for the present study are given in table B-1 with notes regarding the original base and method of conversion if otherwise than stated above.

The results of the estimation are presented in table A-1 to A-5. It may be noted that the net domestic product and the national income have increased by 18 per cent during the II Plan. This is comparatively lower than the official figure. The capital formation has shown irregular growth mainly due to the instability of stocks and the unfavourable balance on current account. The level of net domestic capital formation, however, is considerably higher. Private consumption has also increased by about 18 per cent. As for the changes in the real income distribution, income share of the business and property holders has increased very rapidly by about 90 per cent, while the increase in the income share of employees has only been 12.5 per cent. The increase in indirect taxes was though lower (16 per cent), yet the rate of change was generally greater than the wage rate and other prices paid by the government. On the foreign trade front, imports were generally higher than the real exports. Real exports were also relatively lower in the closing years as compared to those in the earlier years of the II Plan. Moreover, export-import prices were generally unfavourable except during 1957-58.

In conclusion, it may be pointed out that these accounting tables among themselves contain a full and integrated picture of the economy and various income and expenditure flows during 1955-6 to 1960-1. Further, they throw light on questions of domestic productivity, changes in private consumption, wage adjustments, capital formation in fixed assets and stocks and external trading conditions. These, in turn, indicate the immense analytical properties of the articulated system and its possible uses in economic forecasting especially in the short run. However, the analysis of these results is intended to be presented elsewhere³¹ and is not included here.

31. A separate note entitled, 'The real economic growth in India during the II Plan', based on the present estimation is also submitted.

Table A-1

Net Domestic Product at 1960-61 Prices

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
1.1 net domestic product at factor cost	12069	12302	12102	12983	13255	14190
1.2 indirect taxes & fees	1070	1080	1087	1144	1160	1245
1.3 subsidies	-57	-54	-58	-59	-60	-64
net domestic product at market prices	13082	13328	13131	14068	14355	15371
1.4 private consumption	10957	10927	11461	11854	12015	12918
1.5 general government expenditure	932	980	1051	1098	1124	1140
1.6 net domestic capital formation						
i) construction	607	702	703	618	715	773
ii) machinery & equipment	388	502	535	413	476	588
iii) stocks	190	553	68	399	244	369
1.7 exports of goods & services	863	826	848	789	835	787
1.8 imports of goods & services	-855	-1162	-1535	-1103	-1054	-1204
expenditure on domestic product at market prices	13082	13328	13131	14068	14355	15371

Table A-2

National Income at 1960-61 Prices

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
2.1 compensation of employees	3942	3847	3866	4066	4059	4435
2.2 income from self employment	6263	6340	5949	6213	6013	5999
2.3 income from business & property	1996	2216	2485	2723	3164	3781
2.4 trafer effect of indirect taxes and subsidies	-127	-75	-15	-31	+ 44	-
net national income	12074	12328	12285	12971	13280	14215
2.5 net domestic product at factor cost	12069	12302	12102	12983	13255	14190
2.6 net factor income from abroad	85	96	86	57	46	25
2.7 trading gain	-80	-70	+97	-69	-21	-
net national product at factor cost	12074	12328	12285	12971	13280	14215

Table A-3

Capital Formation at 1960-61 Prices

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
3.1 net domestic capital formation	1185	1757	1306	1430	1435	1730
3.2 surplus at current account	+ 13	-310	-504	-326	-194	-392
net capital formation	1198	1447	802	1104	1241	1338
3.3 net saving	1198	1447	802	1104	1241	1338

Table A-4

Consumption at 1960-61 Prices

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
4.1 private consumption	10957	10927	11461	11854	12015	12918
4.2 general government expenditure	932	980	1051	1098	1124	1140
4.3 net saving	1198	1447	802	1104	1241	1338
national expenditure at market prices	13087	13354	13314	14056	14380	15396
4.4 compensation of employees	3942	3847	3866	4066	4059	4435
4.5 income from self employment	6263	6340	5949	6213	6013	5999
4.6 income from business & property	1996	2216	2485	2723	3164	3781
4.7 indirect taxes	1070	1080	1087	1144	1160	1245
4.8 subsidies	-57	-54	-58	-59	-60	-64
4.9 transfer effect of indirect taxes and subsidies	-127	-75	-15	+31	+44	-
net national product	13087	13354	13314	14056	14380	15396

Table A-5

External Transactions at 1960-61 Prices

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
5.1 exports of goods & services	863	826	848	789	835	787
5.2 net factor income from abroad	85	96	86	57	46	25
5.3 trading gain	-80	-70	+97	-69	-21	-
receipts from abroad	868	852	1031	777	860	812
5.4 imports of goods & services	855	1162	1535	1103	1054	1204
5.5 surplus at current account	+13	-310	-504	-326	-194	-392
disposal of receipts from abroad	868	852	1031	777	860	812

Table B-1

Price/Volume indices used for deflation

year	(percentages)						
	a general wholesale price index	b consumer price index	c price index for consumer goods	d government employees index	e cons- truction	f price index for machinery & equipment	g stocks
1955-56	74.0	77.6	82.3	85.3	84.7	88.0	74.2
1956-57	84.3	86.5	93.0	88.8	87.0	88.6	84.6
1957-58	86.8	90.5	93.2	91.6	91.0	91.4	85.3
1958-59	90.4	95.4	98.0	96.4	94.5	93.2	94.8
1959-60	93.8	99.1	98.6	99.5	95.7	95.6	95.5
1960-61	100	100	100	100	100	100	100

Indices continued

year	Table B-1						
	f export price index	g import price index	h export volume index	i import volume index	j price index for go- vernment expendi- ture	k price index for indirect taxes	
1955-56	87.7	96.7	103.9	79.6	77.2	65.5	
1956-57	92.2	100.8	100.0	90.7	80.6	73.7	
1957-58	94.7	85.0	101.8	139.8	87.5	86.2	
1958-59	91.3	100.0	100.5	94.9	90.2	87.4	
1959-60	93.3	95.9	103.9	101.1	92.5	96.0	
1960-61	100	100	100	100	100	100	

- Notes:- a. Economic Adviser's, base year 1952-3.
 b. Base year 1950-1, taken from 'Studies on the distribution of income and levels of living, C.S.O. p.V-10.
 c. 1957-8 weights are used (vide paper by Dhar and others).
 d. Index of total employees with the base 1960-1.
 e. Base year is 1960-1 (vide paper by Tiwari and others).
 f. Original base year is 1958, official index, revised series.

Table C-1

Summary of item-wise Deflation Procedure

item	procedure
1.1 net domestic product	residual entry
1.2 indirect taxes	customs duties by export and import volume indices; excise duties by volume indices of products liable to tax; and the rest by the implicit price index for general private consumption.
1.3 subsidies	implicit price index for private consumption.
1.4 private consumption	Combined index for commodities and services consumed (vide paper by Dhar and others).
1.5 general government expenditure.	wage and salaries component extrapolated by the index of general government employees and the rest by the general wholesale price index.
1.6 capital formation	by the appropriate wholesale price indices for construction, machinery and equipment and stocks separately (vide paper by Tiwari and others).
1.7 exports of goods & services	by ^{the} official price (unit) index of exports.
1.8 imports of goods & services	by the official price (unit) index of imports.
2.1 compensation of employees	by All-India consumer price index.
2.2 income from self employment	by the general wholesale price index (All India).
2.3 income from business & property	residual entry.
2.4 transfer effect of indirect taxes and subsidies	estimated as difference between figures deflated by that under 1.2 above and by implicit price index for general government consumption.
2.6 net factor income from abroad	by the official import price (unit) index.
2.7 trading gain	estimated by using import and export price indices as per formula $\text{export} \left(\frac{I}{P_M} \right) - \left(\frac{I}{P_E} \right)$; where P_M and P_E are the import and export price indices respectively.
3.7 surplus at current account	by export price index for 1955-6 and import price index for 1956-7 to 1960-1.
3.3 net saving	residual entry.

In accounts 4 and 5 the above mentioned items appear again and hence the deflation procedure is also the same.

Table D-11. Net Domestic Product
(at current prices)

item	(rupees crores)					
	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
1.1. net domestic product at factor cost	9980	11300	11400	12620	12970	14190
1.2 indirect taxes & fees less	701	796	937	1000	1113	1245
1.3 /subsidies	- 17	- 29	- 50	- 49	- 55	- 64
net domestic product at market prices	10664	12067	12287	13571	14028	15371
1.4 private consumption	9018	10162	10682	11617	11847	12918
1.5 general government expenditure	720	790	920	990	1040	1140
1.6 net capital formation						
i) construction	514	611	640	584	684	773
ii) machinery & equipment	341	445	489	385	455	588
iii) stocks	141	468	58	378	233	369
1.7 exports of goods & services	757	762	803	720	779	787
1.8 imports of goods & services	- 827	-1171	-1305	-1103	-1010	-1204
expenditure on net domestic product at market prices	10664	12067	12287	13571	14028	15371

Table D-2

2. National Income
(at current prices)

		(rupees crores)					
item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1	
2.1 compensation of employees	3059	3328	3499	3879	4022	4435	
2.2 income from self-employment	4638	5345	5163	5616	5635	5999	
2.3 income from business & property	2365	2724	2811	3182	5358	3781	
net national income	10062	11397	11473	12677	13015	14215	
2.4 net domestic product at factor cost	9980	11300	11400	12620	12970	14290	
2.5 net factor income from abroad							
i) investment income	00	09	- 05	- 20	- 33	- 48	
ii) donations	82	88	78	77	78	73	
net national income at factor cost	10062	11397	11473	12677	13015	14215	

Table D-3

3. Capital Formation
(at current prices)

		(rupees crores)					
item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1	
3.1 net domestic capital formation							
i) construction	514	611	640	584	684	773	
ii) machinery & equipment	41	445	489	385	455	588	
iii) stocks	141	458	58	378	233	369	
3.2 surplus on current account	12	-312	-429	-326	-186	-392	
net capital formation	1008	1212	758	1021	1186	1338	
net saving	1008	1212	758	1021	1186	1338	

Table D-4

4. Private Consumption
(at current prices)

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
4.1 private consumption	9018	10162	10682	11617	11847	12918
4.2 general government expenditure	720	790	920	990	1040	1140
4.3 net saving	1008	1212	758	1021	1186	1338
net national expenditure at market prices	10746	12164	12360	13628	14073	15396
4.4 compensation to employees	3059	3328	3499	3879	4022	4435
4.5 income from self employment	4638	5345	5163	5616	5635	5999
4.6 income from business & property	2365	2724	2811	3182	3558	3781
4.7 indirect taxes & fees	701	796	937	1000	1113	1245
4.8 subsidies	- 17	- 29	- 50	- 49	- 55	- 64
net national product	10746	12164	12360	13628	14073	15396

Table D-5

5. External Transactions
(at current prices)

(rupees crores)

item	1955-6	1956-7	1957-8	1958-9	1959-60	1960-1
5.1 exports of goods & services	757	762	803	720	779	787
5.2 net factor income from abroad	82	97	73	57	45	25
receipts from abroad	839	859	876	777	824	812
5.3 imports of goods & services	827	1171	1305	1103	1010	1204
5.4 surplus at current account	12	-312	-429	-326	-186	-392
disposal of current receipt from abroad	839	859	876	777	824	812

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**INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH**

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**A NEW APPROACH TO THE PROBLEM
OF DEFLATING NATIONAL INCOME**

S. SUBRAMANIAN & G. D. MATHUR

AHMEDABAD

9 - 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

A NEW APPROACH TO THE PROBLEM OF DEFLATING NATIONAL INCOME

S. Subramanian and G. D. Mathur

The importance of obtaining national income and related aggregates at constant prices from the view point of economic analysis, forecasting and economic planning can hardly be exaggerated. As this is a very vast field, the purpose of the present paper is only to touch upon one important aspect, namely, the determination of the net domestic product at factor cost (by industrial origin) for commodity producing sectors at constant prices.

The methods at present in vogue depend on the availability of statistical data. In the single indicator method, either the net value added is carried forward by an index of industrial production or the current net value added is deflated by a price index. In both these cases, the assumption is that the input-output ratios remain constant over the given period of time. The method of preparation of quantity indexes implies an assumption of homogeneity in the component products of a class or comparable movements in all component products, which assumption may not always be valid. In deflating by price indexes it is assumed that prices of component products move more alike than their quantities. According to the double indicator method, both the input and output of each industry in any year are estimated at base year prices and the difference gives the required estimate of net output. In practice, nevertheless, it is difficult to obtain correctly the inputs at base year prices for each industry.

It is suggested, therefore, that for each industry net value added at current prices may be deflated by the unit net value added (net value added per unit of gross physical product) and then the results summed up over all industries. This method is likely to provide a better estimate and more detailed information than either bringing forward the base period net value added by means of an index of production or by deflating the current net value added by an index of prices. Some examples to illustrate the procedure suggested are given in the Appendix.

We are thankful to Shri Sumer Chand for making the calculations shown in the Appendix.

APPENDIX

Let V_0, Q_0 be the net value added and the total quantity of production for an industry in the base year (say 1955).

Then $\frac{V_0}{Q_0} = P_0$ = value added per unit of physical output.

Similarly let V, Q be the net value added and the total quantity of production for the same industry in the current year (say 1958).

Then $\frac{V_n}{Q_n} = P_n$

According to this method the value added during the current period at base year unit-value added per unit of output is given by $(\frac{V_n}{P_n} \times P_0)$.

(1) Jute Textiles

Total value added during 1955: Rs.370.09 million

Total production of jute manufactures during 1955: 1.029722 million tons

$\frac{\text{Value added}}{\text{Total production}} = \frac{370.09}{1.029722} = \text{Rs.}359.41 \text{ per ton}$

Total value added in 1958 : Rs.413.86 million

Total production in 1958 : 1.042139 million tons

$\frac{\text{Value added}}{\text{Total quantity of production}} = \frac{413.86}{1.042139} = \text{Rs.}397.13 \text{ per ton}$

Value added during 1958 at 1955 prices:

$\frac{413.86}{397.13} \times 359.41 = \text{Rs.}374.55 \text{ million}$

(2) Matches:

Total value added during 1955: Rs.31.97 million.

Total production of matches: 27.25 million gross.

$\frac{\text{Value added}}{\text{Production(total)}} = \frac{31.97}{27.25} = \text{Rs.}1.17 \text{ per gross.}$

Value added during 1958 : Rs.47.36 million

Total production of matches: 28.47 million gross

$\frac{\text{Value added}}{\text{Total Production}} = \frac{47.36}{28.47} = \text{Rs.}1.66 \text{ per gross.}$

Value added during 1958 at 1955 prices :

$$\frac{47.36}{1.66} \times 1.17 = \underline{\underline{\text{Rs.33.38 million}}}$$

(3) Electric Fans

Total value added during 1955 = Rs.13.87 million

Total Quantity of Production : 169904 Nos.

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{13.87}{169904} = \text{Rs.81.63 per fan}$$

Total value added during 1958 : Rs.14.28 million

Total Quantity of Production : 325236 Nos.

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{14.28}{325236} = \text{Rs.43.91 per fan}$$

Value added during 1958 at 1955 prices:

$$\frac{14.28}{43.91} \times 81.63 = \underline{\underline{\text{Rs.26.25 million}}}$$

(4) Sewing Machines

Total value added during 1955: Rs.13.43 million

Total Quantity of Production: 112633 Nos.

$$\frac{\text{Value added}}{\text{Total quantity of Production}} = \frac{13.43}{112633} = \text{Rs.119.24 per machine}$$

Total value added during 1958: Rs.29.25 million

Total Quantity of Production : 217921 Nos.

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{29.25}{217921} = \text{Rs.134.22 per machine}$$

Value added during 1958 at 1955 prices:

$$\frac{29.25 \times 119.24}{134.22} = \underline{\underline{\text{Rs.25.99 million}}}$$

(5) Sugar

Total value added during 1955: Rs.292.2 million

Total Production during 1955: 1.72 million tons

$\frac{\text{Value added}}{\text{Total Production}} = \frac{292.2}{1.72} = \text{Rs. } 169.33 \text{ per ton}$
Total value added during 1958: Rs.361.5 million
Total Production : 1.70 million tons
 $\frac{\text{Value added}}{\text{Total Production}} = \frac{361.5}{1.70} = \text{Rs. } 212.65 \text{ per ton}$
Value added during 1958 at 1955 prices:
 $361.5 \times \frac{169.88}{212.65} = \underline{\underline{\text{Rs. } 288.69}} \text{ million}$

(6) Soap

Total value added during 1955: Rs.49.5 million
Total quantity of Production: 85411 tons
 $\frac{\text{Total Value added}}{\text{Total Production}} = \frac{49.5}{85411} = \text{Rs. } 579.55 \text{ per ton}$
Total value added during 1958: Rs.76.2 million
Total Quantity of Production: 101682 tons
 $\frac{\text{Value added}}{\text{Total Production}} = \frac{76.2}{101682} = \text{Rs. } 749.40 \text{ per ton}$
Value added during 1958 at 1955 prices:
 $\frac{76.2}{749.40} \times 579.55 = \underline{\underline{\text{Rs. } 58.93}} \text{ million}$

(7) Bicycles

Total value added during 1955: Rs.30.9 million
Total Quantity of Production : 0.50 million Nos.
 $\frac{\text{Value added}}{\text{Total Production}} = \frac{30.9}{0.50} = \text{Rs. } 61.8 \text{ per bicycle}$
Total value added during 1958: Rs.39.3 million
Total Quantity of Production: 0.70 million Nos.
 $\frac{\text{Value added}}{\text{Quantity of Production}} = \frac{39.3}{0.70} = \text{Rs. } 56.14 \text{ per bicycle}$
Value added during 1958 at 1955 prices
 $\frac{39.3 \times 61.8}{56.14} = \underline{\underline{\text{Rs. } 43.26}} \text{ million}$

(8) Vegetable Oils (excluding edible Hydrogenated oils)

Total value added during 1955: Rs.56.82 million

Total Quantity of Production : 0.77 million tons
(Refined and unrefined)

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{56.82}{0.77} = \text{Rs.73.79 per ton}$$

Value added during 1958 : Rs.69.31 million

Total Quantity of Production: 0.50 million tons

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{69.31}{0.50} = \text{Rs.138.62 per ton}$$

Value added during 1958 at 1955 prices:

$$\frac{69.31}{138.62} \times 73.79 = \underline{\underline{\text{Rs.30.90 million}}}$$

(9) Cotton Textiles

Total value added during 1955: Rs.1625.66 million

Total Production of cotton cloth: 4692.14 million yards

$$\frac{\text{Total value added}}{\text{Total Production}} = \frac{1625.66}{4692.14} = \text{Rs.0.3465 per yard}$$

Total value added during 1958: Rs.1353.40 million

Total Production of cotton cloth: 3845.98 million yards

$$\frac{\text{Total value added}}{\text{Total Production}} = \text{Rs.0.3519 per yard}$$

Value added during 1958 at 1955 prices:

$$\frac{1353.40}{0.3519} \times 0.3465 = \underline{\underline{\text{Rs.1332.35 million}}}$$

(10) Edible Hydrogenated Oils

Total value added during 1955: Rs.45.77 million

Total quantity of production: 237,307 tons

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{45.77}{237,307} = \text{Rs.192.87 per ton}$$

Total value added during 1958: Rs.49.95 million

Total Quantity of Output : 243,612 tons

$$\frac{\text{Value added}}{\text{Total Production}} = \frac{49.95}{243,612} = \text{Rs.200.92 per ton}$$

Value added during 1958 at 1955 prices: $\frac{49.95}{200.92} \times 192.87 = \underline{\underline{\text{Rs.47.95 million}}}$

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**INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH**

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**CERTAIN THOUGHTS ON THE DEFLATION OF
NATIONAL PRODUCT IN INDIA**

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AHMEDABAD

9—11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily
of the Organisations or Institutions to which they belong.

CERTAIN THOUGHTS ON THE DEFLATION OF NATIONAL PRODUCT IN INDIA

M. Mukherjee and Bina Roy

1. According to Indian official national income statistics, the rate of growth of net national product in real terms was 3.7 per cent per year during the period 1950-51 to 1960-61, and the rate of growth of per capita national income was 1.7 per cent per year over the same period. The object of this brief paper is to assess these findings and to study whether there is any overestimation or underestimation involved in these and results published in official sources.

2. Before we tackle the problem, it is necessary to consider three general points. First, we do not propose to probe deeply into the official procedure of estimation of real product year after year. The procedure is admittedly defective, partly because of lack of suitable data. But a defective procedure applied to sectoral estimation can give a reasonably accurate global result since errors associated with sectoral estimates may have a balancing effect on the aggregate. Our reference to the sectoral estimation procedure will be only incidental, and we will be mainly concerned with the end result: the overall national income deflator, and the movement of the national product as a whole. From this, it follows that our judgement in the matter has to be based, at least partly, on certain bodies of external evidence. Second, our attention will be principally focussed on the movement of real national product as an independent finding. The same rate of growth of real product can be obtained from a series of national income estimates at current prices showing a rapidly rising trend and a sharply rising deflator series, and an income series in current prices showing a moderately rising trend coupled with a moderately rising deflator series. We do not propose to consider here the problem of the accuracy of the estimate of the rate of growth of income at current prices, and will be satisfied even if we feel that the rate of growth of national product at current prices and the implicit deflator are both faulty but the ultimate outcome of the deflation procedure, the rate of growth of national product in real terms, gives a dimensionally reasonable picture. Finally, while our interest lies both on the rate of growth of national product and the rate of growth of per capita product, our study of the rate of growth of population will be a cursory one.

3. We may note in the beginning that the official rate of growth of national product in real terms during the post independence period is unprecedented in the Indian economic history. There has not been a single decade in past hundred years in which national product grew at such a high rate. Such a claim, however, cannot be made in respect of per capita real product because it is probably not impossible to find a decade in the first quarter of the 20th century during which per capita product improved at a comparable rate. Next, international comparison indicates that the Indian post independence rate of growth of both national product and per capita national product in real terms fall short of the post

World War II performance of most of the important nations. The Indian post independence rate also falls short of the long period rates of growth of several nations in which national product in real terms has grown fairly rapidly and is dimensionally similar to or more than long period rates of growth of a number of advanced countries. But long period rates of advanced countries comprehending vagaries of business cycles and effects of World Wars are not comparable with Indian post independence performance. To sum up, Indian post independence rate of growth does not appear to be spectacularly large against India's past performance, and should probably be regarded as low against general international performance during the Post World War II period. The above evidence is probably not important in our quest, but it at least suggests that the claims made in our official data are decidedly modest. A good deal of deliberate effort has been put in during the post independence period for the improvement of the rate of growth of the national product, and one would not have been surprised had the rate of growth been considerably higher.

4. For the commodity producing sectors, the deflated series in India are generally obtained by the application of the base period cost ratio on the values of output computed at base period prices. Errors here may, therefore, arise out of three reasons. First, the physical commodity series themselves may be faulty. For example, the increase in agricultural production during 1951-52 to 1953-54 as reported in official statistics, may be too high. But a probe in this matter has shown that the global effect on the rate of growth on national product during the decade would be quite small even if the rates of growth of foodgrains production between 1951-52 to 1952-53, and 1952-53 to 1953-54 are halved. Since 1953-54, the NSS estimates of consumption of foodgrains generally corroborate the movements in the official production and availability data, and can be taken as reasonably accurate. It is granted that production data of reasonable accuracy do not cover the entire agriculture sector, but by and large, the estimators are usually cautious rather than optimistic while producing estimates based on uncertain material. Second, when the commodity composition of the product gets more and more varied, certain pricing difficulty arises for evaluation of new products. Also, there is a chance that some of the new commodities are missed. The effect of the latter would be to depress the rate of growth, and it is not improbable that real rate of growth of industrial production is somewhat underestimated because of this. Regarding former, if a price index number based on old commodities is used to deflate a current period aggregate of new output, it is not unlikely that the deflation leads to some overestimation of the rate of growth because the new products are likely to have higher prices than a similar old products covered by the price index number. Third, errors may arise out of both differential movements in input and output prices and the fact that cost ratios, considered in physical terms, have actually undergone some change during the period under consideration. It is probably true that inputs prices increased more sharply than the price of output in the manufacturing industries sector during the period under review.

If this is true, the value added would have shown a sharper rise had a double deflation method been applied than in the procedure actually used. Thus, there is some chance of underestimation in the official estimates actually utilised on this count. In so far as manufacturing industries are concerned, the official estimates make use of the cost ratios relating to the current period and hence no difficulty arises out of this. For example, if values added at current prices are deflated by an index number of output prices only, all the errors arise only out of the differential movements of input and output prices. But for the other commodity producing sectors in which base period cost ratios have been used, for example, in agriculture, some overestimation of the rate of growth of real net output may arise by adopting this procedure because with rapid growth of output and increasing diversity of production, the cost ratios may have a tendency to increase over time. The effect of differential movements in output and input prices have not been studied for these sectors, but since inputs here are usually a relatively small part of the value of output and also are partly self supplied, the effect cannot possibly be very large. But possibility of some overestimation of the rate of growth cannot be ruled out completely.

5. In most of the other sectors, the general procedure used in official estimation has been to carry forward the base period estimate of value added by an indicator of physical output. The actual execution, however, suffers from lack of availability of suitable data and a study of the procedure does not enable one to form any notion about the nature of biases involved in the estimates of sectoral rates of growth. The estimates at current prices are also very weak in many of the sectors. Thus, it is only possible to make a general appraisal of the situation here more or less on notional grounds. It is almost certain that both current price and the constant price estimates of the rate of growth for professions and liberal arts exhibit some overestimation. Some small overestimation is also involved in the rate of growth of the public administration sector in real terms because here the values added at current prices are taken to be identical with the values added in real terms. On the other hand, there is likely to be some underestimation involved in the sector small enterprises - the only commodity producing sector in which the detailed procedure indicated in the earlier paragraph could not be used for purposes of deflation for lack of data. Index numbers of physical outputs of several components of this sector show a much larger rate of growth than the deflated series incorporated in the official estimates. The rate of growth of trading income implicit in the official estimates also is probably too small because this implies a decline of the share of trading in national output at constant prices, an unlikely contingency in present day India. The other sectors are relatively small. But here, the estimates in respect of railways and communications should be dimensionally correct. The remaining sectors, about which we have little insight, do not exhibit trends which are obviously too high.

6. This cursory and very brief analysis of the official procedure of deflation does not enable us to discover any reason why the rate of growth of aggregate product should be either too high or too low. Some of the factors considered have a tendency of pulling up the real rate of growth while some other factors have an opposite effect. Judging the quantitative effects of several factors, it is not possible to accept a hypothesis that the real rate of growth given in the official series is overestimated. On the other hand, while there is some suspicion of a small underestimation, it is almost impossible to establish this on the basis of available evidence. Under the circumstances, one has to accept the rate of growth of the official series as a dimensionally correct estimate on the basis of evidence considered so far. Finally, for the period 1953-54 onwards, the estimates of household consumption expenditure based on the succeeding rounds of the National Sample Survey give a picture which is consistent with the rate of growth exhibited by the official income series.

7. A consideration of the effect of the rate of growth of population on the rate of growth of per capita real income does not introduce any major change in the above conclusion. The rate of growth of population between 1951 and 1961 based on census information is only slightly below 2 per cent per year, and is considerably higher than the decadal rate based on 1941 and 1951 censuses. How does this affect the estimates of per capita real income? First, a large error may be associated with the estimate of per capita income for a particular year because the actual growth of population in a particular year may be widely different from the interpolated (or extrapolated) estimate. This is unavoidable in the absence of reasonably accurate annual data on population. However, this difficulty is not important for us because we are interested only in the growth over a decade. Second, a high rate of population growth is indicative of a high rate of growth of working force, because age sex specific labour force participation ratio is unlikely to change rapidly. The error on this count would be larger if we think that the rate of growth of population in the earlier decade was, in fact, slightly larger than reported because the rate of growth of working force in a particular decade has a closer link with the rate of growth of population in the previous decade. Since the current Indian income estimates for the decade 1951-1961 in a number of sectors depend on projected estimates of working force based on 1941 and 1951 data, the values added in these sectors are likely to be progressively underestimated to a small extent except for professional services for which a high rate of increase in working force is used for purposes of estimation. Finally, since a larger rate of growth of population, based on 1951 and 1961 data, is used in obtaining estimates of per capita national income, there is some possibility of underestimating the overall rate of growth of per capita real income. But the overall effect, which depends on several factors, remains uncertain. The current increase in the rate of growth of population need not necessarily imply that there has been sizable underestimation

in the rate of growth of working force in sectors in which income estimates depend partly on working force. Further, the overall effect would naturally depend on the share in national product of the sectors in which there is some chance of underestimation on this count. This share cannot possibly be large. Thus while no positive conclusions emerge, a consideration of the population factor suggests a possibility of some slight underestimation rather than an overestimation in the rate of growth of real per capita income, and the official estimate of the rate remains a very plausible one.

8. After having admitted this, it is necessary to point out that this apparently correct result has been obtained in the official statistics more by way of accident than by virtue of its methodological efficiency. This can be brought out in two different ways. First, one may look into the sectoral deflators of official series and notice how plausible they are. Next, one may construct some alternative deflators and compare the results with the official deflators: global and sectoral. We shall be concerned with both in the remaining part of the paper.

9. An examination of the official global deflator shows that there is considerable difference between the movements of the official wholesale and consumer price index numbers. In particular, the national income deflator rises much more slowly than either of the two indexes 1955-56 onwards. Since, the two index numbers should at least reflect the urban price movements approximately, the lower rate of rise in the national income deflator can be explained had there been some evidence of a low rate of increase in rural prices. The internal evidence of the sectoral deflators does not bear this out. While the deflator for agriculture moves from 90 to 117 between 1955-56 and 1960-61 with 1943-49 as base, that for non-agriculture increases from 100 to 106 during the same period, the overall index moving from 95 to 112. While agriculture is not coterminous with rural, and a large part of rural activity is non-agricultural, the result is still very surprising, and it is difficult to see how the global and sectoral national income deflators give a dimensionally correct picture in case the wholesale price and the consumer price index numbers are representative indexes of urban prices. If we tentatively assume that the wholesale price index and the consumer price index which show sympathetic trends and have a wide empirical base do in fact represent the urban price trends, then even the overall national income deflator becomes improbable, except under a hypothesis of very slowly rising rural prices.

10. But there is another possibility, which cannot be completely ruled out. During the period 1955-56 - 1960-61, the official deflators show sharp rise for agriculture and industries and almost stable prices for the rest of the activities. It is not improbable, that the movements shown at current prices are under stated in official national income statistics for these sectors and hence an almost stable

deflator coupled with this, gives in fact the real movement more or less correctly. Some such conclusion becomes almost inescapable if we admit, as we have done already, that the overall rate of growth depicted by the official series is plausible. Put in a slightly different manner, the values added by the service sectors at current prices in the aggregate as given in official national income statistics are nearly equivalent to values added at constant prices in the aggregate, and the process of deflation used is a formal rather than an operationally important procedure. Following up this line of thinking, the decision of the National Income Committee not to apply this formal procedure to government administrative services does not appear to be entirely unjustified. One outcome of this analysis is the suggestion that the rate of growth of the service sectors at current prices in the official national income statistics is under-reported. There does not appear to be any real reason why the costs of services should not increase materially during a period in which both agricultural and industrial prices increased considerably.

11. Next, it is possible to deflate national product by using a final expenditure approach. This was attempted by Kansal sometime back, and by Dhar and Agarwal more recently. In general, Kansal's marshalling of price data was not adequate, and even the more recent work is not entirely satisfactory. We have attempted constructing an index for the period 1956-57, 1958-59 and 1960-61 using the NSS budget weights separately for urban and rural areas. We have also tried to base the urban index entirely on urban prices and rural index as much as possible on rural prices. While it would have been desirable to rely only on retail prices, this has not been possible to any satisfactory extent - though we have tried to maximise the use of retail prices. (A full description of the procedure followed is given in the appendix at the end of the paper). The interesting feature of the index number constructed is that it shows that there was a sharper rise in urban prices than in rural prices, as will be seen from figures below :

year	our index			national income deflator			official index number of	
	rural	urban	total	total	agri-culture	non-agri-culture	whole-sale prices	consumer prices
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1956-57	100	100	100	100	100	100	100	100
1958-59	109	109	109	105	107	103	108	110
1960-61	110	117	112	108	111	105	120	118

The findings support our previous contention and show that the official wholesale price and consumer price index numbers depict the urban price movements not unrealistically. Further, this shows that the movements in agricultural and non-agricultural prices as reflected by the national income deflator probably remain unrealistic. Implicit urban and rural price index numbers given in Dhar and Agarwal's paper also shows a sharper rise of urban prices than rural prices and corroborate our findings.

12. Finally, it may be desirable to consider the deflator implicit in the revised series of national income as given in the Blue Book published by the Central Statistical Organisation. The main findings here is very interesting. The rate of increase of net national product in real terms according to revised calculations is dimensionally similar to that according to the conventional calculations taking the time horizon 1955-56 to 1959-60 in view. The rate of growth of income at current prices, however, is higher in the revised series than in the conventional series. Consequently, the implicit deflator for the conventional series rises less sharply than that for the revised series. Directly available price material relating to urban areas suggests that the deflator for the revised series is more plausible, unless there is some radical difference between urban and rural price movements. It will be of interest to make a comparison between sectoral deflators as implicit in the conventional and in the revised series, a task which we did not attempt. But the sum and substance of our analysis throws some doubt on the rate of growth shown by the conventional series at current prices particularly for service sectors and not so much on the estimates in real terms. In any case, the subject is of great importance and requires much more systematic study than has been attempted in this paper.

APPENDIX : The method of estimation of consumer price index number

1. The method followed to construct the consumer price index number used in the text is briefly described here. Consumer price index numbers for rural and urban areas have been worked out separately; these indices then been combined using urban and rural consumption as weights. The index number constructed relates only to the years 1956-57, 1958-59 and 1960-61. The year 1956-57 has been chosen as the base. Kansal and Dhar and Agarwal⁽¹⁾ constructed such index numbers earlier. Kansal covered the period from 1948-49 to 1954-55. So his series is not comparable with ours. Dhar and Agarwal covered the period 1955-56 to 1960-61. They have used wholesale prices of consumer goods. But the weighting pattern was derived from NSS data on household consumption expenditure. As the period covered by these authors is almost the same as that of the present study, consumer price indices prepared by them have been compared with our estimates.

2. Before presenting the details about the method of estimation, the nature of price materials used for rural and urban areas is described below. Retail prices are appropriate basic data for obtaining consumer price index numbers. As urban retail prices with a comprehensive coverage are not available, mainly wholesale prices published by the Economic Adviser have been used for constructing the urban index. Rural retail prices are available from the National Sample Survey and Labour Bureau. For constructing the rural index, rural retail prices obtained from the above sources have been generally used. For the urban index, 36.7 per cent of the weight is covered by wholesale prices which are essentially urban in character. Urban retail prices cover the remaining 3.3 per cent of the total weight. The rural index is mainly based on rural retail prices, 81.9 per cent of the weight being covered by such material. Unfortunately for 17.3 per cent of the weight, we had to depend on wholesale prices which are urban in character. Further we have used urban retail prices to cover remaining 0.8 per cent of the weight. The urban material used for the rural index mainly relates to clothing, drugs, durable goods, toilet articles, footwear and vanaspati. It is not improbable that price movements of these items are not widely different between urban and rural areas.

3. Weighting diagrams for our index numbers are based on consumption expenditure data collected in the 10th round of the

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- 1 a) On the deflation of the National Income in India by final expenditure approach by S.M. Kansal : Papers on National Income and Allied Topics, Vol.I : Indian Conference on Research in National Income, 1960.
 - b) Private consumer expenditure in India by S.P. Dhar and S.K. Aggarwal, paper submitted to the Fourth Indian Conference on Research in National Income, Bhopal, November 1963.

National Sample Survey, the reference period being December 1955 to May 1956. Weighting diagrams for rural and urban areas are given separately in table (1) below:

Table (1) : Weighting diagrams based on the 10th round of the National Sample Survey.

item of expenditure (1)	percentage of total expenditure	
	urban (2)	rural (3)
1. cereals	24.31	38.41
2. pulses	3.17	4.48
3. foodgrains	27.43	42.89
4. milk and milk products	11.38	9.08
5. vegetables	3.66	2.88
6. fruits and nuts	2.44	0.75
7. meat, fish and eggs	3.66	2.47
8. sugar and gur	3.17	2.88
9. vanaspati	0.57	0.29
10. oil and oil products	3.41	2.88
11. salt	0.33	0.35
12. spices	2.44	3.28
13. refreshments	4.96	1.67
14. pan supari	1.22	0.92
15. total food	64.72	70.34
16. tobacco	2.10	2.07
17. drugs and medicine	2.85	1.96
18. fuel and light	7.11	6.84
19. cotton (hand 100 m)	1.22	1.84
20. cotton (mills)	6.91	9.03
21. educational expenditure	2.28	0.40
22. toilet	1.79	0.69
23. washing and other services	6.18	3.73
24. foot-wear	1.02	0.63
25. durables	3.82	2.47
26. total non-food	35.28	29.66
27. grand total	100.00	100.00

4. The first step in our procedure was to calculate the simple relatives for 74 articles comprising consumer goods for the years 1958-59 and 1960-61 with 1956-57 as the base year for both rural and urban areas. These relatives were then grouped together into the following categories by taking unweighted arithmetic averages : (1) cereals, (2) pulses, (3) milk and milk products, (4) meat, egg and fish, (5) vegetables, (6) fruits and nuts, (7) edible oil and oil product, (8) sugar and gur, (9) salt, (10) spices, (11) beverages and refreshments, (12) pan, supari, (13) tobacco, (14) drugs, medicine and medical services, (15) fuel and light, (16) clothing, (17) education, (18) toilet, (19) washing and other services, (20) foot-wear, (21) durables. Finally, the corresponding group weights (percentages of monthly per capita expenditure on these items) obtained from the National Sample Survey have been applied to the above group average indices to arrive at total consumer price index numbers for rural and urban areas. The consumer price index number for the whole of India has been constructed by combining the rural and urban consumer price index numbers by weighting them with the percentage share of rural and urban consumption expenditure. The price index numbers thus obtained are presented in table (2) below by some major groups.

Table (2) : Consumer price index numbers
by major groups: 1956-57 = 100

items	consumer price index numbers					
	urban			rural		
	weight	1958-59	1960-61	weight	1958-59	1960-61
(1)	(2)	(3)	(4)	(5)	(6)	(7)
food	64.72	109.0	118.9	70.34	110.7	110.5
non-food	35.28	107.9	113.4	29.66	104.9	110.3
total	100.00	108.6	116.9	100.00	108.9	110.4

5. The index numbers worked out by us are presented in table (3) below along with other comparable index numbers.

Table (3): Estimated consumer price index number :
1956-57 = 100.

authors	1956-57	1958-59	1960-61
(1)	(2)	(3)	(4)
estimated index : urban	100.0	108.6	116.9
rural	100.0	108.9	110.4
total	100.0	108.9	111.9
implicit national income deflator (conventional)	100.0	105.2	108.2
Dhar and Aggarwal's index	100.0	106.3	108.7
wholesale price index (Economic Adviser)	100.0	108.2	118.7
consumer price index (Labour Bureau)	100.0	110.5	118.1

6. A list of the sources of primary price data used is given below:

List of sources of data used

1. Directorate of Economics and Statistics, Ministry of Food and Agriculture, Government of India : Agricultural Prices in India, 1959.
2. Economic and Statistical Adviser, Ministry of Food and Agriculture, Government of India : Agricultural Situation in India.
3. _____ : Index Number of Wholesale Prices.
4. Central Statistical Organisation, Department of Statistics Cabinet Secretariat, Government of India : Monthly Abstract of Statistics.
5. _____ : Statistical Abstract, New Series.
6. _____ : National Income Statistics, Proposals for a revised series of National Income Estimates for 1955-56 to 1959-60
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IARNIW/66/1.5

INDIAN ASSOCIATION FOR RESEARCH IN NATIONAL INCOME AND WEALTH

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**ESTIMATION OF NATIONAL INCOME IN
REAL TERMS**

B. W. CHAVAN & Smt. A. B. CHAVAN

AHMEDABAD

9—11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

ESTIMATION OF NATIONAL INCOME IN REAL TERMS

B.W. Chavan and Smt. A.B. Chavan

1. A large variety of information significant from the point of view of the national or regional income estimator is now available from different sources. With some labour, these mass of available statistics on different income components can be integrated systematically by the national income worker to arrive at the aggregate income.
2. Estimation of national income is receiving increasing attention in India and a number of authorities are currently engaged in building up estimates of national or regional income. The statistical systems in the country are also being developed keeping in view, inter alia, the requirement of national income workers. However, major attention is focussed on building and improving the estimates of income at current prices and it is rather a sorry state of affairs that very little attention is paid to improving these aggregates measured in real terms.
3. The object of this paper is to bring to light the deficiencies in the present method of estimation of national income in real terms, the main gaps in the statistical data utilised for the purpose and to suggest ways and means for improving the real income estimates.
4. There is always a strong urge to make comparisons of national income over time or space. An aggregate of income at a point of time is of little interest. There is always a curiosity to study the trends over a period of time. For such comparisons over a series of years, current income can provide merely a picture of structural change. It is the constant income series which enables inter-temporal comparisons as it is not affected by the vagaries of prices. The constant income series which is free from the effects of price fluctuations is widely used for studying the economic growth and, thus, the aggregates of national income measured in real terms are of paramount importance. It is, therefore, surprising that in India very little attention is paid towards improving the methods of estimation of national income in real terms. Thanks to the interest taken by the Central Statistical Organisation,* statistical systems in India are being geared up to fill in the gaps in national income statistics. Countrywide multi-purpose National Sample Survey and the Annual Survey of Industries are well known measures to quote a few in this respect. Nevertheless, most of such developments in the statistical systems suggested for filling in the gaps in national income statistics are directed towards improving the estimates of national income at current prices and very little attention is paid for improving the real income series. The estimates of national income at constant prices continue to be prepared by short cut methods of rough and ready nature. After the publication of first and the final reports of the National Income Committee, the Central Statistical Organisation brought out its monumental work "National Income Statistics - proposals for a revised series of National Income Estimates for 1955-56 to 1959-60".** In this blue book, the first 174 pages are covered in examining the existing sources and methods of estimation of national income at current prices and evolving improved methods of estimation of the same. It is, therefore, disheartening to note that the entire field of estimation

* Hence forward denoted by C.S.O.

** Hence forward, this publication will be referred to as the 'blue book'.

of national income at constant prices is tackled so briefly within the span of ten pages in the same book according to which "A series of estimates of net national output at 1948-49 prices for the period 1948-49 to 1950-51 was presented by the N.I.C. in their Final Report and this series has been brought upto 1959-60 by the C.S.O. following broadly the same methodology."* This tendency of indifference towards real income estimation is prevalent among most of the persons engaged in this field, so much so that while preparing various schemes for developing statistical systems in the country, very little account is taken of the requirements for improving the estimates of national or regional income in real terms.

5. Different authorities have used different methods of estimating national income at constant prices. These fall broadly into five categories as under:-

(i) National income estimates are converted into estimates at constant prices by deflating the corresponding estimates at current prices by means of price index such as consumer price index or wholesale price index.

(ii) Instead of deflating the entire national income total by a single index, at times income in different sectors is deflated individually by making use of different indices approximating the movement of prices of commodities in the corresponding sectors.

(iii) National income total can also be obtained as the sum of the final expenditures and different components of expenditures like household consumption expenditure, government consumption expenditure, and capital formation are deflated by different price indices.

(iv) National income at constant prices is obtained by combining indices of production or indicators showing movement of physical economic activity in different sectors. These indices or indicators are generally combined by using the net value added by various industries during the base year as weights.

(v) National income at constant prices is estimates by evaluating the net output of goods and services from various sectors at base year prices.

6. The first method which consists in deflation of national income by a suitable price index involves only a single operation and is the simplest one. At the same time, this method is the least accurate. The indices used for deflation purposes are generally consumer price index or wholesale price index. The drawback of using cost of living or consumer price index for deflation purposes is that this index is an indicator of consumers' expenditure on goods and services and it will, if at all, be suitable to deflate that component of the income which is used for household consumption only. Such an index will be inadequate for deflating other components of national income like Government consumption expenditure or capital formation. Moreover, consumer price index may not at times, include items whose imputed value is included in the national income.

* Blue Book, page 178.

Many a time: the weights used in preparing such indices pertain to the year which is different from the base year used in the constant income series. The weighting diagram of such indices is also substantially different from the one which would be appropriate for deflating national income total, as such weighting patterns have little resemblance with the expenditure components of the income during the base year of the constant income series. Index number of wholesale prices, too, suffers from similar defects as it does not reflect the movement of prices of all finished goods and especially of services and the weighting coefficients used for wholesale price index are different from those implicit in the base year income estimates.

7. The second method involving adjustments of each component of the national income by different indices, though somewhat cumbersome, will result in a better estimate. Thus, the income from construction is deflated by an index number of building costs, income from retail trade by an index of retail prices, rental income by index of rents, income from agricultural production by index of farm harvest prices and so on. In such cases too, the coverage of the indices might be inadequate and the weighting pattern and base year of the index number series may differ considerably from what is implicit in the base year estimates of income. Moreover, such indices which may seem suitable for deflating 'gross' contribution from the sector may not be applicable for deflating deductible costs. What is necessary is to use instead of a single deflator, a double deflator so that the gross contribution can be deflated by one deflator and the deductible costs can be deflated by some other suitable deflator.

8. In some countries, various components of expenditure are deflated by different indices of prices. For household consumption, for instance, consumer price index number is utilised for deflation purposes. As stated above, the base year or the weighting diagram of such indices might be different from the one desired. The coverage of the indices might be incomplete. Consumer price indices are generally confined to specific areas such as cities or industrial areas covering only a section of population like industrial workers etc., and therefore, render themselves unsuitable for adjusting the expenditure of the entire population at large.

9. The fourth method which entails moving ^{the} base year estimate of sectoral income parallel to the corresponding index of production is widely used. Here too, difference in base years and weighting patterns may not prove such indices useful to the desired extent. Moreover, such indices tend to show trends in gross output rather than net output. The main deficiency of the indices of production when used for building up long term real income series lies in the fact that such indices do not take into account structural changes which may result in a smaller volume of inputs per unit of final output, or a larger volume of transport services utilised or a different pattern of inputs used. Due to electrification, for instance, the industry might shift from coal or diesel consumption to electricity utilisation, resulting in change in net contribution of the industry. In the agricultural sector, the increase in production might be achieved by making use of larger quantities of inputs like fertilisers or increased irrigation facilities with the result that the trend in the gross output might be different from the one in the net output.

that

10. It is the last method, which is also widely used, would generally result in more accurate estimates. The method involves evaluating each item counted in national income total at base year price. The inputs or the deduct items considered for estimating net output are also evaluated at the base year prices. For some sectors, however, it may not always be feasible to evaluate at base year prices. In such cases, this method is used in parts in conjunction with the earlier method and wherever, such evaluation is found impracticable, the corresponding base year estimate of income is projected by means of a suitable index or an indicator of the physical movement of the corresponding economic activity. Thus, it may not always be possible to evaluate educational services at the base year levels but it may be possible to use the rise in the number of students to indicate the trend in the output of the educational services. If there is a long interval between the base year and the current year, so much so, that some technological changes have taken place during the span of time resulting in change in the qualities of products or the emergence of the new products, the base year prices may not be applicable to the current year or base year quotations may not be available at all. In such cases, method of direct evaluation may not give reliable estimates.

11. It may now be seen how with the available data or by collecting additional data, the series of national income can be made more perfect. For this purpose, the methods adopted in the revised series of national income in the blue book are reviewed.

12. According to the blue book, the C.S.O. has followed two methods in preparing the revised series of national income at constant prices. The first method which is followed for the commodity producing sectors consists in evaluation of current year's production at the base year's prices for each of the individual items of production. However, inputs have not been directly evaluated by base year's prices. In practice the income from factory establishments is estimated by moving the base year's figure according to the index of industrial production. Similarly, in the case of small enterprises, the bench mark year estimates of value added in respect of various industry groups are moved backward and forward on the basis of physical index. The second method is followed for the service sectors where the base year's net output is projected on the basis of appropriate indicators of physical change in the volume of activity in those sectors.

13. In the agriculture sector, the value of output in a given year is estimated by the C.S.O. by evaluating each item of production at 1958-59 prices, the latter being the all-India weighted average price for each commodity. The same ratio of net output to gross output in the base year is applied to all the years to estimate the net output. While evaluating the output at constant prices, the C.S.O. uses for each commodity, one single all-India price. While estimating the value at current prices, the C.S.O. adopts an elaborate method where the production in each State is evaluated at the average price in that State. It is not understood why the C.S.O. adopts a short-cut method in building up real income estimates. The commodity sold at different prices in the base year at different places cannot be considered as the same commodity for real income purposes. After all, the base year value is found by evaluating output in different places at different prices. If the net value added per unit of production is higher in place A than in place B in the base year, the production at A cannot be treated at the same level as the production at B and evaluated at the same price. In fact, the

production at A and production at B cease to belong to a strictly homogeneous group. For evaluation purposes, therefore, one tonne of wheat in Maharashtra cannot be considered at par with one tonne of wheat in Madhya Pradesh. It is, thus, necessary (and it is also practicable) to evaluate the production in the State at the corresponding base year price. Many a time, the commodity produced at different places is different in quality. Sugarcane produced in Maharashtra with a high sugar content, for instance, is superior to the sugarcane produced in Uttar Pradesh. To some extent the method of evaluating at regional prices will incidentally, take care of production of different varieties of the same commodity. Similarly, to apply the base year output-input ratio for deriving net output for all the years is rather a crude procedure. The C.S.O. has considered costs on account of 1) seeds, 2) chemical fertilizers, 3) organic manures, 4) cost of feed of livestock required on farms, 5) irrigation charges, 6) market charges, 7) repair, maintenance and other operational costs and 8) depreciation for arriving at the net output of agriculture. Out of these, the first five accounting for nearly 77 per cent of the total cost (during 1958-59) can be easily evaluated at the base year prices. There was, therefore, no need to use base year output-input ratio. Uma Dutta in her paper* has argued "Thus, costs like expenditure on repairs and maintenance, depreciation, market charges, imputed deduction of bank charges and insurance premiums cannot be split up into price and quantity components without which the evaluation of material costs at base year prices has very little significance. It was, therefore, considered advisable to keep the relation of input to output constant over the period under study, recognising at the same time the likely error involved on account of this implicit assumption of the absence of structural change". Structural changes are taking place in the agricultural sector due to Community Development and other programmes and considerable expansion of fertilizer distribution and irrigation programmes. There is no justification, therefore, to assume the same output-input relationship when the major portion of inputs can be estimated separately at the base year prices. Amongst the remaining costs, the cost on account of current repairs and maintenance of implements and various operational costs as well as depreciation is estimated by using per acre estimate for the current price series. There will, therefore, be no serious objection to using the base year costs per acre for subsequent years in the real income series. / It is thus, seen that all the items of deductible costs in the agriculture sector can be evaluated at the base year price.

14. In the case of animal husbandry sector, the C.S.O. has prepared real income estimates in the same manner as is done in the agricultural sector. In this sector too, it is desirable to evaluate regional output rather than evaluate the entire output at an all-India average price. Similarly, the deductible costs can also be estimated separately.

15. In the case of fishery and forestry too, it is necessary to evaluate at the regional level rather than at the national level. Average prices and production are now available for the fish catch in certain States. It would, therefore, be proper to evaluate Statewise value of fish production at the base year prices. Value added by fish curing can also be estimated at constant prices by evaluating fish dried or salted and the inputs at base year prices. Output and prices of forest products

* "Estimation of real product for the Indian Union" published in Asian Studies in Income and Wealth, page 276.

are available at the State-level and it would be worthwhile estimating income from forestry sector at the base year prices of different States.

16. In mining sector, the C.S.O. has evaluated the output at the base year prices. Here again, evaluation at base year prices is necessary at the regional level and not national level. The India Bureau of Mines has started publishing the data regarding mineral output according to grades in respect of certain minerals like manganese ore, iron ore and coal. Gradewise prices are also available. It would, therefore, be worthwhile to use gradewise data and instead of evaluating the entire production at one price of the mineral, gradewise evaluation at the base year prices can be resorted to.

17. In factory establishment sector, the C.S.O. carried forward the base year estimate by using the index number of industrial production. In this sector too, double deflation method has not been adopted. As stated earlier, index of production completely ignores structural changes and indicates trends in gross output approximately. Moreover, these index numbers are not sensitive enough to take into account the trends in various items of production separately but for groups of items. Thus, the index number of production worked out in India treats petroleum products as one item which covers different petroleum products like petrol, high speed diesel, kerosine, etc. These cannot strictly be called homogeneous. Similarly, the internal combustion engines are divided into two very broad groups only, viz. (i) vehicular type diesel engines, and (ii) stationary type diesel engines though there exist several types of engines. Again industrial machines which itself form a very big heterogeneous group of products is considered as one item for the purpose of index of production. In the same manner, all electric fans whether ceiling, table or pedestal are treated equal. The index of production may not, therefore, show the correct trend in the gross value at constant prices. It may not also be possible to evaluate all industrial products at the base year prices as the number of products will itself be quite large and it will be impossible to collect production or price data for each and every item of production. The practical way out would, therefore, be to deflate the gross value group by group of industrial products by relatives of prices of major commodities in the group. The trend shown by one or two major commodities may not always reflect the trend of all the commodities in the group but the prices of the major commodities in the group will show, in most cases, the same trend of prices as other commodities in the group if the groups are sufficiently small. The inputs can also be deflated in a similar manner so that the net value added in real terms can be derived as the difference between the value of output and input measured at constant prices. The calculations at the State or regional level will increase the accuracy of the estimates. The price statistics will have to be expanded considerably for the purpose. Till that time, possibility of utilising price data implicit in the information in the returns submitted by various factories for Annual Survey of Industries can be examined.

17. In small enterprises sector, the C.S.O. has prepared the estimates of income at constant prices in the first instance and then obtained the estimate at current prices by superimposing the effect of prices. The estimates of income at constant prices are built up by moving the estimates for the benchmark year on the basis of physical production of the relevant commodities. The commodities considered by the C.S.O. are likely to be few in the absence of data on production. What is needed, therefore, is the statistical data on physical production in the small enterprises sector.

18. The contribution of the construction sector in real terms is obtained by multiplying the employment by the base year earnings per head. The implicit assumption in the method is the constant productivity per worker over a period which is hardly tenable. It may be worthwhile to collect statistics on value of construction from the municipal authorities who can regulate construction activity in their areas of jurisdiction. The cost structure will have to be studied to find out the magnitude of inputs like cement, bricks, steel, timber, etc. used. These can then be deflated individually by means of relevant indices of building costs, which will have to be specially constructed for the purpose. Since prices as such of the construction units are difficult to determine, the gross value of construction activity in the base year may be moved parallel to the index of building activity which again will have to be prepared specially by using consumption figures of various building materials.

19. For estimating income from 'other commerce and transport', the C.S.O. has estimated, for the commodity handling sectors, the total trade and transport margins on the marketed output in the base year and moved the same in relation to the physical output of the year. In the case of non-commodity handling sectors, the indicator used is the product of the estimated working force and the index of real earnings per worker. Since railway transport is treated as a separate sector, it is not known how the transport margins exclusive of transport charges by railways are estimated by the C.S.O. commoditywise. It is highly improbable that the transport margin per unit of product would remain same over a long period even in real terms. For that matter, even the proportion of marketable surplus to the total output may not remain static from year to year. Instead of sub-dividing the sector 'other commerce and transport' into two sub-sectors only for estimation purposes, estimates can be prepared more precisely if the sector is further sub-divided into more sub-sectors for which data on the physical volume of services are either available or can be collected. For instance, it might not be very difficult to estimate real income for the sub-sectors air-transport, and nationalised road transport, for which considerable statistics are compiled. For estimating income arising out of other transport services like trucks, taxies, rickshaws, it will be necessary to carry out surveys regularly to estimate traffic in terms of tonne-kilometers or passenger-kilometers from a fixed sample of operators of trucks, taxies, rickshaws, etc. and chain indices of rise in traffic through these services coupled with indices showing the trends in number of vehicles will give a better idea about the movement of traffic from year to year. So far as income from 'other commerce' is concerned, the statistics on sales tax, if collected in a manner, will throw light on the turnover of all the goods that are subject to sales tax. In all the States, sales tax is levied and it is compulsory for every registered dealer to submit the return showing turnover. The information contained in the returns can be utilised to get the trends in the turnover of goods handled by the trading class. Since this information can also be had commoditywise, it will be possible to deflate the series by using corresponding indices showing trends in wholesale or retail prices as the case may be. For the unorganised transport services and 'other commerce' it may not be possible to use double deflation method due to the limitations of our statistical systems. To that extent, the estimates will suffer from inaccuracy. Moreover, for a small sub-sector covering transport 'otherwise unspecified' or other similar sub-sectors, where no data are available on volume of traffic carried, there will perhaps be no alternative but to use the real income as the product of working force and the per head earnings. The advantage of dividing the sector into various sub-sectors for estimation purposes would be that estimates of contribution in real terms based on volume of traffic would be more precise than estimated otherwise.

20. As regards railways, the C.S.O. has used i) the number of passenger miles for passenger traffic and (ii) the number of ton-miles for goods-traffic as indicators. Since the Railway Board publishes voluminous statistics regarding railways, it would be possible to employ a better method than using only broad indicators. In the first place, all passenger miles cannot be treated equal. Passenger miles corresponding to air-conditioned class, first class, second class or third class are not additive in the strict sense since their costs are different. Similarly all ton-miles cannot be considered equal. Since the data on passenger miles for different classes and ton-miles for different commodities are available, it will be possible to use these indicators separately. However, a better method would be to deflate the passenger earnings by an index of passenger fares and freight earnings by an index of freight rates and estimate the gross earnings in real terms. Various deductible costs can be deflated by the corresponding price relatives.

21. As regards services sectors, the C.S.O. has used in some cases a few broad indicators even though it is possible to make use of a variety of indicators reflecting movement of different types of services which cannot be considered equivalent to each other. For 'educational services' for example, indicators used are i) the total number of school teachers and ii) the total number of students on rolls. In the case of services, real income is measured in terms of the services received or provided. In the 'education' sector, therefore, the services provided are reflected in the number of students. But, it is necessary to distinguish the educational services received in different types of educational institutes like primary, middle, secondary, arts, science, medical colleges, etc. Since the cost of such services are widely different. Accordingly, different indicators will have to be used according to students in different types of institutions and the data on which are compiled regularly by the Ministry of Education. The indicators used for other service sectors are also weak the reason being non-availability of data throwing light on either productivity or the magnitude of services provided. It is, therefore, necessary to conduct surveys regularly and collect data on changes in the volume of services provided from a fixed sample of service providers and prepare chain indices of productivity per person. The real income can then be estimated as the product of working force, base year per head earnings and the index of productivity. In every sector, however, as many indicators corresponding to different types of services as possible will have to be used to increase the accuracy of the estimates. In certain sectors, the data on the indicators showing the magnitude of services might be available. For the 'legal profession', for instance, the number of cases dealt by different types of courts, like Supreme Court, High Courts, Session Courts, Small Cause Courts, etc., can be used as indicators since the information required for these indicators is likely to be readily available. The indicators are, however, broad since all cases in a particular type of court are treated as equal.

22. As for income from House Property, the same can be deflated by means of index of rents which will have to be constructed specially for the purpose.

23. If a series of real income estimates is to be built up, the data on prices, physical quantities, indicators etc., are required for all the years covered by the series. If the series extends over a broad span of time, the requisite data are not available, at times, for all the years under consideration. In such cases, the series will have to be built up in parts and linked by chain method.

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**DEFLATION OF INCOME ORIGINATING IN NON-COMMODITY
SECTORS OF THE INDIAN ECONOMY**

NAROTTAM SHAH

AHMEDABAD

9-11 APRIL 1966

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DEFLATION OF INCOME ORIGINATING IN NON-COMMODITY

SECTORS OF THE INDIAN ECONOMY

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In any critical scrutiny of the deflation of national income of India, it is the non-commodity sectors* that deserve the top priority, because, it is here that the faulty methods seem to have resulted in a large over-estimation of real income, which, in turn, has given an exaggerated idea of the pace of economic development in India since independence.

The prima facie case for this contention is clearly established by the following data (Table I).

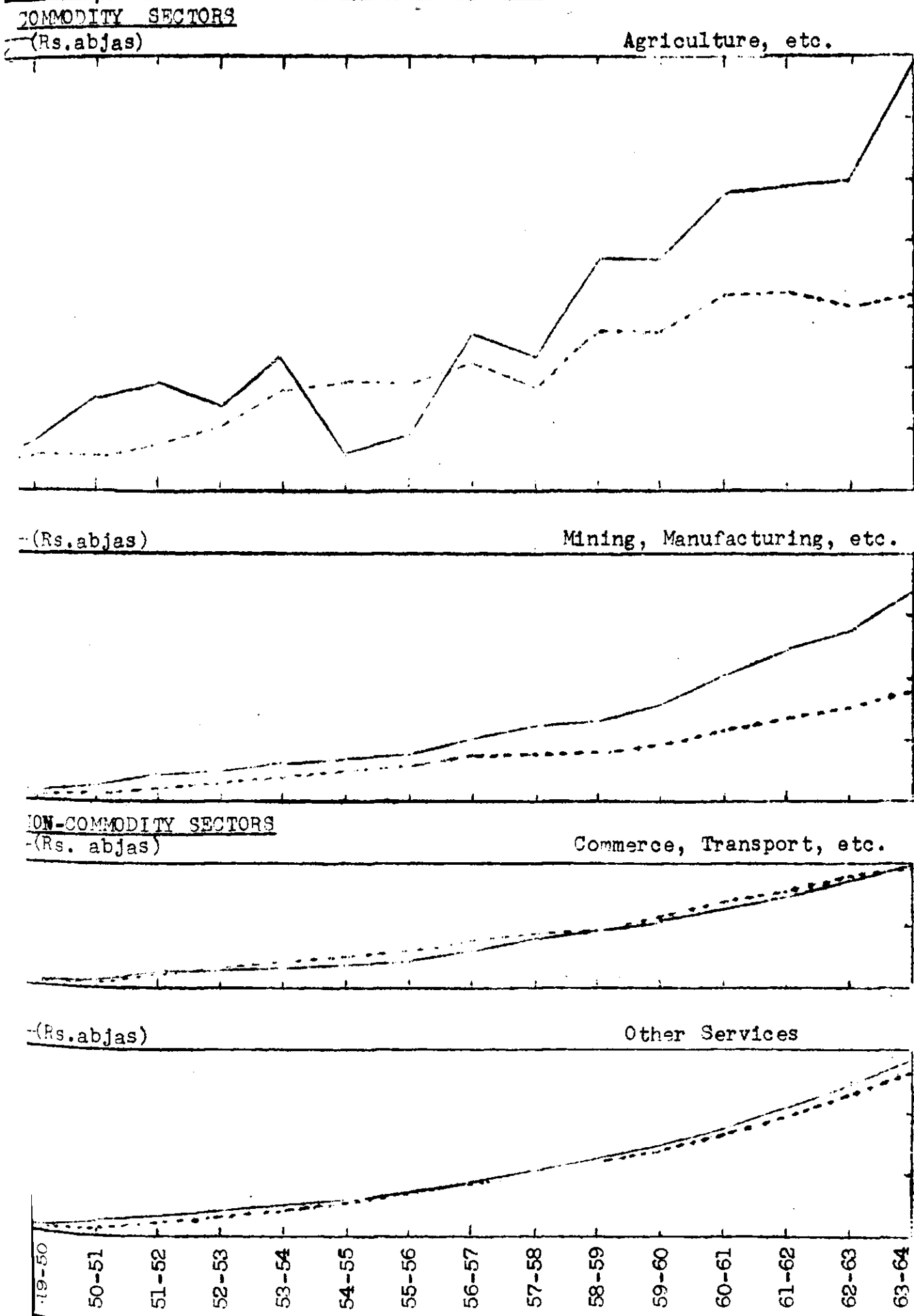
TABLE 1: IMPLICIT DEFLATION OF NET DOMESTIC PRODUCT
IN 1963-64 IN TERMS OF 1948-49 PRICES

Sector	National income at current prices (Rs.ab is)	National income at 1948-49 prices (Rs.ab is)	Implicit deflation $\frac{(2)-(3)}{(2)} \times 100$ per cent.
(1)	(2)	(3)	(4)
(a) Agriculture, etc.	81.0	59.0	27.16
(b) Mining, manufacturing and small enterprises	33.9	24.4	28.02
A. COMMODITY SECTORS (a + b)	<u>114.9</u>	<u>83.4</u>	<u>27.42</u>
(c) Commerce, transport and communication	27.9	27.7	0.72
(d) Other services	30.1	28.9	3.99
B. NON-COMMODITY SECTORS (c + d)	<u>58.0</u>	<u>56.0</u>	<u>2.41</u>
Net Domestic Product at factor cost	172.9	140.0	19.03

* In this paper, I intend to concentrate attention on the sectors which come under the broad rubrics of 'commerce, transport and communication' and 'other services' in the Indian accounts. For the sake of brevity, these sectors will be called the 'non-commodity sectors.' The sectors falling under 'agriculture' and 'mining, manufacturing and small enterprises' will be referred to as 'commodity sectors.'

DEFLATION OF INCOME ORIGINATING IN DIFFERENT SECTORS

INCOME AT CURRENT PRICES —————
 INCOME AT CONSTANT PRICES - - - - -



While the income generated in the commodity sectors was implicitly deflated by 27.4 per cent., that generated in the non-commodity sectors was implicitly deflated by only 2.4 per cent.

The same divergence stands out strikingly in the accompanying chart in which the current prices and constant prices data on income originating in each of the four major domestic sectors are plotted. While in the case of two commodity sectors, there is marked divergence between the two (current prices and constant prices) curves, in the case of the two non-commodity sectors, the two curves almost overlap. The implication of this phenomenon is clear.

TABLE 2: IMPLICIT INCREASE IN FACTOR PRICES IN NATIONAL ACCOUNTS OF INDIA : 1948-49 TO 1963-64

Sector	Index numbers of income originating in the sector: 1948-49=100		Implicit rise in factor prices $\left\{ \frac{(2)}{(3)} \times 100 \right\} - 100$ (Per cent)
	At current prices	At constant prices	
(1)	(2)	(3)	(4)
(a) Agriculture, etc.	190.6	138.8	37.32
(b) Mining, manufacturing & small enterprises	229.1	164.9	38.93
A. COMMODITY SECTORS	<u>200.5</u>	<u>145.6</u>	<u>37.71</u>
(c) Commerce, transport & communication	174.4	173.1	0.75
(d) Other services	224.6	215.7	4.13
B. NON-COMMODITY SECTORS	<u>197.3</u>	<u>192.5</u>	<u>2.49</u>

Or, if we start from the 1948-49 prices data and then examine the current price data (Table 2), it will be seen that, according to the CSO data, while factor prices in the commodity sectors rose by 37.7 per cent., those in the non-commodity sectors rose by only 2.5 per cent. In the context of the fact that bulk of the factor prices involved in the non-commodity sectors consists of wages and salaries of employed people and the earnings of self-employed people, it is absurd to suggest that

factor prices in non-commodity sectors rose by 2.5 per cent. only, during a period when the wages and prices have shown a much sharper increase.

Some data indicating the extent of rise of some of the factor prices which are relevant for our purpose are cited in Table 3 below. As we are interested here in broad trends only, no attempt at refinement of data has been made. Thus, since data relating to the fiscal years 1948-49 and 1963-64 were not readily available, we have put together the data for the nearest years.

TABLE 3: SOME SUGGESTIVE INDICATORS OF INCREASE IN PRICES AND WAGES IN INDIA DURING RECENT YEARS

Indicators	Initial period	Recent period	% rise
(1)	(2)	(3)	(4)
A. 1. Index Number of Wholesale Prices (Base: 1952-53=100)	99.8 (1948)	135.3 (1963-64)	36
2. Index Number of Consumer Prices (Base: 1949 = 100)	100 (1949)	137 (1963-64)	37
B. 1. Annual Average Earnings of Factory Workers (Rs.)	1,036 (1951)	1,459 (1962)	41
2. Annual Average Salary of Primary Teachers (Rs.)	544.5 (1950-51)	872.8 (1960-61)	60
		960.0 (1965-66)	76
3. Annual Average Salary of College Teachers (Rs.)	2,696.1 (1950-51)	3,658.9 (1960-61)	36
		4,000 (1965-66)	48
C. Recorded Implicit Rise in Factor Prices in Non-Commodity Sectors (1948-49 to 1963-64)			2.5

SOURCES: Line 1 Column 2: Derived by splicing the earlier series with the year ending August 1939 as base, as given in Ministry of Finance, India : Pocket Book of Economic Information, 1964, P.98.

Line 3 : ibid., P.25.

Line 4 and 5 : Official release by the Ministry of Education as published in The Economic Weekly, August 7, 1965, P.1249.

Line 6 : From Table 2 above

All other figures are from current official series.

It will be seen that during this period, prices as measured by the index numbers of wholesale and consumer prices rose by more than 35 per cent. and factor prices of labour as measured by the annual average earnings of workers and primary teachers and college teachers increased much more. In view of these facts, it is incredible that the average factor price in the non-commodity sectors increased by only 2.5 per cent. as indicated by the CSO data on national income.

The fact that a divergence of this magnitude is a highly unusual phenomenon will be evident from a study of similar data from any advanced country. In Table 4 below, we present some data compiled from the national accounts of the United Kingdom as an illustration.

TABLE 4: IMPLICIT RISE IN FACTOR PRICES IN THE UNITED KINGDOM BETWEEN 1951 AND 1961

Sector	Index number of income originating in the Sector in 1961: (1951 = 100)		Implicit rise in factor prices between 1951 and 1961 $\left\{ \frac{(2)}{(3)} \times 100 \right\} - 100$ (Per cent.)
	At current prices	At constant prices	
(1)	(2)	(3)	(4)
COMMODITY SECTORS:			
Agriculture	133.1	126.7	5.1
Mining	154.6	89.4	72.9
Manufacturing	174.7	133.7	30.7
Construction	216.6	144.6	49.8
Gas, Electricity	242.3	161.1	50.4
Average for Commodity Sectors			34.7
NON-COMMODITY SECTORS:			
Transport & Communication	169.2	120.4	40.5
Distributive trades	166.9	133.7	24.8

Insurance, Banking and Finance	205.3	149.4	37.4
Ownership of dwellings	248.6	115.6	115.0
Public administration and defence	171.1	88.9	92.5
Average for Non-Commodity sectors			51.7

SOURCE: Columns (2) and (3) : Central Statistical Office, National Income and Expenditure, 1962, Tables 10 & 14.

Column (4) was derived by us from Columns (2) and (3).

It will be seen from this table that the implicit rise in factor prices in non-commodity sectors in the U.K. (ranging from 25 per cent. to 115 per cent., was not entirely out of line with that in the commodity sectors, (ranging, except for agriculture, from 31 per cent. to 73 per cent.), as in the case of Indian data. The weighted average for non-commodity sectors is higher at 51.7 per cent. against 34.7 per cent. for commodity sectors.

MYSTERY SURROUNDING THE METHOD OF ESTIMATION:

Obviously, a careful probing of the manner in which the constant prices series of national income is compiled in India by the CSO is urgently called for. Unfortunately, it is well-nigh impossible for an outsider to conduct such a probing. Let us notice some of the problems that an outsider has to face.

The data in respect of national income at current prices are given in the CSO's White Papers for 14 domestic sectors separately. But when it comes to the breakdown for the constant prices series, the 14 domestic sectors are clubbed together into 4 broad sectors. This is a retrograde departure from the practice laid down by the National Income Committee (1954). For, in its Report (Table A 1. 1, on Page 143), the Committee had given the estimates of the national income at constant prices for all the 14 domestic sectors. But when the CSO took over the responsibility of continuing

the work on national income, it started the practice of clubbing the 14 domestic sectors into 4 broader sectors.

This practice makes even a superficial, sector-by-sector comparison of the two (current prices and constant prices) series impossible.

A far greater obstacle is the lack of a sufficiently detailed explanation in any published official document as to how exactly the constant prices series is constructed. Available fragmentary hints are scattered over a large number of publications and a close reading of all these titbits of material makes it amply clear that CSO has never cared to explain to experts, and much less to the general public, how exactly these estimates are compiled.

With these remarks, we shall briefly review the available hints bearing directly or indirectly on the method of estimation of national income generated in non-commodity sectors.

The National Income Committee had to devote its attention largely to the preparation of current prices series. The preparation of constant prices series was done almost incidentally. An obvious flaw in their estimation of constant prices series was in respect of the 'Government Services (administration.)' "The output of Government administration has been left unadjusted on the implicit assumption that the real output of Government is measured by the money wages paid." (Report, P.143). The very need for deflation in this sector was thus explicitly denied by the NIC.

As for the later estimates, we were generally assured by the CSO in the first White Paper on national income that "The method of estimation adopted in the Final Report of the National Income Committee (February 1954) has been scrupulously followed ..." but, of course, for some minor changes which were indicated in the Notes at the end of the White

Paper. If we were to go by the indications similarly given in the later White Papers, it would appear that the NIC ruling denying the necessity of any deflation in the Government sector still stands, for, in none of the twelve White Papers issued till now has this ruling been changed.*

About the estimation of real product in one more sector 'household service', we find an interesting comment in the White Paper issued in April, 1956 : "Lastly, for domestic service, in the absence of any real indicator, no attempt has been made to adjust the current earnings." (Estimates of National Income, 1948-49 to 1954-55, p.25). Whence this new procedure came in force is not indicated. Nor are we told whether the data for the previous years were recalculated in accordance with the new procedure to make them comparable with those of later years.

This is about all one can glean from the White Papers. But recently, I came across a mimeographed ECAFE seminar document which must be mentioned here in this connection. The document meant "for participants only" is : Sources and Methods of National Accounts in Fifteen ECAFE Countries (ASTAT/NA/5, 29 May, 1964). It has a section dealing with India, which has been prepared by the ECAFE Secretariat, on the basis of the material supplied by the CSO. It is here that we get, for the first time, a full statement (running into three pages) of how the constant prices series is prepared by the CSO.**

* From an ECAFE document mentioned below, it appears that some change was made in some later unspecified year.

** One must incidentally ask: why is it that CSO never thought advisable to put such a note in the white papers for the benefit of a wider audience?

But even these three pages do not give a sufficiently detailed explanation of the method. For one thing, there seems to be some change in the estimation of real product in the 'Government services (administration,)' sector. But as can be seen from the data and the chart presented above, it seems that the change in the procedure has not made any real difference in the final figures.

About the income originating in the house property sector, the document says: "... gross rental income from rural and urban sectors have been obtained from the figures of 'average rental per person' relating to the base year and the estimated population in each year." This procedure obviously assumes constancy of floor space per person. To the extent that there has been a decline in the floor space per person since 1948-49, there is a clear bias for over-estimation in this method. *

INTERNAL EVIDENCE:

Finally, I might draw attention to some 'internal evidence' that is available in the CSO documents. It is possible to develop some internal evidence because we happen to have, for the years 1955-56 and 1959-60, the conventional series on national income as well as a revised series (presented in National Income Statistics: Proposals for a Revised Series of National Income Estimates for 1955-56 to 1959-60, referred to hereafter as NIS Blue Book), in constant and current prices. It is, therefore, possible to derive the implicit rise in factor prices in each of the four broad domestic sectors as given by both these sets of data which are at least partly independent. The relevant data are presented in Table 5.

* "The data from 1961 'House-listing' are under tabulation, but indications are that the situation has worsened since 1951..." Central Statistical Organisation, Country Statement for India, submitted to Asian Population Conference, New Delhi, December 1963, p.29.

TABLE 5 : RISE IN FACTOR PRICES BETWEEN 1955-56 AND 1959-60
AS INDICATED BY TWO SETS OF DATA COMPILED BY CSO.

Sector	Income originating in the sector (Rs. abja)		Index number of income originating in the sec- tor 1955-56= 100	Implicit rise in factor prices (Per cent.)
	1955-56	1959-60		
(1)	(2)	(3)	(4)	(5)

DATA PUBLISHED IN THE WHITE PAPER

Agriculture:

Current Prices	45.2	62.5	138.27	25.97
Constant Prices	50.2	55.1	109.76	

Mining, Manufacture:

Current Prices	18.5	23.2	125.41	12.04
Constant Prices	17.6	19.7	111.93	

Commerce, Transport &
Communication :

Current Prices	18.8	22.3	118.62	2.94
Constant Prices	19.7	22.7	115.23	

Other Services:

Current Prices	17.3	21.8	126.01	1.87
Constant Prices	17.3	21.4	123.70	

DATA PUBLISHED IN THE N.I.S. BLUE-BOOK:

Agriculture:

Current Prices	44.6	62.5	140.13	29.88
Constant Prices	57.0	61.5	107.89	

Mining, Manufacture:

Current Prices	16.3	21.9	134.36	13.64
Constant Prices	18.1	21.4	118.23	

Commerce, Transport
& Communication:

Current Prices	15.6	20.7	132.69	14.01
Constant Prices	17.7	20.6	116.38	

Other Services:

Current Prices	15.5	19.4	125.16	5.60
Constant Prices	16.2	19.2	118.52	

Panel A is based on the conventional data published in the White Papers and Panel B is based on the revised data published in the NIS Blue Book. The data derived in Col. 5 in both the panels presents an interesting comparison. The implicit rise in factor prices in respect of the two commodity sectors indicated by the conventional data (26 and 12 per cent.) is not very much different from that indicated by the revised data (30 and 14 per cent.). But the corresponding figures differ widely when we come to the non-commodity sectors. The implicit rise in factor prices in the two non-commodity sectors is 3 and 2 per cent. according to conventional data, while it is as high as 14 and 6 per cent., respectively, according to revised data. It is thus clear that compared to the revised data, the conventional data suffer from inadequate deflation. This is not to say that the implicit deflation in the revised data is sufficient; all that is maintained here is that the revised data do point to the fact that the implicit deflation is being insufficiently carried out in the non-commodity sectors in the conventional series.

In the absence of a 'full disclosure' by the CSO, it is impossible for an outsider to establish his case completely in a matter like this. But I hope the above discussion has established at least a prima facie for the contention that the implicit deflation carried out in the conventional national income data published by the CSO suffer from seriously inadequate deflation. If this is so, there is an obvious need for a full scale scrutiny of the whole question by independent experts.

THE EXAMPLE OF BRITISH CSO:

Here I would like to draw the attention of all concerned to the excellent manner in which the Central Statistical Office of the United Kingdom has taken care to explain publicly in a priced document the method of estima-

tion that it follows in preparing the real product estimates for the U.K.

This explanation is given in its publication, National Income Statistics : The Sources and Methods. The most valuable part of this explanation is a comprehensive statement (ibid., pp. 358 - 370), in which are listed over 200 indicators of output which are utilised in the compilation of estimates of real product. For each of these items, the British CSO gives the weight assigned to the item, the indicator used and the adjustments, if any, made. Thus, under the rubric 'insurance', for the item 'marine, aviation and transit insurance', we are told that the weight for this item is 1.17 (out of 1,000), the indicator used is total premiums less claims paid, deflated by import and export average value indices. And so on it goes for all the 200 and odd items.

CONCLUDING REMARKS:

One possible reaction to this paper may be something like this: "well, in a broad way all this is correct and fairly well-known." If it is accepted that due to inadequate implicit deflation in non-commodity sectors, there is a sizeable element of over-estimation in the data on India's real product, it is certainly not true that it is well-known. Leaving aside a handful of national income statisticians, people at large and even professional economists are not generally aware of any such large over-estimation of the growth rate of real product. True, it is generally realised that our national income estimates are inaccurate; but 'inaccurate' can imply both a possible under-estimation and overestimation. But, the public at large has certainly no idea that our estimates of real product suffer from a clear and sizable over-estimation implying an over-estimation of the growth rate of the

economy. Nowhere, not even in the NIS Blue Book, has this fact been clearly set forth.

Had the extent of the over-estimation been marginal one need not be a stickler about it. But as can be seen from the data presented above, the degree of over-estimation is fairly large. How large exactly it is, is rather difficult to say, because that would inevitably involve a detailed estimation of the actual rise in the real product. Such an estimation is a rather despairing job in the non-commodity sectors for an outsider. Firstly, even the estimates at current prices in this sector contain a very large element of guess-work. And any 'rough' deflation of the current prices estimates for the non-commodity sectors cannot but compound the errors. One can approach the problem, therefore, through another short cut. If relying on the census data*, we can assume that the structure of the Indian economy has also not changed significantly during the period 1948-49 to 1963-64, we would not be wide of the mark if we make a broad assumption that the structure of real national product has not changed significantly. During the period under discussion, the real income originating in the commodity sectors rose by 45.5 per cent. (from 57.3 abjas to 83.4 abjas). During the same period, according to the conventional data, the income originating in the non-commodity sectors rose by 92.5 per cent. (from 29.4 abjas to 56.6 abjas). If, on the assumption of no change in the structure of real product, we take the correct figure of magnitude of growth in these (non-commodity) sectors to be same as in the commodity sectors, i.e. 45.5 per cent. (instead of 92.5 per cent.) it would seem that the overall growth

* Census of India, Paper No. 1 of 1962, Final Population Totals, p. XXV, Statement 18.

in the real product in India during this period was not 60.8 per cent. as shown by the conventional official data but about 45.5 per cent.

Correspondingly, the increase in the per capita real product during the fifteen year period would work out not 20 per cent. as shown by the conventional official data but only about 9 per cent.

As a first approximation, we have assumed that both the (commodity and non-commodity) sectors have grown at the same pace. But it is likely that the non-commodity sectors may have grown at a somewhat faster rate. Making a rough allowance for this, during the period under discussion, the aggregate real product may have increased by about 50 per cent. (against the official estimate of 61 per cent.) and the per capita real product by about 12 per cent. (against the official estimate of 20 per cent.).

Admittedly, the alternative figure offered here are extremely rough; but they do indicate the order of the magnitude of errors involved in the conventional official data on real product. The magnitude of error is evidently large; and there is, therefore, a strong case for a thorough recalculation of real product data.

While not denying the importance of the current prices series, it should be noted that in a country like India, where economic growth is the central goal of public policy, it is the constant prices series, of all the data on national income, that is most widely quoted and discussed among the economists, policy-makers and the wider public. It is, therefore, of great importance that if the real product data are found to suffer from any serious over-estimation, such as suggested by the above analysis, the matter should be promptly set right. The public should know the facts, however, bitter such a downward revision of the key data may be.

Preliminary & Confidential

IARNIW/66/17

**INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH**

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**PROBLEMS OF DEFLATING THE CURRENT PRICE SERIES
OF NATIONAL INCOME AND RELATED AGGREGATES**

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AHMEDABAD

9 - 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily
of the Organisations or Institutions to which they belong.

PROBLEMS OF DEFLATING THE CURRENT PRICE SERIES OF NATIONAL INCOME AND RELATED AGGREGATES

S.G. Tiwari and B. Kumar

1. Introduction:

1.1 Estimation of national income and related aggregates at current prices has received attention of many research workers in India but the field of real national economic accounting is still largely unexplored. An attempt had been made by the National Income Committee to present rough estimates showing the variations in real output of the country. The method of estimation involved the use of certain indicators to measure the change in national real output by covering each main category of contribution to national income and estimating it by method considered appropriate for that category. The major difficulty attendant on this procedure has been that in some sectors, estimates of output are based on the average earnings and number of workers rather than on the product approach. Since 1954, some work in the field of real accounts has been done in the Central Statistical Organisation, Reserve Bank of India, National Council of Applied Economic Research and also by some individual research workers. However, in view of the complexity of the problems involved in the compilation of real accounts, a lot of ground has yet to be covered. Broadly speaking, these problems are more in number as enumerated in the next paragraph.

1.2 The field of real national economic accounting includes real product by type of expenditure and by industry, measurement of real inputs and the conversion of non-product components of the accounts into real terms. The first problem relates to the comparability of products over time. As long as the requisite type of data in respect of new products and quality changes are not forthcoming, the estimates of real output would be biased. The second problem relates to the choice of appropriate method of estimation to serve a given objective. The national income may be used as a measure of aggregate welfare or as a measure of economic productivity. The former case would involve the compilation of indices of expenditure on final products by using the prices of final products as a basis of the weighting system. In the latter case the valuation rests on the cost basis since the factor cost of production may reflect in approximate degree the relative marginal productivities of factors taking part in their production. The third problem relates to the kind of price deflators used, relevance of the prices collected and the representativeness of the available price indices. The fourth problem relates to the choice of the base year.

1.3 There are certain other equally important related problems. In certain sectors such as general government services and financial institutions, it is difficult to define the unit of output. Again it is not always possible to deflate the non-commodity flows in an appropriate manner. The balancing of external transaction account involves a number of conceptual problems and technical difficulties. If the exports and imports are deflated by separate price deflators, the real imports might sometimes turn out to be larger than real exports, so that the real surplus becomes negative even though at current prices the surplus is.

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1. Final Report of the National Income Committee - February 1954 - Issued by the Department of Economic Affairs, Ministry of Finance, Government of India.

positive. In order to balance the accounts, it has therefore been suggested² that the export (or import) surplus be deflated directly by an implicit price index and an additional item 'trading gain' may be introduced.

1.4 In view of the fact that adequate data for compiling real accounts are not available at present, there is a need to make efforts for the collection of relevant data at least for the compilation of certain key aggregates. Ideally, it may be considered desirable to have a complete set of real accounts but from practical considerations it may be more appropriate to plan for a gradual development of the system.

1.5 In the present paper, an attempt has been made to focus attention on the first three problems relating to real output in the field of (i) industrial origin of gross national product at factor cost, (ii) private consumption expenditure, (iii) general government consumption expenditure, (iv) domestic fixed capital formation, (v) increase in stocks and (vi) saving, with which the research workers are generally faced. Gaps in statistical information and detailed estimational procedures have also been indicated.

2. Industrial origin of gross national product at factor cost.

Out of the four principal methods of computing value added in various sectors viz, (i) double deflation (ii) double extrapolation, (iii) extrapolation by quantity index of input and (iv) extrapolation by quantity index of output, a particular method has been suggested after taking into account the availability of data for a particular sector, the details of which are given in the subsequent paragraphs.

2.1 Agriculture: The contribution of agriculture sector accounts for about 50 per cent of the net output in India. The available data make it possible to adopt a double extrapolation or double deflation method in some detail. Sufficient information is not available about the various varieties and qualities of commodities produced. The price statistics relate to the commodities of average quality and it is not known as to how far they truly represent the actual production. As long as production of a particular variety of a commodity is not large enough for being considered as a common variety, the qualitative improvements get ignored. It, therefore, seems necessary to make arrangements for the collection of data on the price and output of important varieties of commodities in order to make them more representative. In certain cases the available information relates to the value of production only which calls for the compilation of appropriate price deflators. Further, for compiling the estimates of inputs at constant prices, the available data are also inadequate. The farm management studies provide some information which is incomplete; they provide data on inputs in value terms rather than in physical terms. The studies being localised in character are not representative for the State as a whole. Besides seeds, another important input relates to manure which includes inorganic (e.g. ammonium sulphate, super phosphate, urea, ammonium nitrate etc.) and organic manure (e.g. compost and farm yard manure, dung manure etc.). The available information on the use of various types of organic manures is very inadequate for compiling estimates of inputs at base year prices. Irrigation charges which represent the sale of water to the agriculture sector could be estimated by deflating the water charges in the current year by an appropriate index. An alternative method would be to determine the irrigation charges by multiplying the area under irrigation in the current year by base year charges per acre. The current repairs

2. Statistical Office of the United Nations, "National Accounts in Constant Prices" ST/STAT/CONF.7/L.9, April 1959.

and maintenance of implements and current cost of maintenance of bunds, irrigation works, fencing etc. constitute another item of input of the agriculture sector. Data available on this item are not adequate for compiling estimates of value of input. It may be desirable to break up the cost involved into two categories: (i) labour charges and (ii) cost of materials, for determining the real inputs. The other main items of input relate to market charges and cost of feed of livestock required on farm. The estimates of market charges at constant prices would again involve collection of necessary data. For estimating the cost of up-keep of livestock population it is necessary to determine the feed cost in respect of fodder, grains, concentrates, salt, ghee and medicines etc. at the base year prices.

2.2 Livestock production: This sector includes raising of livestock, poultry, rabbits, furbearing or other animals, bees and the production of milk, wool, fur, eggs and honey. Precise level of output in this sector is not known and the available data do not yield any information about the annual changes in the value of output. In view of the limitations of the data it is not possible to prepare reliable estimates of output at constant prices. The main items of input in this sector relate to the feed cost of non-service animals and the cost of materials. Estimates of feed cost can be compiled from the value of output of fodder crops, grass, husk, bran, stalks and straw. However, this procedure may lead to some anomalous results over a period/time. In a lean year with poor crops, total output in this sector, for instance, of milk and milk products would show an increase based as it is on the average milk yield rates per breeding/animals, whereas the input of concentrates, grains, rice-husk bran and straw etc. is likely to decrease because of the fall in the output of by-products of agricultural sector. This results in distortion of the value added both in the years of good and poor harvests because of the assumption that a constant proportion of the output is used as input. This situation therefore necessitates the use of estimation of feed cost on the basis of the livestock population. The cost of materials used as inputs could be determined at the base year prices if some information were available on the quantities and prices of such items. Difficulties are also experienced in estimating the value of increment in livestock population due to non-availability of data about the quality and weight of various types of animals over a period of time.

2.3 Agricultural services: This sector includes agricultural, animal husbandry and horticultural services on a fee or contract basis such as harvesting, baling and threshing, husking and shelling and preparing tobacco for auctioning, animal shearing, veterinary services, animal hospitals and care centres, pest destroying, spraying, pruning, picking and packing and operating irrigation systems and rental of farm machinery. Transportation of farm products by the producers themselves to established markets is included in the agricultural services in view of the fact that these services are ancillary activities of the primary producers. The output of certain agricultural services can be considered to be included in the agricultural sector as the prices used for evaluation of agricultural output include the value of such services. For certain types of agricultural services such as veterinary services and irrigation systems it is possible to make use of the data available in the government accounts. The outputs of veterinary services at current prices could be deflated by a price index of the rates of fees charged and the estimates of input at constant prices could be prepared by deflating the values of various items of inputs used.

2.4 Forestry and logging: It includes timber tracts, planting, re-planting and conservation of forests, gathering of uncultivated materials such as gums and resins, saps, barks, herbs, wild fruits and flowers, reeds and roots. It also includes charcoal burning carried on in the forests. The logging activities include felling and rough cutting of trees, hewing or rough shaping of poles, blocks, bolts and other wood materials and transportation of logs. A limitation of the outturn data is that they represent only the authorised exploited forest resources. No outturn figures are available in respect of most of the minor products. For the double deflation method, it would be appropriate to have an idea of the quantities and prices of some of the important minor products from the industries where they are used as items of inputs. The price data used for estimating the value of output in the sector contain an element of trade and transport charges. Determination of the adjustments for trade and transport charges at constant prices raises certain problems which are discussed under the wholesale and retail trade sector. Estimates of net output can be compiled by making arbitrary overall deduction in value terms for cost of various items of inputs, in the absence of information on such items.

2.5 Fishing and hunting: The activities included in this sector are hunting and trapping of wild animals and game propagation for commercial purposes not connected with sport. Fishing activities include ocean and coastal water fishing and inland water fishing, operation of fish hatcheries and fishing preserves. Fish curing activities and subsistence fishing and angling by all classes of people other than professional fishermen is also included in this sector. The measurement of national product at constant prices in this sector is difficult due to the inadequacy of data. However, it may be possible to obtain the quantity and value of output for various species of fish and to estimate the constant price series by making use of the base year prices. For estimating the inputs at constant prices, it would be necessary to distinguish between the various items of inputs such as expenditure on repairs and maintenance of boats, factory type vessels and materials. The estimates of repairs and maintenance could be compiled on the basis of total capital stock in this sector. For subsistence fishing, no information is available about the quantum of fish caught by non-professional fishermen and angling by other persons. In the case of fish curing activities it may be possible to find out quantity of salt used as an item of input but no information is available as to how much of fresh and cured fish is available for consumption.

2.6 Mining and quarrying: This sector includes extraction of minerals which occur in nature either as solids, liquids, or gases. The output of different minerals at constant prices can be prepared on the basis of the available data relating to the pithead value per unit in the base year and the quantity of minerals produced. Adequate information about the quantity of minor minerals is not available and as such it is necessary to compile a suitable deflator. Further, for estimating inputs it is necessary to ascertain the quantities and prices of various items used as inputs.

2.7 Factory establishments: There are various methods of preparing estimates of real output in this sector. One is to extrapolate the base year value added in each industry by quantity index of output. The second is to extrapolate both the base year value of output and input by quantity indices and obtain their differences in order to arrive at the value added. The third pertains to deflation of current value of output

and input by appropriate price indices. Each of these methods has been applied by research workers. The first procedure may be appropriate as long as the base year cost structure remains unaltered. The second procedure is considered more suitable when the base year cost structure undergoes a change. The third procedure is generally followed when data in respect of commodity outputs and inputs are available only in value terms and not in physical quantities. Data in respect of this sector in India have been collected in the Census of Manufacturing Industries (CMI) for 29 out of 63 groups of manufacturing industries³ for the period 1946 to 1958. The Sample Survey of Manufacturing Industries⁴ (SSMI) provide information for all the 63 groups of industries for the period 1950 to 1958. Since 1959, a comprehensive Annual Survey of Industries (ASI) has been introduced which has replaced both the CMI and the SSMI. This survey covers factories on a census basis which employ 50 or more workers and use power and 100 or more workers which do not use power. The remaining factories, namely, employing 10 to 49 workers with the aid of power/or 20 to 49 workers without the aid of power are covered on a sample basis. The CMI reports as well as the reports for the ASI relating to Census parts only contain data in respect of production of important commodities and inputs of important items with the result that the estimates of real output based on double extrapolation or double deflation method would relate only to a part of the sector, which although would be substantial from 1959 onwards, covers only half of the sector in the preceding period. However, real output series for each industry are not likely to be representative in view of lack of complete information. Further it is observed that the structure of outputs and inputs for a particular industry does not remain the same even during short period and hence this limits even the use of any of the deflation procedures.

2.8 Small manufacturing enterprises: It includes manufacturing enterprises both in the household as well as non-household sectors other than those included in the factory establishments. It is not possible to apply double deflation method for compiling estimates of real income in this sector because of non-availability of information about the quantity and value of outputs and inputs for each industry. The use of certain indicators relating to inputs and outputs is not likely to produce satisfactory results. For instance, moving the estimates pertaining to the benchmark year in respect of each group of industries on the basis of physical indicators of production of relevant commodities such as total handloom production for the textile industry and total availability of cloth for tailoring industry, availability of tobacco for the groups of industries, pan, bidi and tobacco and the availability of oilseeds for the industry, fat, and oils, etc. is not satisfactory. The available data about small manufacturing establishments both for the household and non-household sectors are inadequate for the purpose of compiling satisfactory estimates of real output over time.

2.9 Construction: This sector includes construction, repair and demolition of buildings, highways, streets and culverts, heavy construction of such projects as sewers and water mains, railway road-beds, rail-roads, piers, tunnels, subways, elevated highways, bridges, viaducts, dams, drainage projects, sanitation projects, aqueducts, irrigation and flood control projects, hydro-electric plants, water power projects, gas mains,

3. Employing 20 or more persons and using power were covered by the Census of Manufacturing Industries. The geographical coverage in the CMI has been gradually expanding.

4. They cover 10 or more using power and 20 or more not using power.

pipelines, marine construction such as dredging, under-water rock removal, pile driving, land draining and reclamation, construction of harbours and waterways, water-wells, airports, athletic fields, golf courses, swimming pools, tennis courts, parking areas, communication systems such as telephone and telegraph lines. Special trade contractors in the field of construction, such as carpenters, plumbers, plasterers and electricians are also included in this group. The nature of output of all the items given above has been changing from year to year. No data are available about the value and number of various types of units of accommodation in respect of buildings. Similar is the case in respect of various other types of constructions included in this sector. It is, therefore, not possible to use double deflation method for compiling real output series in this sector. Until detailed data about the value of output and the value of input of each type of construction become available, one may have to be satisfied with the method of carrying forward the base year value added figures by certain indicators relating to quantity/volume of inputs such as cement, bricks, timber, iron and steel etc.

2.10 Electric light and power: This sector includes generation, transmission and distribution of electric energy. The estimates of output of electric energy at base year prices can be prepared by moving the total sale proceeds from electricity with the help of total quantity electric energy sold. This procedure would be valid as long as the pattern of consumption of energy does not alter. However, in view of the fact that specific policy for the use of electricity is being pursued, a change in the pattern of consumption is inevitable even during a short period. In this situation it may be appropriate to move the base year sale proceeds for each type of uses i.e. (i) domestic and residential (ii) commercial (iii) industrial (iv) public water works and sewage pumping (v) traction (vi) public lighting maintenance and (vii) irrigation by corresponding quantities sold. The main items of inputs in this sector include (i) coal (ii) oil (iii) stores (iv) repairs and maintenance (v) purchase of energy and (vi) other expenses. The estimates at constant prices can be compiled by evaluating these items at the base year prices.

2.11 Gas manufacturing and distribution and steam: This sector includes manufacture of gas in gas works and the distribution of manufactured or natural gas to domestic and industrial consumers, production and distribution of steam for heating and power purposes. The main items of outputs in this sector include the receipts from (i) sales (ii) erection and installation and servicing contracts. The main items of inputs include purchases, maintenance of service vehicles, railway freight, installation and servicing contracts, electricity, coal and coke, postage telegrams and printing of stationery. The method of double deflation for compiling estimates of the real income can be applied to this sector provided adequate data are available about the quantity and value of main items of outputs and inputs.

2.12 Water Supply: It includes collection, purification and distribution of water to domestic and industrial consumers. Data relating to sale of water can be collected from the various local bodies and concerned departments of State Governments. There is a need to organise the regular flow of data relating to the quantity and value of sale of water to various categories of consumers such as households (for domestic consumption) and watering of lawns and to business concerns for construction of buildings and other uses. The base year estimates of output could be prepared by estimating the quantity of water used for different purposes by evaluating the consumption at base year prices. The main items of inputs include (i) repairs and maintenance (ii) silt clearing (iii) up-keep of motor vehicles (iv) disinfection of water supply (v) electric energy and (vi) filtration charges etc. The estimates of inputs at constant prices can be compiled by evaluating these items at the base year prices.

2.13 Wholesale and retail trade: Wholesale trade covers the re-sale (sale without transformation) of goods to business units and to institutions and it also includes importers and exporters, manufacturers' sales offices and agents, commission merchants and commodity brokers, commodity exchanges, petroleum bulk stations, assemblers and buyers of farm products and cooperative agricultural marketing associations. Warehousing grading and sorting which is associated with reselling is also included. Retail trade covers the re-sale (sale without transformation) of goods for personal or household consumption or utilisation. It also includes gasoline (petrol) filling stations and retail motor vehicles dealers, hawkers and peddlers and consumer cooperatives. For compiling estimates of gross output in this sector in respect of trade in commodities, there is a need to collect the data relating to quantities of commodities marketed, sale price per unit of commodity marketed and the traders' margins for various categories of commodity groups. The estimates at base year prices can be prepared by deflating the current price estimates by index numbers of wholesale prices for the wholesale trade and index numbers of retail prices for retail trade together with the index numbers of trade margins for appropriate commodity groups both for the wholesale and retail traders. It is of course presumed that the index numbers of wholesale and retail prices are broad-based enough so as to measure precisely the changes in the prices of the commodities traded. The main problem of this sector is the non-availability of data relating to total turnover and trade margins for various commodity groups on an annual basis. The estimates for this important sector both at current and constant prices are bound to be very weak as long as there is no improvement in the availability of the requisite type of data. The net output of commission agents could be estimated from the information relating to the number of persons engaged in this activity, the earnings of these persons and the changes in the commission charges.

2.14 Transport: The transport sector includes railway transport, tramway and omnibus operators, road passenger transport except omnibus operators, road transport not elsewhere classified, ocean transport except in coastal waters, water transport except ocean transport, air transport, services incidental to transport and transport not elsewhere classified.

2.14.1 Railway Transport: It includes transport by railway and allied services such as sleeping-car service and dining-car service. The main sources of income to railways arise from the movement of goods and passengers. The amount of income depends upon the passenger fares for various classes of accommodation and the freight charges for various commodities for varying distances. The services provided by the railways can be measured by (a) passenger kilometres for various classes of accommodation such as air-conditioned, first class, second class (mail, ordinary and air-conditioned) and third class (mail and ordinary) for various gauges (i) 1.676 m (ii) 1.000 m and (iii) 0.762 m and 0.610 m and (b) net tonne kilometres for various commodities such as coal and coke for the public, grains, oilseeds, cotton (raw-pressed or unpressed), cotton manufactured, marble and stone, salt, manganese ore, iron ore, other ores, oil fuel, kerosene oil, petrol, other mineral oils, sugar, cement, cement manufactured products, iron and steel wrought, wood un-wrought, jute raw-pressed or unpressed, vegetable oils, fruits and vegetables fresh, other revenue earnings commodities, railway coal and railway stores and materials for the various gauges. The real output can be measured by estimating the receipts from the movement of passengers and goods by various categories at the base year prices. The various items of inputs include (i) repairs and maintenance of way and works, locomotives, wagons and carriages, steamers and harbours, electrical services, signals and tele-communication services, (ii) coal, (iii) sales tax, excise duty and cess on coal, (iv) other fuel, (v) freight and handling charges on fuel, (vi) electric current for traction purposes, (vii) stationery forms and tickets, (viii) handling, collection and delivery of goods and expenses at out-agencies (ix) compensation for goods lost or damaged (x) clothing and stores and (xi) other expenses etc. The value of real inputs can be prepared by measuring the value of these items at the base year prices.

2.14.2 Air Transport: This includes transport by air of passengers and freight whether by regular services or by private charter and the operation of airports, flying fields, and air navigational facilities such as radio-beacons, flying control centres and radar stations. The income in this sector consists of receipts from passenger fares and freight rates charged for various commodities. The receipts of the Civil Aviation Department include fees for licensing and examination of aircraft, landing housing and parking charges and rent, water and electricity charges. The value of real output in this sector can be measured in the same way as for railway transport. It also includes services rendered to the foreign air transport companies in the nature of landing facilities. It is necessary to take into account the provision of transport facilities by various types of aircrafts to the extent possible. For the domestic product originating in this sector, it is necessary to include wages and salaries of the Indian nationals employed by foreign companies for their services in India and as such it would be necessary to make adjustments in the amount of wages and salaries for any increase in the dearness allowance or due to changes in the scales of pay of these employees.

2.14.3 Road and Water Transport: Road transport includes taxi cabs and other cabs, automobiles and carriages for hire and the operation of all other means of passenger transport by road, freight transport by road, the operation of fixed facilities for road transport such as highways, bridges, terminals and parking facilities. Water transport includes freight and passenger transport by sea on inland and coastal waters, maintenance and operation of piers, docks and associated buildings and facilities, pilotage, maintenance and operation of lighthouses and other aids to navigation, loading and discharge of vessels, maintenance and operation of canals, salvaging distressed vessels and their cargo. The problems of estimating real output in these activities are similar to those in the case of railway transport and air transport. However, there is one important limitation that the regular flow of data in the desired form is available only for the organised part of the sector. In the case of un-organised sector, the base year estimates of output at current prices may be moved by indicators like persons employed, number of transport vehicles used and the amount of increase in the use of physical inputs. As the available data for estimating net output are not adequate, it may be necessary to have a new base year every 5 years.

2.15 Storage and Warehousing: It includes the operation of storage facilities such as warehouses (including bonded warehouses), furniture repositories and safe deposits, when such storage is offered as an independent service. The available data for this sector relates to the warehousing corporations. Data for the cold storage and other storage facilities is not available. The output in this sector can be measured by evaluating storage charges for different commodities at the base year rates. Any special facilities provided should also be taken into account. The inputs in this sector include chemicals consumed, insurance charges, printing and stationery, warehousing licensing fee, repairs and maintenance etc. For estimates at constant prices, these items of inputs may be evaluated at the base year prices.

2.16 Communication: This sector includes communication services rendered to the public whether by post, wire or radio and whether intended to be received audibly or visually. It does not include radio broadcasting studios. The receipts in this sector include the postage and message revenues in the different branches of the Indian Posts and Telegraphs Department such as postal, telegraphs, telephones and radios. The main items of income are sale of ordinary stamps, sale of service stamps, postage realised in cash, telegraph charges, net receipts from radio companies, receipts on account of money orders, British postal orders and Indian postal orders, net fees for broadcasting receiver licences, rent of wires and instruments leased to railways and canals etc., telephone receipts in respect of rentals and local call fees, advance rentals under OYT Scheme, trunk call fees, royalties on licences for private telephone lines and systems and other miscellaneous fees and receipts. Postal saving banks activities and the postal life insurance activities are also undertaken by the Indian Posts and Telegraphs Department. The real output in this sector can be estimated by moving the base year output by appropriate physical indicators for each category of the services provided in this sector. The main items of inputs in this sector are travelling allowance, mail bags, payments to railways, ships and airmail carriers, petrol, electricity, repairs and maintenance expenses, printing and stationery charges etc.

2.17 Services: This sector includes sanitary services, financial services, real estate including ownership of dwellings, general government services, education and research, medical and health, welfare institutions, other community services, business services, recreation services, restaurants and hotels and other personal services.

2.17.1 Sanitary services: It includes garbage and sewage disposal and the operation of drainage systems. The sanitary services may be considered separately for the public and the household sectors. In the public sector each person engaged in this service is allotted a particular area after taking into account the workload of service involved. The quality of service rendered by various persons in the public sector varies in different local bodies. The density of population, the resources at the disposal of the local bodies, the civic standards of the inhabitants and the type of the local bodies play significant role in determining the quality of sanitary services in a particular locality. It is difficult to quantify the various items of output in this sector and as such the only way seems to be to take the total value of output in the base year for certain broad groups of local bodies and move it by the number of persons employed in this service. As regards the households sector, it is desirable to cull out data on the services of sweepers from the information available on the household consumption expenditure for a given year and to make efforts for collecting the required information both for the current year as well as the previous year. This would permit compilation of wage index which could be utilised for the purpose of deflating the total earnings of the sweepers for the real output series. If such information is not forthcoming it might be appropriate to make use of the figures of employment for moving the base year earnings of the sweepers. Information about the various items of inputs in this sector is not available and this may be usefully collected through certain type studies.

2.17.2 Financial services: The financial services include the services of banks and other financial institutions and insurance. They cover currency exchanges, clearing house associations and agencies of foreign banks, credit agencies other than banks such as rediscount and financing institutions, mortgage companies, industrial loan institutions, agricultural credit agencies, sales finance and industrial credit companies and personal credit companies, cooperative credit societies, investment companies, holding companies, security brokers and dealers, underwriters of financial security issues, security exchanges and exchange clearing houses, insurance carriers of all kinds such as life, fire, marine, accident, health, title, financial obligations, casualty, fidelity and surety, insurance agents and brokers etc.

2.17.2.1 Banks: The banking activities may be considered separately for the organised and the unorganised sectors. It is difficult to quantify the various services provided by this sector. The output in this sector can be measured in terms of actual and imputed incomes. The actual incomes are received in the form of commission and other banking charges. The imputed incomes are considered to be equivalent to the net investment income. The real banking charges can be determined on the basis of the number of accounts. Net investment income consists of income received in the form of interest on loans and advances and investment in securities, income from dividends, etc. less interest paid to depositors. Estimates of income in the form of

interest at base year prices can be compiled by deflating the total amount of loans with the help of index number of wholesale prices and determining the amount of interest accruing at base year interest rates. A similar procedure might be adopted for compiling estimates of dividends and interest paid at base year prices.

2.17.2.2 Insurance: Income in the insurance sector consists of the revenue from the premium receipts less payments for claims and surrenders. The services provided by this sector relate to covering of the risks of different types and to providing financial services to the households and other sectors. Life policies include whole life assurances, endowment assurances and miscellaneous. The miscellaneous category includes whole life limited, convertible whole life, janata, joint life, multi-purpose, anticipated endowment, special plans, double endowment, fixed term, educational annuity, pure endowment, triple benefit, two year temporary assurance, convertible term, mortgage redemption. The estimates of output at constant prices for the life insurance sector can be prepared by deflating the net revenue i.e. premia receipts less claims and surrenders by appropriate consumer expenditure prices index. The main items of inputs in the insurance sector include travelling expenses, medical fees, law charges, advertisements, printing and stationery, postage and telegrams, policy stamps, bank charges, tele phone charges and electric charges. The financial services of the insurance sector can be measured at the base year prices by compiling the indices for the rate of returns on the amount of money invested for different purposes such as government securities, loans to policy holders, loans to cooperative societies, investment in business concerns etc. As long as such information is not available, the total receipts may be deflated by an index of the rate of return on long term government securities. The method of estimation in the case of non-life insurance sector would be similar to that adopted for the life insurance with the exception that the wholesale price index in place of consumer price index might be used as a deflator.

2.17.2.3 Other financial institutions: These include state financial corporations, unit trusts, cooperative credit societies, industrial development corporations, investment companies, chit-fund etc. The main source of income of these institutions is interest and dividends. For certain institutions the output includes both investment income as well as sale proceeds from commodities and services. For such institutions it would be desirable to make efforts for collecting supplementary data in such a way as could permit preparation of separate accounts for various types of distinct activities. As long as requisite type of data are not available, it would be necessary to resort to allocation procedures. The problems in compiling real output for these institutions are similar to those in the banking sector. As regards unorganised sector of financial institutions, there is no regular flow of data. It would be useful to make efforts to collect information relating to the total amount of loan provided, classified by the rate of interest charged. In the case of chitfunds and other financial institutions which are

by purpose

deposits from their members, it would be useful to collect data about the changes in the commission charges, if any.

2.17.3 Real estate: Real estate includes land and estate companies and other similar organisations deriving their income from the owning and letting of houses, flats, lock-up garages and similar properties, house and estate agents, rent collecting agents. The major part of output in this sector accrues to land development companies, improvement trusts and property brokers. The output at base year prices can be determined from the current value of developed plots deflated by a suitable index. It may, however, be necessary to make certain adjustments on account of the varying types of developmental activities undertaken at different places at different times. The items of inputs include purchase price of land and materials used for developmental purposes. The property brokers derive their income from the commission on sale/letting of property. The amount of income depends upon the number and value of transactions. For compiling the estimates at base year prices, it is necessary to determine a suitable deflator which takes into account the changes in the rates of commission and the prices of various types of property.

2.17.4 Ownership of dwellings: Output in this sector may be considered separately for urban and rural areas. Data relating to yearly rentals in urban areas may be deflated by consumer price index numbers relating to the expenditure on the house rent for different classes of people. Estimates for rural rentals may be worked out on the basis of data relating to house tax collected by village panchayats in various states. In the absence of any appropriate indicator, the base year figure of net output may be moved by the number of persons in the rural areas. The main item of input in this sector relates to current expenditure on repairs and maintenance.

2.17.5 General government services: It includes Central and State Government and local bodies including armed forces, police and regular administrative departments and offices of Government. This sector does not include governmental activities other than administrative and regulatory in such fields as transport, communication, education, health, production, marketing and the operation of financial institutions, etc. The amount of payment made to government employees is in return for the service obtained by government which is measured in terms of total emoluments paid to them. Emoluments of a person may change every year because of experience and hence his having obtained an increment in the scale of pay in which he is placed. Thus as long as there are no changes in the pay structure or dearness allowances, the payments made to government employees will also measure their real output and hence the current and real output estimates would be the same. This means that the desirability or otherwise of a given level of payment to government employees because of changes in the cost of living or changes in the income of other classes of people in the society, is not under consideration in this context. There is no doubt that if there are no corresponding changes in the wage rates of government employees due to the change in the cost of living index, they are bound to be worse off or better off. This is a social problem which may not be considered in the context of measurement of real output/ it would not be appropriate to move the average base year earnings by the number of total employees as this does not take into account changes in the productivity. To some extent, this comment also applies to a procedure in which base year average earnings of government employees in different size groups of income are moved by the number of persons employed in these groups. According to

/ although it is an important problem in the context of
/ income distribution policies. For the measurement of
real output

National Income Statistics - Sources and Methods for U.K., there is not much to choose between two alternative indicators⁵ viz., (i) total pay and allowances deflated for changes in rates of pay and of allowances and (ii) changes in manpower employed, for the measurements of real output. This is valid so long as employment indicator is used most vigorously i.e. the labour of all the government employees is measured in terms of lowest possible unit of labour and allowances is made for the increase in productivity. The moment there is a deviation from it, the results obtained from these two indicators are not only bound to be different but are likely to be divergent in certain situations. A question in this connection may arise: "Would there be any increase in the productivity of government employees, when there is an all round increase in productivity and there is no change in the employment structure as well as scales of pay of government employees which could permit any increase in the average income of such employees?" Most probably this situation would arise when annual increments do not measure correctly the increase in productivity. The problem in such situations would be to determine the indicator that should be used for measuring an increase in productivity of government employees for which no payment is made.

2.17.6 Education: This includes universities, colleges, primary and secondary schools, technical, vocational and commercial schools, kinder-gartens, correspondence schools, own-account teachers, blind and deaf schools, arts and craft schools, music, dancing and other arts schools and automobile schools. The activities in this sector may be considered separately for the enterprises and non-profit institutions. In the case of enterprises, the real output estimates may be compiled by deflating the total fee receipts in various categories by an index of changes in the rates of fee charged. The fee receipts in the case of non-profit institutions both in the private and public sector do not represent the gross output. The output may be considered to be equivalent to the total current expenditure of such institutions. This means that the difference between the current expenditure and the fee receipts is considered equal to the imputed value of that part of output for which no charges are made from the students. This deficit in the incomes of these institutions is financed from different public funds, grants, income from property etc. The estimates of real output may be obtained by moving the output in base year by the number of students in various categories. Some adjustment may also be necessary if there is any change in the quality of the students over a period of time. The main items of inputs in this sector relate to the expenditure on electricity, chemicals, repairs and maintenance.

2.17.7 Research and scientific institutes : This includes the organisations primarily engaged in research usually on a non-profit basis in the agricultural, biological, physical and social sciences, meteorological institutes and medical research organisations. The output at current year prices in this sector may be considered to be equivalent to the total current expenditure. For compiling the

5. National Income Statistics, Sources and Methods, Central Statistical Office, London, 1956, p. 355.

real output, the base year current expenditure may be carried forward by the number of research papers brought out by these institutions after making due allowance for their quality to the extent possible.

2.17.8 Medical and health: This includes hospitals, sanatoria, nursing homes and similar institutions, maternity and child welfare clinics, nurses and midwives, consulting rooms or offices of physicians, surgeons and other medical practitioners, dental surgeons medical and dental laboratories. The problems in this sector are similar to those in the education services. The output at current prices of private medical practitioners can be measured by the fee charged by them from the patients. In the case of non-profit institutions, the value of output may be considered equivalent to the total current expenditure. For real output estimates, the base year current expenditure may be moved by the simple average of the relatives relating to (i) number of doctors, nurses, midwives, dais, nursing orderlies, technicians and dispensers, (ii) number of indoor patients, and (iii) number of outdoor patients. In the case of enterprises, the real output may be determined on the basis of (i) number of patients treated in clinics and (ii) number of patients visited at their residences. In the absence of the required type of data for the enterprises in this sector, the base year net output may be assumed to move in the same way as the net output for the non-profit medical and health institutions.

2.17.9 Welfare institutions: This includes organisations operating on a non-profit basis for the promotion of the welfare of the community, such as the Red Cross, organisations for the collection and allocation of contributions for charity, day nurseries, orphanages, homes for the aged and homes for the blind. The output at current prices in this sector may be considered equal to the total current expenditure and the imputed value of voluntary labour of individuals. The problem in the measurement of real output relates to the determination of the suitable indicators.

2.17.10 Other community services: This includes religious organisations, trade associations, professional and labour organisations, libraries, museums, botanical and zoological gardens and political organisations etc. The output at current prices in this sector may be considered equivalent to the current expenditure. Estimates of real output may be compiled on the basis of the number of persons employed in religious organisations, libraries, museums and botanical and zoological gardens and number of members of trade associations, professional and labour organisations and political organisations. The problem in this sector would be to determine the appropriate indicators for various types of services. In the case of religious organisations, the services could perhaps be measured more appropriately by the number of visitors. Similarly, in the case of libraries, museums and botanical and zoological gardens, the real output would be determined by the number of members of the libraries, number of persons visiting reading rooms, museums and botanical and zoological gardens, etc.

2.17.11 Business services: The business services include legal services, accounting, auditing and book-keeping services, engineering and technical services, employment agencies, news gathering and reporting agencies, journalists and writers etc. In the case of legal services, the data relating to the total employment without any break-downs are available in the census of Population 1961. There is a need to organise the flow of data about employment into various categories and also to undertake type studies/sample surveys for the collection of information relating to average earnings of each category of persons engaged in legal services. The estimates at current prices would in that case be worked out by multiplying the number of persons engaged in the services and the average earnings for each category of services. The real output could be determined on the basis of the average of relatives relating to number of original and appellate cases in civil and criminal suits. The real output in accounting and auditing services in the public sector could be determined in the same as for general government services. As regards the accounting and auditing services in the private sector, the problem relates to the collection of data about employment and earnings and the determination of an appropriate deflator. Available data relating to engineering and technical and other business services is not adequate.

2.17.12 Recreation services: This includes motion picture production, distribution and projection, theatres, sports and other recreation services. Output in the sector 'motion picture production, distribution and projection' can be estimated from the accounts of the undertakings engaged in this activity. The problem relates to the determination of an appropriate indicator for compiling real output series. As regards operation of cinemas, employment data are available from the Census of Population, 1961. The employment data for other years are not available. Estimates of earnings in this sector could be compiled from the information relating to entertainment taxes and the estimates at constant prices may be obtained by deflating the current price series with the help of changes in the rates of cinema tickets. The important items of input in this sector would relate to cost of films, electricity, transport charges, repairs and maintenance, etc. The output in the case of other recreation services can be determined if efforts are made to organise the regular flow of data from those establishments for which accounts are available. For that part of the sector for which accounts are not available, the estimates may have to be prepared on the basis of data relating to employment and average earnings.

2.17.13 Restaurants and hotels: This includes restaurants, cafes, taverns and other drinking and eating places, retail establishments selling prepared foods and drinks for immediate consumption on the premises, hotels, camps and other lodging places. There is a need to organise flow of data from big hotels for which accounts are available. For the rest of the sector, it would be necessary to collect the required data on the basis of sample surveys.

2.17.14 Other personal services: This includes domestic services, laundries and laundry services, cleaning and dyeing, barber and beauty shops, portraits and commercial photographic studios and other personal services and such as shoe shining, chimney cleaning, window cleaning, disinfecting and fumigating and costume renting. The employment data collected in the Census of Population, 1961 relate to (i) services rendered to households such as those by domestic servants and cooks, (ii) services rendered to households such as those by governesses, tutors and private secretaries, (iii) laundry services rendered by organisations and individuals including all types of cleaning, dyeing, bleaching and dry cleaning services, (iv) hair dressing, other services rendered by organisations and individuals such as those by barbers, hair dressing saloons and beauty shops, and (v) services rendered by portrait and commercial photographic studios. It is necessary to organise sample surveys which could provide data on employment and for necessary indicators to be used in the estimation of real output series.

2.18 Rest of the world account: There is a need to collect detailed data for various components of factor incomes received in India and paid abroad. The net factor income for India is generally negative. The purpose for which foreigners use the net outflow of factor income from India is not known. In case this income is used for financing the purchases of their export surplus, it is necessary to deflate it by an export prices index. However, if this negative net income flow adds to commodity import surplus, then this may be regarded as an important substitute and should be deflated by an import price index. Most probably the latter situation prevails in India.

3. Private consumption expenditures:

3.1 Estimates of private consumption expenditure can be prepared either by following commodity flow method or by utilising data collected through family budget surveys. For commodity flow method, information is generally available both about in respect of quantities as well as their prices and the real expenditure series can be prepared by evaluating the quantities of commodities consumed at the base year prices. However, as is commonly observed, the quality of the goods does not remain the same in all cases and this may call for necessary adjustment in the use of the base year prices. Commodity flow approach also entails a large number of assumptions relating to disposal of commodities produced in various sectors of the economy which introduces an element of bias in the estimates. An important limitation of this method is that it is incapable of providing consumption expenditure for persons in various size groups of income. This procedure, however, has the advantage that it ties up well with the commodity production in various sectors of the economy.

3.2 The family budget survey data is superior in several respects but by itself it cannot always provide satisfactory aggregate estimates of consumption expenditure. It may be possible to reduce sampling errors by having a large sample but the non-sampling errors in data relating particularly to rural areas may be sizeable so as to vitiate the results.

3.3 Through the consumer expenditure schedules, data is collected both for the quantity and value of the commodity purchased. For certain major items of consumption, it is possible to get satisfactory data on quantities. For the rest, consumption data in value terms is available.

This is a major area where the procedure of deflation is bound to be complex.

4. General government consumption expenditure:

It includes the expenditure on compensation of employees and purchase of commodities and services. The estimates for compensation of employees at base year prices can be obtained with the help of an appropriate wage index as discussed earlier in paragraph 2.17.5 in connection with the estimation of real income originating in general government services. The problems in deflating the current value of commodities and services are similar to those experienced for estimating the private consumption expenditure at base year prices which have been indicated in paragraphs 3.1 to 3.3. However, it may be added that adequate information is not available about the quantities of various commodities purchased by general government. The information collected by the Directorate General of Supplies and Disposals and published in the Directory of Government Purchases, relates to value of stores for which orders are placed by Government departments. The coverage of the data published in the Directory of Government Purchases is not complete in the sense that the orders below Rs.2,000/- are not taken into account. Further, the reporting from the State Governments in respect of government purchase is unsatisfactory. The Directorate General of Supplies and Disposals has also made some attempts to prepare the index numbers of purchase prices which can be considered as deflators for the series relating to general government consumption expenditure. These indices suffer from a number of limitations⁶ such as incomplete coverage and lack of necessary information for the compilation of the indices.

5. Domestic fixed capital formation

5.1 Estimates of domestic fixed capital formation at current prices can be compiled from the accounts of government administrative departments and departmental enterprises, government companies, statutory corporations and private corporate sector. For the non-government non-corporate sector, the available information relates to only certain particular years as collected by the Reserve Bank of India, the National Sample Survey and National Council of Applied Economic Research. Estimates of capital formation at constant prices can be compiled if information is available about the base year prices of various types of capital goods such as land, dwellings, non-residential buildings, other construction and works, transport equipment and machinery and other equipment. The data available in the accounts are in value terms and as such it is necessary to prepare an appropriate deflator. The information available in the Directory of Government Purchases is not adequate for the purpose. The Economic Adviser's index numbers of wholesale prices for machinery and transport equipment too have their limitations in the sense that they are not representative of the wide varieties of capital goods produced as well as imported into India. For

6. Index number of purchase prices for 1961-62 issued by the Statistics Directorate, pp. 9-11.

various types of buildings used for residential and non-residential purposes, the quantities and types of construction materials as also the type of labour would vary. This would call for compilation of separate indices of construction costs of certain standard types of buildings which can be considered as representative. Similar problems arise in the case of other construction and works such as bridges, roads, rail-roads, irrigation works, wells, land improvement etc.

5.2 Some data for the construction activity of the household sector in the rural and urban areas has been collected through sample surveys over different periods of time. For years other than those for which the data are available, estimates could be prepared by carrying forward and backward the base year estimates with the help of certain indicators. Estimates for the household sector at base year prices are, however, bound to be unsatisfactory because of non-availability of data on an annual basis.

6. Increase in stocks: Available information relating to value of stocks and changes therein is still more unsatisfactory. Some information about the increase in the value of stocks is available in the accounts of the public and the private corporate sectors. Further, the quantities of various commodities held by the Government as policy stocks could be ascertained. Available information about changes in stocks held by non-government non-corporate sector is very scanty. However, it may be possible to compile estimates of stocks of certain key commodities held by various sectors. Filling in of the gaps in statistical information in respect of stocks held in various sectors and the changes therein would take considerable time. In the case of corporate sector, a firm may adopt either the FIFO or LIFO method or a variant of these two for the purpose of evaluating its inventories. This procedure creates additional problems in this sector. There is also a need to collect data on the quantities of stocks of various commodities held by the producers mostly in the unorganised sector.

7. Saving: Estimates of saving at constant prices can be obtained as the difference of the real domestic product at market prices and the estimates of consumption expenditure at constant prices. The Reserve Bank of India and the National Council of Applied Economic Research have used the implicit price index in the official estimates of national income for deflating their estimates of saving at current prices. This procedure suffers from the limitation that it does not take into account the variations in the prices of consumer goods. This procedure will hold good as long as the price index implicit in national income estimates and the consumer price index of both household and general government are same. In actual practice it would be observed that they are not always identical. In such situations it would be appropriate to deflate savings by a combined index based on prices of capital goods, exports and imports.

8. Concluding remarks: In the preceding paragraphs relating to industrial origin of real national product, efforts have been made to indicate important items of output and input for most of the sectors of the economy which should be taken into account for the compilation of real output series. Data in respect of commodity outputs for commodity producing sectors is available in a large measure although here too there are a number of gaps especially in respect of construction and small manufacturing enterprises. However, data in respect of commodity inputs is not adequate.....(contd.)

For a large part of non-commodity producing sectors, data are still deficient and hence a pragmatic view has to be taken in deciding the specific procedure to be followed in the compilation of real output estimates. In view of the importance of precise measurement of growth, it is necessary that systematic studies on the subject of measurement of real output may be undertaken. This would also call for further collection of data which would help in the evolution of suitable techniques of measurement.

Preliminary & Confidential

IARNIW/66/1.8

INDIAN ASSOCIATION FOR RESEARCH IN NATIONAL INCOME AND WEALTH

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**REAL INCOME ORIGINATING IN THE FACTORY ESTABLISHMENTS
SECTOR — DOUBLE — DEFLATION APPROACH**

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AHMEDABAD

9 — 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

REAL INCOME ORIGINATING IN THE FACTORY ESTABLISHMENTS SECTOR -
DOUBLE-DEFLATION APPROACH

K.R.R. Iyengar and K.C. Taneja

Introduction.

1. The approach of double-deflation is generally accepted as conceptually the most satisfactory for estimation, at constant prices, of the industrial origin of the product. "This method is usually employed in the case of the centrally planned economies, and has been adopted as a basis for practical work in a number of the statistically advanced market economies. However, the extent to which the double-deflation method is in fact employed is constrained by the availability of suitable indicators for the quantity and price components of gross outputs and inputs."⁽¹⁾ The National Income Division (NID) of the Central Statistical Organisation (CSO) which is responsible for publishing estimates of national income every year has for quite some time past, been making concerted attempts to improve the estimates by using more reliable data which have become available over time and by adopting improved methods of estimation in sectors where it is feasible to do so. These have been brought out by the CSO in the form of "Proposals for a Revised Series of National Income Estimates for 1955-56 to 1959-60" (hereafter referred to as "proposals"). However, not much leeway has yet been made in the estimation of constant price estimates particularly due to the lack of proper data on indicators for deflation. In this paper an attempt has been made to employ the double-deflation method to estimate the contribution to national income by the factory establishments sector in India by using data collected annually through the industrial censuses and surveys. Before the method of estimation adopted in this paper is discussed, a brief reference to the methods of estimation which have already been tried may not be out of place.

Existing Practice.

2. Two methods of estimation have been tried ⁽²⁾ still now. The first method consists in deflation of estimates of net output at current prices by using the index numbers of prices of manufactured articles. In the second method the estimate of net output for the base year is carried forward by using the official index numbers of industrial production. As is recognised, both these methods have their defects. While in the former method changes in prices of industrial raw materials are not taken into account and also the index numbers of prices of manufactured articles may not be quite representative the latter method measures only changes in physical output. In addition there are the inherent drawbacks of any index of industrial production viz. that it does not cover new items of production started since the base year and that the weighting pattern based on the relative role of the industries in the base year may have changed subsequently. Of the two methods which were tried, the NID, however, considered the results of the second method as better.

Double-deflation.

3. The double-deflation method involves the deflation of output and input separately. For this purpose suitable deflators for each of them have to be constructed. In this paper, the inputs are further divided into two groups viz., raw materials etc. consumed, and fuel, power etc., used. In other words, separate deflators for each of the three groups viz. (i) products and by-products (ii) raw materials etc. and (iii) fuel, power etc. have to be constructed and used to estimate the net output at constant prices.

(1) U.N. Statistical Commission, XIII Session, Document No. E/CN.3/322.

(2) Vide "Proposals", p. 180.

Price Indices for deflation.

4. The most suitable deflator for each group is obviously a price index representative of the characteristic to be deflated. In this case these characteristics are obviously the various commodities manufactured by the industries, the different raw materials, and fuel, power etc. consumed. The prices of all these items are not directly available anywhere. However the annual reports of Census of Manufacturing Industries (CMI) do provide us with useful data from which the implicit prices can be worked out. The price indices thus obtained are the most appropriate as they are organic to the very system which provides data for the estimation of net output at current prices which is sought to be deflated.

5. As the data used have been taken from the CMI and the Sample Survey of Manufacturing Industries (SSMI) and a reference has been made at the end to the Annual Survey of Industries (ASI), it will not be out of place here to give a brief description of these industrial surveys along with their coverage and scope.

Census of Manufacturing Industries:

From 1946 to 1956, the Census of Manufacturing Industries (CMI) was conducted annually on a statutory basis, under the provisions of Industrial Statistics Act, 1942 and the CMI Rules 1945 made thereunder. The CMI covered only factories registered under Section 2(j) of the Factories Act, 1948 namely factories employing 20 or more workers on any day with the aid of power. Moreover, it was confined to the first 29 of the 63 groups into which the entire field of manufacturing sector was classified. The censuses for the years 1957 and 1958 were conducted on a voluntary basis as the Industrial Statistics Act was repealed with the enforcement of the Collection of Statistics Act, 1953.

Sample Survey of Manufacturing Industries:

A Sample Survey of Manufacturing Industries (SSMI) was conducted by the National Sample Survey covering all the 63 industrial groups with the exception of ordnance factories and Railway Workshops. It covered all the factories registered under Section 2m(i) and 2m(ii) of the Factories Act, 1948, i.e. the factories employing 10 or more workers on any working day, if using power, and employing 20 or more workers, if not using power. The classified list of factories registered under Section 2m(i) and 2m(ii) of the Indian Factories Act, 1948 maintained by the Chief Inspector of Factories in the different States of India formed the basis for the sampling frame adopted for the survey. The allocation among the 61 industries (and their subgroups) has been proportioned to the product of the total number of workers and standard deviation of output per worker (obtained from the results of earlier surveys). Unlike CMI, the SSMI gives a blow-up estimate for the entire population. Both CMI and SSMI provide data for the calendar years, except in the case of sugar industry for which year ending 30th June is adopted.

Annual Survey of Industries:

The Census and Sample Surveys from the year 1959 are being conducted on a unified basis designated as the Annual Survey of Industries (ASI) under the Collection of Statistics Act, 1953. In this survey, all factories registered under Section 2m(i) and 2m(ii) of the Factories Act, 1948 are covered. Data, however, are not collected from the Defence Installations, factories engaged in storage and distribution of oil and technical training institutions not producing anything for sale or exchange, even though these

were registered under the Factories Act, 1948. Within this coverage, all factories employing 50 or more workers if using power, and 100 or more workers if not using power are covered on complete enumeration basis and is known as the census sector of ASI. All other factories not covered in the census sector i.e. the factories employing 10 to 49 workers and using power, and 20 to 99 workers, if not using power, are covered on the probability sample basis and comprise the Sample Sector of ASI.

6. The QMI provides information for the years 1946 to 1958. It gives, inter-alia, for each industry covered, the following data:- (1) quantity and value of each important product and by-product and total value of all products and by-products (2) quantity and value of each important raw material etc. consumed and total value of all materials consumed and (3) quantity and value of important items of fuel, power etc. used and total value of all fuel, power, etc. From each of the above three sets of data the implicit price of each important item for all the years was calculated and a series of price indices with 1948 as base was obtained. 1948 was chosen in order to facilitate a direct comparison between these estimates of real output and the official estimates which also have 1948 as base. The authors however propose to follow this up, shortly, with another series of price indices with a more recent year (e.g. 1960) as base and prepare corresponding estimates of real output. For each industry, as many of the items for which separate information on quantity and value was available and as would ensure a large coverage in terms of quantity and or value were chosen and price indices constructed for each such item with 1948 as base. A combined index for all items in each group (i.e. output, materials etc. and fuel, power etc.) was then constructed by using, as weights, the values of the various items in the base year. This was done for all the industries. Out of the 29 industries two had to be left out. One was Producer Gas Plant which was discontinued in the QMI after 1958. The other was General and Electrical Engineering where range of products and by-products was so huge and varied that proper information on quantity and value for all of them are not available. No attempt has however been made to make any adjustments on this account. The series of price indices given are therefore based on only 27 industries. There were thus 27 series of price indices for each of the three groups being considered. For each group these 27 series were again combined and one series obtained by weighting them by the respective total group values in 1948. Thus three series of price indices were obtained for use in deflating the current price estimates of values of the respective groups. Table 1 presents the three series of price indices constructed as above. The indices for each industry, along with the weights used, for each of the three characteristics are presented in Tables A-1, A-2, and A-3 in the Appendix.

Mathematical Formula.

7. Reduced to mathematical symbols the method can be represented as follows:

Let the suffixes i , j and k denote the i^{th} industry, the j^{th} item selected and the current year. Further let the base year be denoted by the suffix o . Let also p stand for price index, v for value and q for quantity. Then

$$p_{ijk} = (v_{ijk}/v_{ij0})(q_{ij0}/q_{ij0})100$$

The price index for the i^{th} industry as a whole over all the items combined will then be given by

$$p_{ik} = \frac{\sum_j v_{ij0} p_{ijk}}{\sum_j v_{ij0}}$$

The combined price index over all industries for k^{th} year is obtained as

$$p_k = \frac{\sum_i V_{i0} p_{ik}}{\sum_i V_{i0}}$$

TABLE 1

Indices of Prices of Output, Raw Materials and Fuel Consumed

Base 1948 = 100

Year	Output	Materials Consumed	Fuel etc. Consumed
(1)	(2)	(3)	(4)
1951	133.4	154.6	102.2
1952	112.1	129.0	108.2
1953	103.8	112.1	111.8
1954	101.2	107.7	111.3
1955	99.1	100.6	111.4
1956	107.0	112.5	120.2
1957	109.8	117.6	130.9
1958	112.2	114.6	139.4

where V_{i0} represents the total value of the characteristic over all the items in the i^{th} industry in the base year.

8. One series of price indices as calculated above will thus be available for each of the three groups viz. products and by-products, materials etc. and fuel, power etc. If these groups are indicated by α, β, γ respectively the three series as constructed in this paper may be represented by P_K^α, P_K^β the suffix K denoting the year.

9. The total values of products and by-products, materials etc., and fuel, power etc. may now be respectively denoted by $V'_{\alpha K}, V'_{\beta K}$ & $V'_{\gamma K}$

which are at current prices. The values at constant prices would then be given by $V'_{\alpha K} / P_K^\alpha, V'_{\beta K} / P_K^\beta$ and $V'_{\gamma K} / P_K^\gamma$

10. As has been stated above, the QMI which provides data only for 29 industries has been used for construction of price indices for the outputs and inputs. The source of data for estimation of the contribution to national income from the factory establishments sector is however the SSMI which gives the estimates of these characteristics for the entire manufacturing sector. Price indices could not be constructed from SSMI since the latter does not give quantities of the products, materials etc., thereby making it impossible to calculate the implicit prices of the various items.

Therefore, the application of the price indices obtained from CMI data to the total values as given by SSMI for purposes of deflation was a matter of necessity rather than of choice. This however cannot be considered a drawback as the trends of prices of the various characteristics in all industries are generally affected by similar market conditions and therefore the prices implicit in CMI data can reasonably be expected to reflect also the trends of prices for the industries covered by SSMI, particularly when the latter includes also the industries covered by CMI, although on a sample basis.

Value Added by Manufacture

11. The value added by manufacture is given by value of output less value of input. Value of output comprises value of products and by-products plus cost of work done for other concerns and value of input comprises values of raw material, fuel, electricity etc. and cost of work done by other concerns. Values of products and by-products, materials consumed and fuel, power etc. used were obtained from the annual reports of the SSMI for the years 1951 to 1958 and each of these series was deflated by using the corresponding price indices constructed as described above. The estimates presented in this paper are restricted to 1951 to 1958 as this is the period for which SSMI data are available. The difference between the deflated values of materials and fuel, power etc., gave what may be called gross value added by manufacture i.e. gross of the net cost of industrial servicing (i.e. cost of work done for others minus cost of work done by others) at constant prices.

Contribution to National Income

12. Contribution to national income from the factory establishments sector is obtained from the value added by manufacture by deducting certain miscellaneous operational costs, insurance premia and imputed bank charges and depreciation. Proceeding from gross value added therefore, deductions were to be made on account of net cost of industrial servicing, miscellaneous operational costs, insurance and bank charges and depreciation. The deduction on account of miscellaneous operational costs was made only upto 1954 as from 1955 onwards the SSMI data on inputs are already inclusive of such costs. For 1951 to 1954, following the "Proposals", this has been taken as 0.5 percent of the gross value added. For insurance and bank charges as well, the available official estimates were utilised. As regards depreciation, SSMI does not give the necessary information. In the official estimates it is estimated as a certain percentage of gross output based on the CMI data. However, depreciation, it is felt, is more closely related to fixed assets rather than to the value of the output. Hence depreciation for each year was calculated by applying the proportion, in that year, of depreciation to fixed assets obtained from CMI to the value of fixed assets as per SSMI on the obvious assumption that the CMI proportions hold good for SSMI also. Calculated this way, the estimates turn out to be higher (than the official estimates) by about Rs. 6 to 14 crores during 1951 to 1953, of about the same order during 1954 to 1956, and substantially lower in 1957 and 1958.

Deflation of deduct items.

13. Having obtained estimates of all the above deduct items, the question then was one of deflating them to obtain the estimates at constant prices. In the case of miscellaneous operational costs, it was not considered worthwhile to attempt any deflation as it constituted a very small proportion of the gross value added and further, for four years these were already included in the value of input as given by the SSMI. Net cost of industrial servicing as well as insurance and bank charges were also not deflated for lack of proper and relevant deflators. (Suggestions from delegates in this respect will be most gratefully welcomed.) As for depreciation it was originally thought that the wholesale price index for machinery and transport equipment might be a suitable deflator. But this has its drawbacks. For one thing, the index does not take into account construction which would be part of the assets for which depreciation is provided. Secondly the nature of the machinery and equipment included in the index and that normally owned by the factories is not known. However on more careful thought it was felt that depreciation, after all, need not be deflated at all. Depreciation, at least conceptually, is meant to be provided for an asset on the basis of the book value of the asset. That is, irrespective of the value of the asset during the current year, the depreciation provided is only on the purchase value of the asset. This suggests that the depreciation is already at a constant price; otherwise at the current price it would have been much higher. Further, considered in this light, it will be seen that the 'base' is also different for different assets depending on when each was purchased and hence no adjustment can be attempted at all. This argument will not however apply to that portion of the depreciation which has been provided on assets bought during the current year. This is given, in each year, by the increase in depreciation during that year. Such increases were calculated and it was found to be of the order of only Rs. 4 to 6 crores throughout the period. Moreover even this cannot be deflated by the index number of wholesale price of machinery and transport equipment since the chances of the machinery bought during the current year not having been there during the base year are much greater. In view of this it was decided not to deflate estimates of depreciation either. (How far these arguments can be considered tenable is an important point on which the authors would very much appreciate having the considered views of the delegates.)

14. Estimates of value added by manufacture for the years 1951 to 1958 at current and constant prices by the double-deflation method are presented in Table 2. Contribution to national income after making the necessary deductions are presented in Table 3.

Comparison with official estimates.

15. As the method employed to obtain the official estimates at constant prices is quite different from the double-deflation method used here, the two sets of estimates cannot obviously be expected to reflect the same trends. However the two estimates are presented side by side in Table 4.

TABLE 2: Value Added by Manufacture at Constant (1948) Prices, 1951-58.

Item (1)	Value in Rs Crores Price index with 1948 = 100							
	1951 (2)	1952 (3)	1953 (4)	1954 (5)	1955 (6)	1956 (7)	1957 (8)	1958 (9)
1. Value of products and by-products	2136.56	1999.64	2011.09	2150.81	2249.50	2816.23	2891.96	3051.18
2. Price index of " " "(1948=100)	133.4	112.1	103.8	1101.2	99.1	107.0	109.8	112.2
3. Value at 1948 prices	1601.62	1783.80	1937.47	2125.31	2269.93	2631.98	2633.84	2719.41
4. Value of materials consumed	1494.47	1362.79	1300.02	1393.90	1505.90*	2001.01*	1923.62	1952.35
5. Price index of " " (1948 = 100)	154.6	129.0	112.1	107.7	100.6	112.5	117.6	114.6
6. Value at 1948 prices	966.67	1056.43	1159.70	1294.24	1488.04* ^o	1772.37* ^o	1635.73	1703.62
7. Value of fuels etc. consumed	67.86	81.69	80.49	76.36	**	**	102.01	115.61
8. Price index of fuels etc. "(148 = 100)	102.2	108.2	111.8	111.3	111.4	120.2	130.9	139.4
9. Value at 1948 prices	66.40	75.50	71.99	68.61	**	**	77.93	82.93
10. Total input at 1948 prices (6+9)	1033.07	1131.93	1231.69	1362.85	1488.04 ^o	1772.37 ^o	1713.66	1786.55
11. Value of services sold net of purchases	46.68	57.78	51.01	(-) 25.54	(-) 28.10	+	(-) 15.53	101.46
12. Value added (1-4-7+11) ⁺⁺ (at current prices)	620.91	612.94	681.59	655.01	715.50	815.22	850.80	947.95
13. Value added at 1948 prices ⁺⁺ (3-10+11)	615.23	709.65	756.79	736.92	753.79	859.61	904.65	1034.32

* Includes value of fuel etc. etc. ** Included in materials consumed. ⁺⁺ Gross of depreciation
^o Included in value of products and by-products. ^o The combined deflator used for materials, fuel and others is 101.2 for 1955 and 112.9 for 1956.

TABLE 3

Contribution to National Income from Factory Establishments Sector

Year	1		2				Rs. Crores	
	Value added by manufacture		Depreciation	Operational Costs	Insurance & Bank charges	Total deductions (4+5+6)	Contribution to National Income	
	Current prices	1948 prices					Current prices (2-7)	1948 prices (3-7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1951	620.91	615.23	48.77 (42.65)	3.61	12.32	64.70	556.21	550.53
1952	612.94	709.65	53.04 (42.76)	3.62	13.21	69.87	543.07	639.78
1953	681.59	756.79	56.72 (42.91)	3.80	13.59	74.11	607.48	682.68
1954	655.01	736.92	54.03 (54.58)	4.07	14.09	72.19	582.82	664.73
1955	715.50	753.79	58.57 (57.28)	@	15.74	74.31	641.19	679.48
1956	815.22	859.61	63.14 (65.32)	@	19.00	82.14	733.08	777.41
1957	850.80	904.65	69.20 (83.61)	@	20.35	89.55	761.25	815.10
1958	947.95	1034.32	75.12 (99.41)	@	22.03	97.15	850.80	937.17

1 Gross of depreciation

2 Figures in brackets are official estimates given here for comparison.

@ Already accounted for in value added by manufacture.

Table 4 : Comparison with Official Estimates.

Year	Official Estimates		Authors' Estimates		Implicit price Indices	
	Current prices	1948 prices	Current prices	1948 prices	Official estimates	Authors' estimates
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1951	640	552	556	551	116.0	100.9
1952	636	590	543	640	107.8	84.8
1953	692	652	607	683	106.2	88.9
1954	747	697	583	665	107.2	87.7
1955	782	758	641	679	103.2	94.4
1956	901	827	733	777	108.9	94.3
1957	977	852	761	815	114.7	93.4
1958	997	864	851	937	115.3	90.8

16. On an examination of the two sets of estimates, it is noticed that whereas there is a gradual and uninterrupted increase in the case of the official estimates, there is a decline in 1954 in the case of the estimates by the double-deflation method. Comparing the two figures year for year it is noticed that the official estimates are lower in 1952, 1953 and 1958 and, higher in all the other years, the difference being of the order of Rs.50 crores in 1952 and 1956 and of the order of Rs.75 crores in 1955 and 1958.

Glaring Contrast

17. A more glaring contrast is however noticed when these two sets of estimates are compared with the corresponding current price estimates. Except in 1951, the authors' current price estimates are lower than the constant price estimates in all the years whereas it is quite the opposite in the case of the official series. This will be clearer from a comparison of the implicit price indices for the two sets of estimates. These are also presented in Table 4. These show that whereas for the official series the implicit price index declined in 1952, 1953 and 1955, in the case of the double-deflation method, the implicit price index declined in all years except 1953 and 1955. The former shows an overall increase in prices (compared to 1948) whereas the latter reveals an overall decrease for the whole period except 1951. This is clearly contrary to the popular impression that the prices have in general risen and that therefore the current price estimates should be higher than the constant price estimates. On an examination of the method adopted and the actual figures involved, however, it appears that the above impression need not necessarily be correct as will presently be explained.

18. The double-deflation method involves the deflation of the values of output and input separately and deduction of one from the other. It is obvious therefore that the trend in the net deflated values will depend on the trends in the deflators i.e. the price indices. This can be easily done from Table 1. It can easily be seen that the index for materials consumed is

higher than that for output in all the years — higher by as many as 21 and 17 points in 1951 and 1958. In the case of fuel consumed also, the indices are much higher than those for output in all years from 1953 onwards. This means that due to deflation the inputs get reduced by a larger magnitude than the output thereby increasing the net figure after deflation as compared to the same before deflation. One important reason for the differing trends in the two series of deflators seems to be that whereas the values of inputs are purchase prices at probably wholesale rates (and therefore would include indirect taxes, transport charges etc.), the values of output are at factor-cost and perhaps the major portion of the increase in prices is due to increase in the indirect taxes involved rather than in the cost of the factors of production. In view of all this, it appears that although there has been an overall increase in market prices, in so far as deflation of contribution to national income from the factory establishments is concerned, there has been an overall decline in the implicit price index over the whole period.

Some Final Observations.

19. The merits of the double-deflation method are well known. The most important merit is that it takes into account the relative changes in prices of not only outputs but also the raw materials and other inputs. Secondly the price indices, as constructed in the present paper, cover all possible items of inputs as well as outputs and are based on the same data as are used for national income purposes. The methods adopted in this paper with their limitations are only an attempt to demonstrate that it is possible to employ the double-deflation method to obtain estimates of real income so far as the factory establishments are concerned. With the commencement of the Annual Survey of Industries (ASI) from 1959 onwards and the comprehensive coverage and nature of data being collected in the same, it should be possible to put the estimates of real income, at least from 1959 onwards, on a firm footing based on the double-deflation method.

APPENDIX

Prices of Products & By-products in All Industries, 1946-1958.

Industry	Weights	(1943 = 100)													
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1. Wheat flour	1865	71.4	72.4	100.0	97.5	94.5	94.2	96.0	97.8	102.0	73.5	86.3	86.3	87.5	
2. Rice milling	4406	73.1	77.1	100.0	101.6	105.6	106.0	117.5	130.4	116.3	113.7	134.5	151.6	150.8	
3. Biscuit making	366	79.7	92.9	100.0	97.7	100.0	103.7	97.7	95.0	93.3	95.6	92.6	101.0	106.0	
4. Fruit & Vegetable processing	79	83.6	79.0	100.0	87.4	84.1	91.2	96.3	88.1	86.4	101.0	89.8	113.8	102.5	
5. Sugar	6597	70.5	122.0	100.0	91.6	107.6	104.3	90.9	99.6	85.5	82.7	90.3	94.6	96.6	
6. Distilleries & Breweries	265	94.4	100.2	100.0	105.7	101.2	109.9	119.0	111.0	120.1	117.9	124.4	114.7	114.8	
7. Starch	66	118.9	132.7	100.0	121.4	147.5	152.2	132.6	143.7	100.7	84.8	94.2	113.9	109.4	
8. Vegetable oils	10317	72.0	97.6	100.0	103.4	123.0	137.5	101.4	112.2	92.8	73.3	100.9	111.6	111.9	
9. Paints & Varnishes	581	74.3	80.2	100.0	106.6	109.4	107.0	102.3	105.3	104.5	104.9	113.3	126.1	127.2	
10. Soap	1408	78.0	100.8	100.0	106.8	105.0	129.2	129.0	110.4	119.4	129.0	137.5	140.3	156.3	
11. Tanning	621	89.2	88.2	100.0	97.3	113.4	133.4	106.4	111.9	107.5	107.9	102.8	112.0	113.2	
12. Cement	695	73.9	75.7	100.0	99.4	123.6	138.6	126.6	113.3	111.1	115.6	111.3	102.6	104.7	
13. Glass & glassware	395	104.7	93.6	100.0	76.3	82.6	91.1	89.3	82.9	83.3	78.7	77.5	86.4	88.6	
14. Ceramics	313	131.8	97.5	100.0	102.3	92.1	107.8	101.9	111.6	106.0	103.0	104.8	111.3	117.9	
15. Plywood & teacheads.	166	93.9	98.9	100.0	93.6	94.0	123.3	100.6	84.4	94.3	81.5	106.0	116.2	117.7	
16. Paper & paper board	1005	81.3	84.1	100.0	111.2	118.3	126.7	124.3	125.6	123.8	125.2	126.5	130.2	143.4	
17. Matches	671	89.7	82.8	100.0	96.6	100.0	100.9	104.4	103.3	93.9	90.3	95.6	95.5	106.5	
18. Cotton textiles	35493	75.0	82.2	100.0	101.8	98.4	135.8	112.6	102.7	103.9	101.5	107.9	104.5	107.6	
19. Woollen textiles	840	66.9	93.0	100.0	103.0	112.2	154.8	116.7	119.5	121.0	125.6	118.2	137.8	154.2	
20. Jute textiles	16049	56.5	81.6	100.0	105.1	118.6	164.2	119.6	85.5	87.9	90.4	86.7	90.0	83.7	
21. Chemicals	2059	75.9	77.4	100.0	85.7	111.3	125.9	138.3	103.2	96.8	93.5	98.2	104.6	108.2	
22. Aluminium, copper & brass	1838	94.0	89.4	100.0	100.0	102.4	126.7	121.1	116.2	96.5	104.0	110.7	108.9	106.6	
23. Iron & Steel	4325	79.0	81.9	100.0	104.7	104.4	108.9	119.6	126.7	153.2	160.0	186.7	200.6	229.6	
24. Bicycles	83	75.6	111.7	100.0	101.7	112.2	115.8	124.5	139.2	139.6	133.2	133.7	127.9	124.1	
25. Sewing machines	59	94.2	113.9	100.0	91.9	96.4	95.2	90.0	81.3	77.2	87.9	89.8	92.7	84.9	
26. Electric lamps	60	85.1	94.3	100.0	110.9	105.5	107.1	99.4	104.5	96.4	97.9	96.9	81.5	77.7	
27. Electric fans	261	80.4	86.8	100.0	101.7	105.4	105.9	105.5	111.1	113.6	110.3	111.6	99.9	98.8	
All Industries	90888	72.2	87.0	100.0	101.5	107.1	133.4	112.1	103.8	101.2	99.1	107.0	109.8	112.2	

Table A-2. Indices of Prices of Materials Consumed in All Industries, 1946-1958.

(1948 = 100)

Industry	Weights	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1. Wheat flour	1683	73.9	73.9	100.0	98.1	98.3	99.9	111.3	118.7	95.3	79.9	91.7	93.6	93.6
2. Rice milling	4178	69.7	81.0	100.0	106.4	109.6	111.5	122.0	133.9	117.1	110.8	132.8	151.4	152.3
3. Biscuit making	224	63.6	75.2	100.0	93.5	92.3	104.9	106.1	109.2	98.2	87.3	92.5	96.4	99.5
4. Fruit & vegetable processing	31	65.6	78.7	100.0	102.2	77.9	76.4	60.7	100.3	89.7	92.2	98.0	105.4	120.1
5. Sugar	4567	76.6	116.8	100.0	98.3	102.7	102.7	80.8	86.5	85.3	82.2	83.5	85.0	86.1
6. Distilleries & Breweries	112	103.8	103.3	100.0	116.7	87.3	98.3	97.3	92.7	89.1	88.1	82.5	84.0	88.0
7. Starch	46	104.4	95.9	100.0	98.5	99.9	125.1	119.3	102.0	91.8	95.9	94.0	95.3	101.1
8. Vegetable oils	9223	50.9	90.6	100.0	116.6	133.7	145.5	111.1	119.8	99.5	74.6	107.5	120.1	117.1
9. Paints & Varnishes	376	69.7	100.1	100.0	124.7	142.3	176.6	165.6	122.1	115.3	119.2	135.9	142.7	144.4
10. Soap	993	80.2	85.2	100.0	112.7	127.1	140.3	106.6	104.0	88.2	78.2	92.7	103.0	100.4
11. Tanning	493	82.6	113.3	100.0	107.6	113.5	142.0	101.9	105.4	109.8	111.8	68.2	69.7	112.6
12. Cement	216	70.1	86.1	100.0	111.1	109.3	138.2	148.5	112.5	103.7	106.1	105.6	109.4	109.3
13. Glass & glassware	128	44.4	98.4	100.0	99.4	103.3	122.8	119.0	141.9	115.5	108.2	120.4	120.6	121.5
14. Ceramics	68	85.4	91.3	100.0	108.3	111.2	119.3	113.5	120.2	123.3	126.0	128.7	136.2	140.4
15. Plywood & teachefts	91	53.6	67.2	100.0	102.4	104.0	121.4	120.3	104.9	103.4	108.2	114.9	115.0	130.7
16. Paper & paper board	272	69.3	81.7	100.0	104.2	100.8	109.5	113.5	96.3	102.6	113.2	103.9	99.1	113.4
17. Matches	294	79.3	89.4	100.0	100.5	107.0	114.7	131.6	119.1	113.3	111.1	91.7	122.1	117.8
18. Cotton textiles	17597	73.3	80.0	100.0	126.3	147.0	186.1	100.4	129.2	130.1	116.9	127.1	127.6	123.6
19. Woollen textiles	392	93.7	93.5	100.0	115.1	174.3	301.2	199.9	219.8	225.2	215.4	221.2	245.1	235.7
20. Jute textiles	11456	40.3	79.0	100.0	105.1	118.6	168.9	118.4	71.7	74.7	83.0	81.0	83.6	72.7
21. Chemicals	1078	100.4	133.4	100.0	114.0	126.3	100.2	95.4	91.6	84.8	70.5	88.7	99.4	104.3
22. Aluminium, copper & brass	1275	76.1	85.7	100.0	108.3	116.7	152.8	158.9	151.4	137.8	166.1	185.3	155.2	140.4
23. Iron & Steel	1339	79.7	80.4	100.0	111.6	119.0	124.2	141.6	141.6	177.3	190.9	232.9	268.6	289.6
24. Bicycles	33	99.3	91.2	100.0	93.2	115.1	121.4	126.8	129.0	125.5	132.1	151.4	153.1	158.5
25. Sewing machines	13	195.5	104.3	100.0	202.1	208.1	246.6	289.1	298.2	295.1	277.6	270.7	341.1	347.9
26. Electric lamps	31	112.7	101.6	100.0	101.1	108.5	107.1	123.3	128.2	127.7	132.7	134.2	133.1	133.6
27. Electric fans	130	62.5	73.8	100.0	75.6	92.7	104.8	118.3	113.0	117.1	118.8	149.6	135.2	137.9
All Industries	56339	63.9	72.5	100.0	109.1	122.6	154.6	129.0	112.1	107.7	100.6	112.5	117.6	114.6

Table A-3. Indices of Prices of Fuel etc. Consumed in All Industries, 1946-1958.

(1948 = 100)

Industry	Weights	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1. Wheat flour	23	95.0	102.0	100.0	100.9	99.3	113.7	92.2	104.9	113.5	113.9	122.2	126.7	133.4
2. Rice milling	53	82.9	95.5	100.0	97.8	102.4	102.7	109.0	105.3	102.3	102.1	109.6	118.7	119.3
3. Biscuit making	8	99.1	91.9	100.0	97.2	103.6	87.0	90.7	92.7	98.2	95.5	99.0	105.1	109.6
4. Fruit & vegetable processing	1	246.1	190.8	100.0	103.6	104.3	105.3	99.8	93.1	94.3	106.9	125.5	133.3	130.7
5. Sugar	115	87.2	93.2	100.0	94.8	93.0	104.3	113.1	114.4	101.2	107.3	116.3	123.2	125.2
6. Distilleries & Breweries	23	83.0	90.0	100.0	85.7	89.7	91.5	92.8	94.9	96.1	96.3	100.3	109.3	114.7
7. Starch	2	95.3	105.1	100.0	112.2	112.5	122.6	133.1	127.2	124.9	122.3	129.2	135.5	138.7
8. Vegetable oils	158	97.7	92.1	100.0	99.8	96.4	100.6	106.7	112.9	108.7	110.1	117.3	121.9	124.4
9. Paints & varnishes	4	87.4	90.1	100.0	101.1	108.8	104.4	107.5	108.1	103.8	107.1	115.1	119.0	131.1
10. Soap	18	82.8	92.2	100.0	96.1	90.9	79.6	92.1	91.3	96.1	94.9	99.4	103.2	105.8
11. Tanning	6	100.5	92.1	100.0	107.9	109.5	121.1	120.0	127.7	127.6	127.2	128.2	131.2	136.2
12. Cement	143	87.9	92.4	100.0	113.6	106.5	108.0	123.9	127.6	123.2	123.2	132.7	147.1	154.7
13. Glass & glassware	73	81.0	96.8	100.0	99.4	87.5	88.6	93.2	96.6	93.7	90.8	97.9	106.3	101.9
14. Ceramics	52	98.9	101.4	100.0	104.7	103.8	104.0	113.9	118.7	117.3	118.7	127.8	145.8	154.4
15. Plywood & teachefts	4	87.1	88.5	100.0	109.0	115.7	119.4	123.7	142.7	122.6	134.9	123.1	133.9	136.3
16. Paper & paper board	104	93.2	98.2	100.0	99.7	105.6	105.9	109.7	111.8	112.1	111.3	117.4	132.1	141.9
17. Matches	7	147.7	170.4	100.0	117.4	115.9	119.1	129.5	128.6	143.7	141.1	147.4	154.8	157.5
18. Cotton textiles	1046	93.1	95.1	100.0	109.1	110.7	108.8	116.9	124.5	124.1	123.1	131.6	139.6	147.9
19. Woollen textiles	23	89.3	88.3	100.0	106.3	104.7	106.8	120.1	125.5	133.0	109.3	133.6	139.3	141.8
20. Jute textiles	295	89.3	89.7	100.0	106.2	105.1	99.5	103.0	90.7	100.0	99.5	106.4	117.0	128.7
21. Chemicals	90	67.4	88.1	100.0	93.3	89.2	89.2	79.7	81.5	68.2	72.8	76.2	83.1	96.1
22. Aluminium, copper & brass	68	70.5	79.8	100.0	96.2	96.3	98.7	109.5	108.9	80.0	76.7	81.1	90.3	99.5
23. Iron & Steel	723	79.5	84.8	100.0	99.2	96.5	95.6	99.7	104.5	107.6	108.9	121.0	137.6	149.1
24. Bicycles	2	59.6	52.7	100.0	53.4	62.0	64.9	73.2	73.6	74.4	73.5	73.7	69.7	73.4
25. Sewing machines	1	116.1	105.4	100.0	100.9	100.0	99.0	102.3	104.6	96.7	90.6	95.2	111.1	145.2
26. Electric lamps	3	88.0	102.0	100.0	96.0	97.8	97.2	98.0	106.3	98.2	114.9	108.0	112.3	127.8
27. Electric fans	3	111.9	116.8	100.0	106.2	101.0	93.5	97.4	101.3	101.2	99.4	93.2	95.6	109.7
All Industries	3048	87.6	91.6	100.0	103.7	102.7	102.2	108.2	111.8	111.3	111.4	120.2	130.9	139.4

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IARNIW/66/1-9

INDIAN ASSOCIATION FOR RESEARCH IN NATIONAL INCOME AND WEALTH

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**TRENDS IN PRODUCTIVITY AND PRICES IN SELECTED
MANUFACTURING INDUSTRIES IN INDIA, 1948 - 63**

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AHMEDABAD

9 - 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

TRENDS IN PRODUCTIVITY AND PRICES IN SELECTED MANUFACTURING INDUSTRIES IN INDIA - 1948 to 1958

Grace Majumdar

Introduction

Productivity is one of those subjects about which much has been said and written in the recent years. But unfortunately, it is also one of those few words in economics which have aroused many different and sometimes conflicting interpretations. It is, therefore, necessary at the very outset, to define the term precisely. The term productivity may be defined as the ratio of output to any or all the inputs employed in production.⁽¹⁾ Output and input are measured in physical volume terms, since the purpose of the productivity analysis is to get at the efficiency with which the resources are utilized. Ratio of the physical volume of output to any particular input or class of inputs such as labour, capital or materials are useful in showing changes in requirements of the particular input or inputs over time. These ratios are generally expressed as index numbers since the main interest lies in the proportional movements over time.

In order to measure changes in general productive efficiency, output must be related to all associated inputs. Thus, total productivity ratio will reveal the net savings achieved in the use of inputs as a whole thus showing the degree of advances in efficiency of the productive process. Though total productivity is the best indicator of changing productive efficiency, it is extremely difficult to measure it⁽²⁾ because of the theoretical and statistical problems connected with the estimation of real capital stocks and other services. Hence, the most commonly used measure of productivity is the ratio of output to the corresponding input of labour - popularly known as the labour productivity. This, of course, is a partial productivity since it is a ratio of output to only one class of input though the labour is the most important input. Though called 'labour productivity' it does not measure the efficiency of labour in the sense of the effort or skill of this factor alone. However, as labour is the major factor input, real product per unit of labour input will not diverge greatly from total productivity measures. According to Stigler, "Labour is quantitatively the largest input (in marginal units of measure i.e. as a share of income). So large changes in labour productivity over time are likely to reflect at least roughly the movements of a properly defined measure of productivity. But in general the labour productivity measure will exceed it by more, the more capital has grown relative to labour. Labour productivity will, therefore, be a better measure of total productivity, the more nearly proportional the increase of labour and other resources over time and the smaller the relative

(1) For a detailed discussion on the concept and meaning see John W. Kendrick "Productivity Trends, Capital and Labour" Occasional Paper 53 of NBER (1956), Solomon Fabricant "Basic Facts on Productivity Change", Occasional Paper 63 (NBER, 1959), J.H. Seigel "Concepts and Measurement of Production and Productivity", U.S. Bureau of Labour Statistics (March 1952).

(2) Mr. Kendrick is one of the few who could do it. See Kendrick's "Productivity Trends in U.S.A." (NBER, 1961), in this connection. In India Dr. Beri in his book 'Measurement of Production and Productivity' has made an attempt to measure the total productivity. His assumptions in measuring the effect of capital are of doubtful validity.

weight of non-labour resources in the total input".⁽³⁾ Thus, in the absence of total factory productivity measures, labour productivity index can be useful if the limitations of its meaning are kept in mind. Even as indicators of productive efficiency, the bias is generally not large. In fact, U.S. experience shows that industries with the largest increase in labour productivity are accompanied by the largest increase in total productivity.

Thus, having defined productivity in terms of labour productivity, we are left with defining the two terms of the ratio viz; the product and labour.

Measurement of Production

Production can be measured in a number of ways. It can be evaluated in constant prices or net values measured in real terms. In India, as well as in many other countries, increases in production at constant prices for the industry sector is generally measured by means of index number of production. The index number of production, as is available at present, takes care only of the changes in physical volume of production and does not take care of the differences in quality of production or changes in the input structure. We are, therefore, not measuring production with the help of index numbers. Instead, production is measured in terms of values added, evaluated at constant prices. In order to arrive at values added at constant prices, we have deflated the current values of output and raw material and fuel inputs with appropriate price deflators specially constructed for the purpose. The subtraction of inputs from the output both measured in constant prices resulted in arriving at value of unduplicated production measured in real terms.

Measurement of Labour

The labour has been measured in terms of number of man-days worked. The labour relates to all employees and the total number of man-days spent have been considered. It is agreed that the labour force is heterogeneous because of differences in sex and age of the workers. But any attempt to convert them all into a standard of an adult will have to be based on arbitrary assumption.

After having defined production and labour in the above manner, we have attempted to measure productivity as the ratio of production to labour. The productivity measure has been attempted at industry level for some of the major industries viz., 1) cotton, 2) iron and steel, 3) sugar, 4) cement, 5) jute textiles, 6) electric fans, 7) paper and paper board, 8) all industries covered under census of Indian Manufacturers. The analysis has been confined to the period 1948 to 1958, a period for which comparable data is available.

(3) See George J. Stigler's "Economic Problems in measuring changes in productivity" (studies in income and wealth Vol. XXV by NBER). According to Mr. Stigler, "Let $P = A(t)f(C, L)$ where P is output, C is capital, L is labour and $A(t)$ is the index of productivity. If technical progress is independent of the proportions between the factors, as this production function assumes and there are constant returns to scale, one may derive the equation;

$$\frac{1}{P/L} \frac{d(P)}{dt} - \frac{A'(t)}{A(t)} = W_c \frac{d(C/L)}{C/L dt}$$

when W_c is the share of capital return in the total product i.e.

$$W_c = \frac{\partial P}{\partial C} \frac{C}{P}$$

Method of Estimation

The method in brief consists of measuring the net output or production in terms of value added at constant prices and relating it to the corresponding labour input. The value added of the *i*th industry for the *t*th year has been estimated at constant base year prices by the method of double deflation viz. by deflating both output and input with appropriate price indices as follows with the help of Laspeyres's Formulae

Production in year (t) at base year prices for the *i*th industry

$$N_i^{t_0} = \frac{\sum_{j=1}^{n_i} P_{ij}^t Q_{ij}^t}{\sum_{j=1}^{n_i} P_{ij}^0 Q_{ij}^0} \sum_{j=1}^{m_i} P_{ij}^0 Q_{ij}^0$$

$$= \frac{\sum_{j=1}^{n_i} P_{ij}^t Q_{ij}^t}{\sum_{j=1}^{n_i} P_{ij}^0 Q_{ij}^0} \sum_{j=1}^{m_i} P_{ij}^0 Q_{ij}^0$$

where *P* and *Q* represent prices and quantities of *n_i* items of output of *i*th industry and *P_i* and *Q_i* represent the prices and quantities of the *m_i* items of inputs of *i*th industry.

The formula (1) above can also be written as :

$$N_i^{t_0} = \frac{\sum_{j=1}^{n_i} O_{ij}^{t_0}}{\sum_{j=1}^{n_i} O_{ij}^t \frac{P_{ij}^0}{P_{ij}^t}} \sum_{j=1}^{m_i} I_{ij}^t \frac{P_{ij}^t}{P_{ij}^0}$$

where *O_i^t* and *O_i^{t₀}* respectively represent the total value of output of the *i*th industry in the years (t) and (t₀) at current prices and *I_i^t* and *I_i^{t₀}* the corresponding value of input.

After having obtained the net output *N_i^{t₀}* for the year (t) at the base year prices, the productivity of the *i*th industry in the year (t) will be given by *N_i^{t₀} / L_i^t* where *L_i^t* measures the labour inputs of the *i*th industry in terms of man-days in the year (t), and t varies from 1948 to 1958.

Availability of data

The only source of data which gives details of quantities and values of various items of input and output for a number of industries for a considerable period of time on a comparable basis is the Census of Indian Manufacturers (CMI).

The sample survey of Manufacturing Industries (SSMI) though covers all the industries and is available for a long period of time on a comparable basis, does not give details of quantities and values of various items of output and input and therefore, the results cannot be used for building up the series of output and input at constant prices. The other

available data on Industrial Production viz. those collected by the DGTD and brought out by C.S.O. in their Monthly Statistics of Production of Selected Industries is also not of any help in this work since it gives only the quantity of output and not the input details. Hence recourse has been taken to the data thrown up by the QMI in the case of industries chosen for the study. The QMI was conducted annually from 1946 to 1958 covering the factories registered under the section 2j of the Factories Act 1934 namely factories employing 20 or more employees on any day with the aid of power and confining to the first 29 industry groups of industries which covers about 60 to 70 per cent of total production in the factory manufacturing. The slight differences in geographical changes and non-response will not have much bearing on the results of this analysis, since it is not the absolute value but the ratios of output to labour input which are compared over time and hence no adjustment on these accounts has been made.

Details of Estimation

The QMI for all the industries covered, gives the details of all the major items of output and raw materials and fuel inputs in terms of both quantity and value for all the years. For each industry under study the year 1958 has been taken as the base year and the price relative for each year with 1958 as base has been built up for each item of output with the implicit price arrived at by dividing the value of each item by the corresponding quantity for each year from the QMI data (i.e. P_{ij}^t / P_{ij}^0 is built up where P_{ij}^t is the price of jth item of output of the ith industry at time t and P_{ij}^0 is the corresponding price at the base year). The price relatives of various items of output have been aggregated to form the combined price index of output for the industry as a whole with the help of value of output in base year as weights.

Thus we obtain, for each industry, an output price index in the form

$$\frac{\sum_{j=1}^{n_1} \frac{P_{ij}^t}{P_{ij}^0} O_{ij}^{00}}{\sum_{j=1}^{n_1} O_{ij}^{00}}$$

By deflating the value of output in the current year with the above price index, we get the output in the current year at base year prices viz.

$$O_{ij}^{t0} = \sum_{j=1}^{n_1} O_{ij}^{t1} \div \left(\frac{\sum_{j=1}^{n_1} \frac{P_{ij}^t}{P_{ij}^0} O_{ij}^{00}}{\sum_{j=1}^{n_1} O_{ij}^{00}} \right)$$

Similarly the raw materials and fuels are separately deflated to get their values at base year prices and subtracting raw materials and other inputs at constant prices from the corresponding deflated value of output we arrive at the net output measured at constant prices.

It could be noted that we have built up price indices of output and input from the census figures by dividing the value by the corresponding quantity as available in QMI for each item of output and input. We had to take this laborious course since the available index number of wholesale prices do not serve our purpose as it does not provide price indices of all component items of output and raw materials and fuel inputs for each

industry for which we require such indices for deflating the components of outputs and inputs. An overall price index for each industry group as is available in the publication "Index No. of wholesale prices" will not reveal the true picture since each industry will be having product mix which calls for deflation by individual items of output and input.

After having thus arrived at the production Nil at constant prices for all OMI industries individually they have been added up to obtain a total production for all the OMI industries. A production index for each industry group and also for all OMI industries has been built up which gives the trends in production of the industries. The price indices of output and input, and also the production index are discussed in the next section on results.

We have then measured the corresponding labour effort, related it to the production measured in real terms and thus arrived at the total productivity measured in relation to labour input.

The OMI along with the details of production and input gives details of labour input as well. Labour has been measured in terms of number of man-days. It is agreed that the labour force is heterogeneous because of differences in sex and age of the workers. But any attempt to convert them all into a standard of an adult will have to be based on arbitrary ratios and hence open to question. So as Fabricant⁽⁴⁾ says, simple aggregates of numbers have been considered as the practical solution. The data on man-hours has not been taken because the man-hours data is incomplete in the sense that only in the case of the workers directly employed the details of man-hours are provided. In the case of workers who are employed by contractors, the relevant data on man-hours are not available. Since the proportion of workers employed by contractors is not negligible, it was not found fit to omit their effect for the sake of sticking to the data on man-hours. The index based on man-days has, therefore, been considered for our purpose. The indices of net output have been divided by the corresponding indices of labour input to give the index of productivity for each industry.

The Results:

The results are presented only for a few major industries and all OMI industries combined for the years 1948, 1950, 1955 to 1958. The first section deals with the trends in the implicit prices of output and input over the period under study while the second part discusses the changes in productivity.

A. Trends in price indices of Output and Input.

As described in an earlier section, for each industry price indices have been constructed from the data collected from different OMI Reports. For each industry, a weighted price index of output and input have been constructed with 1958 as the base year. These indices of output and input with 1958 as base year for the different industry-groups for the years under study are presented in Table 1.

(4) S. Fabricant, Labour Productivity Statistics, 110 1951.

Table 1. Indices of Prices of Output and Input of Selected Industries

Industry	Type of Index	1948	1950	1955	1956	1957	1958
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Sugar	(a) Weighted price index of output	103.6	111.5	92.9	93.5	97.0	100.0
	(b) Weighted price index of input	115.9	117.5	95.4	96.5	98.6	100.0
2. Cement	(a) Weighted price index of output	95.6	108.5	110.4	106.2	97.7	100.0
	(b) Weighted price index of input	81.3	89.2	90.9	92.7	98.6	100.0
3. Paper & Paper Board	(a) Weighted price index of output	73.8	85.4	91.0	92.7	88.9	100.0
	(b) Weighted price index of input	89.6	80.5	94.3	97.2	83.3	100.0
4. Cotton Textiles	(a) Weighted price index of output	93.7	101.0	94.3	99.7	97.9	100.0
	(b) Weighted price index of input	79.7	115.7	93.8	100.8	102.7	100.0
5. Jute Textiles	(a) Weighted price index of output	117.6	139.4	108.1	95.0	107.3	100.0
	(b) Weighted price index of input	137.2	145.2	113.5	111.6	114.5	100.0
6. Iron & Steel	(a) Weighted price index of output	55.2	58.8	80.1	91.0	95.5	100.0
	(b) Weighted price index of input	47.1	51.2	68.1	82.1	92.1	100.0
7. Electric Fans	(a) Weighted price index of output	104.4	108.9	113.4	114.5	102.7	100.0
	(b) Weighted price index of input	71.4	72.0	87.9	108.4	99.0	100.0
8. All CMI Industries	(a) Weighted price index of output	93.2	101.0	88.5	95.7	98.9	100.0
	(b) Weighted price index of input	89.2	111.0	86.0	96.8	102.0	100.0

It would be seen from the table 1 that the price indices of output and input, in general, moved in the same direction between the two period under study. The extent of change of the two indices is not precisely of the same order but generally they are in the same direction with slight variation in the absolute degree of change. In the case of sugar industry, the price index of output stood around 104 in 1948 increased to 112 in 1950 dropped down to 93 in 1955 gradually increasing uptill the year 1958. The input price index also shows the same trend being 116 in 1948, 118 in 1950, 95 in 1955 gradually increasing uptill 1958. In the case of iron and steel and also paper and paper board both the series of price indices (except that of prices of input in 1950 of paper and paper board) show a slow and gradual but steady rise from 1948 to 1958. In the case of cotton textiles also the trend is similar to that of sugar increasing between 1948 and 1950 and decreasing between 1950 and 1955 and thereafter increasing. In the case of jute textiles, the price increased between 1948 and 1950 but then has been declining with slight fluctuations for the further period. In the case of electric fans, the prices increased from 1948 to 1956 thereafter the trend is a little reversed for the next two years. In this case, the trend in output and input price index are also in different directions.

For all CMI industries combined, the index has again increased between 1948 and 1950 dropped between 1950 and 1955 and then gradually increased in the rest of the period.

All these show the definite and sudden increase in prices during the early fifties due to the Korean War and the decline thereafter and the gradual increase in the last few years under study.

Trends in Productivity: With the help of the price indices of output and input, the current values of output and input as obtained from CMI have been deflated in order to obtain the output and input evaluated at 1958 prices. The difference between output and input give the value added defined here as production in real terms. Table 2 presents the deflated value of output, input and value added for different industries.

It may be mentioned in this connection that the absolute values of output, input, etc. as revealed by CMI are not strictly comparable over time due to slight differences in geographical coverage and non-response in the census from year to year. However, no adjustment has been made to make these data comparable over time since such minor differences will not have much effect on the ratio of output to labour input. The absolute values of output or production as presented in Table 2 have been used only in arriving the productivity indices relating to these industries.

With the help of the number of man-days worked corresponding to the output in the industries under study, an index of labour input I_L has been constructed. The index of value added I_V , the index of labour and the index of Productivity (I_P) of the various industries are given in Table 3.

Table 2. Output, Input and Value added at 1958 Prices.

(Rs. Lakhs)

Industries	Output/Input Value added	1948	1950	1955	1956	1957	1958
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. <u>Sugar</u>	Output	6362	7746	12721	14286	14338	13597
	Input	4058	5207	9090	10400	10151	9614
	Value added	2304	2539	3631	3886	4187	3983
2. <u>Cement</u>	Output	727	1273	2512	3015	3717	4066
	Input	495	855	1618	1979	2227	2502
	Value added	282	418	894	1036	1490	1564
3. <u>Paper & Paper Board</u>	Output	1344	1519	2775	3084	3791	4288
	Input	648	903	1419	1622	2246	2124
	Value added	696	616	1356	1462	1545	1864
4. <u>Cotton Textiles</u>	Output	37793	31468	47420	48729	50276	45363
	Input	23670	18112	29694	30392	32163	29812
	Value added	14123	13356	17726	18337	18113	15551
5. <u>Jute Textiles</u>	Output	13640	10679	12512	15029	12679	13754
	Input	8568	7093	8467	8868	8441	9084
	Value added	5072	3586	4045	6161	4238	4670
6. <u>Iron & Steel</u>	Output	7691	9501	11556	12527	12329	12899
	Input	4470	5517	6528	6606	6358	6810
	Value added	3281	3984	5028	5921	5971	6089
7. <u>Electric Fans</u>	Output	252	229	265	209	340	402
	Input	195	173	176	128	215	254
	Value added	57	56	89	81	125	148
8. <u>All CMI Industries.</u>	Output	102323	101783	158881	168682	174298	171134
	Input	69767	65422	111444	114912	119232	117383
	Value added	32556	36361	47437	53770	55066	53751

Table 3. Indices of Value added (I_v); Labour (I_L) and Productivity (I_p).

Industries		1948	1950	1955	1956	1957	1958
Sugar	I _v	100.0	110.2	157.6	168.7	181.7	172.9
	I _L	100.0	72.2	105.0	115.8	108.9	94.3
	I _p	100.0	152.6	150.1	145.7	166.9	183.4
Cement	I _v	100.0	148.2	316.5	367.3	528.0	554.3
	I _L	100.0	128.0	142.8	198.8	212.3	217.1
	I _p	100.0	115.8	221.6	184.8	248.7	255.3
Paper & Paper Board	I _v	100.0	88.5	194.8	210.0	221.9	267.6
	I _L	100.0	102.3	133.1	152.0	176.1	184.1
	I _p	100.0	86.5	146.4	138.2	126.0	145.4
Cotton Textiles	I _v	100.0	94.6	125.3	129.8	128.3	110.1
	I _L	100.0	86.3	108.2	112.8	115.8	104.0
	I _p	100.0	109.6	115.8	115.1	110.8	105.9
Jute Textiles	I _v	100.0	70.7	79.8	121.5	83.6	92.1
	I _L	100.0	80.9	84.1	84.3	75.6	77.4
	I _p	100.0	87.4	94.9	144.1	110.6	119.0
Iron & Steel	I _v	100.0	121.4	153.3	180.5	182.0	185.6
	I _L	100.0	100.3	126.7	126.3	123.9	131.3
	I _p	100.0	121.0	121.0	142.9	146.9	141.4
Electric Fans	I _v	100.0	96.7	153.9	139.4	216.7	256.5
	I _L	100.0	89.4	87.9	77.4	81.7	83.1
	I _p	100.0	108.0	175.1	181.0	265.2	308.7
All CMI Industries	I _v	100.0	111.7	145.7	165.2	169.1	165.1
	I _L	100.0	92.6	113.4	117.1	119.6	112.6
	I _p	100.0	120.6	128.5	141.1	141.4	146.6

In the case of Sugar industry, the index of productivity has gone up by 83 per cent in a period of ten years. However, this increase has not been uniformly spread over the period. The index of productivity shot up from 100 in 1948 to 153 in 1950; then slightly declined in 1955 and 1956 and again increased to 167 in 1957 and 163 in 1958. In the case of Cement, the production index increased to 555 in 1958 in relation to the increase in labour index of 217 thereby giving the productivity index of 255 in 1958 compared to 100 in 1948. It is interesting to note that the productivity index steadily increased from 100 in 1948 to 116 in 1950 to 222 in 1955 and to 255 in 1958.

The productivity index in the Paper and Paper Board Industry increased from 100 in 1948 to 145 in 1958. The index in this case is fluctuating - decreasing to 87 in 1950 again increasing to 146 in 1955, thereby slightly decreasing the next 2 years to retain the same level of 145 in 1958.

Cotton Textiles is one of the industries where there is no considerable increase in productivity. Between 1948 and 1955, the productivity index increased from 100 to 115 thereafter declining to 106 in 1958. This slight increase in productivity is probably due to the fact that Cotton Textiles which is one of the traditional industries has not undergone much technological changes which gives scope for increase in productivity.

In the case of Jute Textiles, the productivity index has increased only by 19 points over the decade. The index is very much fluctuating during this period decreasing from 100 in 1948 to 87 in 1950, 95 in 1955, then suddenly shot up to 144 in 1956 and then declined to 119 in 1958. Of course, Jute textiles has problems of its own which may partly account for such trends in productivity.

Iron and steel industry showed a steady increase in productivity. It increased from 100 in 1948 to 121 in 1950, remained at the same level in 1955, thereby increased to 141 in 1958. If years later than 1958 were also considered, the rate of increase in production and productivity would have probably been much more than the increases revealed here.

In the case of electric fans, compared to a production index of 257 in 1958, the labour index showed a decline to 83 thereby giving a productivity index of 309 in 1958. The productivity index rose steadily from 100 in 1948 to 108 in 1950, 175 in 1955 to 309 in 1958.

Considering all the CMI industries combined, the results are encouraging. Compared to a production increase of 65 per cent in 10 years, the labour input has increased by about 13 per cent. The productivity index increased by about 47 per cent during the ten year period 1948-1958 thereby giving an average growth rate of 3.9 per cent per annum. The growth has been steady during the decade increasing from 100 in 1948 to 120 in 1950, 128 in 1955, 141 in 1957 to 147 in 1958. It could be seen that increase in productivity has to a great extent helped in increasing production during the decade. In fact, when production index increased by 65 per cent, the index of productivity increased by as much as 47 per cent. However, it may again be pointed out that though measured in terms of labour input alone, this productivity increase does not measure the efficiency of labour alone. There are other factors responsible for increasing productivity, namely, technological progress resulting from innovation in plant and machinery, changes in the process of organisation of production, economy of scale and more efficient rates of utilisation of capacity.

**INDIAN ASSOCIATION FOR RESEARCH
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**ESTIMATES OF INDICES OF INDUSTRIAL GROWTH — QUANTUM
AND VALUE APPROACH**

K. C. TANEJA

AHMEDABAD

9 — 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

ESTIMATES OF INDICES OF INDUSTRIAL GROWTH -
QUANTUM AND VALUE APPROACH

K.C. Taneja

INTRODUCTION.

A suitably constructed index of industrial production has two fold objectives. Firstly, it helps in assessing changes in the total industrial output. Secondly, it is required to explain the state of affairs of the industrial sector in the economy of a country at a particular time. Obviously, these indices can be constructed in several ways by studying the variation in the level of industrial output with respect to a base year. One way of construction of such index numbers is to find the level of production in the country at a suitable time. It may, however, be remembered that these index numbers throw light on the changes in the quantum of physical production and not in terms of value. If the variation in the value of industrial output is to be studied, data about the value of the industrial output have to be used for the purposes of constructing such index numbers. For study of the type undertaken here, what is required is an annual data on a uniform basis, on the quantity of important products and by-products of each industry and their respective values. The Directorate General of Technical Development, Ministry of Industry and Supply collects information on the quantum of production of a large number of selected commodities, and based on these data the Industrial Statistics Wing (I.S. Wing) of the Central Statistical Organisation (CSO) prepare the index of industrial production at the all India level. Though all these data are available with very little time lag, details of value of production are not available and as such these data are not readily useful for the present study. The Industrial Census Reports, however, based on these data collected regularly through the annual industrial enquiries give some useful information required for the study. Accordingly, an attempt has been made in this paper to examine these industrial census data from the point of view of their usefulness for evolving the methodology as also constructing the two series of industrial growth both by quantum and value approach. The series, henceforth, would be called as index of industrial production and output index respectively. For an appraisal of the various industrial enquiries and the limitations under which the study has been undertaken, a brief description of these annual industrial censuses along with their scope and coverage will not be out of place at this stage.

Census of Manufacturing Industries:

From 1946 to 1956, the Census of Manufacturing Industries (CMI) was conducted annually on a statutory basis, under the provisions of Industrial Statistics Act, 1942 and the CMI Rules 1945 made thereunder. The CMI covered only factories registered under section 2(1) of the Factories Act, 1934 namely factories employing 20 or more workers on any day with the aid of power. Moreover, it was confined to the first 29 of the 63 groups into which the entire field of manufacturing sector was classified. The censuses for the years 1957 and 1958 were conducted on a voluntary basis as the Industrial Statistics Act was repealed with the enforcement of the Collection of Statistics Act, 1953.

Sample Survey of Manufacturing Industries:

A Sample Survey of Manufacturing Industries (SSMI) was conducted by the National Sample Survey covering all the 63 industrial groups with the exception of ordnance factories and Railway Workshops. It covered all the

factories registered under Section 2m(i) and 2m(ii) of the Factories Act, 1948 i.e. the factories employing 10 or more workers on any working day, if using power, and employing 20 or more workers, if not using power. The classified list of factories registered under Section 2m(i) and 2m(ii) of the Indian Factories Act, 1948 maintained by the Chief Inspector of Factories in the different States of India formed the basis for the sampling frame adopted for the survey. The allocation among the 61 industries (and their subgroups) has been proportioned to the product of the total number of workers and standard deviation of output per worker (obtained from the results of earlier surveys). Unlike CMI, the SSMI gives a blown up estimate for the entire population. Both CMI and SSMI provide data for the calendar years, except in the case of sugar industry for which year ending 30th June is adopted.

Annual Survey of Industries:

The Census and Sample Surveys from the year 1959 are being conducted on a unified basis designated as the Annual Survey of Industries (ASI) under the Collection of Statistics Act, 1953. In this survey, all factories registered under Section 2m(i) and 2m(ii) of the Factories Act, 1948 are covered. Data, however, are not collected from the Defence Installations, factories engaged in storage and distribution of oil and technical training institutions not producing anything for sale or exchange, even though these were registered under the Factories Act, 1948. Within this coverage, all factories employing 50 or more workers if using power, and 100 or more workers if not using power are covered on complete enumeration basis and is known as the census sector of ASI. All other factories not covered in the census sector i.e. the factories employing 10 to 49 workers and using power, and 20 to 99 workers, if not using power, are covered on the probability sample basis and comprise the Sample Sector of ASI.

Scope and coverage:

As may be seen from the above brief description of the various industrial enquiries, there have been differences in scope and coverage of the various censuses. Besides, the method of presentation of industrial data in the various Census Reports have also been different. For example, in the SSMI Report, which covered the entire manufacturing sector, and could be useful material for the present study, unlike the Census Sector Reports, only the total value of the products and by-products, and that too in respect of a few industries is given. Same is the case with ASI Sample Sector Reports. In the circumstances explained above, the study had therefore to be restricted to the CMI only.

Method of Construction of the Indices of Industrial Growth:

(a) Selection of Items.

The CMI reports which provide the main material for the present work give information on (i) quantity as also values of important products and by-products and (ii) only values of the other products. As many commodities as possible and for which information on both quantity and value of production was available have been taken for the construction of these series, the aim being the maximum possible coverage of the industry's products and by-products.

(b) Choice of the Base Year.

The calendar year 1950 has been chosen as the base year. The main consideration for selecting this as the base year was that by the year 1950, the CMI coverage had extended to the entire country. Besides 1950 is the year immediately preceding the Planning Era.

(c) Weights.

(i) Industry Level.

For arriving at the index of industrial production as also output index for each industry, output values of the selected commodities in the base year have been taken as the weights.

(ii) Entire Manufacturing Sector.

For constructing the indices for the entire manufacturing sector, the value added by manufacture by the industries in the base year were taken as the weights.

(d) Non-response.

Although the data are collected on a statutory basis, there is some non-response. This has also been taken care of by multiplying the indices with the correction factor R_0/R_n where R_0 and R_n are the response percentages in the base and the current years respectively.

(e) Construction of the Index.

I. Index of Industrial Production.

The index in both the cases for each industry and for the State as a whole, is the weighted arithmetic mean calculated as under:

(i) Industry Level.

Let the suffixes 'i' and 'j' denote the 'ith' industry and the 'jth' product in the 'ith' industry and the suffixes '0' and 'n' the base year and the current year respectively. Then the index is given by

$$I_i = \frac{\sum_j p_0^j q_n^j}{\sum_j p_0^j q_0^j}$$

' I_i ' is the index of industrial production for the 'ith' industry, $p_0^j = \frac{v_0^j}{q_0^j}$, v_0^j being the value of the 'jth' commodity in the base year, q_0^j & q_n^j are quantities of the 'jth' commodity in the base year and current year respectively.

(ii) Entire Manufacturing Sector.

$$I = \frac{\sum_i I_i W_i}{\sum_i W_i}$$

where I_i is the index of industrial production in the 'ith' industry and ' W_i ' the value added by manufacture in the 'ith' industry. The indices of industrial production thus arrived

TABLE (1) INDICES OF INDUSTRIAL PRODUCTION

INDUSTRY	VALUE ADDED BY MANUFACTURE 1000 Rs.	1950 = 100												
		1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
1. WHEAT FLOUR	12811	77.9	50.0	82.8	73.8	100.0	100.6	88.0	93.9	120.7	168.9	203.3	264.6	241.9
2. RICE MILLING	24097	135.2	112.0	104.1	110.7	100.0	89.2	96.0	105.8	145.9	165.8	116.8	173.1	144.6
3. BISCUIT MAKING	22199	43.5	44.9	58.2	69.0	100.0	101.8	101.0	101.7	101.7	91.0	114.7	139.1	138.4
4. FRUIT AND VEGETABLE PROCESSING	4384	30.9	21.7	29.4	50.7	100.0	71.1	70.3	65.9	73.7	45.1	69.1	93.3	86.7
5. SUGAR	237880	74.0	81.6	76.8	99.9	100.0	116.1	102.8	78.2	141.2	144.2	155.7	152.5	159.8
6. DISTILLERIES & BREWERIES	9366	116.5	90.4	87.9	85.7	100.0	105.1	100.5	84.0	79.1	103.0	96.0	105.9	105.7
7. STARCH	1668	68.4	44.8	138.9	86.3	100.0	227.1	180.0	398.4	710.1	686.7	949.7	1047.7	1007.3
8. (a) VEGETABLE OILS (b) (EXCLUDING EDIBLES) EDIBLE HYDROGENATED OILS	64728	76.8	90.2	91.9	106.0	100.0	149.1	151.8	142.2	170.0	234.3	123.5	246.2	207.1
9. PAINTS AND VARNISHES	20465	104.2	115.9	106.5	120.7	100.0	140.2	129.7	123.7	142.2	151.4	166.7	158.1	194.1
10. SOAP	36231	79.9	77.2	100.3	102.2	100.0	113.0	117.5	109.2	123.6	144.5	134.7	130.6	159.6
11. TANNING	15516	56.2	69.4	82.7	71.8	100.0	112.4	92.9	104.6	123.0	147.5	185.9	155.9	143.0
12. CEMENT	54811	45.7	47.2	58.1	71.8	100.0	133.3	150.5	159.0	184.8	194.8	225.2	260.3	292.9
13. GLASS AND GLASSWARE	18052	54.9	49.5	70.2	93.1	100.0	90.0	94.0	105.8	103.4	133.2	153.7	163.9	225.0
14. CERAMICS	21137	40.0	49.0	79.6	90.5	100.0	102.7	105.9	133.6	129.0	136.7	164.3	193.4	236.9
15. PLYWOOD AND TEACHERS	6049	53.9	61.1	118.3	100.2	100.0	135.3	139.6	113.3	146.8	206.9	229.9	213.5	223.4
16. PAPER AND PAPER BOARD	49180	98.8	88.8	99.6	98.0	100.0	128.5	153.0	135.4	144.6	171.1	195.8	283.1	276.1
17. MATCHES	31549	87.6	93.8	101.3	95.5	100.0	133.9	134.7	120.0	115.4	123.0	121.7	124.0	175.4
18. COTTON TEXTILES	1043190	93.4	81.9	92.2	96.5	100.0	112.8	132.0	128.8	148.6	154.9	160.6	179.6	173.2
19. WOOLLEN TEXTILES	42630	133.5	78.5	67.4	72.1	100.0	91.9	92.0	119.5	120.1	160.6	164.8	144.3	167.0
20. JUTE TEXTILES	441828	123.6	120.6	122.4	109.3	100.0	103.1	115.5	107.8	111.3	120.5	131.1	123.1	135.9
21. CHEMICALS	96963	62.7	95.6	96.5	78.7	100.0	113.3	88.4	102.5	151.0	151.1	386.3	433.7	475.2
22. ALUMINIUM, COPPER & BRASS	61273	67.3	81.9	87.1	91.0	100.0	88.3	66.3	72.4	132.1	172.4	176.8	203.9	238.8
23. IRON AND STEEL	252126	89.8	104.5	93.3	101.1	100.0	121.6	124.1	121.8	87.7	93.6	91.0	83.1	116.1
24. BICYCLES	9358	37.7	38.9	59.7	88.8	100.0	116.4	182.7	269.8	330.3	416.7	540.7	733.3	858.3
25. SEWING MACHINES	4685	94.2	94.5	100.0	91.9	100.0	142.6	164.6	213.0	267.6	339.9	456.4	677.6	892.8
26. ELECTRIC LAMPS	3844	41.3	42.5	56.2	82.2	100.0	102.6	135.9	134.9	155.4	161.7	211.3	420.7	329.6
27. ELECTRIC FANS	11851	80.9	80.0	99.5	78.2	100.0	112.7	109.8	118.5	81.6	123.5	114.2	172.1	232.1
28. GENERAL ENGINEERING	241427	80.9	90.1	94.7	97.5	100.0	113.0	121.5	117.7	134.7	145.6	162.1	174.7	183.1
ALL INDUSTRIES	2839286	92.3	90.1	94.7	97.5	100.0	113.0	121.5	117.7	134.7	145.6	162.1	174.7	183.1

II. Output Index Number.

For the purpose of construction of such a series what is required is Gross output in each industry and then arriving at a combined index of output for the entire manufacturing sector. In an ideal situation where the price structure remains constant throughout, the series of annual figures of value of output would automatically yield the corresponding series/indices of output for each industry. In the practical situation, however, the annual series of indices of output values could still yield output indices if a device could be evolved to correct the output values for price changes. In other words, the series of annual output in each industry deflated by the corresponding annual series of indices of prices of, at least, important products of the industry would yield a series of industrial output for that industry. Accordingly, the price index has been compiled from the CMI data themselves so that the deflating factors become organic with the system of the same industrial enquiry. Details of the method of arriving at the price indices as also indices of output from the census data are discussed in the following paragraphs.

Arriving at Price Indices.

After selecting the commodities which covered large proportion of the gross output and when both quantities and values are given, unit price was calculated for each commodity in each of the industry for all the years from 1946 to 1958. And then with 1950 as base, price relatives for each of the commodities were obtained. The price index for each of the industry, computed specially for this study, is the Laspyre's Index and this can be expressed mathematically as under:

Let the suffixes 'i' and 'j' denote the 'jth' commodity in the 'ith' industry and the suffixes 'o' and 'n' the base year (1950) and a current year respectively. Then price of 'jth' commodity in the 'ith' industry in the base year would be given by

$$p_0^{ij} = \frac{v_0^{ij}}{q_0^{ij}} \quad \text{where } v_0^{ij}$$

is the value of the 'jth' product/by-product in the 'ith' industry in the base year. Using similar notations, we will have the prices in the current year given by

$$p_n^{ij} = \frac{v_n^{ij}}{q_n^{ij}}$$

Laspyre's price index is then constructed by using the formula

$$\frac{\sum p_n^{ij} q_0^{ij}}{\sum p_0^{ij} q_0^{ij}} \quad \text{in the form} \quad \sum p_0^{ij} q_0^{ij} \times \frac{p_n^{ij}}{p_0^{ij}}$$

Arriving at the Output Index.

The index in both the cases i.e. for each industry and for the entire manufacturing sector is the weighted arithmetic mean calculated as under:

TABLE (2) INDICES OF OUTPUT

1950 = 100

INDUSTRY	VALUE ADDED BY MANUFACTURE	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
1. WHEAT FLOUR	12811	79.4	48.8	79.3	94.0	100.0	98.8	92.2	113.7	143.1	184.4	218.5	269.2	237.8
2. RICE MILLING	24097	143.2	117.0	105.6	112.0	100.0	89.1	94.5	95.4	141.7	162.2	165.7	171.6	143.8
3. BISCUIT MAKING	22199	42.7	43.3	58.0	67.0	100.0	99.6	101.3	100.4	99.7	88.3	113.6	137.9	140.7
4. FRUIT AND VEGETABLE PROCESSING	4384	26.2	23.2	64.1	58.1	100.0	98.8	61.9	71.9	72.8	69.9	94.0	101.9	110.5
5. SUGAR	237870	75.1	80.0	75.5	100.4	100.0	115.1	101.5	77.4	138.3	141.9	153.5	150.7	158.6
6. DISTILLERIES AND BREWERIES	9366	104.2	90.2	85.7	85.5	100.0	111.4	107.0	95.2	95.8	124.3	118.3	144.8	150.4
7. STARCH	1668	58.7	47.1	125.6	94.2	100.0	218.2	170.1	320.8	602.2	673.2	917.9	954.6	1044.0
8. (a) VEGETABLE OILS) (b) EDIBLE HYDROGENATED) OILS)	64728	88.4	82.8	86.1	105.0	100.0	106.7	110.5	102.2	122.6	169.4	158.6	170.1	151.5
9. PAINTS AND VARNISHES	20465	98.0	112.7	103.5	120.4	100.0	135.1	126.3	121.6	140.4	150.9	170.7	165.1	201.3
10. SOAP	36231	79.9	77.2	100.3	103.2	100.0	123.0	131.1	108.5	122.7	144.0	135.2	130.8	159.6
11. TANNING	15516	80.7	92.4	92.2	86.2	100.0	109.3	95.0	106.5	116.3	137.3	168.6	160.3	135.4
12. CEMENT	54811	45.9	47.5	58.3	72.0	100.0	133.5	150.6	150.9	185.6	195.9	227.1	263.3	297.6
13. GLASS AND GLASS WARE	18052	49.3	65.5	71.8	88.7	100.0	89.7	87.6	105.1	105.3	138.0	158.4	171.0	221.1
14. CERAMICS	21137	29.8	45.8	71.6	79.7	100.0	100.2	98.4	112.7	107.2	111.5	122.5	134.5	161.7
15. PLYWOOD AND TEACHESTS	6049	51.2	56.0	96.7	89.8	100.0	118.4	158.2	129.7	165.8	279.6	259.8	232.7	231.9
16. PAPER AND PAPER BOARD	49180	104.0	93.8	102.5	98.2	100.0	130.1	143.4	135.8	147.4	172.5	206.2	246.6	316.3
17. MATCHES	31549	85.1	94.7	100.4	93.4	100.0	128.9	131.0	116.2	110.9	119.1	117.6	120.4	170.3
18. COTTON TEXTILES	1043190	96.7	89.7	105.4	100.0	100.0	101.0	110.5	116.0	126.5	132.8	137.7	150.1	145.0
19. WOOLLEN TEXTILES	42630	127.5	114.8	74.0	73.9	100.0	89.6	86.3	104.7	110.5	128.5	153.8	124.8	145.0
20. JUTE TEXTILES	441828	127.8	124.5	126.0	109.1	100.0	104.7	116.8	109.0	113.6	122.5	137.1	128.8	143.2
21. CHEMICALS	96963	62.7	95.6	96.5	78.7	100.0	123.8	128.4	200.9	244.6	294.0	338.9	385.2	462.7
22. ALUMINIUM, COPPER AND BRASS	61273	59.5	76.7	77.9	80.1	100.0	85.1	74.0	82.7	122.2	143.5	156.2	165.7	193.9
23. IRON AND STEEL	252126	82.7	101.9	86.3	95.3	100.0	101.8	108.8	109.2	100.6	112.4	114.2	114.5	122.4
24. BICYCLES	9358	36.8	49.3	60.8	84.0	100.0	119.0	167.0	244.1	305.9	395.7	519.2	710.9	844.0
25. SEWING MACHINES	4685	13.3	22.7	70.4	87.6	100.0	142.8	165.3	212.5	269.0	395.0	765.1	1261.1	1725.0
26. ELECTRIC LAMPS	3844	39.5	44.4	57.9	82.9	100.0	102.2	143.5	144.0	167.9	192.6	250.0	470.7	344.2
27. ELECTRIC FANS	11851	51.2	52.4	64.6	54.4	100.0	77.1	84.9	84.7	85.7	84.9	80.1	123.7	167.2
28. GENERAL ENGINEERING	241427	78.1	75.2	81.2	95.3	100.0	103.2	119.3	122.9	152.7	191.3	228.6	293.4	332.0
ALL INDUSTRIES	2839286	92.1	92.2	97.8	97.9	100.0	105.5	112.2	114.3	130.7	145.3	158.8	172.9	184.9

A comparison of these series with official index of industrial production, it is felt, may also be quite useful and as such the three series for the entire manufacturing sector are presented in Table 4 below.

TABLE 4 : ESTIMATES OF INDICES OF INDUSTRIAL GROWTH

<u>PERIOD</u>	<u>SERIES</u>		
	INDICES OF INDUSTRIAL		
	<u>OUTPUT</u>	<u>PRODUCTION</u>	
		<u>AUTHOR'S</u>	<u>OFFICIAL</u>
1952	106.4	107.5	103.6
1953	108.3	104.2	105.6
1954	123.9	119.2	112.9
1955	137.7	128.9	122.4
1956	150.5	143.5	132.6
1957	163.9	154.6	137.3
1958	175.3	162.0	139.7

As may be seen from the above table, the official index of industrial production seems to be underestimating the industrial growth; this being 139.7 in the year 1958 as compared to 162.0, and 175.3 of the estimated indices of industrial production and industrial output respectively. Besides, in all the years under study, the index of industrial output stood higher than that of index of industrial production, both official and as estimated in the study. Detailed industrywise comparison of the three series may, however, be seen in the Appendix.

Year	1951 = 100		
	Author's Index of Industrial Production	Index of Output	Official Index of Industrial Production
(1)	(2)	(3)	(4)

1. WHEAT FLOUR

1952			
1953	87.5	93.3	105.5
1954	93.3	11.51	99.6
1955	120.0	144.8	91.1
1956	167.9	186.6	100.7
1957	202.1	221.2	110.7
1958	263.0	272.5	149.5
	240.5	240.7	168.3

2. SUGAR

1952			
1953	88.5	88.2	
1954	67.4	67.3	134.0
1955	121.6	120.2	115.8
1956	124.2	123.3	97.4
1957	134.1	133.4	143.0
1958	137.4	130.9	166.5
	137.6	137.8	185.5
			175.6

3. VEGETABLE OILS

1952			
1953	101.8	103.6	
1954	95.4	95.8	110.7
1955	114.0	114.9	111.2
1956	157.1	158.8	133.9
1957	149.9	148.6	151.3
1958	165.1	159.4	148.3
	138.9	142.0	174.9
			171.3

4. PAINTS AND VARNISHES

1952			
1953	92.5	93.5	96.1
1954	88.2	90.0	95.7
1955	101.4	103.9	109.9
1956	108.0	111.7	116.6
1957	118.9	126.4	124.2
1958	112.8	122.2	126.2
	138.5	149.0	143.3

APPENDIX (Contd.)

(1)	(2)	(3)	(4)
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5. SOAP

1952	104.0	106.0	103.5
1953	96.6	88.2	98.5
1954	109.4	99.8	105.5
1955	127.9	117.1	118.7
1956	119.2	109.9	132.1
1957	115.6	106.3	133.8
1958	141.2	129.8	148.0

6. TANNING

1952	82.7	86.9	82.4
1953	93.1	97.4	77.4
1954	109.4	106.4	78.9
1955	131.2	125.6	89.5
1956	165.4	154.3	93.9
1957	138.7	146.7	93.8
1958	127.2	123.9	106.3

7. CEMENT

1952	112.9	112.8	110.7
1953	119.3	113.0	118.3
1954	138.6	139.0	137.6
1955	146.1	146.7	140.4
1956	168.9	170.1	154.2
1957	195.3	197.2	175.3
1958	219.8	222.9	189.9

8. GLASS AND GLASSWARE

1952	104.4	97.7	93.1
1953	117.6	117.2	88.1
1954	114.9	117.4	107.4
1955	148.0	153.9	127.8
1956	170.8	176.6	148.7
1957	182.1	190.6	162.3
1958	250.0	247.5	196.3

9. CERAMICS

1952	103.1	98.2	105.7
1953	130.1	112.5	107.6
1954	125.6	107.0	117.6
1955	133.1	111.3	127.5
1956	160.0	122.3	156.1
1957	188.3	134.2	174.0
1958	230.8	161.4	208.5

APPENDIX (Contd.)

(1)	(2)	(3)	(4)
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10. PLYWOOD AND TEACHESTS

1952	103.2	133.6	127.8
1953	83.7	109.5	86.4
1954	108.5	140.0	109.8
1955	152.9	236.1	156.0
1956	169.9	219.4	175.2
1957	157.8	196.5	178.5
1958	165.1	195.9	176.7

11. PAPER AND PAPER BOARD (INCLUDING STRAW BOARD)

1952	119.1	110.2	104.2
1953	105.4	104.4	105.9
1954	112.5	113.3	117.7
1955	133.2	132.6	140.2
1956	152.4	158.5	146.6
1957	220.3	189.6	189.3
1958	214.9	243.1	191.8

12. COTTON TEXTILES - SPINNING AND WEAVING

1952	117.0	109.4	102.3
1953	114.2	114.9	109.1
1954	131.7	125.2	110.9
1955	137.3	131.5	111.9
1956	142.4	136.3	117.5
1957	159.2	148.6	115.6
1958	153.5	143.6	108.9

13. JUTE TEXTILES

1952	112.0	111.6	107.6
1953	104.6	104.1	101.1
1954	108.0	108.5	107.3
1955	116.9	117.0	118.0
1956	127.2	131.0	127.3
1957	119.4	123.0	120.5
1958	131.8	134.9	123.9

14. CHEMICALS

1952	78.0	103.7	117.9
1953	90.5	162.3	130.0
1954	133.3	197.6	141.1
1955	133.4	237.5	159.0
1956	341.0	273.7	171.1
1957	382.8	311.2	181.3
1958	419.4	373.7	206.2

APPENDIX (Contd.)

(1)	(2)	(3)	(4)
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15. ALUMINIUM, COPPER AND BRASS

1952	75.1	87.0	80.7
1953	82.0	97.2	85.2
1954	149.6	143.6	126.5
1955	195.2	168.6	123.7
1956	200.0	183.6	124.7
1957	230.9	194.7	151.7
1958	270.4	227.8	166.5

16. IRON AND STEEL

1952	102.1	106.9	102.2
1953	100.2	107.3	95.7
1954	72.1	98.8	113.2
1955	77.0	110.4	113.3
1956	74.8	112.2	119.4
1957	68.3	112.5	119.3
1958	116.1	120.2	119.1

17. BICYCLES

1952	157.0	140.3	172.4
1953	231.8	205.1	231.2
1954	283.8	257.1	325.8
1955	358.0	332.5	429.8
1956	464.5	436.3	581.0
1957	630.0	597.4	691.8
1958	737.4	709.3	798.6

18. SEWING MACHINES

1952	115.4	124.0	112.6
1953	149.4	159.4	140.4
1954	187.7	201.7	180.4
1955	273.4	296.2	228.2
1956	329.1	573.8	293.3
1957	475.2	945.8	376.7
1958	626.1	1293.7	461.5

19. ELECTRIC LAMPS

1952	132.5	140.4	134.5
1953	131.5	140.9	126.7
1954	151.5	164.3	148.7
1955	157.6	188.5	156.2
1956	205.9	244.5	198.0
1957	410.0	460.6	213.6
1958	321.2	336.8	196.4

APPENDIX (Contd.)

(1)	(2)	(3)	(4)
20. <u>ELECTRIC FANS</u>			
1952	97.4	97.2	92.0
1953	105.1	105.2	94.0
1954	72.4	72.2	112.4
1955	109.6	110.1	132.8
1956	101.3	103.9	159.5
1957	152.7	160.4	246.9
1958	205.9	216.9	299.1
21. <u>GENERAL AND ELECTRICAL ENGINEERING</u>			
1952	-	115.6	92.8
1953	-	119.1	108.9
1954	-	148.0	151.9
1955	-	185.4	183.3
1956	-	221.5	228.1
1957	-	284.3	241.3
1958	-	321.7	254.1
22. <u>ALL INDUSTRIES</u>			
1952	107.5	106.4	103.6
1953	104.2	108.3	105.6
1954	119.2	123.9	112.9
1955	128.9	137.7	122.4
1956	143.5	150.6	132.6
1957	154.6	163.9	137.3
1958	162.0	175.3	139.7

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RESEARCH IN NATIONAL INCOME**

**REGIONAL INDICES OF INDUSTRIAL OUTPUT AND OUTPUT
PRICES — A STUDY FROM CENSUS OF PRODUCTION DATA**

K. C. TANEJA & B. K. BEHAL

AHMEDABAD

9 — 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

REGIONAL INDICES OF INDUSTRIAL OUTPUT AND OUTPUT
PRICES - A STUDY FROM CENSUS OF PRODUCTION DATA

K.C. Taneja and B.K. Behal

India is a country of continental proportion with many regions large and small. It would, therefore, be necessary to resort to detailed microplanning of development at the regional level to achieve an optimum rate of economic growth consistent with the human and other resources of the constituent regions of India. Since the administration of the States are entrusted with formulation, execution and evaluation of Plans at regional levels, it is desirable, rather essential to have estimates of industrial production at the State level as well as at the All India level. Besides, the demand of such indices is being increasingly felt for arriving at the State income estimate — an indicator of regional development. Accordingly, an attempt has been made in this paper to arrive at such estimates. This attempt, so far as the authors' knowledge goes, is the first of its kind in this field and it is hoped that this study would be of interest to all research workers engaged in estimating income both at national and regional levels.

The Directorate General of Technical Development (D.G.T.D.) collects monthly information on the quantum of production of a large number of selected commodities and these are published in the "Monthly Statistics of the Production of selected Industries of India" issued every month by the Industrial Statistics Wing (I.S. Wing) of the Central Statistical Organisation. Based on these data, the I.S. Wing is also preparing the index of industrial production at the all India level with 1956 as base and publish it in the above mentioned monthly publication. But lack of data on production of various important commodities at the State level as collected by the D.G.T.D. seriously inhibits preparation of State indices of industrial production based on that data. The Census of Manufacturing Industries, however, give some State-wise information from which it has been possible to build up State-wise indices of output for studying regional differentials in industrial growth. For the present study, therefore, the data of the industrial censuses have been tapped for constructing the indices of industrial output at the State level by studying the changes in each of the industry in the State, and arriving at a combined index of industrial output for the whole State. For an appraisal of the various industrial enquiries and the limitations under which the study has been undertaken, a brief description of these annual industrial censuses, alongwith their scope and coverage is given below:-

From 1946 to 1956, the census of Manufacturing Industries (C.M.I.) was conducted annually on a statutory basis, under the provisions of Industrial Statistics Act, 1942 and the CMI Rules 1945 made thereunder. The C.M.I. covered only factories registered under Section 2 j of the Factories Act, 1934, namely factories employing 20 or more workers on any day with the aid of power. Moreover it was confined to the first 29 of 63 groups into which the entire field of industries was classified. The censuses for the years 1957 and 1958 were conducted on a voluntary basis, as the Industrial Statistics Act was repealed with the enforcement of the collection of Statistics Act, 1953.

The authors acknowledge with gratitude the valuable suggestions made by Sarvashri K.N. Shrinivasan and M.N. Kapur.

A Sample Survey of Manufacturing Industries was conducted by the National Sample Survey covering all the 63 industrial groups with the exception of ordnance factories and Railway Workshops. It covered all the factories registered under Section 2 m (i) and 2 m (ii) of the Factories Act 1948 i.e. the factories employing 10 or more workers on any working day if using power, and employing 20 or more workers if not using power. The classified list of factories registered under Sections 2 m(i) and 2 m(ii) of the Indian Factories Act, 1948 maintained by the Chief Inspector of Factories in the different States in India, formed the basis for the sampling frame adopted for the survey. The allocation among the 61 industries (and their sub-groups) has been proportional to the product of the total number of workers and standard deviation of output per worker (obtained from the results of earlier surveys). Unlike CMI the SSMI gives a blown up estimates for the entire population. Both CMI and SSMI provide data for the calendar years, except in the case of sugar industry for which year ending 30th June is adopted.

The census and sample surveys from the year 1959 are being conducted on a unified basis designated as the Annual Survey of Industries (ASI) under the collection of Statistics Act 1953. In this survey all factories registered under Section 2 m(i) and 2 m(ii) of the Factories Act, 1948 are covered. Data, however, are not collected from the Defence Installations, factories engaged in storage and distribution of oil and technical training institutes not producing anything for sale or exchange, even though these were registered under the Factories Act, 1948. Within this coverage, all factories employing on an average 50 or more workers if using power, or 100 or more workers if not using power are covered on complete enumeration basis and is known as the census sector of the A.S.I. All other factories not covered in the census sector i.e. the factories employing 10 to 49 workers and using power or 20 to 99 workers and not using power are covered on the probability sample basis and comprise the sample sector of the A.S.I.

As may be seen from the above brief description of the various industrial enquiries, there have been differences in scope and coverage of the various industrial censuses. Besides, the method of presentation of data in the various census Reports have also been different. For example, in the reports of SSMI which covered the entire manufacturing sector, State-wise and industry-wise break-up, which could have been a useful material for the present study, was not available prior to 1958. In the circumstances explained above the study had, therefore, to be restricted to the CMI only, and also could not be extended to the pre 1956 period because of so many difficulties arising out of the reorganisation of States in 1956 and before. The study, therefore, at present has a limited scope and can be treated as exploratory and important from the methodological point of view.

For the purpose of the present study, what is required is Gross output in each industry and then arriving at a combined index of output for the whole State. In an ideal situation where the price structure remains constant, the series of annual figures of value of output would automatically yield the corresponding series of indices of output for each industry. In the practical situation of changing prices, however, the annual series of output values could still yield output indices if a device evolved to correct the output values for price changes. In other words, the series of annual output in each industry deflated by the corresponding annual series of indices of prices of, at least, important products of the industry would yield a series of industrial output for that industry. Details of the method of arriving at the price indices as also indic

Information on the following aspects in respect of each industry are available from the GMI reports:

- i) quantity and also values of important products
- ii) only values of the other products and not the quantity thereof.

The price index has been compiled from the GMI data themselves so that the deflating factor becomes organic with the system of the same industrial enquiry. The index has been compiled for each industry by deflating the value of the output of the industry relative to the base year by the above mentioned price index as described in detail later for the industries. The combined index for all the industries in a State has been calculated as a simple weighted average of indices of output of the different industries. The weights have been taken in proportion to the value added by manufacture of the respective industries for 1956, which has been taken as the base for the index.

The price index for each industry has been compiled as the Laspyre's Index. The method adopted thus is equivalent to computing Pasches' Quantity Index. This would be obvious from the following:

Let the suffixes 'i' and 'j' denote the jth commodity in the 'ith industry and the suffixes '0' and 'n' the base year 1956 and a current year respectively. Then price of the jth commodity in the ith industry in the base year would be given by $p_0^{ij} = \frac{V_0^{ij}}{q_0^{ij}}$ where V_0^{ij}

is the value of the jth product in the base year and q_0^{ij} is the quantity of jth product/by-product in the ith industry in the base year. Using similar notations, we will have the prices of the current year given by $p_n^{ij} = \frac{V_n^{ij}}{q_n^{ij}}$ LASPYER'S price index is

then constructed by using the formula $\frac{\sum_i p_n^{ij} q_0^{ij}}{\sum_i p_0^{ij} q_0^{ij}}$ in the form $\frac{\sum_i p_0^{ij} q_0^{ij} \times p_n^{ij}/p_0^{ij}}{\sum_i p_0^{ij} q_0^{ij}}$ the value of output relative to the base year i.e. $\frac{\sum_i p_n^{ij} q_n^{ij}}{\sum_i p_0^{ij} q_0^{ij}}$ when deflated by the price index gives $\frac{\sum_i p_n^{ij} q_n^{ij}}{\sum_i p_0^{ij} q_0^{ij}} \times \frac{\sum_i p_0^{ij} q_0^{ij}}{\sum_i p_n^{ij} q_0^{ij}} = \frac{\sum_i p_n^{ij} q_0^{ij}}{\sum_i p_0^{ij} q_0^{ij}}$

which is Pasche's quantity index. The indices of output thus arrived at for each industry in the State and combined index of output for all industries for the State are given in the pages that follow.

Table 1 : Regional Indices of output

(1956 = 100)

State	Net value added by manufacture in 1956 ('000 Rs.)	Percentage to total	Indices of output	
			1956	1958
1. Andhra Pradesh	105528	2.2	106.4	112.9
2. Assam	16666	0.4	93.1	76.5
3. Bihar	539161	11.5	100.6	103.7
4. Bombay (Gujarat & Maharashtra)	1712803	36.5	106.8	115.9
5. Kerala	59206	1.3	100.7	116.0
6. Madhya Pradesh	36296	0.8	252.1	190.6
7. Madras	370076	7.9	115.9	118.4
8. Orissa	39757	0.9	116.7	125.6
9. Punjab	92799	2.0	113.0	141.6
10. Rajasthan	31042	0.7	104.5	106.4
11. Uttar Pradesh	340292	7.2	103.8	101.8
12. West Bengal	1122215	23.9	115.4	135.5
13. Delhi	90036	1.9	120.4	120.5
14. Others	131502	2.8	-	-
Total	4687369	100.0	108.9	116.4

As would be expected, the heavy concentration of industries is noticed in Bombay and West Bengal. The different rates of the progress in industrial production/influenced to a great extent by the level of industrialisation already achieved in a State. Even then the progress observed in West Bengal is quite substantial i.e. a rate of 17.5 per cent per annum. The annual rate of increase in production is very high in Madhya Pradesh i.e. about 45 per cent in 1958 as compared to 1956, the base year. For some of the important industries detailed region-wise indices of output have been presented in Appendix I.

Another feature which has emerged out of the present study is a new series of price indices which can be constructed from the census of production data. Lack of price series data seriously inhibits the estimation of income at regional levels. The C.M.I. Reports usefully provide the data on quantity as well as their respective values for a large number of commodities produced as also consumed in each of the industry, and this can be gainfully tapped for building up the price series. Table 2 giving the State-wise indices of industrial output prices worked out as stated earlier, and combined index for all India

Table 2 : Regional indices of output prices

(1956 = 100)

State	Indices of output prices	
	1957	1958
1. Andhra Pradesh	109.2	84.6
2. Assam	114.8	112.3
3. Bihar	102.1	97.9
4. Bombay (Gujarat & Maharashtra)	100.6	102.3
5. Kerala	106.5	110.0
6. Madhya Pradesh	114.5	109.4
7. Madras	100.0	100.3
8. Orissa	103.4	99.7
9. Punjab	105.0	110.9
10. Rajasthan	104.9	103.5
11. Uttar Pradesh	103.4	103.9
12. West Bengal	104.0	102.5
13. Delhi	99.5	99.6
All India	<u>103.7</u>	<u>104.3</u>

Region-wise as also industry-wise indices of output and output prices have been presented in Appendix II.

i) Prior to 1958, industry-wise information for the States is not available in the S.S.M.I. Reports and as such the study had to be restricted only to C.M.I. data.

ii) For states like Assam, Orissa, Rajasthan, Kerala, etc. due to the secrecy clause in the relevant Acts in most of the cases, the factories which/less than two in certain industries for these states were clubbed together with the factories of other states and as such separate indices for these industries in the State could not be worked out.

In conclusion this may be stated that inspite of the limitations, this study makes an attempt to use the census of production data for constructing the output indices both at regional and all India level. It is felt that with the continuation of ASI in the present form and with the base year of the official index of industrial production being shortly shifted from 1956 to 1960, the limitation from which the present study suffers would cease to be there and a series of industrial output as also output prices from the census of production data on a continuing basis would be available.

APPENDIX I
Region-wise Indices of Output for a few Industries

1956 = 100

State	Net value added by manufacture in 1956 ('000 Rs.)	Percentage to total	Indices of output	
			1957	1958
<u>SUGAR</u>				
1. Andhra Pradesh	30716	10.0	106.8	92.8
2. Bihar	40737	13.3	89.5	97.9
3. Bombay (Gujarat & Maharashtra)	58900	19.2	141.5	173.4
4. Madras	20452	6.7	104.4	116.1
5. Rajasthan	1953	0.6	76.3	53.5
6. Uttar Pradesh	132188	43.2	88.6	82.3
Total All-India	284946 (306293)	93.0	99.2	103.4
<u>CERAMICS</u>				
1. Andhra Pradesh	735	2.0	121.5	165.6
2. Bihar	14204	38.0	115.7	153.7
3. Bombay	4609	12.3	130.6	147.6
4. Madhya Pradesh	4279	11.5	111.4	129.8
5. West Bengal	11543	30.9	115.4	143.1
6. Delhi	1335	3.6	139.9	151.3
Total All India	36705 (37340)	98.3	109.7	132.0
<u>JUTE TEXTILES</u>				
1. Andhra Pradesh	10434	2.5	107.1	157.0
2. Uttar Pradesh	8026	1.9	96.4	90.3
3. West Bengal	385761	93.2	98.0	109.5
Total All India	404221 (414128)	97.6	93.9	103.0

Figures in brackets give the total net value added by manufacture for All India.

APPENDIX I (Contd.)

1956 = 100

State	Net value added by manufacture in 1956 (1000 Rs.)	Percentage to total	Indices of output	
			1957	1958
<u>COTTON TEXTILES</u> (Spinning and Weaving)				
1. Andhra Pradesh	11073	0.6	108.9	119.2
2. Bombay (Gujarat & Maharashtra)	1125119	65.2	100.5	100.2
3. Kerala	18800	1.1	93.1	103.3
4. Madhya Pradesh	8371	0.5	667.8	529.1
5. Madras	240706	13.9	114.9	116.3
6. Orissa	8112	0.5	111.0	143.6
7. Punjab	15692	0.9	133.9	194.2
8. Rajasthan	13726	0.8	112.2	98.8
9. Uttar Pradesh	102931	6.0	108.9	101.2
10. West Bengal	73345	4.2	107.4	120.4
11. Delhi	56807	3.3	120.6	104.3
Total	1674682	97.0	107.3	107.0
All India	(1726996)			

<u>CHEMICALS</u> (Including Drugs and Pharmaceuticals)				
1. Andhra Pradesh	3025	1.0	138.5	162.6
2. Bihar	58739	9.0	92.4	96.0
3. Bombay (Gujarat & Maharashtra)	144083	46.7	117.3	143.9
4. Kerala	8109	2.6	116.2	124.1
5. Madras	14945	4.8	116.6	129.1
6. Punjab	752	0.2	131.5	-
7. Uttar Pradesh	7638	2.5	152.0	165.0
8. West Bengal	59384	19.2	121.5	140.3
9. Delhi	8902	2.9	114.8	160.5
Total	305577	98.9	113.7	136.6
All India	(308997)			

APPENDIX I (Contd.)

1956 = 100

State	Net value added by manufacture in 1956 ('000 Rs.)	Percentage to total	Indices of output	
			1957	1958
CHEMICAL ENGINEERING AND ELECTRICAL ENGINEERING (Excluding Generation and Transformation of Electrical Energy)				
1. Andhra Pradesh	5310	1.1	119.7	98.7
2. Assam	1649	0.3	97.0	111.7
3. Bihar	26201	5.5	98.9	107.0
4. Bombay (Gujarat & Maharashtra)	163950	34.1	126.6	157.1
5. Madhya Pradesh	1919	0.4	129.3	210.4
6. Madras	23489	4.9	138.8	134.2
7. Orissa	2169	0.5	85.6	63.4
8. Punjab	12597	2.6	106.0	122.2
9. Rajasthan	1540	0.3	180.6	267.3
10. Uttar Pradesh	10941	2.3	126.2	142.1
11. West Bengal	180343	37.6	149.3	171.4
12. Delhi	13889	2.9	124.9	149.6
Total	443997	92.5	134.0	156.4
All India	(480020)			

IRON AND STEEL SMELTING
(Including Blast furnace operation)

1. Bihar	319111	57.9	103.4	102.2
2. Bombay (Gujarat & Maharashtra)	15866	2.9	96.2	187.5
3. Madras	2376	0.4	163.0	177.0
4. Punjab	5693	1.0	76.9	85.7
5. Rajasthan	281	0.1	81.3	99.7
6. Uttar Pradesh	9321	1.7	100.9	119.8
7. West Bengal	186839	33.9	115.7	167.1
8. Delhi	917	0.2	78.4	156.3
Total	540403	98.1	100.3	107.1
All India	(551052)			

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APPENDIX II

Indices of Output and output prices by industries within regions (1956 = 100)

Industry	Net value added by manufacture (1000 Rs.)	Percent- age to total	Indices of			
			output		output prices	
			1957	1958	1957	1958
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>ANDHRA PRADESH</u>						
1. Rice milling	21068	19.98	122.9	134.2	119.7	131.3
2. Biscuit making (including Bakeries and Confectioneries)	339	0.32	122.9	134.2	119.7	131.3
3. Sugar	30716	29.11	106.8	92.8	96.0	109.3
4. Distilleries & Breweries (including power alcohol manufacturing)	2529	2.40	97.3	93.1	100.8	74.9
5. Tanning	60	0.06	91.5	85.2	102.8	108.2
6. Ceramics	735	0.70	121.5	165.6	93.1	87.6
7. Cotton textiles - spinning & weaving	11073	10.49	108.9	119.2	106.3	104.6
8. Wollen textiles						
9. Jute textiles	10434	9.89	107.1	157.0	100.5	94.6
10. Chemicals (including Drugs & Pharmaceuticals)	3025	2.87	138.5	162.6	110.1	106.4
11. Aluminium, copper and Brass - All processes from Ore smelting to manufacturing of final products ready for use	810	0.77	1014.0	92.6	98.0	101.0
12. General Engineering & Electrical Engineering (excluding Generation and transformation of Electrical Energy)	5310	5.03	119.7	98.7	-	-
ALL INDUSTRIES	105528	81.62	106.4	112.9	109.2	84.57
<u>ASSAM</u>						
Rice milling	3492	2095	124.0	85.6	117.5	113.1
Plywood & Teacheists	5821	34.93	73.4	61.2	107.3	110.2
General Engineering & Electrical Engineering (excluding Generation and Transformation of Electrical Energy)	1649	9.89	97.0	111.7	-	-
ALL INDUSTRIES	16666	65.77	93.1	76.5	114.8	112.3

INDEX II (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>BIHAR</u>						
Wheat flour	933	0.17	65.1	120.6	97.7	85.1
Rice milling	3937	0.73	91.8	48.1	115.7	150.2
Biscuit making (including Bakeries and Confectioneries)	921	0.17	106.0	117.7	105.3	100.9
Sugar	40727	7.56	89.5	97.9	103.1	104.6
Distilleries & Breweries (including power alcohol manufacturing)	1108	0.21	111.0	103.3	92.9	99.0
Cement	23130	4.29	105.6	123.4	97.1	100.0
Glass & Glassware	1510	0.28	103.5	241.8	100.3	100.4
Ceramics	14204	2.63	115.7	153.7	107.1	117.8
Chemicals (including Drugs & Pharmaceuticals)	58739	10.39	92.4	96.0	102.1	106.6
Aluminium, Copper and Brass - All processes from ores melting to manufacturing of final products ready for use	26753	10.89	92.4	99.0	95.1	86.3
Iron & Steel - smelting (including blast furnace operations)	319111	59.19	103.4	102.2	100.4	102.2
General Engineering & Electrical Engineering (excluding Generation and Transformation of Electrical Energy)	26201	4.86	98.9	107.0	-	-
ALL INDUSTRIES	539161	95.94	100.6	103.7	102.1	97.9

<u>BOMBAY</u>						
Wheat flour	10223	0.60	113.3	161.6	96.7	95.9
Rice milling	320	0.02	39.1	34.0	113.1	135.4
Biscuit making (including Bakeries and confectioneries)	6821	0.40	112.2	134.0	109.2	111.4
Fruit & Vegetable processing	1138	0.07	130.4	112.2	93.9	112.4

(Contd....11)

INDEX II (Contd.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>BOMBAY (Contd.)</u>							
Sugar	58900	2.36	141.5	173.4	103.9	101.0	
Distilleries & Breweries (including power alcohol manufacturing)	850	0.05	110.8	159.4	91.2	96.3	
Starch	3828	0.22	77.4	76.9	121.3	119.0	
Vegetable oils (edible)	18999	1.11	94.6	104.7	112.3	113.1	
Paints and Varnishes	8049	0.47	101.3	139.9	108.0	115.9	
Soap	33901	1.98	110.5	114.2	105.9	108.0	
anning	1400	0.08	78.0	111.0	95.8	96.8	
ement	12151	0.71	127.4	124.7	93.2	94.1	
lass & Glassware	10609	0.62	115.9	141.6	112.2	110.0	
eramics	4609	0.27	130.6	147.7	95.1	108.0	
lywood & Teakwoods							
aper & Paperboard (including straw board)	15475	0.90	119.8	190.0	106.8	88.6	
atches	8191	0.48	102.5	109.8	102.7	101.5	
otton textiles - pinning & weaving	1125119	65.69	100.5	100.2	98.0	99.8	
ollen Textiles	10908	0.64	104.7	135.8	109.8	110.0	
hemicals (including drugs pharmaceuticals)	144083	8.41	117.3	143.9	109.8	117.2	
lluminium, copper and rass - all processes from re smelting to manufacturing ffinal products ready for se	14791	0.86	105.8	150.5	94.8	92.9	
ron & Steel - smelting (including blast furnace perations)	15866	0.93	96.2	187.5	114.6	116.9	
icycles	9867	0.58	109.1	68.3	94.5	89.9	
ewing machines							

(Contd....p.12)

APPENDIX II (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>BOMBAY (Contd.)</u>						
25. Electric Lamps	--	--	--	--	--	--
26. Electric Fans	859	0.05	126.9	178.5	85.6	117.5
27. General Engineering and Electrical Engineering (including Generation and Transformation of Electrical Energy)	163950	9.57	126.6	157.1	--	--
All Industries	1712803	97.07	106.8	115.9	100.6	102.3
<u>KERALA</u>						
1. Soap	5426	9.16	88.1	142.2	110.9	113.8
2. Cotton textiles - spinning & weaving	18800	31.75	93.1	103.3	92.1	96.9
3. Chemicals (including drugs & Pharmaceuticals)	8109	13.70	116.2	124.1	116.2	110.4
All Industries	59206	54.61	100.7	116.0	--	--
<u>MAHARASHTRA</u>						
1. Rice flour	381	1.05	271.5	184.6	97.3	97.3
2. Rice milling	5918	16.03	116.8	58.8	117.1	110.0
3. Ceramics	4279	11.79	111.4	129.8	94.6	114.0
4. Cotton textiles - spinning & weaving	8371	23.06	667.8	529.1	118.0	109.6
5. General Engineering & Electrical Engineering (excluding Generation and Transformation of Electrical Energy)	1919	5.29	129.3	210.4	--	--
All Industries	36296	57.22	252.1	190.6	114.5	109.4

APPENDIX II (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>MADRAS</u>						
1. Wheat flour	676	0.18	193.0	212.9	103.7	96.9
2. Rice milling	8431	0.28	105.4	116.0	108.4	113.3
3. Biscuit making (including Bakeries and confectioneries)	258	0.07	101.0	87.3	94.1	94.9
4. Fruit & vegetable processing	-	-	-	-	-	-
5. Sugar	20452	5.53	104.4	116.1	101.5	113.7
6. Tanning	8328	2.25	91.9	59.8	111.0	108.9
7. Cement	19661	5.31	117.5	111.7	87.5	90.3
8. Matches	11200	3.03	101.3	122.7	92.3	109.66
9. Cotton textiles - spinning & weaving	240706	65.04	114.9	116.3	95.8	94.7
10. Woollen textiles	32	0.01	57.6	36.6	115.9	90.9
11. Jute textiles	-	-	-	-	-	-
12. Chemicals (including drugs & pharmaceuticals)	14945	4.0	116.6	129.1	113.3	111.5
13. Aluminium, copper and Brass - All processes from one smelting to manufacturing of final products ready for use	3665	0.99	97.3	98.2	104.6	97.6
14. Iron & Steel - smelting (including Blast furnace operations)	2375	0.64	163.0	157.0	111.1	110.5
15. Bicycles	7569	2.05	147.0	166.1	97.1	97.4
16. Electric lamps	3675	0.99	129.8	140.0	-	-
17. Electric fans						
18. General Engineering & Electrical Engineering (excluding Generation and Transformation of Electrical Energy)	23489	6.35	137.8	134.2	-	-
All Industries	370076	96.72	115.9	116.4	100.0	100.3

APPENDIX II (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>ORISSA</u>						
1. Rice milling	5889	17.88	128.9	86.4	103.8	96.9
2. Cotton textiles - spinning & weaving	81.2	20.00	111.0	143.6	102.9	103.0
3. General Engineering & Electrical Engineering (excluding Generation & Transformation of Electrical Energy)	2769	5.46	85.6	63.4	--	--
All Industries	39757	38.74	116.7	125.6	103.4	99.7
<u>PUNJAB</u>						
1. Wheat flour	4654	5.65	117.9	134.1	102.1	101.6
2. Rice milling	179	0.19	580.5	392.9	94.2	97.9
3. Distilleries & Breweries (including power alcohol manufacturing)	2158	2.33	93.7	--	106.0	--
4. Cotton textiles - spinning and weaving	15692	16.91	133.9	194.2	98.1	97.5
5. Woollen Textiles	11665	12.79	92.6	86.6	116.6	131.9
6. Chemicals (including Drugs & Pharmaceuticals)	752	0.81	131.5	--	101.1	--
7. Aluminium, copper and Brass - All processes from Ore smelting to manufacturing of final products ready for use	1999	2.15	123.2	163.1	97.0	98.5
8. Iron & Steel - smelting (including Blast Furnace operation)	5693	6.13	76.9	85.7	107.3	122.5
9. Bicycles	5223	5.63	136.3	201.5	94.5	93.8
10. Sewing machines	1600	1.72	113.5	152.3	106.8	93.8
11. Electric Fans	175	0.19	127.3	168.4	102.7	97.2
12. General Engineering and Electrical Engineering (excluding Generation and Transformation of Electrical Energy)	12597	13.58	106.0	122.2	--	--
All Industries	92799	67.08	113.0	141.6	105.0	111.0

APPENDIX II (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>RAJASTHAN</u>						
1. Sugar	1953	6.29	76.3	53.5	121.4	139.4
2. Cotton textiles - spinning and weaving	13726	44.22	142.2	89.8	99.4	102.8
3. Aluminium, copper and brass - all processes from Ore smelting to manufacturing of final products ready for use	3303	1064	93.2	132.6	114.6	78.2
4. Iron & Steel smelting (including blast furnace operation)	281	0.21	81.3	99.7	112.1	140.1
5. General Engineering & Elec- trical Engineering (excluding Generation and Transformation of Electrical Energy)	1540	4.96	180.6	267.3	-	-
All Industries	31042	67.02	104.5	106.4	104.9	103.5
<u>UTTAR PRADESH</u>						
1. Wheat flour	1587	0.17	105.9	81.5	102.5	102.9
2. Rice milling	1452	0.43	80.0	76.8	118.6	127.8
3. Biscuit making (including Bakeries and confectioneries)	375	0.11	68.4	68.6	98.2	100.2
4. Sugar	132188	38.85	88.6	82.3	106.2	106.9
5. Distilleries & Breweries (including power alcohol manufacturing)	4206	0.28	94.1	98.3	100.9	97.5
6. Vegetable oils (edible)	9879	2.90	126.9	124.1	104.2	105.2
7. Paints and varnishes	679	0.20	98.9	116.2	115.8	89.1
8. Soap	497	0.15	80.4	89.6	112.4	116.3
9. Tanning	4546	1.34	104.5	140.6	102.2	75.6
10. Cement	54253		116.8	118.7	91.5	92.3
11. Glass & Glassware	4133	1.22	102.0	112.6	113.2	97.5
12. Plywood & Teaksheds	1238	0.36	143.8	194.8	112.3	83.6

(Contd....p. 16)

APPENDIX II (Contd.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>UTTAR PRADESH (Contd.)</u>							
13. Paper & paperboard (including straw boards)	6388	1.88	101.5	87.4	74.9	62.0	
14. Matches	-	-	-	-	-	-	
15. Cotton textiles - spinning & weaving	102931	30.25	103.9	101.2	102.0	103.4	
16. Wooden textiles	8504	2.50	99.0	125.1	106.5	100.9	
17. Jute textiles	8026	2.36	96.4	90.3	105.4	96.9	
18. Chemicals (including drugs and pharmaceuticals)	7638	2.24	152.0	165.0	99.8	109.6	
19. Aluminium, copper and brass - All processes from ore starting to manufacturing of final products ready for use	1437	0.42	123.7	152.7	90.3	84.1	
20. Iron & Steel - smelting (including Blast furnace operations)	9321	2.74	100.9	119.8	105.2		
21. Bicycles	1808	0.53	121.0	142.8	106.4	86.5	
22. General Engineering & Elec- tical Engineering (excluding Generation and Transformation of Electrical Energy)	10941	3.22	126.2	142.1			
All Industries	340292	92.45	103.8	101.8	103.4	103.9	

WEST BENGAL

1. Wheat flour	8495	0.76	99.4	100.6	99.0	98.8	
2. Rice milling	18974	1.69	109.3	70.2	114.9	121.1	
3. Biscuit making (including Bakeries and Confectioneries)	6902	0.62	145.6	134.7	105.9	111.9	
4. Fruit & Vegetable processing	509	0.05	71.5	233.5	95.0	89.7	
5. Distilleries & Breweries (including power alcohol Manufacturing)	3237	0.29	133.3	122.9	86.9	93.2	
6. Vegetable oils (edible)	8185	0.73	116.4	121.6	107.7	107.2	
7. Paints and Varnishes	23943	2.13	114.7	115.8	112.5	113.6	

APPENDIX II (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>WEST BENGAL (Contd.)</u>						
1. Soap	15858	1.41	110.0	146.6	107.4	113.8
2. Tanning	4728	0.04	107.9	153.3	122.1	124.0
3. Cement	-	-	-	-	-	-
4. Glass & Glassware	9157	0.82	127.1	142.4	102.6	111.8
5. Ceramics	11543	1.03	115.4	143.1	101.9	86.7
6. Plywood & Teacheats	3752	0.33	94.0	80.0	102.6	109.8
7. Paper & paperboard (including straw board)	42664	3.80	96.6	107.2	100.8	109.8
8. Cotton textiles - spinning and weaving	73345	6.54	107.4	120.4	96.9	100.7
9. Woollen textiles	-	-	-	-	-	-
10. Jute textiles	38571	34.37	98.0	109.5	99.2	92.7
11. Chemicals (including drugs & pharmaceuticals)	59384	5.29	121.5	140.3	101.6	105.0
12. Aluminium, Copper and brass - All Processes from Ore smelting to manufacturing of final products ready for use	18314	2.52	120.2	117.7	107.1	99.1
13. Iron & Steel smelting (including Blast furnace operations)	186839	16.65	114.7	167.1	112.0	117.6
14. Bicycles	10086	0.90	101.5	155.1	101.5	108.6
15. Sewing machines	13647	1.22	225.8	265.2	-	-
16. Electric Lamps	5717	0.51	103.3	66.8	-	-
17. Electric Fans	7040	0.63	172.4	222.7	-	-
18. General Engineering & Elec- trical Engineering (exclu- ding Generation and Trans- formation of Electrical Energy)	180343	16.07	149.3	171.4	-	-
All Industries	1122215	98.07	115.4	135.5	104.0	102.5

APPENDIX II (Contd)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>DELHI</u>							
1. Biscuit making (including Bakeries & Confectioneries)	372	0.41	11.0	94.9	97.9	115.9	
2. Ceramics	1335	1.48	139.9	151.3	102.9	123.2	
3. Cotton textiles - Spinning and Weaving	56807	63.09	120.6	105.0	97.5	96.5	
4. Chemicals (including Drugs & Pharmaceuticals)	8902	9.89	114.8	160.5	101.5	102.3	
5. Aluminium, Copper and brass - All Processes from Ore smelting to manufacturing of final products ready for use	524	0.59	108.7	134.9	92.9	98.0	
6. Iron & Steel - smelting (including blast-furnace operations).	917	10.2	78.4	156.3	108.6	106.5	
7. General Engineering & Electrical Engineering (excluding Generation and Transformation of Electrical Energy)	13889	15.43	124.9	149.6	--	--	
All Industries	90036	91.91	120.4	120.5	99.5	99.6	

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**INDIAN ASSOCIATION FOR RESEARCH
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**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

ALL - INDIA RURAL DEBT AND INVESTMENT SURVEY,

1961 — 62

RESERVE BANK OF INDIA

AHMEDABAD

9 — 11 APRIL 1966

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ALL-INDIA RURAL DEBT AND INVESTMENT SURVEY, 1961-62

TANGIBLE WEALTH, CAPITAL EXPENDITURE AND CAPITAL
FORMATION OF RURAL HOUSEHOLDS



Price Rs. 1.50

Reprinted from
Reserve Bank of India Bulletin
JUNE 1965

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TANGIBLE WEALTH, CAPITAL EXPENDITURE AND CAPITAL FORMATION OF RURAL HOUSEHOLDS*

Introduction

An article presenting the provisional estimates in respect of certain important items covered in the All-India Rural Debt and Investment Survey, 1961-62 was published in the December 1963 issue of Reserve Bank of India Bulletin wherein, the purpose of the Survey, the scope and method of approach, plan of enquiry and concepts and definitions adopted for the Survey were briefly explained. The present article deals with a detailed examination of the estimates of tangible wealth, capital expenditure and capital formation for the rural household sector.

Tangible assets are broadly of two types ; reproducible and non-reproducible. Land (excluding all man-made improvements), sub-soil assets, works of art and collectors' items (such as rare books and stamps) are regarded as non-reproducible assets, while reproducible assets comprise all other tangible assets, namely, improvements to land, buildings, other structures, livestock, machinery and other equipment, inventories of raw materials, semi-finished and finished goods, stocks of precious metals and consumer goods. Expenditure incurred from year to year on capital assets resulting in increased productive capacity is referred to as capital formation. Generally capital formation is estimated on the basis of addition to capital assets. Fixed capital formation of enterprises is defined as "the expenditures for machinery, equipment, buildings and other construction and works". Non-reproducible capital assets do not figure in capital formation except for the man-made improvements to the existing assets.

The constituent items of tangible wealth of rural households enumerated in the Survey are classified as follows :

1. Owned land and land held under special rights.
2. Residential buildings.
3. Other structures and building sites.
4. Livestock,

5. Equipment used in farm business (including tractors but excluding transport equipment),
6. Equipment used in non-farm business (excluding transport equipment),
7. Bullock carts,
8. Other transport equipment,
9. Durable household assets.

The items of capital expenditure in farm business are enumerated below :

1. Purchase of land,
2. Purchase of land rights,
3. Reclamation of land,
4. Bunding and other land improvements,
5. Orchards and plantations,
6. Wells,
7. Other irrigation resources,
8. Agricultural implements, machinery, transport equipment, etc.,
9. Farm houses, grain *golas* and cattle sheds,
10. Purchase of livestock,
11. Other capital expenditure in farm business.

Apart from expenditure on purchase of land and land rights as also on purchase of livestock, expenditure on other items can be divided into broad groups namely those which refer to the improvement of land surface and irrigation facilities, farm equipment and farm buildings. In estimating capital formation we have excluded transfer items like purchases of land and livestock ; for other items, cash expenditure, contribution by family labour, owned materials used and expenditure in kind are taken into consideration for estimating capital formation.

The first section of the article deals with stocks of tangible assets, the second with cash expenditure of a capital nature and the third deals with capital formation in the rural household sector.

Distribution of rural households according to value of assets

The percentage distribution of cultivator and non-cultivator households† in individual States is presented in Statement No. 1 of Appendix. According to the Survey, nearly

* Prepared in the Department of Statistics.

† Households which reported some area under personal cultivation, except small garden plots, as on 31 December 1961, were classified as cultivator households. All other households were grouped as non-cultivator households.

three-fourths of the rural households were cultivators, the proportion varying from 59 per cent in Punjab to 91 per cent in Jammu & Kashmir.

A preliminary examination of the distribution of households falling in the various asset groups will be useful to provide the necessary background for an understanding of the significant differences, if any, in levels of estimates for these groups. The households have been classified into seven asset groups according to value of assets as on 31st December 1961. *viz.*,

1. Less than Rs. 500
2. Rs. 500—Rs. 1,000
3. Rs. 1,000—Rs. 2,500
4. Rs. 2,500—Rs. 5,000
5. Rs. 5,000—Rs. 10,000
6. Rs. 10,000—Rs. 20,000
7. Rs. 20,000 and above.

The value of total assets includes the value of (i) ownership rights in land, (ii) special rights in land, (iii) buildings, (iv) livestock, (v) implements, machinery, transport equipment, etc., (vi) durable household assets, (vii) dues receivable on loans advanced in cash and in kind and (viii) specified items of financial assets, like National Plan Savings Certificates, Government securities, shares and debentures of companies and co-operative institutions, deposits with banks and private money lenders, etc. Cash in hand, insurance policies, annuity certificates and chit funds, as also, stocks of commodities are not covered in the value of assets.

Data for all-India on the proportion of households falling in each of the asset groups, the aggregate value of assets and the share of each asset group in total value of assets in respect of cultivators, non-cultivators and all rural households are presented in Table I.

TABLE I—DISTRIBUTION OF RURAL HOUSEHOLDS ACCORDING TO VALUE OF ASSETS—ALL-INDIA

Asset group	Cultivators		Non-cultivators		All rural households	
	Per-centage of households	Aggregate value of assets (in crores of Rs.)	Per-centage of households	Aggregate value of assets (in crores of Rs.)	Per-centage of households	Aggregate value of assets (in crores of Rs.)
Less than Rs. 500	.. 6.5	99.4 (0.3)	49.4	198.8 (6.5)	17.9	298.2 (0.8)
Rs. 500—Rs. 1,000	.. 9.7	366.3 (1.1)	19.3	250.2 (8.1)	12.2	616.5 (1.7)
Rs. 1,000—Rs. 2,500	.. 24.8	2,124.1 (6.3)	17.4	492.5 (16.0)	22.9	2,616.6 (7.1)
Rs. 2,500—Rs. 5,000	.. 23.3	4,215.9 (12.5)	7.1	455.0 (14.8)	19.0	4,670.9 (12.7)
Rs. 5,000—Rs. 10,000	.. 18.6	6,587.8 (19.5)	4.1	528.8 (17.2)	14.7	7,116.6 (19.3)
Rs. 10,000—Rs. 20,000	.. 10.7	7,498.6 (22.2)	1.6	407.5 (13.2)	8.3	7,906.1 (21.4)
Rs. 20,000 and above	.. 6.4	12,885.6 (38.1)	1.1	746.0 (24.2)	5.0	13,631.6 (37.0)
All-assets group	.. 100.0	33,777.6(100.0)	100.0	3,078.8(100.0)	100.0	36,856.4(100.0)

Figures in brackets are percentage to total for all asset groups.

The aggregate value of assets of all rural households was estimated at Rs. 36,856 crores, cultivator households accounting for 91.6 per cent of the total. Over 50 per cent of the rural households in the country had assets valued at less than Rs. 2,500 each, as on 31st December 1961 and the value of assets held by them was slightly less than 10 per cent of the total for

the country. About 18 per cent of the rural households had assets less than Rs. 500 per household, their share in terms of value of assets being less than one per cent. About one-third of the rural households held assets between Rs. 2,500 and Rs. 10,000 each, their share in total value being about 32 per cent, while a little over 13 per cent of the households

which were in the asset groups Rs. 10,000 or more, accounted for about 60 per cent of the total value of assets. The relative disparity in the asset holdings as between cultivator and non-cultivator households is reflected in the fact that, whereas 41 per cent of the cultivator households were in the asset groups less than Rs. 2,500, as many as 86 per cent of the non-cultivator households had assets less than Rs. 2,500. While about 23 per cent of the cultivator households were in the asset group Rs. 2,500 to Rs. 5,000 and another 19 per cent in the asset group Rs. 5,000 to Rs. 10,000 the corresponding proportions for non-cultivator households were only 7 per cent and 4 per cent. About 17 per cent of the cultivator households and a little less than 3 per cent of the non-cultivator households held assets amounting to Rs. 10,000 or more per household.

Statement No. 2 of Appendix gives the Statewise data on aggregate value of assets, proportion of households falling in each asset group and percentage share of each asset group in the total value of assets. Among the individual States, the proportion of cultivator households each having assets less than Rs. 2,500 was about 52 per cent in Assam and Kerala, about 49 per cent in West Bengal and 47 per cent in Bihar. The proportion varied between 40 per cent and 45 per cent in the States of Andhra Pradesh, Madhya Pradesh, Madras, Orissa, and Uttar Pradesh while in the remaining States it ranged between 25 per cent and 37 per cent with the exception of Punjab, where the corresponding proportion was around 15 per cent. In Punjab, there was a greater concentration of cultivator households in the higher asset groups than in the lower asset groups. In fact, over two-thirds of the cultivator households in Punjab had assets of Rs. 5,000 and more per household and a little less than one-fourth of the cultivators had assets amounting to Rs. 20,000 and over.

The proportion of cultivator households each having assets between Rs. 2,500 and Rs. 10,000 varied between 33 per cent to 40 per cent in Andhra Pradesh, Bihar, Kerala, Madras, Punjab and West Bengal while in the case of Assam, Gujarat, Madhya Pradesh, Maharashtra, Mysore, Orissa and Uttar Pradesh it varied between 42 per cent and 47 per cent. More than one half of cultivator

households in Jammu & Kashmir (59 per cent) and Rajasthan (52 per cent) were found to possess assets between Rs. 2,500 and Rs. 10,000 per household.

In the case of non-cultivator households it is observed that more than 80 per cent of them held assets less than Rs. 2,500 in eleven States while in the remaining four States, *viz.*, Jammu & Kashmir, Mysore, Punjab and Rajasthan the proportion was between 68 per cent and 78 per cent. The proportion of non-cultivators each having assets less than Rs. 500 was the highest at 78 per cent in Kerala. The proportion was between 55 per cent and 61 per cent in Andhra Pradesh, Bihar, Madhya Pradesh, Madras, Maharashtra and West Bengal and between 36 per cent and 49 per cent in the case of Assam, Gujarat, Mysore, Orissa and Uttar Pradesh. The proportion was relatively low in Rajasthan (28 per cent), Punjab (19 per cent) and Jammu & Kashmir (18 per cent). In the last two States, the proportion of non-cultivators each having assets between Rs. 500 and Rs. 1,000 and between Rs. 1,000 and Rs. 2,500 exceeded the proportion of non-cultivators having assets less than Rs. 500.

The proportion of non-cultivator households each having assets between Rs. 2,500 and Rs. 10,000 was less than 15 per cent in eleven States while it was 19 per cent in Mysore, 20 to 21 per cent in Rajasthan and Punjab and 27 per cent in Jammu & Kashmir. The proportion of non-cultivator households each having assets of Rs. 10,000 and over, was less than 5 per cent in all the States excepting Punjab (9 per cent).

I. TANGIBLE WEALTH OF RURAL HOUSEHOLDS

The constituent items of tangible wealth have been enumerated in the introduction. An important gap in the estimates presented here is that they do not include the value of stocks of commodities held by rural households. In respect of each item of tangible assets the market value as on 30th June 1962 as given by the respondent has been taken into account in arriving at the estimates.

The estimated value of constituent items of tangible wealth of rural households for all-India are presented in Table II.

TABLE II—TANGIBLE WEALTH OF RURAL HOUSEHOLDS—ALL-INDIA
(in crores of rupees)

Item	Cultivators		Non-cultivators		All rural households	
	Value of Tangible assets	Percentage to total	Value of Tangible assets	Percentage to total	Value of Tangible assets	Percentage to total
1. Owned land and land held under special rights	21,443 (95.1)	64.4	1,097 (4.9)	38.1	22,540	62.3
2. Residential buildings	5,257 (83.2)	15.8	1,062 (16.8)	36.9	6,319	17.5
3. Other Structures and building sites	1,178 (89.8)	3.5	134 (10.2)	4.7	1,312	3.6
4. Livestock	2,578 (95.0)	7.7	136 (5.0)	4.7	2,714	7.5
5. Equipment used in farm business (including tractors but excluding transport equipment)	468 (97.6)	1.4	12 (2.4)	0.4	480	1.3
6. Equipment used in non-farm business (excluding transport equipment)	83 (62.7)	0.3	50 (37.3)	1.7	133	0.4
7. Bullock carts	246 (98.8)	0.7	3 (1.2)	0.1	249	0.7
8. Other transport equipment .. .	119 (75.3)	0.4	39 (24.7)	1.4	158	0.4
9. Durable household assets .. .	1,902 (84.5)	5.7	348 (15.5)	12.1	2,250	6.2
Tangible wealth	33,275 (92.0)	100.0	2,881 (8.0)	100.0	36,156	100.0

Figures in brackets denote percentage shares of cultivators and non-cultivators in the total.

The value of tangible assets held by rural households as on 30th June 1962 was about Rs. 36,156 crores of which the value of reproducible assets was Rs. 13,615 crores (about 38 per cent). About 95 per cent of the asset holdings in land and about 92 per cent of the total tangible wealth in the rural household sector is accounted for by cultivator households. Residential buildings, other structures and building sites accounted for a little over one-fifth of the tangible wealth of rural households, livestock accounted for 7.5 per cent and durable household assets 6.2 per cent. All equipment used in farm and non-farm business including transport equipment, accounted for less than 3 per cent of the total value of tangible assets of rural households.

About 84 per cent of the tangible wealth of cultivator households and 80 per cent of that of non-cultivator households was in the form of land and house property. However, the share of land alone was 64 per cent in the case of cultivators and 38 per cent in case of non-cultivators. Livestock and durable house-

hold assets formed 8 per cent and 6 per cent, respectively, of the tangible wealth of cultivator households, whereas, the corresponding shares were 5 per cent and 12 per cent in case of non-cultivators.

As is to be expected, the share of non-cultivators is sizeable, and more than their share in number of households, only in the case of equipment used in non-farm business, followed by transport equipment other than bullock carts. They have a moderate share in residential buildings and durable household assets and other structures and building sites, while in other assets relating to farm business, their share is very low.

Share of each asset group in the tangible wealth

The percentage shares of the different asset groups in the total tangible wealth in respect of cultivator, non-cultivator and all rural households together with the proportion of households falling in each asset group are set out in Table III.

TABLE III—DISTRIBUTION OF TANGIBLE WEALTH BY ASSET GROUPS—ALL-INDIA

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households in asset group (per cent)	Percentage share in tangible wealth	Average per household (Rs.)	Proportion of households in asset group (per cent)	Percentage share in tangible wealth	Average per household (Rs.)	Proportion of households in asset group (per cent)	Percentage share in tangible wealth	Average per household (Rs.)
Less than Rs. 500	6.5	0.3	312	49.4	6.9	222	17.0	0.8	244
Rs. 500—Rs. 1,000	9.7	1.1	752	19.3	8.4	685	12.2	1.7	723
Rs. 1,000—Rs. 2,500	24.8	6.4	1,689	17.4	16.2	1,471	22.9	7.1	1,644
Rs. 2,500—Rs. 5,000	23.3	12.6	3,570	7.1	15.0	3,336	19.0	12.8	3,546
Rs. 5,000—Rs. 10,000	18.6	19.6	6,958	4.1	17.3	6,642	14.7	19.4	6,934
Rs. 10,000—Rs. 20,000	10.7	22.3	13,738	1.6	13.1	12,632	8.3	21.6	13,681
Rs. 20,000 and above	6.4	37.8	39,079	1.1	23.0	33,949	5.0	36.6	38,786
All-assets group	100.0	100.0	6,609	100.0	100.0	1,574	100.0	100.0	5,267

The households in the two highest asset groups (Rs. 10,000 and above), which formed about 13 per cent of the total number of rural households, accounted for about 58 per cent of the total tangible wealth of rural households in the country, while 30 per cent of the rural households, falling in the two lowest asset groups (below Rs. 1,000), had only 2.5 per cent of the total tangible wealth. That the concentration of tangible asset holdings is more in higher asset brackets for both cultivator and non-cultivator households is reflected in the fact, that the highest two asset groups comprising of 17 per cent and 3 per cent of cultivator and non-cultivator households accounted for 60 per cent and 36 per cent of the total tangible wealth of cultivator and non-cultivator households respectively, while the two lowest groups represented by 16 per cent and 69 per cent of cultivators and non-cultivators had shares of slightly more than one per cent and 15 per cent respectively, in the tangible asset holdings of cultivator and non-cultivator households. However, the inequality of distribution of wealth is higher among non-cultivators. While the share of tangible wealth steadily increased with the size of the asset group in the case of cultivators, such striking

rate of increase was not noticeable among non-cultivators, though the share of the highest group was the largest among all groups.

The Statewise data relating to average value of tangible assets per household and the relative importance of constituent items in the total value are discussed below for cultivators and non-cultivators (*vide* Statement No. 3 of Appendix).

The average value of tangible assets per cultivator household in the country was Rs. 6,609 while it was only Rs. 1,574 per non-cultivator household. The highest average was recorded for Punjab both in respect of cultivators (Rs. 14,631) and non-cultivators (Rs. 3,627). Apart from Punjab, the average was above the all-India level in Gujarat (Rs. 8,737), Mysore (Rs. 8,592), Andhra Pradesh (Rs. 7,704), Madras (Rs. 7,185), Maharashtra (Rs. 7,004) and Bihar (Rs. 6,688) in respect of cultivator households and in Jammu & Kashmir (Rs. 2,641), Rajasthan (Rs. 2,440), Mysore (Rs. 2,122), West Bengal (Rs. 1,810), Gujarat (Rs. 1,784), and Andhra Pradesh (Rs. 1,679) in respect of non-cultivators. The average per cultivator household was the lowest in Assam

at Rs. 3,356 and was relatively low in the range of Rs. 4,400—Rs. 5,000 in Orissa, West Bengal and Madhya Pradesh. The average per non-cultivator household was lowest in the case of Kerala at Rs. 466 and was comparatively low in the States of Madhya Pradesh (Rs. 841), Maharashtra (Rs. 928), Orissa (Rs. 1,163) and Bihar (Rs. 1,207).

The cultivator households in the country held about 64 per cent of their tangible assets in the form of land, 19 per cent in house property, 8 per cent in livestock, 6 per cent in durable household assets and 3 per cent in equipment for farm business, non-farm business and transport. The share of land in the total tangible wealth was highest for Bihar at 75 per cent and was relatively high (between 67 and 72 per cent) for Madras, Andhra Pradesh, Maharashtra, Kerala, Mysore and West Bengal. The share of land was lowest in Rajasthan at 46 per cent. Whereas the share of land was rather low in Jammu & Kashmir at 55 per cent, the share of house property to total tangible wealth in the State was highest at 27 per cent. House property claimed a relatively higher share in Assam (24.7 per cent) and Uttar Pradesh (24.1 per cent) while its share was low in Maharashtra, Madras and Bihar (14 to 16 per cent). Livestock accounted for the highest share in Rajasthan at 17 per cent followed by Madhya Pradesh (14.2), Assam (11.7), Jammu & Kashmir (11.5) and Gujarat (10.2). The share of livestock in total value of tangible assets was lowest in Kerala at 1.7 per cent and relatively low in Madras and Bihar (4.6 per cent each). Tangible wealth held in the form of durable household assets was important in Rajasthan (10.9 per cent), Uttar Pradesh (9.1) and Madhya Pradesh (7.1) while, the share of this item was comparatively low (3 to 4 per cent) in Maharashtra, Bihar, Andhra Pradesh, Mysore and West Bengal. The share of equipment (used in farm and non-farm business and for transport) was highest for Gujarat at 5.2 per cent and was over 3 per cent for only 4 other States, viz., Rajasthan, Madhya Pradesh, Maharashtra and Punjab. Its contribution was the lowest in Bihar and Jammu & Kashmir at 1.2 per cent each.

As is to be expected, the relative shares of constituent items in tangible wealth in re-

spect of non-cultivator households follow a pattern somewhat different from that of cultivator households. Of the total tangible wealth of non-cultivators in the country, about 42 per cent was held in the form of house property, 38 per cent in land, 12 per cent in durable household assets, 4.7 per cent in livestock and 3.6 per cent in equipment. The share of house property was highest for Gujarat at 59 per cent followed by Uttar Pradesh (51.2), Jammu & Kashmir (50.9) and Rajasthan (49.9); the share was lowest for Andhra Pradesh at 31.6 per cent. Land claimed the highest share in case of Andhra Pradesh (53 per cent), West Bengal (48.3 per cent) and Mysore (48 per cent) while its share was lowest in Gujarat at less than 9 per cent. The share of land was relatively low (17 to 24 per cent) for Rajasthan, Uttar Pradesh and Madhya Pradesh. Livestock as an asset was important for non-cultivators in Madhya Pradesh (9.2 per cent of tangible wealth), Rajasthan (7.9), Jammu & Kashmir (7.4) and Maharashtra (7.4) while its share was less than 3 per cent in Madras and West Bengal and around 3 per cent for Andhra Pradesh, Mysore and Orissa. Holdings of durable household assets were relatively more important for non-cultivators than for cultivators, the share of this item in total tangible wealth being the highest at 23 per cent for Rajasthan followed by Kerala (19.4), Madhya Pradesh (18.2), Gujarat (16.7) and Uttar Pradesh (16.7). Durable household assets claimed a relatively low share at around 9 per cent in Bihar, Mysore and Orissa. The percentage share of equipment was high in Kerala (11) and Gujarat (8.9) while it was between 2 to 5 per cent in other States.

II. CAPITAL EXPENDITURE OF RURAL HOUSEHOLDS

Capital expenditure in agriculture depends to a large extent on the economic capacity of the rural householder subject to the constraints imposed by the geographical environment which is of vital consideration for digging wells, reclamation of land, bunding and other land improvements, planning of new orchards, as physical and technical considerations would in a great measure determine the opportunities and possibilities open to cultivators. Land tenure systems also have

a vital bearing on the extent of capital expenditures which have long-term possibilities. The relative proportion of expenditure in cash or otherwise is to a large extent determined by the financial resources that can be raised for the purpose by the householder.

Data on capital expenditure collected by the Survey include payments in cash and kind, value of owned assets and materials used and value of work done by household labour. The estimates of capital expenditure presented here pertain only to the cash components of expenditure. These estimates are discussed under the heads—(i) capital expenditure in farm business, (ii) capital expenditure in non-farm business and (iii) expenditure on residential plots and buildings and purchase of durable household assets.

Capital Expenditure in farm business

Farm business was defined to comprise cultivation, including cultivation of plantation

and orchard crops, processing of produce on the farm and animal husbandry and ancillary activities. All other activities were included under the head 'non-farm business.' Data relating to capital expenditure in farm business were collected in respect of the following items—(i) Purchase of land, (ii) Purchase of land rights, (iii) Reclamation of land, (iv) Bunding and other land improvements, (v) Orchards and plantations, (vi) Construction and repair of wells, (vii) Other irrigation resources, (viii) Purchase of agricultural implements, machinery and transport equipment, (ix) Purchase, construction and repair of farm houses, grain *golas* and cattle sheds, (x) Purchase of livestock, and the residuary item—(xi) Other capital expenditure in farm business. The proportion of households in the country reporting capital expenditure in farm business and the average amount of expenditure per household and per reporting household are presented in Table IV.

TABLE IV—CAPITAL EXPENDITURE IN FARM BUSINESS—(ALL-INDIA)
(CASH EXPENDITURE)

	Proportion of households reporting (Per cent)	Average per reporting household (Rs.)	Average per household (Rs.)	Aggregate expenditure (in crores of Rs.)
Cultivators	55.5	224.0	124.3	626.0 (95.8)
Non-cultivators	11.6	128.7	15.0	27.4 (4.2)
All rural households	43.8	217.2	95.2	653.5 (100.0)

The total capital expenditure in farm business of the rural household sector was of the order of Rs. 653 crores for the reference year and about 96 per cent of the expenditure was due to cultivator households. About 56 per cent of the cultivator households reported capital expenditure in farm business

as against only 12 per cent of non-cultivator households. In all the States the cultivator households accounted for not less than 90 per cent of total capital expenditure in farm business. Data on the percentage share of each asset group in the total capital expenditure are given in Table V.

TABLE V—CAPITAL EXPENDITURE IN FARM BUSINESS BY ASSET GROUPS—ALL-INDIA
(CASH EXPENDITURE)

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Share of each asset group in the total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Share of each asset group in the total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Share of each asset group in the total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)
1. Less than Rs. 500 ..	25.2	0.6	4.1	9.1	12.9	3.5	13.4	1.2	7.6
2. Rs. 500—Rs. 1,000 ..	35.5	1.9	12.2	11.6	16.9	4.6	25.4	2.6	16.8
3. Rs. 1,000—Rs. 2,500 ..	45.1	8.4	52.7	14.6	32.1	8.8	38.9	9.4	61.5
4. Rs. 2,500—Rs. 5,000 ..	58.0	14.7	91.7	14.0	15.1	4.1	53.6	14.7	95.9
5. Rs. 5,000—Rs. 10,000 ..	65.7	21.0	131.4	19.0	11.1	3.0	62.2	20.6	134.4
6. Rs. 10,000—Rs. 20,000 ..	75.4	22.1	138.1	21.0	6.2	1.7	72.5	21.4	139.8
7. Rs. 20,000 and above ..	85.0	31.3	195.9	24.1	5.3	1.6	81.5	30.2	197.4
All-assets group ..	55.5	100.0	626.0	11.6	100.0	27.4	43.8	100.0	653.5

The proportion of households reporting, as also the share in the total expenditure, increased progressively from the lowest to the highest asset group in case of cultivator households. The households in the highest three asset groups which constituted a little over one-third of the total number of cultivator households accounted for about three-fourths of the total expenditure.

In the case of non-cultivators, the households in the asset groups Rs. 10,000 and above, which constituted less than 3 per cent of the total number of non-cultivator households, accounted for 12 per cent of the capital expenditure in farm business of all non-cultivator households while, about 70 per cent of the households, with assets less than Rs. 1,000 per household, had a share of less than 30 per cent in the total expenditure.

The Statewise data on capital expenditure in farm business are given in Statement No. 4 of Appendix. These are discussed below separately for cultivators and non-cultivators.

The proportion of cultivator households reporting capital expenditure in farm business was the highest for Punjab (71.4 per cent) followed by Mysore (69.5 per cent); it was 61 to 63 per cent in Gujarat, Uttar Pradesh and Kerala, 57 per cent in West Bengal and in the range of 50 to 54 per cent in Maharashtra, Madras, Bihar, Orissa, Madhya Pradesh and Rajasthan. The proportions for Andhra Pradesh (44.5 per cent) and Assam (49.2 per cent) were relatively low. The proportion was lowest for Jammu & Kashmir at 33.6 per cent.

For the cultivator households in the lowest asset group, the proportion of reporting households ranged from around 10 per cent each for Jammu & Kashmir and Gujarat to about 39 per cent in Kerala while, for households in the highest asset group, it ranged from 57 per cent in Jammu & Kashmir to over 90 per cent each in the States of Bihar, Kerala, Mysore and West Bengal.

The capital expenditure in farm business per reporting cultivator household was the highest for Andhra Pradesh at Rs. 39.

followed by Punjab at Rs. 370 and Madras at Rs. 367. It was over Rs. 300 for only three other States, viz., Mysore, Rajasthan and Gujarat. It was lowest for West Bengal at Rs. 90 and was in the range of Rs. 100 to Rs. 130 for Orissa, Assam, Bihar and Kerala.

For the lowest asset group the expenditure per reporting household was less than Rs. 50 for Assam, Bihar, Kerala, Maharashtra, Orissa, Uttar Pradesh and West Bengal and between Rs. 50 and Rs. 100 for Andhra Pradesh, Madhya Pradesh and Mysore. For households in the highest asset group it was over Rs. 1,000 for the States of Mysore (Rs. 1,461), Andhra Pradesh (Rs. 1,138) and Madras (Rs. 1,123) and between Rs. 580 and Rs. 827 for Punjab, Assam, Uttar Pradesh, Jammu & Kashmir, Rajasthan, Maharashtra, Gujarat, and Madhya Pradesh.

The percentage shares of the different asset groups in the total capital expenditure in farm business in respect of individual States may be seen from Statement No. 5 of Appendix.

The highest two asset groups of cultivator households accounted for about 62 to 68 per cent of the total capital expenditure in farm business in Andhra Pradesh, Gujarat, Mysore and Punjab and between 50 and 60 per cent in Bihar, Kerala, Madras and Maharashtra while the percentage varied between 30 and 45 per cent in other State excepting Assam, where it was very low at 24 per cent. The proportion of cultivator households in the two highest asset groups varied between 6 and 21 per cent in respect of individual States with the exception of Gujarat and Punjab where these two asset groups together accounted for about 28 per cent and 45 per cent, respectively, of the total number of cultivator households. The cultivator households belonging to the lowest three asset groups accounted for about 4 to 17 per cent of the total capital expenditure in farm business in all the States excepting Assam (29 per cent) and West Bengal (23 per cent) though these three asset groups together accounted for about 25 to 52 per cent of the cultivator households in all the States excepting Punjab (15 per cent).

The proportion of non-cultivator households reporting capital expenditure in farm business was highest in Kerala (24.3 per cent) followed by Punjab (17.8 per cent) and Mysore (17.0 per cent); it varied between 10 and 14 per cent for the States of Bihar, Jammu & Kashmir, Madhya Pradesh, Madras, Orissa, Rajasthan, Uttar Pradesh and West Bengal while it was 9 per cent or less in the remaining 4 States.

The average expenditure incurred in farm business per reporting non-cultivator household was maximum in Jammu & Kashmir at Rs. 730 (which was more than twice the average expenditure per reporting cultivator household). Next in order were Andhra Pradesh (Rs. 254), Punjab (Rs. 234), Rajasthan (Rs. 175); it was between Rs. 119 and Rs. 153 for Uttar Pradesh, Madras, Gujarat, Maharashtra, Assam while, in the remaining States, it was below Rs. 100.

The proportion of non-cultivator households reporting expenditure in farm business and the average expenditure per reporting household and per household did not increase uniformly from lowest to highest asset groups in respect of all the States—trends which were marked in respect of cultivator households.

In the case of non-cultivators, the lowest three asset groups which formed over 70 per cent of the total non-cultivator households in most of the States, accounted for a major portion (over 50 per cent) of the total capital expenditure in farm business with the exception of Kerala (16.8 per cent), Punjab (43.7 per cent) and West Bengal (44 per cent) States. In the case of Kerala, non-cultivator households with assets between Rs. 2,500 and Rs. 5,000 accounted for 78 per cent of the total capital expenditure in farm business though this group accounted for only about 3 per cent of the non-cultivator households.

Relative Importance of Individual Items of Farm Business

The proportion of households in the country reporting capital expenditure on individual items of farm business and the percentage share of each item in the total expenditure are given in Table VI.

TABLE VI—EXPENDITURE ON INDIVIDUAL ITEMS OF FARM BUSINESS—ALL-INDIA
(CASH EXPENDITURE)

Item	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Share in total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Share in total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Share in total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)
1. Purchase of land ..	1.9	18.8	117.7	0.4	25.1	6.9	1.5	19.1	124.5
2. Purchase of land rights ..	0.3	0.9	5.9	..	0.4	0.1	0.2	0.9	6.0
3. Reclamation of land ..	2.2	2.9	18.2	0.2	1.0	0.3	1.6	2.8	18.5
4. Bunding and other land improvements	14.7	8.9	55.9	0.5	1.7	0.5	10.9	8.6	56.4
5. Orchards and plantations	1.2	1.1	6.9	..	..	..	0.9	1.1	6.9
6. Wells	2.4	7.1	44.7	0.2	1.5	0.4	1.8	6.9	45.1
7. Other irrigation resources	1.5	0.9	5.6	..	1.6	0.4	1.1	0.9	6.0
8. Agricultural implements, machinery, transport equipment, etc.	34.8	11.4	71.2	4.2	2.1	0.6	26.6	11.0	71.8
9. Farm houses, grain <i>golas</i> and cattle sheds	6.2	2.9	18.2	0.7	1.8	0.5	4.7	2.9	18.7
10. Purchase of livestock ..	21.7	44.4	278.0	6.9	64.6	17.7	17.8	45.2	295.7
11. Other capital expenditure in farm business	0.5	0.6	3.7	..	0.1	..	0.4	0.4	3.8
Total capital expenditure in farm business	55.5	100.0	626.0	11.6	100.0	27.4	43.8	100.0	653.5

.. Negligible.

The proportion of rural households which reported expenditure on 'agricultural implements, machinery, etc.' was highest at 27 per cent followed by 'purchase of livestock' (17.8 per cent), 'bundling and other land improvements' (10.9 per cent) and 'farm houses, grain *golas* etc.', (4.7 per cent). The proportion of households reporting expenditure on each of the remaining items was less than 2 per cent. The expenditure on agricultural implements, etc., however, accounted for only 11 per cent of the total expenditure, whereas, expenditure on purchase of livestock constituted about 45 per cent and that on bunding, etc., for about 9 per cent of the total expenditure. Even though only 1.5 per cent of the rural households reported expenditure on purchase of land, this item accounted for about 19 per cent of the aggregate capital

expenditure in farm business. Thus the expenditure on land and livestock together constituted a little less than two-thirds of the total capital expenditure in farm business of rural households.

Over one-third of the cultivator households in the country reported expenditure on agricultural implements, etc., but the expenditure on this item—accounted for only 11 per cent of the total capital expenditure in farm business. Expenditure on purchase of livestock reported by about 22 per cent of the cultivator households, and on purchase of land, reported by a little less than 2 per cent of the cultivator households, constituted 44 per cent and 19 per cent respectively, of the aggregate capital expenditure. Expenditure on bunding etc., was reported by about 15 per cent of

the cultivator households and accounted for 9 per cent of the total capital expenditure, whereas, expenditure on wells which was reported by 2.4 per cent of the cultivator households constituted 7 per cent of the total expenditure. The expenditure on other individual items of farm business was relatively small.

About 7 per cent of the non-cultivator households in the rural areas of the country reported expenditure on purchase of livestock which accounted for 64 per cent of the total capital expenditure in farm business by non-cultivator households. Only 0.4 per cent of the non-cultivator households reported expenditure on purchase of land but the item accounted for one-fourth of the aggregate capital expenditure in farm business of non-cultivator households. Of the remaining items, purchase of agricultural implements was reported by about 4 per cent of these households and on all other items, the proportion reporting was less than one per cent and percentage share of each to the total expenditure was less than 2 per cent.

The Statewise data on expenditure on constituent items of farm business are given in Statement Nos. 6 & 7 of Appendix. In all the States, purchases of land and livestock were the predominant items of expenditure in farm business. These two items accounted for over 70 per cent of the total expenditure in 5 States, viz., Bihar, Punjab, Uttar Pradesh, Rajasthan and West Bengal and between 50 to 70 per cent of the expenditure in Andhra Pradesh, Assam, Jammu & Kashmir, Kerala, Madhya Pradesh, Madras and Orissa. In respect of non-cultivator households also the expenditure on land and livestock accounted for over 80 per cent of their total expenditure in farm business in all the States except Mysore and Orissa.

The proportion of households reporting purchase of land among non-cultivators was less than 0.6 per cent in all States excepting Jammu & Kashmir and Andhra Pradesh where it was 3 and one per cent, respectively. Among cultivator households the proportion of households reporting expenditure on purchase of land varied between 0.8 per cent in Jammu & Kashmir to 3.8 per cent in Andhra Pradesh (*vide* Statement No. 8 of Appendix).

The average expenditure on purchase of land per reporting cultivator household was maximum at Rs. 2,066 in Punjab while it varied between Rs. 571 and Rs. 811 in Orissa, West Bengal, Assam, Madhya Pradesh, Uttar Pradesh and Bihar. In the remaining eight States it varied between Rs. 1,000 and Rs. 2,000.

The proportion of households reporting purchase of livestock was uniformly higher than that for purchase of land in all the States for cultivator as well as non-cultivator households. The proportion of cultivator households reporting purchase of livestock was maximum in Punjab (37 per cent) followed by Uttar Pradesh and Rajasthan (about 30 per cent each) while in other States it was between 12 per cent and 24 per cent. (*vide* Statement No. 9 of Appendix).

The average expenditure per reporting cultivator household on purchase of livestock varied from Rs. 94 (in Kerala) to Rs. 429 (in Punjab) while in the case of non-cultivator households it varied between Rs. 22 (in Kerala) and Rs. 259 (in Jammu & Kashmir).

The proportion of cultivator households reporting expenditure on bunding and other land improvements varied between 5 per cent in Jammu & Kashmir and 33 per cent in Mysore while, the percentage expenditure on this item varied between 2 per cent in Rajasthan and Punjab and 19 per cent in Mysore.

The proportion of non-cultivators reporting expenditure on 'bunding and other land improvements' and the proportion of expenditure on this item to the total were negligible in all the States excepting Mysore where they were 1.8 per cent and 10.6 per cent, respectively. The proportion of non-cultivator households reporting expenditure on purchase of agricultural implements, machinery and transport equipment varied between one per cent in Gujarat and about 15 per cent in Kerala while the percentage expenditure on this item of farm business varied between 0.7 per cent in Jammu & Kashmir and 10.2 per cent in Orissa. In the case of all rural households, the proportion of households reporting expenditure on 'bunding and other land improvements' varied between 4 per cent in

Jammu & Kashmir and 25 per cent in Mysore while the percentage expenditure on this item ranged between 2 per cent each in Punjab and Rajasthan and 19 per cent in Mysore.

Among individual items of farm business, the proportion of rural households reporting expenditure on purchase of agricultural implements, machinery and transport equipment was the highest in all the States except in Andhra Pradesh. The proportion varied from 11 per cent in Andhra Pradesh to about 38 per cent in Mysore while the share in expenditure varied between 3 per cent in Jammu & Kashmir and about 32 per cent in Gujarat. The proportion of households reporting ex-

penditure on other items of farm business as also their percentage share in total expenditure were negligible.

Capital Expenditure in Non-Farm Business

Data on expenditure in non-farm business were collected under the heads—'land and buildings,' 'production equipment and accessories,' 'transport equipment,' 'furniture and fixtures' and 'other capital expenditure'.

The proportion of households in the country reporting capital expenditure in non-farm business, as also estimates of average and aggregate expenditure are presented in Table VII.

TABLE VII—CAPITAL EXPENDITURE IN NON-FARM BUSINESS—ALL-INDIA
(CASH EXPENDITURE)

	Proportion of households reporting (Per cent)	Average Per reporting household (Rs.)	Average Per household (Rs.)	Aggregate expenditure (in crores of Rs.)
Cultivators	5.4	116	6.2	31.4 (71.7)
Non-cultivators	7.7	88	6.8	12.4 (28.3)
All rural households	6.0	106	6.4	43.8 (100.0)

Capital expenditure in non-farm business was reported by only 6 per cent of the rural households ; the average expenditure per rural household in non-farm business was also very low at Rs. 6. The aggregate expenditure at

Rs. 44 crores was less than 7 per cent of the aggregate capital expenditure in farm business. The inter-asset group variation may be seen from Table VIII.

TABLE VIII—CAPITAL EXPENDITURE IN NON-FARM BUSINESS BY ASSET GROUPS—ALL-INDIA
(CASH EXPENDITURE)

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Share of each asset group in the total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Share of each asset group in the total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Share of each asset group in the total expenditure (Per cent)	Aggregate expenditure (in crores of Rs.)
Less than Rs. 500	2.8	0.5	0.2	3.6	5.7	0.7	3.4	2.0	0.9
Rs. 500—Rs. 1,000	3.8	1.3	0.4	8.6	9.7	1.2	5.8	3.7	1.6
Rs. 1,000—Rs. 2,500	4.3	6.9	2.2	13.2	22.6	2.8	6.1	11.4	5.0
Rs. 2,500—Rs. 5,000	5.2	8.9	2.8	14.0	13.1	1.6	6.1	10.0	4.4
Rs. 5,000—Rs. 10,000	6.0	16.4	5.2	11.6	14.6	1.8	6.4	15.9	7.0
Rs. 10,000—Rs. 20,000	7.0	20.7	6.5	18.0	11.3	1.4	7.6	18.0	7.9
Rs. 20,000 and above	10.6	45.3	14.2	21.4	23.0	2.8	11.2	39.0	17.1
All-assets group	5.4	100.0	31.4	7.7	100.0	12.4	6.0	100.0	43.8

The proportion of cultivator households reporting capital expenditure in non-farm business increased uniformly from 2.8 per cent for the lowest asset group to 10.6 per cent for the highest asset group. The average expenditure per household also registered a corresponding rise from Re. 0.5 to Rs. 44.2. The proportion of non-cultivators reporting expenditure in non-farm business increased from 3.6 per cent for the lowest asset group to 21.4 per cent for the highest and the average expenditure increased from Re. 0.8 to Rs. 146. Further, for each of the asset groups, the proportion reporting, as well as the average expenditure, were higher for non-cultivator as compared to cultivator households.

The Statewise data on the proportion of cultivator and non-cultivator households reporting expenditure in non-farm business and the average level of expenditure per reporting household and per household are presented in Statement No. 10 of Appendix.

It will be seen that the proportion of cultivator households reporting expenditure in non-farm business was highest at about 16 per cent in Kerala, followed by about 9 per cent in Uttar Pradesh, 8 per cent in Punjab and 7 per cent each in West Bengal and Bihar and between 1 and 5 per cent in the other States. Among non-cultivator households the proportion was highest at 18 per cent in Punjab, followed by about 17 per cent in Kerala, about 13 per cent in Uttar Pradesh and about 8 to 9 per cent in Bihar, Gujarat, Madras and Rajasthan, while in the remaining States the proportion was between 2 per cent and 7 per cent.

The average expenditure in non-farm business per reporting cultivator household was maximum at Rs. 411 in Maharashtra; Gujarat was next at Rs. 297, while in the other States, it was between Rs. 48 and Rs. 191.

Though the percentage of non-cultivator households reporting expenditure in non-farm business was uniformly more than that of cultivator households in all the States (excepting West Bengal), the average expenditure per reporting non-cultivator household exceeded the corresponding amount for cultivator households only in seven States, viz., Assam, Bihar, Madhya Pradesh, Mysore, Orissa,

Punjab and West Bengal. The average expenditure per reporting non-cultivator household was maximum at Rs. 311 in Mysore, followed by Rs. 146 in Gujarat and Rs. 133 in Assam, while in the remaining States it varied between Rs. 49 and Rs. 116.

Table VIII gives the percentage contribution of each asset-group in the total capital expenditure in non-farm business—separately for cultivator, non-cultivator and all rural households.

It would be seen that about 13 per cent of rural households in the country, falling in the two highest asset groups, together accounted for 57 per cent of the total capital expenditure in non-farm business, while the households in the two lowest asset groups constituting 30 per cent of all rural households accounted for hardly 6 per cent of the total expenditure. The concentration was even more marked in respect of cultivator households. The highest two asset groups representing about 17 per cent of the cultivator households accounted for about two-thirds of the total capital expenditure in non-farm business, while about 16 per cent of the cultivators in the two lowest asset groups together incurred less than 2 per cent of the total expenditure.

About half of the non-cultivator households in the country had assets amounting to less than Rs. 500 per household; they accounted for less than 6 per cent of the total expenditure in non-farm business of non-cultivators. It is interesting to note that a substantial share (about 23 per cent) of the total capital expenditure in non-farm business was incurred by non-cultivator households in one of the lower asset groups, viz., Rs. 1,000—Rs. 2,500 (these households constituted 17 per cent of the total number of non-cultivator households). The concentration of expenditure is again apparent in the case of non-cultivator households in the highest asset group, who accounted for another 23 per cent of the aggregate expenditure though they formed only one per cent of the total number of non-cultivators.

The Statewise position regarding the contribution of each asset group in the total capital expenditure in non-farm business may be seen from Statement No. 11 of Appendix.

Relative Importance of Individual items of Non-Farm Business

The proportion of cultivator, non-cultivator and all rural households in the country report-

ing expenditure on individual items of non-farm business and the percentage share of each item in the total capital expenditure are presented in Table IX—(Statewise data are at Statement 13 of Appendix).

TABLE IX—EXPENDITURE ON INDIVIDUAL ITEMS OF NON-FARM BUSINESS—(ALL-INDIA)
(CASH EXPENDITURE)

Item	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Percentage share in the total expenditure	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Percentage share in the total expenditure	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting (Per cent)	Percentage share in the total expenditure	Aggregate expenditure (in crores of Rs.)
Land and buildings	0.4	28.2	8.9	0.4	10.9	1.3	0.4	23.4	10.2
Production equipment and accessories	2.3	26.8	8.1	4.6	39.6	4.9	2.9	29.6	13.0
Transport equipment	2.6	41.0	12.9	2.3	41.9	5.2	2.5	41.2	18.0
Furniture & fixtures	0.3	1.6	0.5	0.7	3.5	0.4	0.4	2.0	0.9
Other capital expenditure in non-farm business	0.3	3.5	1.1	0.7	4.1	0.5	0.4	3.8	1.6
Total capital expenditure in non-farm business	5.4	100.0	31.4	7.7	100.0	12.4	6.0	100.0	43.8

The proportion of households reporting expenditure on the individual items of non-farm business ranged from 0.4 per cent to 3 per cent for the different items. As regards the percentage share of expenditure on each item in the total, it is observed that, the item 'transport equipment' accounted for about 41 per cent and 42 per cent of the total expenditure of cultivator and non-cultivator households respectively. 'Production equipment and accessories' accounted for 26 per cent and 40 per cent respectively of the total expenditure incurred by cultivator and non-cultivator households, while the proportion of expenditure on 'land and buildings' was 28 per cent and 11 per cent, respectively.

The two items, 'production equipment and accessories, and 'transport equipment', together accounted for more than 66

per cent of the total capital expenditure of cultivators in non-farm business except in the States of Jammu & Kashmir (34 per cent), Uttar Pradesh (46 per cent), Kerala (52 per cent) and Mysore (57 per cent). In the case of non-cultivators, these two items together accounted for more than 60 per cent of the total capital expenditure in non-farm business in all the States, except in Assam in which these items accounted for only 43 per cent of the total expenditure. In Assam, the item 'purchase of land and buildings' accounted for about 53 per cent of the total expenditure in non-farm business of non-cultivators. The cultivator households of Uttar Pradesh also reported about 52 per cent of the total expenditure on purchase of land and buildings.

The expenditure on other items on non-farm business was negligible.

Borrowings as Source of Finance for Capital Expenditure in Farm Business

Asset-group-wise data on the proportion of households in the country who have reported

borrowings for financing capital expenditure in farm business, the average amount borrowed per reporting household and the proportion of expenditure financed from borrowings are given in Table X.

TABLE X—BORROWINGS FOR CAPITAL EXPENDITURE IN FARM BUSINESS—ALL-INDIA

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of borrowing households (Per cent)	Average amount per reporting household (Rs.)	Proportion of expenditure financed from borrowings (Per cent)	Proportion of borrowing households (Per cent)	Average amount per reporting household (Rs.)	Proportion of expenditure financed from borrowings (Per cent)	Proportion of borrowing households (Per cent)	Average amount per reporting household (Rs.)	Proportion of expenditure financed from borrowings (Per cent)
Less than Rs. 500	3.6	116	34.1	1.2	148	44.0	1.8	131	38.7
Rs. 500—Rs. 1,000	6.6	163	42.6	2.4	239	43.0	4.8	179	42.7
Rs. 1,000—Rs. 2,500	8.8	183	38.4	4.3	251	39.4	7.9	190	38.6
Rs. 2,500—Rs. 5,000	11.6	254	37.9	3.0	289	27.0	10.8	255	37.4
Rs. 5,000—Rs. 10,000	14.4	352	36.1	4.3	314	33.3	13.6	351	36.0
Rs. 10,000—Rs. 20,000	15.0	564	33.1	4.1	504	36.4	14.4	563	33.1
Rs. 20,000 and above	14.9	1,093	26.7	2.6	1,123	35.7	14.2	1,093	26.8
All-assets group	11.0	373	33.1	2.3	249	37.6	8.7	364	33.3

It may be seen that about 11 per cent of cultivators and 2 per cent of non-cultivators resorted to borrowings for financing capital expenditure in farm business. The proportion of households reporting borrowings as well as the amount borrowed per reporting household progressively increased from the lowest to the highest asset group in respect of cultivator households. Further, the proportion of expenditure financed from borrowings in respect of cultivator households declined from 43 per cent for the asset

group Rs. 500—Rs. 1,000, to about 27 per cent for the highest asset group. The proportion of expenditure financed from borrowings was relatively high for non-cultivators in the lowest three asset groups.

The proportion of households reporting borrowings for financing expenditure on individual items of farm business and the amount borrowed per borrowing household are shown in Table XI.

TABLE XI—CAPITAL EXPENDITURE IN FARM BUSINESS : PROPORTION OF HOUSEHOLDS REPORTING BORROWINGS AND AVERAGE AMOUNT PER BORROWING HOUSEHOLD—ALL-INDIA

Item	Cultivators		Non-cultivators		All rural households	
	Proportion of households reporting borrowings (Per cent)	Average amount per borrowing household (Rs.)	Proportion of households reporting borrowings (Per cent)	Average amount per borrowing household (Rs.)	Proportion of households reporting borrowings (Per cent)	Average amount per borrowing household (Rs.)
1. Purchase of Land	1.0 (52.1)	996	0.2 (60.3)	530	0.8 (52.3)	960
2. Purchase of land rights	0.1 (26.7)	560	..	*	0.1 (27.3)	547
3. Reclamation of land	0.3 (15.1)	307	..	*	0.1 (15.2)	301
4. Building and other land improvements	0.9 (6.3)	246	0.1 (12.5)	160	0.7 (6.3)	244
5. Orchards & plantations	0.1 (6.4)	382	—	—	0.1 (0.7)	382
6. Wells	0.6 (23.9)	586	..	*	0.4 (23.5)	581
7. Other irrigation resources	0.1 (4.0)	389	..	*	..	*
8. Agricultural implements, machinery, etc.	1.0 (2.9)	346	..	*	0.8 (2.8)	343
9. Farm houses, grain golas, etc.	0.2 (0.5)	289	..	*	0.2 (3.2)	282
10. Purchase of livestock	7.9 (36.3)	245	1.9 (27.0)	209	6.3 (35.3)	242
11. Other capital expenditure in farm business	..	*	..	*	..	*
Total capital expenditure in farm business	11.0 (19.9)	373	2.3 (19.4)	249	8.7 (19.8)	364

* Amount not specified as the proportion reporting is negligible. .. Negligible — Nil
 Figures in brackets indicate the percentage of households reporting borrowings to the number of households reporting expenditure on the particular item.

The proportion of cultivator households reporting borrowings for purchase of livestock was highest at about 8 per cent ; it was one per cent each in case of purchase of land and agricultural implements, machinery, etc., while in case of other items it was less than one per cent. The average amount of borrowings per reporting household was highest at Rs. 996 in case of 'purchase of land,' followed by expenditure on wells (Rs. 586) and purchase of land rights (Rs. 560).

Among the households that reported capital expenditure in farm business, about 20 per cent resorted to borrowings to finance the expenditure. In case of cultivators reporting purchase of land, about 52 per cent reported borrowings, and of those reporting purchase of livestock, about 36 per cent resorted to borrowings.

The average expenditure per household in respect of individual items of farm business and the proportion of expenditure financed from borrowings are given in Table XII.

TABLE XII—CAPITAL EXPENDITURE ON INDIVIDUAL ITEMS OF FARM BUSINESS:
PROPORTION FINANCED FROM BORROWINGS—ALL-INDIA

Item	Cultivators		Non-cultivators		All rural households	
	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per cent)
1. Purchase of land	23.4	42.9	3.8	32.5	18.1	42.4
2. Purchase of land rights	1.2	39.6	0.1	13.2	0.9	39.7
3. Reclamation of land	3.6	28.0	0.2	41.6	2.7	28.2
4. Bunding and other land improvements	11.1	29.5	0.3	33.1	8.2	29.6
5. Orchards and plantations	1.4	21.3	..	—	1.0	21.3
6. Wells	8.9	37.4	0.2	44.2	6.6	37.5
7. Other irrigation resources	1.1	29.0	0.2	74.8	0.9	24.1
8. Agricultural implements etc.	14.1	24.9	0.3	3.3	10.4	24.8
9. Farm houses etc.	3.6	14.4	0.3	8.0	2.7	14.2
10. Purchase of livestock	55.2	35.0	9.7	49.5	43.1	35.3
11. Other capital expenditure in farm business	0.7	17.8	..	78.5	0.6	18.3
Total capital expenditure in farm business	124.3	33.1	15.0	37.6	95.2	33.3

.. Negligible. — Nil.

About 33 per cent of the total capital expenditure in farm business of cultivator households and about 38 per cent of that of non-cultivator households was financed through borrowings. In case of cultivator households, 43 per cent of the expenditure on purchase of land and 35 per cent of the expenditure on purchase of livestock was financed through borrowings.

It will be seen from Statement No. 14 of Appendix that in all the States, borrowings played a significant role in financing the capital expenditure in farm business incurred by cultivator households. The proportion of expenditure thus financed was maximum in Rajasthan (54 per cent), followed by Madras (47 per cent) and Andhra Pradesh (39 per cent). The proportion varied between 25 per cent and 33 per cent in Gujarat, Kerala, Madhya Pradesh, Maharashtra, Mysore, Punjab and Uttar Pradesh. As regards individual items, it may be stated that cultivator households in all the States resorted to borrowings to a large extent to finance expenditure on purchase of land, land rights and livestock.

Borrowings for capital expenditure in farm business in case of non-cultivator households were relatively unimportant.

Borrowing as Source of Finance for Capital Expenditure in Non-Farm Business

It may be seen from the Table XIII that, the proportion of households reporting borrowings for financing the capital expenditure in non-farm business was very low and did not exceed 0.6 per cent for any asset group in case of cultivators and 1.2 per cent in the case of non-cultivators. Further, excepting for households in the highest asset group, the proportion of households reporting borrowings was uniformly higher for non-cultivator households as compared to cultivator households. The average amount per reporting household for cultivator and non-cultivator households was Rs. 379 and Rs. 203 respectively. In case of non-cultivator households, barring the lowest asset group, the proportion of expenditure financed from borrowings declined with the size of assets. The proportion of expenditure financed from borrowings was relatively high for non-cultivators in the lower asset groups.

TABLE XIII—BORROWINGS FOR CAPITAL EXPENDITURE IN NON-FARM BUSINESS—ALL-INDIA

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Average amount per reporting household (Rs.)	Proportion of expenditure financed from borrowings (Per cent)	Proportion of households reporting (Per cent)	Average amount per reporting household (Rs.)	Proportion of expenditure financed from borrowings (Per cent)	Proportion of households reporting (Per cent)	Average amount per reporting household (Rs.)	Proportion of expenditure financed from borrowings (Per cent)
Less than Rs. 500	0.2	53	20.7	0.3	52	20.0	0.3	52	20.2
Rs. 500—Rs. 1,000	0.3	53	17.1	0.6	141	25.4	0.4	107	23.2
Rs. 1,000—Rs. 2,500	0.2	167	23.7	0.6	297	20.5	0.3	217	21.9
Rs. 2,500—Rs. 5,000	0.3	190	21.8	0.5	462	19.6	0.3	238	21.0
Rs. 5,000—Rs. 10,000	0.3	390	22.9	1.1	405	18.4	0.4	393	21.7
Rs. 10,000—Rs. 20,000	0.5	442	18.5	1.2	185	4.8	0.6	412	16.1
Rs. 20,000 and above	0.6	1,360	16.6	0.4	600	1.4	0.5	1,323	14.1
All—assets group	0.3	379	19.0	0.5	203	14.3	0.4	316	17.7

The proportion of households reporting borrowings for financing capital expenditure on individual items of non-farm business was very low as may be seen from the Table XIV. The average amount borrowed per borrowing cultivator household was highest at Rs. 574

in case of 'land and buildings', followed by 'production equipment and accessories', for which the amount works out to Rs. 378. In case of non-cultivator households also the amount of borrowings per borrowing household was highest in case of land and buildings at Rs. 286.

TABLE XIV—CAPITAL EXPENDITURE ON INDIVIDUAL ITEMS OF NON-FARM BUSINESS: PROPORTION OF HOUSEHOLDS REPORTING BORROWINGS AND AVERAGE AMOUNT PER BORROWING HOUSEHOLD—ALL-INDIA

Item	Cultivators		Non-cultivators		All rural households	
	Proportion of households reporting borrowings (Per cent)	Average amount per borrowing household (Rs.)	Proportion of households reporting borrowings (Per cent)	Average amount per borrowing household (Rs.)	Proportion of households reporting borrowings (Per cent)	Average amount per borrowing household (Rs.)
Land and buildings	0.1 (10.1)	574	0.1 (14.7)	286	0.1 (11.4)	468
Production equipment and accessories	0.1 (5.6)	378	0.2 (5.0)	222	0.2 (5.4)	316
Transport equipment	0.2 (5.3)	287	0.1 (5.9)	158	0.2 (5.4)	254
Furniture and fixtures	..	*	..	*	..	*
Other capital expenditure in non-farm business	..	*	0.1 (5.6)	99	..	*
Total capital expenditure in non-farm business	0.3 (5.8)	379	0.5 (6.2)	203	0.4 (6.0)	316

.. Negligible.

* Amount not specified as the proportion reporting is negligible.

Figures in brackets indicate the proportion of those households reporting borrowings to finance expenditure on a specified item to the households reporting expenditure on that particular item.

The proportions of expenditure financed from borrowings in respect of individual items

of non-farm business for cultivator, non-cultivator and all rural households are given in Table XV.

TABLE XV—CAPITAL EXPENDITURE ON INDIVIDUAL ITEMS OF NON-FARM BUSINESS :
PROPORTION FINANCED FROM BORROWINGS—ALL-INDIA

Item	Cultivators		Non-cultivators		All rural households	
	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per cent)
Land and buildings	1.8	13.4	0.7	25.7	1.5	15.0
Production equipment and accessories	1.6	30.3	2.7	19.2	1.9	26.1
Transport equipment	2.6	15.6	2.8	7.5	2.6	13.3
Furniture and fixtures	0.1	31.9	0.2	7.7	0.1	19.9
Other capital expenditure in non-farm business	0.2	16.1	0.3	13.6	0.2	15.4
Total capital expenditure in non-farm business	6.2	19.0	6.8	14.3	6.4	17.7

It would be seen that about 30 per cent of the expenditure on production equipment and accessories and about 13 per cent of the expenditure on land and buildings was financed from borrowings in case of cultivator households. For non-cultivator households the corresponding proportions were 19 per cent and 26 per cent, respectively.

Statement 15 of Appendix presents data on borrowings for financing capital expenditure in non-farm business in the individual States.

Both cultivator and non-cultivator households resorted to borrowings for financing the capital expenditure in non-farm business in all the States (barring only the non-cultivators in Jammu & Kashmir).

In Andhra Pradesh and in Madras about 38 per cent of the total capital expenditure in non-farm business incurred by all rural households was met through borrowings. The corresponding percentage was 27 in Gujarat and 28 in Rajasthan, while in the other States the percentage of expenditure financed through borrowings varied between 3 and 21.

In the case of cultivator households, the share of borrowings in total expenditure was about 51, 45, 28 and 27 per cent in Madras,

Gujarat, Andhra Pradesh and Rajasthan States respectively, while in the other States less than one-fourth of the expenditure was met through borrowings.

A sizeable proportion of the expenditure of non-cultivator households was financed through borrowings in Andhra Pradesh (49 per cent), Orissa and Rajasthan (26 per cent each) and Punjab (25 per cent). In the remaining States the extent of borrowing for the purpose of financing capital expenditure in non-farm business was not considerable.

Expenditure on Residential Plots, Residential Houses and Purchase of Durable Household Assets

Data for all-India and for individual States on the proportion of households reporting, average expenditure and proportion financed from borrowings, in respect of cash expenditure on (i) purchase of residential plots and residential buildings, expenditure on repairs, additions, major alterations and construction of residential houses and (ii) purchase of durable household assets are presented in Statement No. 16 of Appendix. The aggregate expenditures for all-India in respect of these two items for cultivator, non-cultivator and all rural households are given in Table XVI.

TABLE XVI—AGGREGATE EXPENDITURE ON RESIDENTIAL PLOTS AND HOUSES AND ON DURABLE HOUSEHOLD ASSETS—ALL-INDIA
(CASH EXPENDITURE)

(in crores of Rs.)

Asset group	Cultivators		Non-cultivators		All rural households	
	Expenditure on residential plots, etc.	Expenditure on durable household assets	Expenditure on residential plots, etc.	Expenditure on durable household assets	Expenditure on residential plots, etc.	Expenditure on durable household assets
Less than Rs. 500	2.5	0.2	5.5	1.1	7.9	1.3
Rs. 500—Rs. 1,000	4.1	0.7	4.6	0.9	8.7	1.6
Rs. 1,000—Rs. 2,500.. .. .	17.3	2.4	5.9	1.3	23.2	3.6
Rs. 2,500—Rs. 5,000	26.2	4.6	4.2	0.9	30.4	5.5
Rs. 5,000—Rs.10,000.. .. .	35.5	6.7	3.9	0.7	39.4	7.3
Rs. 10,000—Rs. 20,000	45.4	7.5	1.9	0.5	47.3	8.0
Rs. 20,000 and above	59.5	18.6	4.5	1.3	64.0	19.9
All-assets group	190.6	40.7	30.4	6.6	221.0	47.3

The aggregate amounts of expenditure on these two items for all-India were of the order of Rs. 221 crores and Rs. 47 crores, respectively. About 86 per cent of the total expenditure on both residential plots, houses etc., and durable household assets, was incurred by cultivator households. The amount of expenditure increased uniformly from lower to the higher asset groups. The degree of concentration can be judged from the fact that, about 30 per cent of all rural households which fall in the lowest two asset groups account for only about 7 per cent of the total expenditure on residential plots, etc., and about 6 per cent of the expenditure on durable household assets, while 13 per cent of the households in the two uppermost asset groups account for more than half of the expenditure on each of these two items.

It will be seen from Statement No. 16 of Appendix that, generally the percentage of households reporting expenditure on the two items, as also the amount per reporting household and amount per household are higher for cultivator than for non-cultivator households. The proportion of households reporting expenditure on residential plots, buildings, etc., is much higher than that for expenditure on durable household assets in all the States with the exception of Punjab, where the

proportion of households reporting expenditure on durable household assets is higher, both for cultivator and non-cultivator households.

About one-third of the rural households in the country reported expenditure on purchase of residential plots and houses, the average expenditure per reporting household being Rs. 96. Among the States, the proportion of cultivators reporting expenditure on 'purchase of residential plots and buildings etc.' was highest at 79 per cent in Kerala followed by about 53 per cent in West Bengal and 49 per cent each in Bihar, Orissa and Uttar Pradesh, while in the remaining States it varied between 13 per cent and 31 per cent. Among the non-cultivators the proportion of households reporting expenditure on this item was 66 per cent in Kerala, 51 per cent in Orissa and about 36 per cent to 37 per cent each in Bihar, Uttar Pradesh and West Bengal while in the remaining States it ranged from 8 per cent in Mysore to 22 per cent in Madhya Pradesh. The average expenditure on residential plots and buildings per reporting cultivator household was highest at Rs. 384 in Jammu & Kashmir followed by Rs. 364 in Mysore, while for non-cultivators, it was highest in Jammu & Kashmir at Rs. 280 followed by Madras at Rs. 207. Further, the proportion of cultivator households re-

porting expenditure on this item was uniformly higher than the corresponding proportion of non-cultivator households in all the States excepting Jammu & Kashmir, Orissa and Punjab. The average expenditure per reporting cultivator household was also higher than that for reporting non-cultivator household in all the States except Madras and Madhya Pradesh.

About one-tenth of the rural households in the country reported expenditure on durable household assets. About 11 per cent of cultivator households and 8 per cent of non-cultivator households reported expenditure on this item. The proportion of reporting households was highest in Punjab for cultivator as well as for non-cultivator households.

Average expenditure per reporting household and per household on durable household assets for all-India worked out to about Rs. 66 and Rs. 7 respectively. The expenditure was higher in case of cultivator as compared to non-cultivator households. For cultivator households the expenditure per household at Rs. 20 for Punjab was the highest, while for non-cultivator households the per household expenditure of Rs. 11 for Jammu & Kashmir was the highest.

Borrowed funds formed slightly more than one-fifth of the expenditure on residential plots etc., and a little over one-tenth of the expenditure on durable household assets—both for cultivator and non-cultivator households. The average amount borrowed per household for cultivators at Rs. 38 was more than twice that for non-cultivators. In case of expenditure on residential plots, etc., for all rural households, the percentage of expenditure financed from borrowings varied from about 5 per cent for Assam to about 44 per cent for Andhra Pradesh. In case of durable household assets the proportion financed from borrowings varied between less than one per cent for Assam to 27 per cent for Rajasthan (*vide* Statement No. 17 of Appendix).

III. FIXED CAPITAL FORMATION IN THE RURAL HOUSEHOLD SECTOR

The estimates of fixed capital formation presented here have been compiled by adopting the 'Expenditure of Funds' approach to capital formation. The expenditure on capital account of households which reflects the in-

crease in the productive capacity is a measure of capital formation in the household sector. The Survey data on capital expenditure cover 'maintenance expenditure' and 'expenditure leading to assets formation' in respect of individual items. The estimates of expenditure on assets formation in farm business, non-farm business and residential housing are presented here as constituting fixed capital formation of the rural household sector under these heads. While the estimates of capital expenditure presented in the preceding section relate only to expenditure in cash, the estimates presented in this section include expenditure in kind, value of owned assets and materials used and value of work done by members of the household and permanent servants, all items having been suitably evaluated into monetary units.

In respect of each of the items of capital expenditure in farm business, barring purchase of land, land rights, livestock and farm houses, cattle sheds, etc., a classification of the total expenditure into the two components, viz., maintenance expenditure and expenditure leading to assets formation was attempted. The gross expenditure leading to assets formation on all items together has been presented under the head 'fixed capital formation in farm business'.

The constituent items included in the calculation of fixed capital formation in farm business are: (i) reclamation of land, (ii) construction of new bunds and major alterations and additions to existing bunds and other land improvement works, (iii) new plantations and additions to existing orchards and plantations, (iv) construction of new wells and major alterations like broadening and deepening of existing wells, (v) construction of new irrigation resources and major alterations like broadening and deepening of existing irrigation resources, (vi) purchase of new additional equipment (agricultural implements, machinery, transport equipment, etc.) of the traditional type and of the improved type, (vii) construction of new structures, and major alterations and additions to existing structures of farm houses, grain *golas* and cattle sheds, including those on the farm and (viii) other capital expenditure in farm business like new construction or works and major alterations and additions to existing construction or works.

Data relating to capital expenditure in non-farm business were collected under various heads, such as, 'land and buildings,' 'production equipment and accessories, etc.' In case of each item, barring purchase of land and buildings, the maintenance expenditure and the expenditure leading to assets formation were separately noted. The capital expenditure, excluding the expenditure on purchase of land and buildings and the maintenance expenditure on buildings, production equipment and other existing assets, has been presented as the capital formation in non-farm business. The constituent items included in the calculation of fixed capital formation in non-farm business are: (i) construction of new buildings, and major alterations and additions to existing buildings used for non-farm business, (ii) purchase of new production equipment and accessories, (iii) purchase of new transport equipment and accessories, (iv) purchase of new furniture and fixtures and (v) other capital expenditure in non-farm business like new construction or works and major alterations and additions to existing construction or works.

Estimates of capital formation in residential housing include expenditure on new construction of residential houses and major alterations and additions to existing structures.

Major alterations to existing structures were defined to include replacing of a thatched roof by a tiled roof, mud walls by stone walls, katcha floor by pucca floor and similar items of work which lead to an improvement in the life of the existing structures. Additions were defined to include construction of extra rooms, additional floor, etc., which increase the capacity and usefulness of the existing structures.

The estimates of fixed capital formation presented here represent the expenditure excluding that on repairs and replacement in case of plant and machinery, repairs and annual replanting in the case of orchards and plantations and repairs in the case of other items. No allowance has been made in regard to sale of assets or loss and damage due to accidents. Allowance has also not been made for expenditure on reclamation of land which had gone out of use only temporarily.

Capital formation in farm business

The proportion of households reporting capital formation in farm business, the average amount per household and estimates of aggregate capital formation for cultivator, non-cultivator and all rural households in the country are presented in Table XVII.

TABLE XVII—FIXED CAPITAL FORMATION IN FARM BUSINESS—ALL-INDIA

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)
Less than Rs. 500	10.1	3.4	1.1 (0.7)	3.6	0.3	0.3 (14.0)	5.3	1.1	1.4 (0.8)
Rs. 500—Rs. 1,000	13.1	4.2	2.0 (1.2)	3.3	0.7	0.2 (11.2)	9.0	2.7	2.3 (1.4)
Rs. 1,000—Rs. 2,500	16.9	6.7	8.4 (5.1)	3.6	1.0	0.3 (15.0)	14.2	5.5	8.7 (5.2)
Rs. 2,500—Rs. 5,000	22.2	12.9	15.1 (9.2)	3.3	1.1	0.1 (6.6)	20.3	11.7	15.2 (9.1)
Rs. 5,000—Rs. 10,000	27.5	30.9	28.9 (17.6)	4.9	2.0	0.2 (7.3)	25.8	28.7	29.1 (17.4)
Rs. 10,000—Rs. 20,000	35.3	65.4	35.3 (21.4)	5.0	9.7	0.3 (13.9)	33.7	62.5	35.6 (21.4)
Rs. 20,000 and above	49.3	229.5	73.9 (44.9)	5.8	34.4	0.7 (32.1)	46.8	218.4	74.6 (44.7)
All-assets group	23.3	32.7	164.7 (100.0)	3.6	1.1	2.1 (100.0)	18.1	24.3	166.8 (100.0)

Figures in brackets show the percentage contribution of each asset group to the total for all asset groups.

About 18 per cent of the rural households in the country contributed towards capital formation in farm business and the average amount per household was about Rs. 24. A little less than one-fourth of the cultivator households and only 4 per cent of non-cultivator households reported capital formation in farm business. Average capital formation per cultivator household was Rs. 33 as compared to Re. 1 per non-cultivator household. The aggregate capital formation in farm business for all rural households was Rs. 167 crores, of which Rs. 165 crores (98.8 per cent) was due to cultivator households alone.

The percentage contribution of each asset group to the total capital formation increased with the size of assets in respect of cultivator households—the highest asset group accounting for 45 per cent of the total. The three highest asset groups which together accounted for about 36 per cent of households contributed about 84 per cent of the capital formation by all cultivator households. In case of non-cultivator households, the proportion of households reporting capital formation increased with the size of the asset groups but the rate of increase was not as high, as in the case of cultivators. Though the average amount per household shows increase from lowest to the highest asset group, the contribution of the different asset groups to the total does not show an increasing trend. Almost 86 per cent of the non-cultivators fall in the three lowest asset groups and together they accounted for only 40 per cent of the total capital formation in farm business, while the highest asset group which covers only one per cent of the non-cultivator households was responsible for 32 per cent of the total.

Among the individual States, the proportion of reporting cultivator households was highest for Punjab at 45 per cent followed by Orissa (36 per cent) and Mysore (35 per cent). For the remaining States the percentage for cultivator households varied between about 10 for Jammu & Kashmir and about 27 for Kerala. The average amount per household was highest at Rs. 85 for Mysore; Gujarat was next at Rs. 80 per household (*vide* Statement No. 18 of Appendix).

In respect of non-cultivator households, the proportion reporting capital formation in farm business was much smaller than that for cultivator households. The proportion varied between less than one per cent for Jammu & Kashmir and Gujarat to about 10 per cent for Orissa. The average amount of capital formation per non-cultivator household was low in all the States—that for Assam being the highest at Rs. 3.

The relative importance of individual items in the capital formation in farm business is given in Statement No. 19 of Appendix.

It will be seen that, for the country as a whole, purchase of farm equipment was the most important item accounting for about 28 per cent of the total capital formation in farm business. 'Wells and other irrigation resources' was next in importance accounting for slightly more than one-fourth of the total, followed by 'Reclamation of land', the share of which worked out to 17 per cent.

'Purchase of new additional equipment' constituted the most important item of capital formation in case of Andhra Pradesh, Gujarat, Madras, Punjab and Uttar Pradesh. Capital formation on 'Wells and other irrigation resources' claimed the highest share in Bihar, Madhya Pradesh, Maharashtra, Mysore and Rajasthan. About 61 and 57 per cent of the capital formation in Assam and Orissa respectively, was on 'Reclamation of land', while 'Farm houses, grain *golas*, etc.' accounted for about 62 and 45 per cent of the total capital formation in Jammu & Kashmir and West Bengal. 'Orchards and plantations' was the most important item in Kerala accounting for 23 per cent of the capital formation in farm business.

Capital formation in non-farm business

The proportion of households reporting capital formation, average amount per household and the aggregate amount of capital formation in non-farm business for the country are presented in Table XVIII.

TABLE XVIII—FIXED CAPITAL FORMATION IN NON-FARM BUSINESS—ALL-INDIA

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)
Less than Rs. 500	1.2	0.4	0.1 (0.5)	1.7	0.5	0.4 (5.4)	1.6	0.4	0.5 (1.8)
Rs. 500—Rs. 1,000	1.6	0.5	0.3 (1.2)	3.3	2.0	0.7 (9.0)	2.6	1.1	1.0 (3.2)
Rs. 1,000—Rs. 2,500	1.5	1.2	1.5 (6.6)	5.5	5.8	1.8 (23.4)	2.3	2.1	3.3 (11.0)
Rs. 2,500—Rs. 5,000	1.8	1.6	1.9 (8.5)	5.8	8.5	1.1 (14.1)	2.2	2.3	3.0 (10.0)
Rs. 5,000—Rs. 10,000	2.1	3.7	3.5 (15.8)	5.5	19.8	1.5 (19.0)	2.3	4.9	5.0 (16.7)
Rs. 10,000—Rs. 20,000	2.2	8.9	4.8 (21.9)	8.0	26.6	0.8 (10.2)	2.5	9.9	5.6 (18.8)
Rs. 20,000 and above	3.4	31.2	10.0 (45.5)	9.5	75.9	1.5 (18.9)	3.8	33.7	11.5 (38.5)
All—assets group	1.9	4.4	22.1 (100.0)	3.4	4.3	7.8 (100.0)	2.3	4.4	29.9 (100.0)

Figures in brackets show the percentage contribution of each asset group to the total for all asset groups.

Only about 2 per cent of cultivator households and less than 4 per cent of the non-cultivator households reported capital formation in non-farm business. The average capital formation for cultivator as well as non-cultivator households was about Rs. 4.4 per household. The aggregate capital formation in non-farm business for all rural households for the country as a whole was of the order of Rs. 30 crores of which a little more than one-fourth was contributed by non-cultivator households.

The proportion of households reporting and the average amount of capital formation per household increased uniformly from the lowest to the highest asset group both in respect of cultivator and non-cultivator households, but the variation is higher for non-cultivators compared to cultivators as may be seen from the Table XVIII. Both the proportion reporting and average per household for each group were higher for non-cultivators. As in the case of farm business, capital formation is concentrated in the higher asset groups. The cultivator households in the highest asset group accounted for about 46 per cent and the

households in the three highest asset groups accounted for 83 per cent of the total capital formation in non-farm business by all cultivator households. In case of non-cultivator households about 50 per cent of the households, which fall in the lowest asset group, accounted for only 5 per cent of the total capital formation, while 17 per cent of the households with assets between Rs. 1,000 and Rs. 2,500 contributed about one-fourth of the total capital formation.

The Statewise data in respect of capital formation in non-farm business are presented in Statement Nos. 18 and 20 of Appendix.

Among cultivator households the percentage of households reporting capital formation in non-farm business as also the average amount per household were much lower than the corresponding figures for capital formation in farm business in respect of all the States. The cultivator households of Kerala recorded both the highest percentage of reporting households (6 per cent) as also the largest average amount of capital formation per household (Rs. 10).

In respect of non-cultivator households the proportion of reporting households varied between one per cent for Orissa and about 7 per cent for Punjab. The average amount per household varied between Re. 1 for Orissa and Rs. 14 for Mysore.

Purchase of transport equipment, purchase of new production equipment and accessories, construction of buildings for non-farm business accounted for 36 per cent, 29 per cent and 27 per cent respectively, of the total capital formation in non-farm business in the country.

Among individual States, the item 'Purchase of new production equipment and accessories'

accounted for the highest percentage of total capital formation in Andhra Pradesh, Gujarat, Madras, Jammu & Kashmir, Orissa and West Bengal. 'Purchase of new transport equipment' claimed the highest share in Mysore, Bihar, Madhya Pradesh, Maharashtra, Punjab and Rajasthan States, while 'Construction of new structures' was relatively more important in Assam, Kerala and Uttar Pradesh.

Capital formation in residential housing

The proportion of reporting households, average amount per household and aggregate capital formation in residential housing are presented in Table XIX.

TABLE XIX—CAPITAL FORMATION IN RESIDENTIAL HOUSING—ALL-INDIA

Asset group	Cultivators			Non-cultivators			All rural households		
	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)	Proportion of households reporting (Per cent)	Average per household (Rs.)	Aggregate (in crores of Rs.)
Less than Rs. 500	2.7	3.4	1.1 (0.8)	2.0	2.6	2.4 (14.7)	2.2	2.8	3.5 (2.3)
Rs. 500—Rs. 1,000	2.6	3.2	1.6 (1.2)	2.8	5.5	2.0 (12.1)	2.7	4.2	3.5 (2.3)
Rs. 1,000—Rs. 2,500	3.8	7.4	9.3 (6.8)	3.4	10.1	3.2 (19.9)	3.7	8.0	12.5 (8.2)
Rs. 2,500—Rs. 5,000	4.4	14.7	17.2 (12.7)	3.3	14.4	1.9 (11.6)	4.3	14.7	19.1 (12.6)
Rs. 5,000—Rs. 10,000	4.9	24.3	22.7 (16.7)	4.2	30.0	2.2 (14.0)	4.8	24.7	25.0 (16.4)
Rs. 10,000—Rs. 20,000	7.0	65.3	35.3 (26.0)	4.7	36.8	1.1 (6.8)	6.9	63.8	36.4 (24.0)
Rs. 20,000 and above	10.2	150.6	48.5 (35.7)	6.6	172.5	3.4 (20.9)	10.0	151.9	51.8 (34.2)
All—assets group	4.7	27.0	135.7 (100.0)	2.7	8.8	16.1 (100.0)	4.2	22.1	151.8 (100.0)

Figures in brackets show the percentage contribution of each asset group to the total for all asset groups.

The aggregate capital formation in residential housing for all households was around Rs. 152 crores, the respective shares of cultivator and non-cultivator households being about 89 and 11 per cent. The proportion of reporting households as also the average per household generally increased from the

lowest to the highest asset group for both cultivators and non-cultivators. While the average amount also showed a similar trend among cultivators, no definite trend was observed among non-cultivators though the highest asset group accounted for the largest percentage. The proportion of reporting households

among cultivators was about 5 per cent as compared to about 3 per cent for non-cultivators—the difference mainly arising due to the higher reporting percentages in the two highest asset groups of cultivators. The average amount per cultivator household was over 3 times the corresponding amount of about Rs. 9 for non-cultivators. The inter-asset group variation may be seen from the percentage share of each asset group given by the figures in brackets in Table XIX. For cultivator households the percentage contribution increased with the size of asset groups. About 6 per cent of the cultivator households comprising the highest asset group accounted for slightly more than one-third of the total capital formation in housing, while the 6 per cent falling in the lowest asset group accounted for less than one per cent. Among non-cultivators, about 50 per cent of the households which fall in the lowest asset group, contributed 15 per cent of the total capital formation, while about one per cent of the households in the highest asset group accounted for

over one-fifth of the total capital formation in housing. 'Construction of new structures' accounted for about two-thirds of the total capital formation in residential housing while major alterations and additions to existing structures accounted for the rest.

Among individual States, the construction of new structures generally contributed for more than 60 per cent of the total capital formation in residential housing, except in Gujarat, where it was slightly below 50 per cent. In Andhra Pradesh and Madras the share of 'new structures' was more than 80 per cent (*vide* Statement No. 21 of Appendix).

Total Fixed Capital Formation

The estimates of aggregate and average amount per household in respect of total fixed capital formation in farm, and non-farm business and residential housing are presented in Table XX.

TABLE XX—TOTAL FIXED CAPITAL FORMATION—ALL-INDIA

	Farm business		Non-farm business		Residential housing		Total capital formation	
	Average amount per household (Rs.)	Aggregate (in crores of Rs.)	Average amount per household (Rs.)	Aggregate (in crores of Rs.)	Average amount per household (Rs.)	Aggregate (in crores of Rs.)	Average amount per household (Rs.)	Aggregate (in crores of Rs.)
Cultivators	32.7	164.7	4.4	22.1	27.0	135.7	64.1	322.5
Non-cultivators	1.1	2.1	4.3	7.8	8.8	16.1	14.2	26.0
All rural households	24.3	166.8	4.4	29.9	22.1	151.8	50.8	348.5

The average amount of total capital formation per cultivator household was Rs. 64 for all-India ; the average was highest for Mysore at Rs. 123 followed by Gujarat at Rs. 121 and Punjab at Rs. 111. It was low (between Rs. 30 and Rs. 37) in the States of Assam, Bihar, Madhya Pradesh, Orissa and West Bengal (*vide* Statement No. 18 of Appendix).

The average total capital formation in respect of non-cultivators was Rs. 14 per household for all-India ; the average was maximum for Jammu & Kashmir at Rs. 48 followed by

Punjab at Rs. 30 and Madras at Rs. 22. It was lowest for Orissa at Rs. 5 and was less than Rs. 10 for three other States viz., Andhra Pradesh, Assam and Maharashtra.

The aggregate capital formation of the rural household sector in farm and non-farm business and residential housing amounted to Rs. 348.5 crores for the reference year. Of this 48 per cent was in farm business, 43 per cent in residential housing and only 9 per cent in non-farm business. About 92 per cent of the aggregate capital formation was due to cultivator households. The non-cultivator house-

holds accounted for a little over one per cent of the capital formation in farm business, over one-fourth of the capital formation in non-farm business and about 11 per cent of that in residential housing.

Among cultivator households, capital formation in farm business accounted for a little over one-half and residential housing accounted for about 42 per cent of the

total fixed capital formation. In case of non-cultivators, capital formation in non-farm business contributed 30 per cent and residential housing about 62 per cent of the total.

The asset-group wise aggregates of total fixed capital formation for cultivator, non-cultivator and all rural households are presented in the Table XXI.

TABLE XXI—TOTAL FIXED CAPITAL FORMATION BY ASSET GROUPS—ALL-INDIA

Asset group	Cultivators		Non-cultivators		All rural households	
	Percentage distribution of households	Aggregate total capital formation (in crores of Rs.)	Percentage distribution of households	Aggregate total capital formation (in crores of Rs.)	Percentage distribution of households	Aggregate total capital formation (in crores of Rs.)
Less than Rs. 500	6.5	2.3 (0.7)	49.4	3.1 (11.9)	17.9	5.4 (1.5)
Rs. 500—Rs. 1,000	9.7	3.9 (1.2)	19.3	2.9 (11.1)	12.2	6.8 (2.0)
Rs. 1,000—Rs. 2,500	24.8	19.1 (5.9)	17.4	5.4 (20.7)	22.9	24.5 (7.0)
Rs. 2,500—Rs. 5,000	23.3	34.2 (10.6)	7.1	3.1 (11.9)	19.0	37.3 (10.7)
Rs. 5,000—Rs. 10,000	18.6	55.1 (17.1)	4.1	3.9 (14.9)	14.7	59.0 (16.9)
Rs. 10,000—Rs. 20,000	10.7	75.4 (23.4)	1.6	2.2 (8.4)	8.3	77.6 (22.3)
Rs. 20,000 and above	6.4	132.4 (41.0)	1.1	5.5 (21.1)	5.0	137.9 (39.6)
All-assets group	100.0	322.5 (100.0)	100.0	26.0 (100.0)	100.0	348.5 (100.0)

Figures in brackets show the percentage contribution of each asset group to the total for all asset groups.

Among cultivator households, the share of each asset group increased from the lowest to the highest asset group. About 17 per cent of the households, falling in the two highest asset groups, accounted for more than 60 per cent of the total capital formation. The contribution of non-cultivator households did not show such trend, mainly because of the concentration of non-cultivator households in the lower asset groups. About half of the non-cultivator households fall in the lowest asset group and their contribution to total was just about 12 per cent, while the highest asset group accounted for a little over 21 per cent of the total capital formation, though only 1.1 per cent of the non-cultivator households fall in this asset group.

In respect of all rural households, percentage contribution of capital formation in farm business to the total was highest for Assam (68.5 per cent). It was more than 60 per cent in case of Mysore, Orissa, Gujarat, Maharashtra and Madras. It was lowest for Bihar at 21.9 per cent.

The contribution of non-farm business to the total capital formation was uniformly low for all States; the percentage for Kerala at 15.8 was the highest.

Capital formation in residential housing contributed about 68 per cent of the total in case of Bihar and over 60 per cent of the total capital formation in West Bengal, Jammu & Kashmir and Rajasthan.

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Note:- (1) The figures for All-India are inclusive of the Union Territories of Delhi, Himachal Pradesh, Manipur and Tripura.

(2) The figures for Madras are inclusive of Pondicherry.

(3) The following symbols have been used :
.. denotes negligible. — denotes nil.

(4) Sum of constituent items may not in all cases tally with the total as shown, due to rounding.

STATEMENT No. 1—PROPORTION OF CULTIVATORS AND NON-CULTIVATORS AMONG RURAL HOUSEHOLDS

State	Proportion of cultivator households (per cent)	Proportion of non-cultivator households (per cent)
	1	2
1. Andhra Pradesh	65.4	34.6
2. Assam	75.4	24.6
3. Bihar	78.2	21.8
4. Gujarat	67.8	32.2
5. Jammu & Kashmir	91.2	8.8
6. Kerala	80.5	19.5
7. Madhya Pradesh	78.6	21.4
8. Madras	63.0	37.0
9. Maharashtra	68.2	31.8
10. Mysore	73.3	26.7
11. Orissa	71.1	28.9
12. Punjab	58.9	41.1
13. Rajasthan	86.7	13.3
14. Uttar Pradesh	80.0	20.0
15. West Bengal	67.0	33.0
All-India	73.4	26.6

STATEMENT No. 2—PERCENTAGE DISTRIBUTION OF HOUSEHOLDS ACCORDING TO VALUE OF ASSETS AND SHARE OF EACH ASSET GROUP IN THE TOTAL VALUE OF ASSETS

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State/Asset group	Aggregate value of assets (in crores of Rs.)	Less than Rs. 500		Rs. 500—Rs. 1,000		Rs. 1,000—Rs. 2,500		Rs. 2,500—Rs. 5,000		Rs. 5,000—Rs. 10,000		Rs. 10,000—Rs. 20,000		Rs. 20,000 and above		All-assets group	
		Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CULTIVATORS																	
1. Andhra Pradesh ..	32,12.7	9.5	0.4	11.7	1.1	24.0	5.1	19.9	9.1	15.0	13.5	11.1	19.9	8.7	50.9	100.0	100.0
2. Assam	5,59.9	5.7	0.6	13.7	2.8	32.9	15.3	27.3	26.1	14.3	26.9	5.0	18.5	1.1	9.8	100.0	100.0
3. Bihar	40,64.6	11.6	0.5	11.5	1.3	24.3	5.9	19.9	10.5	15.2	15.8	10.0	20.4	7.6	45.6	100.0	100.0
4. Gujarat	16,81.4	1.8	0.1	5.1	0.4	18.9	3.8	23.4	9.7	23.3	19.0	17.0	27.1	10.5	39.9	100.0	100.0
5. Jammu & Kashmir	3,13.4	0.7	..	3.4	0.4	20.4	5.6	32.5	18.5	26.9	29.4	11.9	24.5	4.2	21.5	100.0	100.0
6. Kerala	12,82.1	17.2	0.7	12.1	1.4	22.3	5.8	17.7	10.1	15.4	17.4	9.4	21.0	5.9	43.7	100.0	100.0
7. Madhya Pradesh ..	22,23.6	4.3	0.3	10.3	1.6	29.7	10.2	26.5	18.9	18.5	25.5	7.6	20.7	3.1	22.9	100.0	100.0
8. Madras	25,12.4	11.4	0.4	10.6	1.1	21.0	4.8	19.7	9.8	18.4	17.8	11.1	21.4	7.8	44.8	100.0	100.0
9. Maharashtra ..	26,48.3	4.9	0.2	9.1	1.0	22.7	5.5	22.4	11.6	20.4	20.4	13.2	25.8	7.3	36.5	100.0	100.0
10. Mysore	21,69.3	3.9	0.1	7.7	0.7	21.8	4.2	22.8	9.4	23.0	18.7	13.3	20.9	7.6	46.0	100.0	100.0
11. Orissa	10,54.7	3.8	0.3	9.2	1.6	32.4	12.4	28.8	23.0	17.4	27.0	6.2	18.8	2.2	16.9	100.0	100.0
12. Punjab	24,48.6	0.8	..	3.5	0.2	11.0	1.3	16.4	4.0	23.0	11.1	22.2	21.1	23.2	62.3	100.0	100.0
13. Rajasthan ..	15,92.5	2.1	0.1	7.1	0.9	23.4	6.9	29.6	18.4	22.9	27.1	11.4	26.1	3.5	20.4	100.0	100.0
14. Uttar Pradesh ..	59,80.6	3.2	0.2	8.5	1.1	27.9	7.7	25.6	14.9	10.4	22.0	10.4	23.2	5.1	31.0	100.0	100.0
15. West Bengal ..	16,38.5	9.6	0.6	13.5	2.0	25.8	8.7	22.0	15.7	16.4	23.3	8.8	24.6	4.0	25.1	100.0	100.0
All-India	3,37,77.6	6.5	0.3	9.7	1.1	24.8	6.3	23.3	12.5	18.6	19.5	10.7	22.2	6.4	38.1	100.0	100.0

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STATEMENT No. 2—PERCENTAGE DISTRIBUTION OF HOUSEHOLDS ACCORDING TO VALUE OF ASSETS AND SHARE OF EACH ASSET GROUP IN THE TOTAL VALUE OF ASSETS—Contd.

State/Asset group	Aggregate value of assets (in crores of Rs.)	Less than Rs. 500		Rs. 500—Rs. 1,000		Rs. 1,000—Rs. 2,500		Rs. 2,500—Rs. 5,000		Rs. 5,000—Rs. 10,000		Rs. 10,000—Rs. 20,000		Rs. 20,000 and above		All-assets group	
		Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NON-CULTIVATORS																	
1. Andhra Pradesh ..	3,78.2	54.5	6.7	18.4	7.3	14.1	12.4	6.8	13.2	3.5	14.3	1.5	11.8	1.4	34.2	100.0	100.0
2. Assam	82.9	39.4	5.9	22.6	9.8	24.3	23.0	7.7	15.4	4.1	17.8	1.0	8.2	0.9	19.9	100.0	100.0
3. Bihar	2,15.0	56.2	9.6	17.2	9.6	16.1	19.1	5.6	15.0	3.2	17.2	1.1	11.1	0.7	18.5	100.0	100.0
4. Gujarat	1,89.5	40.2	4.6	21.2	7.4	22.3	16.8	8.8	14.6	4.3	13.7	1.8	12.1	1.5	30.8	100.0	100.0
5. Jammu & Kashmir	12.5	18.0	1.9	20.5	5.7	30.0	18.2	16.8	20.3	10.1	26.0	4.3	24.0	0.3	3.8	100.0	100.0
6. Kerala	23.1	78.0	22.8	10.3	14.6	8.0	25.9	2.8	20.6	0.7	10.5	0.2	5.5	—	—	100.0	100.0
7. Madhya Pradesh ..	1,07.0	60.2	15.1	20.4	16.0	13.0	22.7	3.4	13.5	2.2	17.8	0.4	5.0	0.4	9.8	100.0	100.0
8. Madras	3,24.6	60.4	6.8	13.9	6.0	12.4	11.9	6.8	15.1	4.0	17.1	1.3	11.5	1.2	31.5	100.0	100.0
9. Maharashtra	1,67.6	61.1	12.8	19.0	13.7	12.0	19.1	4.2	15.4	2.2	16.4	1.3	17.1	0.2	5.5	100.0	100.0
10. Mysore	2,02.5	40.5	3.4	18.4	5.8	18.9	13.6	10.9	17.2	7.6	24.4	2.4	15.3	1.3	20.4	100.0	100.0
11. Orissa	1,12.1	48.5	10.2	23.6	14.0	17.5	23.2	6.3	18.5	3.0	16.8	0.9	10.4	0.2	6.9	100.0	100.0
12. Punjab	4,41.6	18.8	1.4	22.9	4.3	28.4	11.7	11.5	10.5	9.2	17.0	5.4	19.0	3.8	36.0	100.0	100.0
13. Rajasthan	1,14.4	27.8	2.8	20.9	5.2	26.3	14.6	10.7	13.5	9.6	23.8	3.4	16.8	1.3	23.3	100.0	100.0
14. Uttar Pradesh ..	3,63.6	35.6	6.8	25.3	12.1	25.0	25.0	8.7	20.2	4.2	19.4	0.8	7.4	0.3	9.0	100.0	100.0
15. West Bengal	3,18.8	55.3	6.5	16.3	5.9	13.0	10.6	7.0	12.5	3.9	14.0	2.7	18.5	1.8	31.9	100.0	100.0
All-India	39,78.8	49.4	6.5	19.3	8.1	17.4	16.0	7.1	14.8	4.1	17.2	1.6	13.2	1.1	24.2	100.0	100.0

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STATEMENT No. 2—PERCENTAGE DISTRIBUTION OF HOUSEHOLDS ACCORDING TO VALUE OF ASSETS AND SHARE OF EACH ASSET GROUP IN THE TOTAL VALUE OF ASSETS—*Concl'd.*

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State/Asset group	Aggregate value of assets (in crores of Rs.)	Less than Rs. 500		Rs. 500—Rs. 1,000		Rs. 1,000—Rs. 2,500		Rs. 2,500—Rs. 5,000		Rs. 5,000—Rs. 10,000		Rs. 10,000—Rs. 20,000		Rs. 20,000 and above		All-assets group	
		Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)	Proportion of households (Per-cent)	Share of the asset group (Per-cent)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
ALL RURAL HOUSEHOLDS																	
1. Andhra Pradesh ..	35,90.9	25.1	1.0	14.0	1.8	20.6	5.9	15.3	9.5	11.0	13.6	7.8	19.0	6.2	49.2	100.0	100.0
2. Assam	6,42.8	14.0	1.2	15.9	3.7	30.7	16.3	22.5	24.7	11.8	25.7	4.0	17.2	1.1	11.1	100.0	100.0
3. Bihar	42,79.6	21.3	1.0	12.7	1.7	22.5	6.6	16.8	10.7	12.6	15.8	8.0	20.0	6.1	44.3	100.0	100.0
4. Gujarat	18,70.9	14.2	0.5	10.3	1.1	20.0	5.1	18.7	10.2	17.1	18.5	12.1	25.6	7.6	39.0	100.0	100.0
5. Jammu & Kashmir	3,25.8	2.2	0.1	4.9	0.6	21.3	6.1	31.2	18.6	25.4	29.3	11.2	24.5	3.8	20.8	100.0	100.0
6. Kerala	13,05.2	29.1	1.0	11.8	1.7	19.5	6.1	14.8	10.3	12.5	17.3	7.6	20.7	4.7	42.9	100.0	100.0
7. Madhya Pradesh ..	23,30.6	16.3	1.0	12.4	2.2	26.1	10.7	21.6	18.7	15.0	25.2	6.1	20.0	2.5	22.3	100.0	100.0
8. Madras	28,37.0	29.5	1.2	11.8	1.6	17.8	5.6	15.0	10.4	13.1	17.7	7.5	20.2	5.3	43.3	100.0	100.0
9. Maharashtra	28,15.9	22.8	1.0	12.3	1.7	19.3	6.3	16.6	11.8	14.6	20.2	9.4	25.3	5.0	33.7	100.0	100.0
10. Mysore	23,71.8	13.6	0.4	10.5	1.1	21.1	5.0	19.6	10.1	18.9	19.2	10.4	20.5	5.9	43.8	100.0	100.0
11. Orissa	11,66.8	16.7	1.2	13.4	2.8	28.1	13.5	22.2	22.5	13.3	26.0	4.7	18.0	1.6	15.9	100.0	100.0
12. Punjab	28,90.2	8.2	0.2	11.5	0.8	18.2	2.9	14.4	5.0	17.3	12.0	15.2	20.8	15.2	58.3	100.0	100.0
13. Rajasthan	17,08.9	5.6	0.3	8.9	1.2	23.8	7.5	27.1	18.1	21.1	26.8	10.3	25.5	3.2	20.6	100.0	100.0
14. Uttar Pradesh ..	63,44.3	9.7	0.6	11.9	1.7	27.3	8.7	22.2	15.2	16.4	21.8	8.5	22.3	4.1	29.8	100.0	100.0
15. West Bengal	19,57.3	24.7	1.6	14.4	2.6	21.6	9.0	17.0	15.2	12.2	21.8	6.8	23.6	3.3	26.2	100.0	100.0
All-India	3,68,56.4	17.9	0.8	12.2	1.7	22.9	7.1	19.0	12.7	14.7	19.3	8.3	21.4	5.0	37.0	100.0	100.0

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STATEMENT No. 3—AVERAGE VALUE OF TANGIBLE ASSETS PER HOUSEHOLD AND SHARE OF CONSTITUENT ITEMS IN THE TOTAL TANGIBLE WEALTH

State	Aggregate value of Tangible assets (in crores of Rs.)	Average per household (Rs.)	Percentage share in total tangible assets of				
			Land	House Property	Livestock	Durable household assets	Equipment used in Farm and Non-farm business and for Transport
	1	2	3	4	5	6	7
CULTIVATORS							
1. Andhra Pradesh ..	3150	7704	71.6	15.4	6.4	4.4	2.1
2. Assam ..	548	3356	56.7	24.7	11.7	4.3	2.5
3. Bihar ..	3993	6688	75.0	15.5	4.6	3.7	1.2
4. Gujarat ..	1673	8737	58.3	20.9	10.2	5.3	5.2
5. Jammu & Kashmir ..	313	6446	54.6	27.1	11.5	5.7	1.2
6. Kerala ..	1263	6273	70.0	21.5	1.7	5.5	1.3
7. Madhya Pradesh ..	2200	4970	55.4	19.3	14.2	7.1	3.9
8. Madras ..	2460	7185	72.4	15.3	4.6	4.6	3.0
9. Maharashtra ..	2637	7004	70.6	14.4	8.2	3.1	3.7
10. Mysore ..	2125	8592	69.9	17.0	6.5	4.0	2.6
11. Orissa ..	1050	4413	63.2	21.8	7.6	5.1	2.4
12. Punjab ..	2380	14631	62.1	21.4	8.0	5.3	3.2
13. Rajasthan ..	1543	5680	46.2	21.3	17.0	10.9	4.6
14. Uttar Pradesh ..	5922	6120	56.3	24.1	7.8	9.1	2.8
15. West Bengal ..	1624	4926	67.4	20.7	6.0	4.2	1.7
All-India	33275	6609	64.4	19.3	7.7	5.7	2.8
NON-CULTIVATORS							
1. Andhra Pradesh ..	363	1679	53.0	31.6	3.0	10.3	2.1
2. Assam ..	70	1394	37.5	41.2	6.6	11.1	3.6
3. Bihar ..	201	1207	44.5	40.3	3.5	8.6	3.0
4. Gujarat ..	162	1784	8.7	58.9	6.7	16.7	8.9
5. Jammu & Kashmir ..	12	2641	26.2	50.9	7.4	13.1	2.4
6. Kerala ..	23	466	24.2	41.9	3.5	19.4	11.0
7. Madhya Pradesh ..	101	841	23.2	44.4	9.2	18.2	5.1
8. Madras ..	306	1525	42.3	39.6	2.3	11.5	4.2
9. Maharashtra ..	163	928	38.3	39.6	7.4	10.2	4.6
10. Mysore ..	191	2122	48.0	36.9	3.1	9.2	2.8
11. Orissa ..	112	1163	37.2	48.3	3.2	9.2	2.2
12. Punjab ..	411	3627	42.4	38.9	5.5	10.4	2.8
13. Rajasthan ..	102	2440	17.0	49.9	7.9	23.1	2.2
14. Uttar Pradesh ..	347	1433	22.0	51.2	6.5	16.7	3.6
15. West Bengal ..	294	1810	48.3	36.4	2.8	9.3	3.3
All-India	2881	1574	38.1	41.6	4.7	12.1	3.6
ALL RURAL HOUSEHOLDS							
1. Andhra Pradesh ..	3514	5619	69.6	17.1	6.1	5.0	2.2
2. Assam ..	618	3023	54.5	26.6	11.2	5.1	2.6
3. Bihar ..	4195	5491	73.5	16.7	4.6	4.0	1.2
4. Gujarat ..	1836	6496	53.9	24.2	9.9	6.4	5.6
5. Jammu & Kashmir ..	325	6111	53.5	28.0	11.4	6.0	1.2
6. Kerala ..	1286	5137	69.2	21.8	1.7	5.8	1.4
7. Madhya Pradesh ..	2301	4089	54.0	20.5	14.0	7.6	3.9
8. Madras ..	2766	5093	69.1	18.0	4.4	5.4	3.1
9. Maharashtra ..	2800	5072	68.7	15.9	8.2	3.5	3.8
10. Mysore ..	2316	6864	68.1	18.7	6.2	4.4	2.5
11. Orissa ..	1162	3472	60.7	24.3	7.1	5.5	2.4
12. Punjab ..	2791	10113	59.2	24.0	7.6	6.1	3.1
13. Rajasthan ..	1645	5249	44.4	23.1	16.4	11.6	4.4
14. Uttar Pradesh ..	6269	5182	54.4	25.6	7.7	9.5	2.7
15. West Bengal ..	1919	3898	64.5	23.1	5.5	5.0	2.0
All-India	36156	5267	62.3	21.1	7.5	6.2	2.8

STATEMENT No. 4—CAPITAL EXPENDITURE IN FARM BUSINESS: PROPORTION OF HOUSEHOLDS REPORTING, AVERAGE AMOUNT PER HOUSEHOLD AND AVERAGE AMOUNT PER REPORTING HOUSEHOLD

State/Asset group	Less than Rs. 500			Rs. 500—Rs. 1,000			Rs. 1,000—Rs. 2,500			Rs. 2,500—Rs. 5,000		
	Proportion of house-holds reporting (Per cent)	Average amount per house-hold (Rs.)	Average amount per reporting house-hold (Rs.)	Proportion of house-holds reporting (Per cent)	Average amount per house-hold (Rs.)	Average amount per reporting house-hold (Rs.)	Proportion of house-holds reporting (Per cent)	Average amount per house-hold (Rs.)	Average amount per reporting house-hold (Rs.)	Proportion of house-holds reporting (Per cent)	Average amount per house-hold (Rs.)	Average amount per reporting house-hold (Rs.)
	1	2	3	4	5	6	7	8	9	10	11	12
CULTIVATORS												
1. Andhra Pradesh ..	20.9	18.6	89	30.5	35.4	116	37.2	68.2	183	47.6	104.0	218
2. Assam ..	31.3	11.6	37	39.6	17.1	43	46.2	34.6	75	53.9	48.3	90
3. Bihar ..	19.0	3.8	20	24.4	9.6	39	39.8	26.9	68	55.9	38.1	68
4. Gujarat ..	10.0	10.4	104	27.3	27.8	102	37.3	25.7	69	56.8	68.2	120
5. Jammu & Kashmir ..	9.1	11.0	120	14.7	42.3	289	24.2	51.0	210	30.8	53.5	174
6. Kerala ..	39.4	11.0	28	54.8	22.7	41	62.0	31.8	51	66.1	68.6	104
7. Madhya Pradesh ..	13.8	9.5	51	28.0	20.7	74	38.9	26.7	69	58.9	71.6	122
8. Madras ..	23.3	24.4	105	33.8	45.9	136	42.7	51.3	120	52.0	104.0	200
9. Maharashtra ..	25.8	9.8	38	35.9	18.5	51	37.3	36.1	97	50.7	70.4	139
10. Mysore ..	38.4	31.3	82	52.5	43.1	82	59.0	54.9	93	68.2	110.0	161
11. Orissa ..	18.5	5.1	28	26.5	20.4	77	42.4	21.2	50	60.2	43.6	72
12. Punjab ..	21.0	23.6	112	41.0	44.3	108	50.4	107.2	213	66.3	142.8	214
13. Rajasthan ..	14.9	31.5	212	30.6	62.0	203	38.3	78.6	205	55.4	151.6	274
14. Uttar Pradesh ..	28.4	8.3	29	45.4	23.5	52	54.2	46.4	86	64.2	81.4	127
15. West Bengal ..	29.5	12.0	41	37.1	14.8	40	48.2	32.5	67	61.0	40.4	66
All-India	25.2	12.4	49	35.5	25.1	71	45.1	42.1	93	58.0	78.2	135
NON-CULTIVATORS												
1. Andhra Pradesh ..	6.0	4.4	73	9.0	14.8	164	11.2	50.5	453	15.1	67.8	449
2. Assam ..	5.7	5.8	101	7.3	2.3	32	10.6	9.3	88	12.0	40.2	335
3. Bihar ..	9.3	1.2	13	14.5	4.7	32	12.2	8.4	68	15.2	9.6	63
4. Gujarat ..	3.0	1.7	57	3.1	3.7	118	6.4	12.3	190	3.8	4.2	109
5. Jammu & Kashmir ..	3.4	6.9	204	9.0	168.6	1882	10.2	68.7	673	12.7	58.1	457
6. Kerala ..	25.5	3.0	12	22.4	4.2	19	15.6	1.8	12	18.8	477.4	2546
7. Madhya Pradesh ..	7.7	4.1	53	13.9	8.7	62	12.6	11.5	91	12.5	7.0	56
8. Madras ..	8.5	4.4	52	9.9	13.9	140	12.8	35.2	276	12.5	20.0	160
9. Maharashtra ..	7.9	4.0	51	10.4	12.4	119	11.8	47.4	401	3.9	0.8	20
10. Mysore ..	13.1	8.5	65	13.3	14.5	109	21.4	15.2	71	17.6	16.6	94
11. Orissa ..	13.1	1.2	9	9.4	1.2	13	16.7	8.2	49	10.0	4.5	45
12. Punjab ..	8.4	12.3	146	16.2	25.6	158	19.3	35.3	183	21.7	50.0	230
13. Rajasthan ..	4.0	3.3	82	9.9	24.0	242	18.6	31.4	169	17.5	49.5	282
14. Uttar Pradesh ..	9.4	5.4	57	13.9	22.6	163	17.8	36.0	202	17.5	28.3	162
15. West Bengal ..	9.2	2.0	22	10.9	2.8	25	13.3	12.6	95	12.0	19.0	159
All-India	9.1	3.9	43	11.6	13.1	113	14.6	27.6	189	14.0	31.9	227
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh ..	9.7	7.9	82	20.8	26.0	125	31.0	64.0	206	42.8	98.6	231
2. Assam ..	13.7	7.6	55	28.3	11.9	42	39.2	29.7	76	50.3	47.6	95
3. Bihar ..	13.5	2.3	17	21.5	8.1	38	35.5	24.0	68	53.0	36.0	68
4. Gujarat ..	3.6	2.5	69	11.3	11.8	105	26.2	20.9	80	48.8	58.5	120
5. Jammu & Kashmir ..	4.9	8.0	162	12.6	88.5	704	22.5	53.2	236	29.9	53.7	179
6. Kerala ..	32.1	6.8	21	49.3	19.5	40	58.3	29.4	50	64.3	84.0	131
7. Madhya Pradesh ..	10.0	5.2	52	23.0	16.5	72	36.1	25.1	69	57.3	69.4	121
8. Madras ..	12.1	9.3	77	23.4	32.0	137	35.0	47.1	135	45.4	90.0	198
9. Maharashtra ..	10.5	4.9	47	23.4	15.5	66	32.2	38.4	119	47.0	64.8	133
10. Mysore ..	18.3	13.2	72	31.2	29.8	87	49.9	45.4	91	60.7	96.2	158
11. Orissa ..	14.0	1.9	13	17.8	10.6	60	37.8	18.9	50	56.1	40.4	72
12. Punjab ..	9.2	13.0	141	20.6	29.0	140	30.4	61.0	201	52.0	112.3	216
13. Rajasthan ..	7.7	12.7	166	24.2	50.2	208	35.4	71.7	203	53.4	146.2	274
14. Uttar Pradesh ..	14.4	6.1	43	31.9	23.1	72	47.5	44.5	94	60.5	77.3	128
15. West Bengal ..	14.5	4.6	32	27.3	10.3	38	41.3	28.6	69	54.4	37.5	69
All-India	13.4	6.2	46	25.4	20.0	79	38.9	39.2	101	53.6	73.6	137

STATEMENT No. 4—CAPITAL EXPENDITURE IN FARM BUSINESS: PROPORTION OF HOUSEHOLDS REPORTING, AVERAGE AMOUNT PER HOUSEHOLD AND AVERAGE AMOUNT PER REPORTING HOUSEHOLD—*Condd.*

State/Asset group	Rs. 5,000-Rs. 10,000			Rs. 10,000-Rs. 20,000			Rs. 20,000 and above			All-assets group		
	Proportion of house-holds report- ing (Per cent)	Aver- age per house- hold (Rs.)	Aver- age amount report- ing house- hold (Rs.)	Proportion of house-holds report- ing cent)	Aver- age per house- hold (Rs.)	Aver- age amount report- ing house- hold (Rs.)	Proportion of house-holds report- ing cent)	Aver- age per house- hold (Rs.)	Aver- age amount report- ing house- hold (Rs.)	Proportion of house-holds report- ing cent)	Aver- age per house- hold (Rs.)	Aver- age amount report- ing house- hold (Rs.)
	13	14	15	16	17	18	19	20	21	22	23	24
CULTIVATORS												
1. Andhra Pradesh	47.2	140.6	298	62.8	346.4	552	74.1	842.8	1138	44.5	176.2	396
2. Assam	55.8	70.2	126	66.9	144.9	217	67.6	419.4	620	49.2	49.6	101
3. Bihar	68.9	88.0	128	78.2	91.1	117	90.9	267.1	294	51.0	58.4	115
4. Gujarat	69.1	161.5	235	80.4	334.8	416	86.5	676.8	783	60.7	188.0	310
5. Jammu & Kashmir	37.4	91.9	246	47.0	147.3	313	57.0	378.6	655	33.6	87.2	260
6. Kerala	72.6	100.9	139	82.5	256.0	310	92.0	322.0	350	63.3	82.4	130
7. Madhya Pradesh	66.2	114.8	173	82.5	234.1	284	87.9	726.4	827	52.1	90.9	175
8. Madras	61.0	193.6	317	66.1	331.1	501	86.0	985.9	1123	50.7	186.0	367
9. Maharashtra	56.2	128.0	228	66.4	246.5	371	76.1	594.4	781	50.1	127.9	235
10. Mysore	74.9	217.0	290	84.2	357.5	424	93.0	1372.5	1461	69.5	243.6	351
11. Orissa	65.3	78.3	119	71.7	157.3	219	79.5	316.8	399	51.8	51.9	100
12. Punjab	72.3	216.1	299	77.6	290.5	374	84.4	490.0	580	71.4	264.4	370
13. Rajasthan	64.9	200.0	308	76.6	365.0	476	81.8	600.1	733	54.3	176.6	325
14. Uttar Pradesh	71.6	156.3	218	80.4	261.8	326	87.5	543.7	621	63.6	121.2	192
15. West Bengal	74.8	69.0	92	80.7	117.6	146	90.4	230.2	255	56.6	51.3	90
All-India	65.7	140.4	214	75.4	255.8	339	85.0	608.4	716	55.5	124.3	224
NON-CULTIVATORS												
1. Andhra Pradesh	23.3	54.9	236	25.0	133.8	535	20.7	156.6	757	9.0	22.8	254
2. Assam	12.5	33.8	270	—	—	—	11.1	0.2	2	8.0	9.5	119
3. Bihar	18.3	63.8	348	10.0	6.8	68	7.1	20.8	291	11.3	5.6	50
4. Gujarat	7.8	10.6	136	3.1	3.6	115	3.7	3.7	100	4.1	5.2	126
5. Jammu & Kashmir	9.1	20.8	229	28.6	74.4	260	—	—	—	9.8	71.4	730
6. Kerala	50.0	133.2	266	—	—	—	—	—	—	24.3	17.4	72
7. Madhya Pradesh	15.4	10.4	68	—	—	—	25.0	78.8	315	10.0	6.5	65
8. Madras	13.3	30.5	229	28.0	104.3	372	13.0	27.2	208	10.0	13.3	133
9. Maharashtra	7.3	6.7	91	4.2	1.5	35	25.0	5.0	20	8.6	10.7	124
10. Mysore	29.6	43.1	146	30.4	102.0	335	25.0	25.4	102	17.0	16.9	99
11. Orissa	16.3	16.5	101	7.7	3.8	50	—	—	—	12.7	3.1	25
12. Punjab	23.2	84.9	366	24.7	75.0	303	29.0	154.2	531	17.8	41.6	234
13. Rajasthan	13.7	12.4	91	16.7	7.5	45	14.3	5.7	40	12.0	21.0	175
14. Uttar Pradesh	22.2	38.6	174	23.8	61.9	260	50.0	136.2	272	14.1	21.7	153
15. West Bengal	21.4	25.4	118	31.2	27.4	88	42.4	55.8	132	11.9	7.3	61
All-India	19.0	40.4	212	21.0	56.7	270	24.1	81.2	337	11.6	15.0	129
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh	44.5	131.2	295	60.2	332.1	552	70.0	789.9	1129	32.2	123.1	382
2. Assam	52.1	67.1	129	62.7	135.7	217	55.8	331.6	594	39.1	39.7	102
3. Bihar	66.1	86.7	131	76.2	88.7	116	88.6	260.6	294	42.3	46.9	111
4. Gujarat	64.2	149.4	234	76.8	319.1	416	81.2	634.1	781	42.5	129.0	304
5. Jammu & Kashmir	36.4	89.4	246	46.4	144.9	312	56.6	371.0	655	31.5	85.8	273
6. Kerala	72.3	101.2	140	82.1	254.8	310	92.0	322.0	350	55.7	69.7	125
7. Madhya Pradesh	64.6	111.5	173	81.5	231.3	284	86.0	707.4	822	43.1	72.9	169
8. Madras	55.7	175.3	315	63.6	316.2	497	79.8	886.8	1111	35.6	122.2	343
9. Maharashtra	53.8	122.1	227	63.6	235.7	370	75.4	586.2	777	36.9	90.6	245
10. Mysore	70.0	198.4	283	80.8	341.4	422	90.0	295.1	1440	55.4	183.1	330
11. Orissa	62.1	74.3	120	68.1	148.7	218	76.5	305.1	399	40.5	37.8	93
12. Punjab	61.6	187.5	305	69.9	259.1	371	78.8	455.8	579	49.4	172.9	350
13. Rajasthan	61.8	188.7	305	74.0	349.4	472	78.1	567.6	727	48.6	155.9	320
14. Uttar Pradesh	69.1	150.2	217	79.3	258.0	325	87.0	537.5	618	53.2	101.3	190
15. West Bengal	69.2	64.4	93	74.2	105.9	143	81.6	198.0	243	41.9	36.7	88
All-India	62.2	133.0	214	72.5	245.4	338	81.5	578.2	710	43.8	95.2	217

STATEMENT No. 5—PERCENTAGE SHARE OF EACH ASSET GROUP IN THE TOTAL CAPITAL EXPENDITURE IN FARM BUSINESS

State/Asset group	Less than Rs. 500		Rs. 500— Rs. 1,000		Rs. 1,000— Rs. 2,500		Rs. 2,500— Rs. 5,000		Rs. 5,000— Rs. 10,000		Rs. 10,000— Rs. 20,000		Rs. 20,000 and above		All-assets group	
	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total	Proportion of house- holds report- ing (Per- cent)	Share of the asset group in the total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CULTIVATORS																
1. Andhra Pradesh	20.9	1.0	30.5	2.3	37.2	9.3	47.6	11.8	47.2	12.0	62.8	21.9	74.1	41.7	44.5	100.0
2. Assam	31.8	1.3	39.6	4.7	46.2	22.9	53.9	26.6	55.8	20.3	66.9	14.5	67.6	9.6	49.2	100.0
3. Bihar	19.0	0.7	24.4	1.9	39.8	11.2	55.9	13.0	68.9	22.9	78.2	15.5	90.9	34.8	51.0	100.0
4. Gujarat	10.0	0.1	27.3	0.8	37.3	2.6	56.8	8.5	69.1	20.0	80.4	30.2	86.5	37.8	60.7	100.0
5. Jammu & Kashmir	9.1	0.1	14.7	1.7	24.2	11.9	30.8	19.9	37.4	28.3	47.0	20.1	57.0	17.9	33.6	100.0
6. Kerala	30.4	2.3	54.8	3.3	62.0	8.6	66.1	14.7	72.6	18.9	82.5	20.1	92.0	23.1	63.3	100.0
7. Madhya Pradesh	18.8	0.5	28.0	2.3	38.9	8.7	58.9	20.9	66.2	23.3	82.5	19.6	87.9	24.7	52.1	100.0
8. Madras	23.3	1.5	33.8	2.6	42.7	5.8	52.0	11.0	61.0	19.2	66.1	19.7	86.0	40.2	50.7	100.0
9. Maharashtra	25.8	0.4	35.9	1.3	37.3	6.4	50.7	12.3	56.2	20.5	66.4	25.4	76.1	33.7	50.1	100.0
10. Mysore	38.4	0.5	52.5	1.4	59.0	4.9	68.2	10.3	74.9	20.5	84.2	19.4	93.9	43.0	69.5	100.0
11. Orissa	18.5	0.4	26.5	3.6	42.4	13.2	60.2	23.7	85.3	26.8	71.7	18.8	79.5	13.4	51.8	100.0
12. Punjab	21.0	0.1	41.0	0.6	50.4	4.5	66.8	8.8	72.3	18.8	77.6	24.3	84.4	42.9	71.4	100.0
13. Rajasthan	14.9	0.4	30.6	2.5	38.3	10.4	55.4	25.4	64.9	25.9	76.6	23.5	81.8	11.9	54.3	100.0
14. Uttar Pradesh	28.4	0.2	45.4	1.6	54.2	10.7	64.2	17.2	71.6	25.0	80.4	22.4	87.5	22.8	63.0	100.0
15. West Bengal	29.5	2.3	37.1	3.9	48.2	16.4	61.0	17.3	74.8	22.0	80.7	20.2	90.4	18.0	56.6	100.0
All-India	25.2	0.6	35.5	1.9	45.1	8.4	58.0	14.7	65.7	21.0	75.4	22.1	85.0	31.3	55.5	100.0

STATEMENT No. 6—EXPENDITURE ON INDIVIDUAL ITEMS OF FARM BUSINESS—PROPORTION OF HOUSEHOLDS REPORTING AND AVERAGE PER REPORTING HOUSEHOLD

State/Item	Purchase of Land		Purchase of Land Rights		Reclamation of Land		Bunding and other Land improvements		Orchards and Plantations		Wells	
	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)
	1	2	3	4	5	6	7	8	9	10	11	12
CULTIVATORS												
1. Andhra Pradesh..	3.8	1,675	0.1	1,430	1.7	220	12.0	132	0.2	112	2.4	500
2. Assam	1.4	727	0.2	244	8.9	68	8.5	34	1.1	83	3.7	28
3. Bihar	1.6	811	0.1	282	0.5	101	10.6	31	0.5	32	1.0	217
4. Gujarat	1.0	1,801	1.0	164	0.9	132	23.6	108	0.2	188	4.0	412
5. Jammu & Kashmir	0.8	1,229	—	—	2.4	119	4.8	170	1.4	140	0.4	498
6. Kerala	2.2	1,083	0.8	800	1.9	200	17.2	48	11.5	44	2.0	42
7. Madhya Pradesh	1.7	754	0.3	184	0.6	120	14.4	77	0.2	201	1.6	426
8. Madras	2.8	1,950	..	10	2.8	334	11.6	89	0.6	135	4.6	535
9. Maharashtra ..	1.6	1,642	0.5	247	3.6	129	19.3	122	0.3	307	3.4	598
10. Mysore	2.7	1,368	..	1,000	2.9	513	33.4	142	4.8	286	3.6	654
11. Orissa	1.8	571	0.1	75	9.6	92	18.9	46	0.3	40	0.6	138
12. Punjab	1.8	2,066	0.1	1,300	4.3	100	9.7	54	0.3	278	5.6	172
13. Rajasthan ..	1.2	1,111	0.9	629	0.4	194	5.8	56	0.2	32	2.4	459
14. Uttar Pradesh ..	1.4	771	0.4	304	1.4	159	13.3	39	1.3	56	2.5	208
15. West Bengal ..	2.6	654	—	—	0.9	108	19.0	24	0.7	92	0.1	155
All-India	1.9	1,202	0.3	409	2.2	165	14.7	76	1.2	109	2.4	372
NON-CULTIVATORS												
1. Andhra Pradesh..	1.0	1,045	0.1	400	0.3	46	0.5	86	—	—	0.1	35
2. Assam	0.6	867	—	—	—	—	0.3	22	—	—	0.3	22
3. Bihar	0.4	536	0.1	300	—	—	—	—	—	—	—	—
4. Gujarat	—	—	—	—	—	—	0.3	63	—	—	—	—
5. Jammu & Kashmir	2.8	1,849	—	—	—	—	—	—	0.6	242	—	—
6. Kerala	0.4	4,060	—	—	0.2	5	0.5	15	—	—	0.2	5
7. Madhya Pradesh	0.3	296	—	—	—	—	0.2	152	—	—	—	—
8. Madras	0.2	1,235	—	—	0.2	302	0.2	92	—	—	0.2	117
9. Maharashtra ..	0.6	1,065	—	—	0.3	40	0.3	70	—	—	0.1	30
10. Mysore	0.5	848	—	—	0.1	200	1.8	99	—	—	0.3	475
11. Orissa	0.2	183	—	—	0.6	94	0.3	30	0.1	50	0.1	5
12. Punjab	0.1	3,162	0.3	139	0.1	75	0.2	38	—	—	0.8	171
13. Rajasthan ..	—	—	—	—	—	—	0.8	51	—	—	—	—
14. Uttar Pradesh ..	0.1	170	—	—	—	—	0.5	9	..	20	0.2	192
15. West Bengal ..	0.4	538	—	—	0.1	30	1.3	22	—	—	—	—
All-India	0.4	979	..	216	0.2	104	0.5	55	..	64	0.2	164
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh..	2.8	1,595	0.1	1,172	1.2	206	8.0	131	0.1	112	1.6	490
2. Assam	1.2	744	0.1	244	6.7	68	6.5	34	0.8	83	2.8	28
3. Bihar	1.3	794	0.1	285	0.4	101	8.3	31	0.4	32	0.8	217
4. Gujarat	0.7	1,801	0.7	164	0.6	132	16.1	108	0.2	188	2.7	412
5. Jammu & Kashmir	1.0	1,376	—	—	2.2	119	4.4	170	1.4	144	0.4	498
6. Kerala	1.9	1,194	0.7	800	1.6	196	14.0	48	9.2	44	1.6	41
7. Madhya Pradesh	1.4	730	0.2	184	0.5	120	11.4	77	0.2	201	1.3	426
8. Madras	1.9	1,920	..	10	1.8	332	7.4	90	0.4	135	2.9	527
9. Maharashtra ..	1.3	1,563	0.4	247	2.5	126	13.2	122	0.2	307	2.4	648
10. Mysore	2.1	1,334	..	1,000	2.1	509	25.0	141	3.5	286	2.7	648
11. Orissa	1.4	554	..	75	7.0	92	13.5	46	0.3	41	0.5	132
12. Punjab	1.1	2,115	0.2	471	2.6	99	5.8	54	0.2	278	3.6	172
13. Rajasthan ..	1.0	1,111	0.8	629	0.4	194	5.1	56	0.2	32	2.1	459
14. Uttar Pradesh ..	1.1	763	0.3	304	1.1	159	10.8	39	1.1	56	2.0	208
15. West Bengal ..	1.9	645	—	—	0.6	105	13.1	24	0.5	92	0.1	155
All-India	1.5	1,187	0.2	402	1.6	164	10.9	75	0.9	109	1.8	368

STATEMENT No. 6—EXPENDITURE ON INDIVIDUAL ITEMS OF FARM BUSINESS—PROPORTION OF HOUSEHOLDS REPORTING AND AVERAGE PER REPORTING HOUSEHOLD—Concl'd.

State/Item	Other irrigation resources		Agricultural implements, Machinery, Transport equipment etc.		Farm houses Grain golas and Cattle sheds		Purchase of Livestock		Other Capital Expenditure in Farm Business		Total Capital Expenditure in Farm Business	
	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)	Proportion of households reporting (Per-cent)	Average per reporting household (Rs.)
	13	14	15	16	17	18	19	20	21	22	23	24
CULTIVATORS												
1. Andhra Pradesh..	0.7	118	16.0	107	4.7	75	24.0	243	0.1	525	44.5	396
2. Assam .. .. .	..	8	27.0	10	7.9	44	14.2	145	4.7	21	49.2	101
3. Bihar	0.5	154	38.5	14	3.0	46	16.8	189	0.2	27	51.0	115
4. Gujarat	2.7	146	44.0	140	1.8	445	14.8	347	0.4	137	60.7	310
5. Jammu & Kashmir	1.5	40	16.4	17	3.2	495	15.8	266	—	—	33.6	260
6. Kerala	0.7	283	35.9	15	15.8	17	23.6	94	3.1	49	63.3	130
7. Madhya Pradesh..	0.1	110	34.8	19	4.9	52	18.5	264	0.1	310	52.1	175
8. Madras	0.5	84	30.6	93	1.2	188	22.9	230	0.5	376	50.7	367
9. Maharashtra .. .	0.8	215	27.8	53	6.3	72	12.1	243	0.2	157	50.1	255
10. Mysore	2.0	112	48.6	57	1.8	296	23.6	273	1.1	670	69.5	351
11. Orissa	0.2	60	30.4	17	11.3	20	12.8	120	0.1	58	51.8	100
12. Punjab	5.7	50	33.0	69	3.6	250	36.6	429	0.5	24	71.4	370
13. Rajasthan .. .	1.1	108	33.4	63	1.6	113	29.9	396	0.1	129	54.3	325
14. Uttar Pradesh ..	4.0	35	39.4	20	7.8	48	20.7	269	0.2	146	63.0	192
15. West Bengal .. .	0.2	98	35.8	11	16.8	28	14.1	135	0.2	108	56.6	90
All-India	1.5	74	34.8	41	6.2	59	21.7	254	0.5	151	55.5	224
NON-CULTIVATORS												
1. Andhra Pradesh..	0.1	2,075	1.2	16	0.5	28	6.3	139	—	—	9.0	264
2. Assam	—	—	2.0	6	0.6	28	4.1	89	0.7	19	8.0	119
3. Bihar	—	—	7.5	3	0.5	28	4.0	78	—	—	11.3	50
4. Gujarat	0.1	100	1.0	27	0.1	200	2.8	161	—	—	4.1	126
5. Jammu & Kashmir	0.3	139	4.0	13	0.3	218	6.7	259	—	—	9.8	730
6. Kerala	—	—	14.6	4	1.6	7	10.1	22	—	—	24.3	72
7. Madhya Pradesh..	—	—	4.5	6	0.4	87	5.1	90	—	—	10.0	65
8. Madras	—	—	2.5	24	—	—	7.4	122	—	—	10.0	133
9. Maharashtra .. .	—	—	2.8	7	1.0	18	4.9	85	—	—	8.6	124
10. Mysore	—	—	7.9	10	0.2	92	8.8	89	—	—	17.0	99
11. Orissa	—	—	9.4	3	1.6	9	6.0	26	—	—	12.7	25
12. Punjab	0.1	42	3.2	13	0.1	300	14.6	240	0.1	370	17.8	234
13. Rajasthan .. .	—	—	1.9	9	0.4	125	10.0	201	—	—	12.0	175
14. Uttar Pradesh ..	0.1	2	4.5	5	0.9	64	9.1	225	—	—	14.1	153
15. West Bengal .. .	—	—	3.7	7	2.0	44	6.1	57	—	—	11.9	61
All-India	..	736	4.2	7	0.7	40	6.9	140	..	76	11.6	129
ALL RURAL HOUSE HOLDS												
1. Andhra Pradesh..	0.5	253	10.8	104	3.2	73	17.9	230	..	525	32.2	382
2. Assam .. .. .	..	8	30.8	10	6.1	44	11.7	140	3.7	21	35.1	102
3. Bihar	0.4	154	31.7	13	2.4	45	14.0	183	0.2	27	42.3	111
4. Gujarat	1.8	145	30.1	139	1.2	442	11.0	332	0.2	137	42.5	304
5. Jammu & Kashmir	1.4	42	15.4	16	3.0	492	15.0	266	—	—	31.5	273
6. Kerala	0.6	283	31.7	14	11.0	17	21.0	87	2.5	49	55.7	125
7. Madhya Pradesh..	..	110	28.3	19	3.9	52	15.6	252	0.1	310	43.1	169
8. Madras	0.3	84	20.2	90	0.7	188	17.2	213	0.3	376	35.6	343
9. Maharashtra .. .	0.5	215	19.9	51	4.6	68	9.8	218	0.2	157	36.9	245
10. Mysore	1.5	112	37.7	54	1.4	288	19.7	251	0.8	670	55.4	330
11. Orissa	0.1	60	24.3	16	8.5	19	10.8	105	0.1	58	40.5	93
12. Punjab	3.4	50	32.5	67	2.1	250	27.6	388	0.3	51	49.4	350
13. Rajasthan .. .	0.9	108	29.2	62	1.5	114	27.3	386	0.1	129	48.6	320
14. Uttar Pradesh ..	3.2	35	32.4	20	6.4	49	26.3	266	0.2	146	53.2	190
15. West Bengal .. .	0.1	98	25.2	10	11.9	28	11.4	122	0.1	108	41.9	88
All-India	1.1	20	26.6	79	4.7	58	17.8	243	0.4	150	43.8	217

STATEMENT No. 7—PERCENTAGE EXPENDITURE ON INDIVIDUAL ITEMS OF FARM BUSINESS

State/Item	Purchase of Land		Purchase of land rights		Reclamation of Land		Bunding and other Land improvements		Orchards and Plantations		Wells	
	Proportion of house-holds reporting	Percentage to the total expenditure	Proportion of house-holds reporting	Percentage to the total expenditure	Proportion of house-holds reporting	Percentage to the total expenditure	Proportion of house-holds reporting	Percentage to the total expenditure	Proportion of house-holds reporting	Percentage to the total expenditure	Proportion of house-holds reporting	Percentage to the total expenditure
	1	2	3	4	5	6	7	8	9	10	11	12
CULTIVATORS												
1. Andhra Pradesh	3.8	35.9	0.1	0.6	1.7	2.2	12.0	9.0	0.2	0.1	2.4	6.9
2. Assam	1.4	21.1	0.2	0.8	8.9	12.3	8.5	5.8	1.1	1.8	3.7	2.1
3. Bihar	1.6	21.6	0.1	0.4	0.5	0.9	10.6	5.7	0.5	0.3	1.0	3.7
4. Gujarat	1.0	9.3	1.0	0.8	0.9	0.6	23.6	13.6	0.2	0.2	4.0	8.8
5. Jammu & Kashmir	0.8	12.0	—	—	2.4	3.3	4.8	9.3	1.4	2.3	0.4	2.5
6. Kerala	2.2	29.5	0.8	8.0	1.9	4.7	17.2	10.0	11.5	6.1	2.0	1.0
7. Madhya Pradesh	1.7	14.0	0.3	0.5	0.6	0.8	14.4	12.3	0.2	0.4	1.6	7.7
8. Madras	2.8	29.9	..	..	2.8	4.9	11.6	5.6	0.6	0.5	4.6	13.1
9. Maharashtra ..	1.6	20.6	0.5	1.0	3.6	3.6	19.3	18.4	0.3	0.8	3.4	16.1
10. Mysore	2.7	15.2	..	0.2	2.9	6.0	33.4	19.4	4.8	5.6	3.6	9.6
11. Orissa	1.8	20.0	0.1	0.1	9.6	17.0	18.9	16.8	0.3	0.3	0.6	1.6
12. Punjab	1.8	14.3	0.1	0.4	4.3	1.6	9.7	2.0	0.3	0.3	5.6	3.7
13. Rajasthan ..	1.2	7.6	0.9	3.1	0.4	0.4	5.8	1.8	0.2	..	2.4	6.2
14. Uttar Pradesh ..	1.4	8.9	0.4	1.0	1.4	1.8	13.3	4.3	1.3	0.6	2.5	4.3
15. West Bengal ..	2.6	33.3	—	—	0.9	1.9	19.0	8.8	0.7	1.3	0.1	0.3
All-India	1.9	18.8	0.3	0.9	2.2	2.9	14.7	8.9	1.2	1.1	2.4	7.1
NON-CULTIVATORS												
1. Andhra Pradesh	1.0	47.9	0.1	0.8	0.3	0.6	0.5	2.0	—	—	0.1	0.1
2. Assam	0.6	56.0	—	—	—	—	0.3	0.7	—	—	0.3	0.7
3. Bihar	0.4	35.3	0.1	2.8	—	—	—	—	—	—	—	—
4. Gujarat	—	—	—	—	—	—	0.3	3.4	—	—	—	—
5. Jammu & Kashmir	2.8	71.2	—	—	—	—	—	—	0.6	2.1	—	—
6. Kerala	0.4	82.8	—	—	0.2	..	0.5	0.4	—	—	0.2	..
7. Madhya Pradesh	0.3	15.8	—	—	—	—	0.2	4.0	—	—	—	—
8. Madras	0.2	19.7	—	—	0.2	4.8	0.2	1.1	—	—	0.2	1.4
9. Maharashtra ..	0.6	54.3	—	—	0.3	1.0	0.3	2.1	—	—	0.1	0.1
10. Mysore	0.5	28.7	—	—	0.1	1.3	1.8	10.6	—	—	0.3	9.0
11. Orissa	0.2	12.1	—	—	0.6	20.0	0.3	2.6	0.1	1.1	0.1	0.1
12. Punjab	0.1	9.2	0.3	1.0	0.1	0.2	0.2	0.2	—	—	0.8	3.3
13. Rajasthan ..	—	—	—	—	—	—	0.8	1.8	—	—	—	—
14. Uttar Pradesh ..	0.1	0.6	—	—	—	—	0.5	0.2	..	..	0.2	1.4
15. West Bengal ..	0.4	32.9	—	—	0.1	0.3	1.3	3.9	—	—	—	—
All-India	0.4	25.1	..	0.4	0.2	1.0	0.5	1.7	..	..	0.2	1.5
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh	2.8	36.6	0.1	0.6	1.2	2.1	8.0	8.5	0.1	0.1	1.6	6.5
2. Assam	1.2	23.2	0.1	0.8	6.7	11.6	6.5	5.5	0.8	1.7	2.8	2.0
3. Bihar	1.3	21.9	0.1	0.4	0.4	0.8	8.3	5.6	0.4	0.3	0.8	3.6
4. Gujarat	0.7	9.2	0.7	0.8	0.6	0.6	16.1	13.4	0.2	0.2	2.7	8.6
5. Jammu & Kashmir	1.0	16.4	—	—	2.2	3.0	4.4	8.6	1.4	2.3	0.4	2.3
6. Kerala	1.9	32.1	0.7	7.6	1.6	4.5	14.0	9.5	9.2	5.8	1.6	1.0
7. Madhya Pradesh	1.4	14.0	0.2	0.5	0.5	0.8	11.4	12.1	0.2	0.4	1.3	7.5
8. Madras	1.9	29.5	..	..	1.8	4.9	7.4	5.4	0.4	0.5	2.9	12.6
9. Maharashtra ..	1.3	21.9	0.4	0.9	2.5	3.5	13.2	17.8	0.2	0.8	2.4	15.5
10. Mysore	2.1	15.5	..	0.2	2.1	5.9	25.0	19.2	3.5	5.5	2.7	9.6
11. Orissa	1.4	19.8	..	0.1	7.0	17.1	13.5	16.4	0.3	0.3	0.5	1.6
12. Punjab	1.1	13.8	0.2	0.5	2.6	1.5	5.8	1.8	0.2	0.3	3.6	3.6
13. Rajasthan ..	1.0	7.5	0.8	3.0	0.4	0.4	5.1	1.8	0.2	..	2.1	6.1
14. Uttar Pradesh ..	1.1	8.5	0.3	1.0	1.1	1.7	10.8	4.1	1.1	0.6	2.0	4.2
15. West Bengal ..	1.9	33.3	—	—	0.6	1.8	13.1	8.5	0.5	1.2	0.1	0.3
All-India	1.5	19.1	0.2	0.9	1.6	2.8	10.9	8.6	0.9	1.1	1.8	6.9

STATEMENT No. 7—PERCENTAGE EXPENDITURE ON INDIVIDUAL ITEMS OF FARM BUSINESS—*Concl'd.*

State/Item	Other irrigation resources		Agricultural Implements, Machinery and Transport equipment		Farm houses, Grain <i>golas</i> etc.		Purchase of Livestock		Other Capital Expenditure in Farm Business		Total Capital Expenditure in Farm Business		Aggregate expenditure (in crores of Rs.)
	Pro-portion of house-holds reporting	Per-centage to the total ex-pen-diture	Pro-portion of house-holds reporting	Per-centage to the total ex-pen-diture	Pro-portion of house-holds reporting	Per-centage to the total ex-pen-diture	Pro-portion of house-holds reporting	Per-centage to the total ex-pen-diture	Pro-portion of house-holds reporting	Per-centage to the total ex-pen-diture	Pro-portion of house-holds reporting	Per-centage to the total ex-pen-diture	
	13	14	15	16	17	18	19	20	21	22	23	24	25
CULTIVATORS													
1. Andhra Pradesh	0.7	0.5	16.0	9.7	4.7	2.0	24.0	33.0	0.1	0.1	44.5	100.0	72.1
2. Assam .. .. .	..	..	27.0	5.5	7.9	7.0	14.2	41.6	4.7	2.0	49.2	100.0	7.6
3. Bihar	0.5	1.4	38.5	9.1	3.0	2.3	16.8	54.5	0.2	0.1	51.0	100.0	34.9
4. Gujarat	2.7	2.1	44.0	32.7	1.8	4.2	14.8	27.4	0.4	0.3	60.7	100.0	36.0
5. Jammu & Kashmir	1.5	0.7	16.4	3.1	3.2	18.4	15.8	48.3	—	—	33.6	100.0	4.2
6. Kerala	0.7	2.4	35.9	6.3	15.8	3.3	23.6	26.8	3.1	1.8	63.3	100.0	16.6
7. Madhya Pradesh	0.1	0.1	34.8	7.4	4.9	2.8	18.5	53.7	0.1	0.4	52.1	100.0	40.2
8. Madras	0.5	0.2	30.6	15.4	1.2	1.2	22.9	28.3	0.5	0.9	50.7	100.0	63.7
9. Maharashtra ..	0.8	1.3	27.8	11.6	6.3	3.5	12.1	22.9	0.2	0.2	50.1	100.0	48.2
10. Mysore	2.0	0.9	48.6	11.4	1.8	2.2	23.6	26.5	1.1	3.0	69.5	100.0	60.3
11. Orissa	0.2	0.2	30.4	10.0	11.3	4.3	12.8	29.6	0.1	0.1	51.8	100.0	12.3
12. Punjab	5.7	1.1	53.0	13.9	3.6	3.4	36.6	59.3	0.5	..	71.4	100.0	43.0
13. Rajasthan .. .	1.1	0.7	33.4	11.9	1.6	1.0	29.9	67.1	0.1	0.1	54.3	100.0	48.0
14. Uttar Pradesh ..	4.0	1.2	39.4	6.5	7.8	3.1	30.7	68.0	0.2	0.2	63.0	100.0	117.3
15. West Bengal ..	0.2	0.3	35.8	7.4	16.8	9.1	14.1	37.2	0.2	0.3	56.6	100.0	16.9
All-India	1.5	0.9	34.8	11.4	6.2	2.9	21.7	44.4	0.5	0.6	55.5	100.0	626.0
NON-CULTIVATORS													
1. Andhra Pradesh	0.1	8.6	1.2	0.8	0.5	0.6	6.3	38.6	—	—	9.0	100.0	4.9
2. Assam	—	—	2.0	1.2	0.6	1.8	4.1	38.1	0.7	1.5	8.0	100.0	0.5
3. Bihar	—	—	7.5	4.0	0.5	2.6	4.0	55.2	—	—	11.3	100.0	0.9
4. Gujarat	0.1	1.1	1.0	5.3	0.1	2.1	2.8	88.1	—	—	4.1	100.0	0.5
5. Jammu & Kashmir	0.3	0.6	4.0	0.7	0.3	0.9	6.7	24.4	—	—	9.8	100.0	0.3
6. Kerala	—	—	14.6	3.1	1.6	0.6	10.1	13.0	—	—	24.3	100.0	0.9
7. Madhya Pradesh	—	—	4.5	3.9	0.4	5.8	5.1	70.4	—	—	10.0	100.0	0.8
8. Madras	—	—	2.5	4.6	—	—	7.4	68.4	—	—	10.0	100.0	2.7
9. Maharashtra ..	—	—	2.8	1.8	1.0	1.7	4.9	38.9	—	—	8.6	100.0	1.9
10. Mysore	—	—	7.9	4.5	0.2	1.2	8.8	46.7	—	—	17.0	100.0	1.5
11. Orissa	—	—	9.4	10.2	1.6	4.7	6.0	49.2	—	—	12.7	100.0	0.3
12. Punjab	0.1	0.1	3.2	1.0	0.1	0.4	14.6	83.9	0.1	0.6	17.8	100.0	4.7
13. Rajasthan .. .	—	—	1.9	0.8	0.4	2.2	10.0	95.1	—	—	12.0	100.0	0.9
14. Uttar Pradesh ..	0.1	..	4.5	1.0	0.9	2.6	9.1	94.1	—	—	14.1	100.0	5.2
15. West Bengal ..	—	—	3.7	3.7	2.0	11.8	6.1	47.5	—	—	11.9	100.0	1.2
All-India	..	1.6	4.2	2.1	0.7	1.8	6.9	64.6	..	0.1	11.6	100.0	27.4
ALL RURAL HOUSEHOLDS													
1. Andhra Pradesh	0.5	1.0	10.8	9.1	3.2	1.9	17.9	33.4	..	0.1	32.2	100.0	77.0
2. Assam .. .. .	..	..	20.8	5.2	6.1	6.7	11.7	41.4	3.7	1.9	39.1	100.0	8.1
3. Bihar	0.4	1.4	31.7	9.0	2.4	2.4	14.0	54.5	0.2	0.1	42.3	100.0	35.8
4. Gujarat	1.8	2.1	30.1	2.3	1.2	4.2	11.0	28.2	0.2	0.3	42.5	100.0	36.5
5. Jammu & Kashmir	1.4	0.7	15.4	2.9	3.0	17.1	15.0	46.6	—	—	31.5	100.0	4.6
6. Kerala	0.6	2.2	31.7	6.2	13.0	3.2	21.0	26.2	2.5	1.8	55.7	100.0	17.5
7. Madhya Pradesh	..	0.1	28.3	7.4	3.9	2.8	15.6	54.0	0.1	0.4	43.1	100.0	41.0
8. Madras	0.3	0.2	20.2	14.9	0.7	1.1	17.2	29.9	0.3	0.9	35.6	100.0	66.4
9. Maharashtra ..	0.5	1.2	19.9	11.2	4.6	3.5	9.8	23.5	0.2	0.2	36.9	100.0	50.0
10. Mysore	1.5	0.9	37.7	11.2	1.4	2.1	19.7	27.0	0.8	2.9	55.4	100.0	61.8
11. Orissa	0.1	0.2	24.3	10.0	8.5	4.3	10.8	30.1	0.1	0.1	40.5	100.0	12.7
12. Punjab	3.4	1.0	32.5	12.6	2.1	3.1	27.6	61.8	0.3	0.1	49.4	100.0	47.7
13. Rajasthan .. .	0.9	0.6	29.2	11.7	1.5	1.1	27.3	67.6	0.1	0.1	48.6	100.0	48.9
14. Uttar Pradesh ..	3.2	1.1	32.4	6.3	6.4	3.1	26.3	69.2	0.2	0.2	53.2	100.0	122.5
15. West Bengal ..	0.1	0.3	25.2	7.1	11.9	9.2	11.4	37.9	0.1	0.3	41.9	100.0	18.1
All-India	1.1	0.9	26.6	11.0	4.7	2.9	17.8	45.2	0.4	0.6	43.8	100.0	653.5

STATEMENT No. 8—CAPITAL EXPENDITURE IN FARM BUSINESS : PURCHASE OF LAND

State/Asset group	Proportion of households reporting (Per cent)								Expenditure per reporting household (Rs.)							
	Less than Rs. 500	Rs. 500-1,000	Rs. 1,000-2,500	Rs. 2,500-5,000	Rs. 5,000-10,000	Rs. 10,000-20,000	Rs. 20,000 and above	All-assets group	Less than Rs. 500	Rs. 500-1,000	Rs. 1,000-2,500	Rs. 2,500-5,000	Rs. 5,000-10,000	Rs. 10,000-20,000	Rs. 20,000 and above	All-assets group
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CULTIVATORS																
1. Andhra Pradesh	0.8	0.9	3.2	4.7	3.2	5.6	8.9	3.8	148	672	614	782	868	2,770	3,691	1,675
2. Assam	—	0.2	1.0	1.4	2.3	4.7	11.8	1.4	—	100	672	387	720	624	2,150	727
3. Bihar	0.3	0.4	1.5	1.4	3.0	2.1	2.3	1.6	40	257	572	652	980	654	1,553	811
4. Gujarat	—	0.5	0.3	0.7	1.0	1.9	1.8	1.0	—	277	288	696	1,766	1,998	3,105	1,801
5. Jammu & Kashmir	—	2.6	1.4	0.6	0.4	0.5	2.1	0.8	—	821	1,323	706	806	2,386	2,333	1,229
6. Kerala	0.8	1.4	1.6	2.7	3.9	4.2	2.2	2.2	207	569	408	1,367	985	1,845	1,578	1,083
7. Madhya Pradesh	1.6	1.1	0.8	2.1	2.0	3.1	3.0	1.7	89	621	537	620	895	881	1,882	764
8. Madras	1.9	0.9	1.6	2.5	3.5	5.3	6.0	2.8	439	700	290	1,369	1,604	1,765	5,460	1,950
9. Maharashtra	—	0.8	1.5	1.2	1.7	2.7	2.8	1.6	—	217	566	1,243	1,475	2,254	3,700	1,642
10. Mysore	3.0	2.0	2.0	1.9	3.0	2.9	6.6	2.7	560	488	304	996	1,653	1,780	2,331	1,368
11. Orissa	—	0.6	1.2	1.6	3.9	1.4	6.4	1.8	—	1,650	310	345	476	2,505	896	571
12. Punjab	—	—	1.2	1.0	1.8	2.5	2.4	1.8	—	—	1,283	535	1,287	2,182	3,202	2,066
13. Rajasthan	—	0.4	0.6	1.6	1.3	1.8	2.5	1.2	—	150	662	427	1,035	2,729	2,300	1,111
14. Uttar Pradesh	—	0.5	0.7	0.8	1.9	3.4	4.8	1.4	—	110	433	547	947	818	1,001	771
15. West Bengal	0.9	1.2	2.3	1.9	3.7	5.9	5.5	2.6	205	290	515	641	652	786	1,246	654
All-India	0.8	0.8	1.3	1.7	2.4	3.3	4.3	1.9	278	478	523	765	1,050	1,596	2,783	1,262

NON-CULTIVATORS																			
1.	Andhra Pradesh	..	..	0.4	0.8	2.4	3.6	2.7	3.1	—	1.0	425	1,020	961	1,364	1,038	2,600	—	1,045
2.	Assam	..	..	0.8	—	0.4	2.7	—	—	—	0.6	533	—	1,000	1,300	—	—	—	867
3.	Bihar	..	..	0.2	—	0.3	—	0.7	—	—	0.4	50	—	500	—	788	—	—	536
4.	Gujarat	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5.	Jammu & Kashmir	..	..	—	4.5	4.1	3.6	—	—	—	2.8	—	3,454	1,230	678	—	—	—	1,849
6.	Kerala	..	..	—	—	—	6.2	25.0	—	—	0.4	—	—	—	7,620	500	—	—	4,060
7.	Madhya Pradesh	..	..	0.1	1.3	—	—	—	—	—	0.3	310	292	—	—	—	—	—	296
8.	Madras	..	..	—	—	1.3	—	1.3	—	—	0.2	—	—	1,313	—	1,000	—	—	1,235
9.	Maharashtra	..	..	0.2	0.9	2.3	—	—	—	—	0.6	550	508	1,605	—	—	—	—	1,065
10.	Mysore	..	..	0.3	0.6	—	1.0	2.8	—	—	0.5	1,000	1,568	—	675	500	—	—	848
11.	Orissa	..	..	—	—	0.8	—	2.3	—	—	0.2	—	—	150	—	250	—	—	183
12.	Punjab	..	..	—	—	—	—	0.7	—	1.6	0.1	—	—	—	—	1,325	—	4,500	3,162
13.	Rajasthan	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14.	Uttar Pradesh	..	..	—	—	0.3	—	—	—	—	0.1	—	—	170	—	—	—	—	170
15.	West Bengal	..	..	0.1	—	0.9	2.4	1.4	—	3.0	0.4	400	—	700	417	1,000	—	250	538
All-India				0.2	0.3	0.7	0.8	1.6	0.3	0.8	0.4	438	813	1,002	1,541	829	2,600	2,089	979

ALL RURAL HOUSEHOLDS																			
1.	Andhra Pradesh	..	..	0.5	0.8	3.0	4.5	3.1	5.5	8.2	2.8	306	821	678	851	885	2,763	3,691	1,595
2.	Assam	..	..	0.6	0.2	0.9	1.5	2.1	4.4	9.3	1.2	533	100	702	527	720	624	2,150	744
3.	Bihar	..	..	0.2	0.3	1.3	1.3	3.2	2.0	2.3	1.3	45	257	570	652	958	654	1,553	794
4.	Gujarat	..	..	—	0.2	0.2	0.6	0.9	1.8	1.6	0.7	—	277	288	696	1,766	1,998	3,105	1,801
5.	Jammu & Kashmir	..	..	—	3.3	1.8	0.8	0.4	0.5	2.1	1.0	—	2,138	1,296	699	808	2,386	2,333	1,376
6.	Kerala	..	..	0.4	1.2	1.4	2.8	4.2	4.1	2.2	1.9	207	569	408	1,888	953	1,845	1,578	1,194
7.	Madhya Pradesh	..	..	0.4	1.2	0.7	2.0	2.0	3.0	2.9	1.4	144	498	537	620	895	881	1,882	730
8.	Madras	..	..	0.5	0.5	1.5	2.1	3.3	5.0	5.5	1.9	439	700	509	1,369	1,576	1,765	5,460	1,920
9.	Maharashtra	..	..	0.2	0.8	1.6	1.2	1.7	2.6	2.8	1.3	550	362	854	1,243	1,475	2,254	3,700	1,563
10.	Mysore	..	..	0.8	1.4	1.5	1.7	3.0	2.7	6.2	2.1	670	703	304	969	1,538	1,780	2,331	1,334
11.	Orissa	..	..	—	0.3	1.2	1.4	3.8	1.3	6.2	1.4	—	1,650	290	345	466	2,505	896	554
12.	Punjab	..	..	—	—	0.4	0.7	1.6	2.1	2.3	1.1	—	—	1,283	535	1,336	2,182	3,294	2,115
13.	Rajasthan	..	..	—	0.3	0.5	1.5	1.2	1.7	2.3	1.0	—	150	662	427	1,035	2,729	2,300	1,111
14.	Uttar Pradesh	..	..	—	0.3	0.6	0.8	1.8	3.3	4.7	1.1	—	110	408	547	947	818	1,001	763
15.	West Bengal	..	..	0.3	0.8	2.0	2.0	3.4	5.2	5.0	1.9	254	290	531	603	667	766	1,135	645
All-India				0.3	0.6	1.2	1.6	2.4	3.2	4.1	1.5	331	550	579	805	1,039	1,602	2,775	1,187

STATEMENT No. 9—CAPITAL EXPENDITURE IN FARM BUSINESS : PURCHASE OF LIVESTOCK

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State/Asset group	Proportion of households reporting (Per cent)							Expenditure per reporting household (Rs.)								
	Less than Rs. 500	Rs. 500-1,000	Rs. 1,000-2,500	Rs. 2,500-5,000	Rs. 5,000-10,000	Rs. 10,000-20,000	Rs. 20,000 and above	All-assets groups	Less than Rs. 500	Rs. 500-1,000	Rs. 1,000-2,500	Rs. 2,500-5,000	Rs. 5,000-10,000	Rs. 10,000-20,000	Rs. 20,000 and above	All-assets group
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CULTIVATORS																
1. Andhra Pradesh	14.3	19.6	22.8	23.2	28.0	31.8	28.2	24.0	114	134	175	211	285	333	423	243
2. Assam	11.8	11.7	14.6	15.6	12.6	18.9	14.7	14.2	76	94	114	151	169	339	292	145
3. Bihar	5.6	8.8	12.2	16.7	22.9	26.0	37.0	16.8	49	88	124	138	193	203	370	189
4. Gujarat	4.3	10.3	7.9	11.5	15.4	23.1	24.1	14.8	111	208	155	250	329	411	528	347
5. Jammu & Kashmir	4.6	6.0	9.7	14.1	20.1	22.5	22.5	15.8	230	308	211	250	253	309	411	266
6. Kerala	15.0	18.9	22.7	25.8	26.6	31.3	35.8	23.6	30	40	55	67	111	156	258	94
7. Madhya Pradesh	5.9	9.3	11.6	20.1	24.4	35.6	42.4	18.5	117	120	146	213	270	383	642	264
8. Madras	13.0	19.8	22.8	22.6	25.0	25.8	34.0	22.9	106	171	162	187	255	323	397	230
9. Maharashtra	6.2	9.2	10.1	12.6	14.4	13.3	15.1	12.1	96	102	157	187	256	294	603	243
10. Mysore	16.2	21.2	20.8	21.1	23.1	27.5	40.6	23.6	72	110	149	236	291	402	454	273
11. Orissa	10.4	7.1	10.1	14.2	13.5	21.9	32.0	12.8	39	80	81	97	137	212	284	130
12. Punjab	10.5	18.1	24.6	36.8	39.0	38.7	41.6	36.6	172	227	327	319	391	436	570	429
13. Rajasthan	10.8	22.4	24.6	30.7	32.1	38.8	42.2	29.0	289	264	274	376	429	526	594	396
14. Uttar Pradesh	10.2	18.3	25.2	30.9	36.2	41.2	50.3	30.7	70	111	151	206	294	419	590	269
15. West Bengal	11.5	9.0	15.0	13.8	15.8	15.6	24.0	14.1	76	87	97	125	155	211	291	135
All-India	10.6	14.2	17.8	21.8	25.4	29.5	35.2	21.7	79	123	152	209	279	363	487	254

RESERVE BANK OF INDIA BULLETIN

June 1965

NON-CULTIVATORS

1. Andhra Pradesh	4.4	7.5	8.4	10.1	12.7	9.4	3.4	6.3	61	88	295	173	141	437	350	139
2. Assam	3.6	5.0	3.0	5.3	7.5	—	11.1	4.1	38	41	129	93	427	—	2	89
3. Bihar	2.4	5.6	5.9	6.7	6.7	5.0	7.1	4.0	40	74	102	136	77	125	270	78
4. Gujarat	2.6	2.1	4.5	3.2	1.3	—	—	2.8	64	144	262	121	500	—	—	161
5. Jammu & Kashmir	3.4	7.5	6.1	9.1	6.1	14.3	—	6.7	204	183	295	315	256	262	—	259
6. Kerala	9.8	17.2	6.7	—	25.0	—	—	10.1	23	22	8	—	30	—	—	22
7. Madhya Pradesh	4.3	5.1	7.3	7.5	7.7	—	25.0	5.1	81	85	100	88	125	—	225	90
8. Madras	6.3	8.0	10.2	10.9	5.3	16.0	8.7	7.4	69	173	177	161	190	301	62	122
9. Maharashtra	3.8	7.5	8.2	2.6	2.4	—	—	4.9	71	92	117	28	18	—	—	85
10. Mysore	8.1	6.4	11.8	5.9	12.7	17.4	8.3	8.8	60	67	113	84	162	84	150	89
11. Orissa	6.8	3.8	7.2	5.6	7.0	—	—	6.0	11	17	46	70	111	—	—	26
12. Punjab	6.2	13.0	16.9	20.1	17.9	20.2	14.5	14.6	194	194	201	243	380	330	324	240
13. Rajasthan	4.0	9.9	14.3	15.8	9.8	11.1	—	10.0	82	242	209	292	113	60	—	201
14. Uttar Pradesh	5.3	8.9	12.0	11.7	15.7	14.3	37.5	9.1	101	238	290	235	201	385	197	225
15. West Bengal	4.9	8.8	6.9	4.8	4.3	10.4	12.1	6.1	26	30	65	155	86	193	238	57
All-India	5.0	7.5	9.6	9.1	10.1	11.3	10.2	6.9	61	134	200	191	215	276	240	140

ALL RURAL HOUSEHOLDS

1. Andhra Pradesh	6.9	14.1	19.4	21.3	26.5	30.3	26.3	17.9	88	123	187	208	277	335	422	230
2. Assam	6.1	9.4	12.3	14.7	12.2	17.7	14.0	11.7	61	84	114	150	182	339	244	140
3. Bihar	3.8	7.8	11.2	16.0	22.0	25.4	36.2	14.0	46	85	122	138	191	203	370	183
4. Gujarat	2.8	4.8	6.7	10.2	14.3	22.0	22.5	11.0	70	190	181	244	330	411	528	332
5. Jammu & Kashmir	3.7	6.6	9.2	13.9	19.6	22.2	22.4	15.0	212	256	218	252	253	308	411	266
6. Kerala	12.3	18.6	21.4	24.9	26.6	31.2	35.8	21.0	27	37	54	67	111	156	258	87
7. Madhya Pradesh	4.6	7.8	11.1	19.7	23.9	35.2	41.9	15.6	90	112	142	212	269	383	635	252
8. Madras	7.9	14.7	19.5	20.6	22.8	25.1	31.9	17.2	84	172	164	185	254	322	389	213
9. Maharashtra	4.2	8.4	9.7	11.8	13.9	12.7	14.9	9.8	77	98	150	184	254	294	603	218
10. Mysore	9.8	14.3	18.6	18.8	22.0	26.8	38.8	19.7	64	101	143	229	283	389	451	251
11. Orissa	7.4	5.4	9.6	13.5	13.1	20.7	30.9	10.8	17	57	76	96	136	212	284	105
12. Punjab	6.4	13.9	19.7	31.3	34.4	36.0	38.8	27.6	192	202	258	303	389	427	561	388
13. Rajasthan	6.3	18.5	23.1	30.0	30.8	37.6	39.8	27.3	200	260	268	374	423	520	594	386
14. Uttar Pradesh	6.6	14.3	22.8	29.4	35.2	40.7	50.1	26.3	88	145	164	207	292	418	585	266
15. West Bengal	6.6	8.9	13.4	12.5	14.6	14.9	21.8	11.4	49	66	94	126	153	209	286	122
All-India	6.5	11.4	16.2	20.5	24.2	28.6	33.8	17.8	69	126	158	208	277	362	482	243

STATEMENT No. 10—CAPITAL EXPENDITURE IN NON-FARM BUSINESS : PROPORTION OF HOUSEHOLDS REPORTING, AVERAGE AMOUNT PER HOUSEHOLD AND AVERAGE AMOUNT PER REPORTING HOUSEHOLD

State/Asset group	Less than Rs. 500			Rs. 500-Rs. 1,000			Rs. 1,000-Rs. 2,500			Rs. 2,500-Rs. 5,000		
	Proportion of households reporting	Average amount per household	Average amount per reporting household	Proportion of households reporting	Average amount per household	Average amount per reporting household	Proportion of households reporting	Average amount per household	Average amount per reporting household	Proportion of households reporting	Average amount per household	Average amount per reporting household
	(Per-cent)	(Rs.)	(Rs.)	(Per-cent)	(Rs.)	(Rs.)	(Per-cent)	(Rs.)	(Rs.)	(Per-cent)	(Rs.)	(Rs.)
	1	2	3	4	5	6	7	8	9	10	11	12
CULTIVATORS												
1. Andhra Pradesh	2.1	0.5	22	2.8	0.5	18	1.7	0.8	48	1.9	1.3	61
2. Assam	1.8	0.2	14	1.5	0.5	34	1.2	1.0	86	2.7	1.3	47
3. Bihar	2.9	0.3	10	4.2	1.0	23	6.2	1.6	26	7.7	2.5	33
4. Gujarat	—	—	—	1.6	0.8	48	1.7	0.8	49	2.0	3.5	174
5. Jammu & Kashmir	—	—	—	—	—	—	1.6	1.6	100	1.1	1.0	93
6. Kerala	9.3	2.1	22	13.9	2.0	14	17.4	6.7	38	20.5	9.4	46
7. Madhya Pradesh	1.1	0.3	28	1.4	0.1	9	1.3	0.2	12	0.6	0.1	15
8. Madras	1.1	0.5	46	2.9	1.2	42	4.4	4.6	105	6.3	3.0	47
9. Maharashtra	—	—	—	2.8	2.0	70	2.7	2.5	92	4.2	2.4	56
10. Mysore	1.0	0.2	20	2.5	0.8	31	1.6	0.9	58	2.2	0.4	17
11. Orissa	0.7	—	5	1.8	0.7	37	1.0	0.9	87	1.4	0.6	46
12. Punjab	5.3	0.5	10	2.4	0.5	20	5.8	2.9	50	6.7	2.2	33
13. Rajasthan	1.4	1.4	100	3.7	0.9	24	2.5	2.9	116	3.7	4.6	125
14. Uttar Pradesh	3.7	0.1	3	5.6	1.0	17	6.2	1.1	17	8.3	2.4	29
15. West Bengal	2.0	0.4	18	2.6	0.5	19	6.3	2.6	41	6.5	3.7	57
All-India	2.8	0.5	18	3.8	0.9	23	4.3	1.7	40	5.2	2.4	45
NON-CULTIVATORS												
1. Andhra Pradesh	1.6	0.3	20	5.9	3.8	65	4.0	2.0	50	8.6	5.9	69
2. Assam	1.8	0.9	52	3.2	2.3	73	3.8	8.9	235	4.0	1.8	44
3. Bihar	4.5	0.6	14	12.6	2.6	21	15.5	10.6	68	10.5	3.0	29
4. Gujarat	2.1	1.2	60	7.0	5.3	76	14.1	12.6	89	19.6	25.5	130
5. Jammu & Kashmir	1.7	0.2	10	3.0	1.0	33	6.1	7.8	128	3.6	3.3	90
6. Kerala	12.8	2.4	19	24.1	14.3	59	35.6	19.0	53	31.2	24.8	79
7. Madhya Pradesh	1.4	0.7	46	2.1	0.8	38	4.0	2.2	56	5.0	0.7	14
8. Madras	4.1	1.1	26	11.8	7.4	63	21.3	10.9	51	18.8	26.1	139
9. Maharashtra	2.4	0.5	22	6.6	5.0	75	12.3	3.1	25	13.0	2.1	16
10. Mysore	2.4	0.4	17	6.4	1.3	20	9.6	3.4	36	1.0	0.2	15
11. Orissa	0.6	0.1	11	3.0	0.5	18	7.2	8.9	125	5.6	12.5	225
12. Punjab	11.4	2.4	21	10.3	3.2	31	18.6	15.1	81	24.3	36.8	151
13. Rajasthan	3.4	0.3	9	5.4	0.4	6	6.4	1.6	25	19.3	8.6	45
14. Uttar Pradesh	5.9	1.0	16	12.8	2.5	20	17.9	12.2	68	22.4	12.4	55
15. West Bengal	2.9	0.6	22	9.5	3.9	41	13.7	8.6	62	7.2	2.6	36
All-India	3.6	0.8	22	8.6	3.4	40	13.2	8.8	67	14.0	12.5	89
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh	1.7	0.4	21	4.2	2.0	48	2.2	1.1	49	2.9	2.0	69
2. Assam	1.8	0.7	40	2.7	1.1	55	1.7	2.6	150	2.8	1.3	46
3. Bihar	3.8	0.5	13	6.7	1.5	22	7.6	3.0	39	7.9	2.6	33
4. Gujarat	1.9	1.1	60	5.2	3.8	73	6.2	5.1	82	4.7	6.8	146
5. Jammu & Kashmir	1.2	0.1	10	1.1	0.4	33	2.2	2.4	110	1.2	1.1	92
6. Kerala	11.1	2.3	20	15.6	4.1	26	18.9	7.7	41	20.9	10.0	48
7. Madhya Pradesh	1.4	0.6	43	1.6	0.4	22	1.6	0.4	24	0.8	0.1	15
8. Madras	3.4	0.9	28	6.8	3.9	58	8.8	6.3	71	8.4	6.8	82
9. Maharashtra	2.1	0.4	22	4.7	3.4	73	4.6	2.6	57	4.9	2.3	48
10. Mysore	2.1	0.4	17	4.3	1.0	23	3.5	1.5	43	2.0	0.3	17
11. Orissa	0.6	0.1	10	2.4	0.6	25	2.2	2.4	109	1.7	1.6	93
12. Punjab	11.0	2.3	21	8.9	2.7	30	14.0	10.7	77	12.5	13.6	108
13. Rajasthan	2.7	0.6	24	4.2	0.7	17	3.0	2.7	88	4.5	4.8	107
14. Uttar Pradesh	5.3	0.8	14	8.7	1.6	19	8.4	3.1	37	9.4	3.2	34
15. West Bengal	2.7	0.6	21	5.2	1.8	34	7.8	3.8	49	6.6	3.5	54
All-India	3.4	0.7	21	5.8	1.9	33	6.1	3.2	52	6.1	3.4	55

STATEMENT No. 10—CAPITAL EXPENDITURE IN NON-FARM BUSINESS: PROPORTION OF HOUSEHOLDS REPORTING, AVERAGE AMOUNT PER HOUSEHOLD AND AVERAGE AMOUNT PER REPORTING HOUSEHOLD—Concl'd.

State/Asset group	Rs. 5,000-Rs. 10,000			Rs. 10,000-Rs. 20,000			Rs. 20,000 and above			All-assets group		
	Proportion of households reporting	Average amount per household	Average amount per reporting household	Proportion of households reporting	Average amount per household	Average amount per reporting household	Proportion of households reporting	Average amount per household	Average amount per reporting household	Proportion of households reporting	Average amount per household	Average amount per reporting household
	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)
	13	14	15	16	17	18	19	20	21	22	23	24
CULTIVATORS												
1. Andhra Pradesh	1.5	2.2	142	1.6	1.8	116	2.0	6.6	279	1.9	1.6	83
2. Assam	3.7	2.5	67	3.4	11.7	347	2.9	5.9	200	2.2	1.8	82
3. Bihar	9.9	5.5	55	8.5	7.9	93	14.8	11.3	76	7.3	3.5	48
4. Gujarat	2.2	1.0	48	2.3	5.7	235	2.3	35.8	1587	2.0	6.0	297
5. Jammu & Kashmir	1.0	1.7	175	1.5	3.0	206	3.5	22.5	640	1.3	2.4	191
6. Kerala	17.9	25.4	142	16.1	41.9	260	19.0	39.2	207	16.2	13.9	86
7. Madhya Pradesh	1.8	1.0	55	2.4	3.0	124	4.6	21.8	480	1.4	1.2	86
8. Madras	5.0	4.6	92	7.8	9.8	125	7.6	73.3	964	5.0	9.4	188
9. Maharashtra ..	3.4	10.4	310	3.3	3.4	104	6.7	140.2	2103	3.4	14.0	411
10. Mysore	2.5	1.4	54	2.3	1.0	43	6.6	41.8	633	2.5	4.0	161
11. Orissa	2.8	3.0	110	3.6	0.9	25	7.7	23.8	309	1.8	1.6	91
12. Punjab	7.6	4.5	60	8.2	8.2	99	10.1	6.9	68	7.8	5.1	66
13. Rajasthan	4.7	4.7	100	5.3	4.5	85	11.6	61.6	532	4.0	5.9	145
14. Uttar Pradesh ..	9.4	7.9	84	13.2	33.0	250	20.2	81.9	407	8.7	10.1	117
15. West Bengal ..	8.9	5.2	58	11.8	14.3	121	19.2	20.4	106	6.9	4.5	66
All-India	6.0	5.5	93	7.0	12.0	171	10.6	44.2	418	5.4	6.2	116
NON-CULTIVATORS												
1. Andhra Pradesh	5.5	19.8	361	6.2	13.8	220	3.4	2.5	72	3.4	2.5	73
2. Assam	2.5	0.1	5	10.0	43.3	433	11.1	33.3	300	3.0	4.0	133
3. Bihar	11.7	104.0	891	20.0	176.2	881	21.4	25.1	117	8.5	8.0	94
4. Gujarat	14.3	54.3	380	25.0	50.3	201	33.3	194.8	584	8.8	12.8	146
5. Jammu & Kashmir	3.0	1.8	60	14.3	38.6	270	—	—	—	4.3	5.0	116
6. Kerala	25.0	161.0	644	100.0	2849.0	2849	—	—	—	16.5	11.8	71
7. Madhya Pradesh	7.7	21.2	275	25.0	250.0	1000	25.0	2.2	9	2.3	2.2	95
8. Madras	12.0	8.6	72	4.0	1.6	40	13.0	219.9	1686	8.7	7.8	90
9. Maharashtra ..	12.2	8.7	71	25.0	20.6	82	25.0	250.0	1000	5.4	2.7	51
10. Mysore	2.8	22.8	808	13.0	42.6	327	16.7	867.5	5205	4.8	14.9	311
11. Orissa	2.3	0.6	25	—	—	—	—	—	—	2.6	2.5	95
12. Punjab	31.8	20.2	63	30.3	21.3	70	32.3	45.4	141	18.4	14.4	78
13. Rajasthan	5.9	3.4	57	33.3	20.7	62	42.9	111.4	260	8.1	4.0	49
14. Uttar Pradesh ..	9.3	23.8	257	19.0	63.8	335	50.0	35.8	72	12.5	6.7	54
15. West Bengal ..	10.0	8.0	80	8.3	30.6	367	13.2	191.4	1052	6.4	6.9	108
All-India	11.6	23.9	205	18.0	46.8	260	21.4	146.0	681	7.7	6.8	88
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh	1.9	4.1	209	1.9	2.6	139	2.1	5.4	253	2.4	1.9	78
2. Assam	3.6	2.3	64	3.8	13.7	362	4.6	11.6	250	2.4	2.3	98
3. Bihar	10.0	10.9	109	8.8	12.7	145	15.0	11.6	78	7.6	4.5	59
4. Gujarat	3.1	5.3	170	3.4	7.6	223	4.2	45.9	1086	4.2	8.2	195
5. Jammu & Kashmir	1.1	1.7	164	1.9	4.2	222	3.5	22.4	640	1.5	2.6	173
6. Kerala	18.0	26.9	149	16.5	54.7	331	19.0	39.2	207	16.2	13.5	83
7. Madhya Pradesh	2.0	1.6	83	2.7	6.0	222	5.2	21.2	413	1.6	1.4	89
8. Madras	5.8	5.1	87	7.6	9.3	123	8.1	85.6	1062	6.4	8.8	138
9. Maharashtra ..	3.8	10.3	272	4.2	4.2	99	6.9	141.7	2048	4.0	10.4	258
10. Mysore	2.6	3.7	143	3.0	3.6	121	7.2	89.2	1243	3.1	6.9	223
11. Orissa	2.7	2.9	105	3.4	0.8	25	7.4	22.9	309	2.1	1.9	93
12. Punjab	12.9	8.0	62	11.5	10.1	88	12.3	10.8	88	12.1	9.0	74
13. Rajasthan	4.7	4.6	97	6.6	5.2	80	13.3	64.3	484	4.6	5.6	123
14. Uttar Pradesh ..	9.4	8.7	93	13.3	33.5	253	20.6	81.2	394	9.4	9.4	100
15. West Bengal ..	9.0	5.4	60	11.4	16.4	144	19.0	61.9	273	6.7	5.3	79
All-India	6.4	6.9	108	7.6	13.8	182	11.2	50.0	447	6.0	6.4	106

STATEMENT No. 11—PERCENTAGE SHARE OF EACH ASSET GROUP IN THE TOTAL CAPITAL EXPENDITURE IN NON-FARM BUSINESS

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State/Asset group	Less than Rs. 500		Rs. 500- Rs. 1,000		Rs. 1,000- Rs. 2,500		Rs. 2,500- Rs. 5,000		Rs. 5,000- Rs. 10,000		Rs. 10,000- Rs. 20,000		Rs. 20,000 and above		All-assets group			
	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total	Proportion of households reporting	Share of the group in the total		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
CULTIVATORS																		
1. Andhra Pradesh	2.1	2.8	2.8	3.7	1.7	12.2	1.9	16.6	1.5	20.5	1.6	13.0	2.0	31.2	1.9	100.0
2. Assam	1.8	0.8	1.5	3.9	1.2	19.4	2.7	19.3	3.7	20.2	3.4	32.6	2.9	3.8	2.2	100.0
3. Bihar	2.9	1.0	4.2	3.1	6.2	10.9	7.7	14.3	9.9	23.8	8.5	22.4	14.8	24.5	7.3	100.0
4. Gujarat	—	—	1.6	0.6	1.7	2.6	2.0	13.9	2.2	4.0	2.3	15.6	2.3	63.3	2.0	100.0
5. Jammu & Kashmir	—	—	—	—	1.6	13.4	1.1	13.6	1.0	19.2	1.5	15.0	3.5	38.9	1.3	100.0
6. Kerala	9.3	2.6	13.9	1.7	17.4	10.7	20.5	12.0	17.9	28.1	16.1	28.2	19.0	16.7	16.2	100.0
7. Madhya Pradesh	1.1	1.1	1.4	1.1	1.3	3.8	0.6	2.0	1.8	15.3	2.4	19.7	4.6	57.0	1.4	100.0
8. Madras	1.1	0.6	2.9	1.4	4.4	10.4	6.3	6.2	5.0	9.1	7.8	11.6	7.6	60.6	5.0	100.0
9. Maharashtra	—	—	2.8	1.3	2.7	4.0	4.2	3.8	3.4	15.2	3.3	3.2	6.7	72.6	3.4	100.0
10. Mysore	1.0	0.2	2.5	1.5	1.6	5.1	2.2	2.1	2.5	7.9	2.3	3.4	6.6	79.9	2.5	100.0
11. Orissa	0.7	0.1	1.8	3.8	1.0	17.9	1.4	10.9	2.8	32.1	3.6	3.4	7.7	31.9	1.8	100.0
12. Punjab	5.3	0.1	2.4	0.3	5.8	6.2	0.7	7.0	7.6	20.2	8.2	35.1	10.1	31.0	7.8	100.0
13. Rajasthan	1.4	0.5	3.7	1.1	2.5	11.5	3.7	23.3	4.7	18.2	5.3	8.7	11.6	36.7	4.0	100.0
14. Uttar Pradesh	3.7	..	5.6	0.8	6.2	2.9	8.3	6.1	9.4	15.1	13.2	33.8	20.2	41.2	8.7	100.0
15. West Bengal	2.0	0.7	2.6	1.5	6.3	14.9	6.5	18.0	8.9	18.7	11.8	28.0	19.2	18.1	6.9	100.0
All-India			2.8	0.5	3.8	1.3	4.3	6.9	5.2	8.9	6.0	16.4	7.0	20.7	10.6	45.3	5.4	100.0

RESERVE BANK OF INDIA BULLETIN

June 1965

NON-CULTIVATORS

1.	Andhra Pradesh	..	..	1.6	6.9	5.9	28.5	4.0	11.5	8.6	15.8	5.5	27.6	6.2	8.4	3.4	1.4	3.4	100.0
2.	Assam	..	..	1.8	9.4	3.2	13.3	3.8	54.8	4.0	3.4	2.5	0.1	10.0	11.2	11.1	7.8	3.0	100.0
3.	Bihar	..	..	4.5	4.5	12.6	5.7	15.5	21.1	10.5	2.1	11.7	41.1	20.0	23.2	21.4	2.3	8.5	100.0
4.	Gujarat	..	..	2.1	3.9	7.0	8.8	14.1	22.0	19.6	17.5	14.3	18.1	25.0	7.0	33.3	22.8	8.8	100.0
5.	Jammu & Kashmir	..	..	1.7	0.6	3.0	4.1	6.1	47.2	3.6	11.1	3.0	3.7	14.3	33.3	—	—	4.3	100.0
6.	Kerala	..	..	12.8	16.0	24.1	12.5	35.6	12.9	31.2	6.0	25.0	9.7	100.0	42.9	—	—	16.5	100.0
7.	Madhya Pradesh	..	..	1.4	18.1	2.1	7.3	4.0	12.9	5.0	1.1	7.7	21.4	25.0	38.8	25.0	0.3	2.3	100.0
8.	Madras	..	..	4.1	8.3	11.8	13.1	21.3	17.3	18.8	22.5	12.0	4.3	4.0	0.3	13.0	34.1	8.7	100.0
9.	Maharashtra	..	..	2.4	11.8	6.6	34.4	12.3	13.7	13.0	3.2	12.2	7.1	25.0	9.9	25.0	19.9	5.4	100.0
10.	Mysore	..	..	2.4	1.1	6.4	1.6	9.6	4.3	1.0	0.1	2.8	11.5	13.0	7.0	16.7	74.4	4.8	100.0
11.	Orissa	..	..	0.6	1.2	3.0	4.9	7.2	62.1	5.6	31.1	2.3	0.7	—	—	—	—	2.6	100.0
12.	Punjab	..	..	11.4	3.1	10.3	5.0	18.6	29.8	24.3	29.4	31.8	12.9	30.3	8.0	32.3	11.9	18.4	100.0
13.	Rajasthan	..	..	3.4	2.1	5.4	1.8	6.4	10.7	19.3	23.1	5.9	8.0	33.3	17.6	42.9	36.7	8.1	100.0
14.	Uttar Pradesh	..	..	5.9	5.1	12.8	9.4	17.9	45.2	22.4	16.0	9.3	14.9	19.0	7.8	50.0	1.7	12.5	100.0
15.	West Bengal	..	..	2.9	5.0	9.5	9.3	13.7	16.0	7.2	2.6	10.0	4.5	8.3	11.8	18.2	50.8	6.4	100.0
All-India				3.6	5.7	8.6	9.7	13.2	22.6	14.0	13.1	11.6	14.6	18.0	11.3	21.4	23.0	7.7	100.0

ALL RURAL HOUSEHOLDS

1.	Andhra Pradesh	..	..	1.7	4.7	4.2	15.0	2.2	11.9	2.9	16.2	1.9	23.7	1.9	10.9	2.1	17.6	2.4	100.0
2.	Assam	..	..	1.8	4.4	2.1	7.8	1.7	34.3	2.8	12.6	3.6	11.8	3.8	23.6	4.6	5.5	2.4	100.0
3.	Bihar	..	..	3.8	2.3	6.7	4.1	7.6	14.9	7.9	9.6	10.0	30.6	8.8	22.7	15.0	15.8	7.6	100.0
4.	Gujarat	..	..	1.9	2.0	5.2	4.8	6.2	12.4	4.7	15.7	3.1	11.1	3.4	11.2	4.2	42.8	4.2	100.0
5.	Jammu & Kashmir	..	..	1.2	0.1	1.1	0.7	2.2	18.9	1.2	13.2	1.1	16.6	1.9	18.0	3.5	32.5	1.5	100.0
6.	Kerala	..	..	11.1	4.9	15.6	3.6	18.9	11.1	20.9	11.0	18.0	25.0	16.5	30.7	19.0	13.8	16.2	100.0
7.	Madhya Pradesh	..	..	1.4	6.8	1.6	3.2	1.6	6.9	0.8	1.7	2.0	17.3	2.7	26.2	5.2	37.9	1.6	100.0
8.	Madras	..	..	3.4	3.2	6.8	5.3	8.8	12.7	8.4	11.6	5.8	7.6	7.6	7.9	8.1	51.8	6.4	100.0
9.	Maharashtra	..	..	2.1	1.0	4.7	4.0	4.6	4.8	4.9	3.7	3.8	14.5	4.2	3.8	6.9	68.2	4.0	100.0
10.	Mysore	..	..	2.1	0.7	4.3	1.5	3.5	4.6	2.0	1.0	2.6	10.0	3.0	5.5	7.2	76.7	3.1	100.0
11.	Orissa	..	..	0.6	0.5	2.4	4.2	2.2	34.8	1.7	18.7	2.7	20.0	3.4	2.1	7.4	19.7	2.1	100.0
12.	Punjab	..	..	11.0	2.1	8.9	3.4	14.0	21.8	12.5	21.8	12.9	15.4	11.5	17.2	12.3	18.4	12.1	100.0
13.	Rajasthan	..	..	2.7	0.6	4.2	1.1	3.0	11.4	4.5	23.3	4.7	17.2	6.6	9.0	13.3	36.7	4.6	100.0
14.	Uttar Pradesh	..	..	5.3	0.8	8.7	2.0	8.4	8.9	9.4	7.5	9.4	15.1	13.3	30.1	20.6	35.6	9.4	100.0
15.	West Bengal	..	..	2.7	2.6	5.2	4.8	7.8	15.4	6.6	11.4	9.0	12.6	11.4	21.0	19.0	32.2	6.7	100.0
All-India				3.4	2.0	5.8	3.7	6.1	11.4	6.1	10.0	6.4	15.9	7.6	18.0	11.2	39.0	6.0	100.0

STATEMENT No. 12—EXPENDITURE ON INDIVIDUAL ITEMS OF NON-FARM BUSINESS: PROPORTION OF HOUSEHOLDS REPORTING, AVERAGE AMOUNT PER REPORTING HOUSEHOLD AND AVERAGE AMOUNT PER HOUSEHOLD

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State/Item	Land and Buildings			Production equipment and accessories			Transport equipment			Furniture and fixtures			Other capital expenditure			Total capital expenditure			
	Proportion of households reporting	Average expenditure per reporting household	Average expenditure per household	Proportion of households reporting	Average expenditure per reporting household	Average expenditure per household	Proportion of households reporting	Average expenditure per reporting household	Average expenditure per household	Proportion of households reporting	Average expenditure per reporting household	Average expenditure per household	Proportion of households reporting	Average expenditure per reporting household	Average expenditure per household	Proportion of households reporting	Average expenditure per reporting household	Average expenditure per household	
	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	(Per cent)	(Rs.)	(Rs.)	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
CULTIVATORS																			
1. Andhra Pradesh	..	52	..	1.2	48	0.8	0.6	135	0.8	—	—	—	0.1	229	0.2	1.9	83	1.6	
2. Assam	..	0.3	53	0.2	1.2	89	1.0	0.6	85	0.5	0.3	21	0.1	0.1	15	..	2.2	82	1.8
3. Bihar	..	0.3	215	0.6	3.1	33	1.0	3.9	46	1.8	0.2	10	..	0.4	16	0.1	7.3	48	3.5
4. Gujarat	..	0.2	621	1.2	0.8	191	1.6	0.9	341	3.1	0.1	60	0.1	0.1	58	..	2.0	297	6.0
5. Jammu & Kashmir	0.2	372	0.8	0.7	78	0.6	0.2	148	0.3	..	600	0.2	0.2	430	0.6	1.3	191	2.4	
6. Kerala	..	4.1	148	6.1	10.4	27	2.8	3.4	130	4.4	1.4	35	0.5	0.6	25	0.2	16.2	86	13.9
7. Madhya Pradesh	0.1	165	0.1	0.5	46	0.2	0.8	103	0.9	—	—	—	..	17	..	1.4	86	1.2	
8. Madras	..	0.4	571	2.1	2.8	143	4.0	2.0	113	2.3	0.3	144	0.5	0.2	256	0.4	5.0	188	9.4
9. Maharashtra	..	0.2	205	0.5	1.4	286	3.9	1.9	504	9.4	0.1	41	0.1	0.2	64	0.2	3.4	411	14.0
10. Mysore	..	0.1	412	0.3	1.4	128	1.8	0.8	58	0.5	0.2	13	..	0.2	599	1.4	2.5	161	4.0
11. Orissa	..	0.2	242	0.4	0.5	72	0.4	1.1	78	0.9	0.1	20	..	0.1	6	..	1.8	91	1.6
12. Punjab	..	0.2	121	0.3	2.2	85	1.9	4.8	55	2.6	1.2	13	0.2	0.2	80	0.2	7.8	66	5.1
13. Rajasthan	..	0.1	1,557	1.4	1.4	75	1.0	2.5	114	2.9	0.1	34	..	0.3	203	0.6	4.0	145	5.9
14. Uttar Pradesh	..	0.3	1,833	5.3	3.0	59	1.8	5.3	55	2.9	0.7	7	0.1	0.4	36	0.2	8.7	117	10.1
15. West Bengal	..	0.7	141	1.0	2.8	43	1.2	2.7	77	2.1	0.2	36	0.1	1.0	11	0.1	6.9	66	4.5
All-India	0.4	435	1.8	2.3	70	1.6	2.6	97	2.6	0.3	26	0.1	0.3	76	0.2	5.4	116	6.2	

RESERVE BANK OF INDIA BULLETIN

June 1966

NON-CULTIVATORS

1. Andhra Pradesh	0.4	115	0.4	2.6	64	1.6	0.2	69	0.2	0.1	50	..	0.5	46	0.2	3.4	73	2.5
2. Assam	0.5	406	2.1	1.7	51	0.9	0.4	198	0.8	0.4	36	0.2	0.3	12	..	3.0	133	4.0
3. Bihar	0.7	93	0.6	6.6	45	3.0	1.2	350	4.3	0.2	5	..	0.8	15	0.1	8.5	94	8.0
4. Gujarat	0.3	243	0.8	6.4	105	6.7	1.7	251	4.3	0.4	100	0.4	1.1	57	0.6	8.8	146	12.8
5. Jammu & Kashmir	0.3	436	1.3	3.4	59	2.0	0.6	270	1.6	—	—	—	—	—	—	4.3	116	5.0
6. Kerala	1.6	123	2.0	13.1	46	6.1	1.8	135	2.4	1.4	88	1.2	1.4	9	0.1	16.5	71	11.8
7. Madhya Pradesh	—	—	—	1.2	23	0.3	0.6	221	1.3	0.3	183	0.5	0.4	31	0.1	2.3	95	2.2
8. Madras	0.6	131	0.8	5.4	72	3.9	2.5	101	2.6	0.7	56	0.4	0.3	66	0.2	8.7	90	7.8
9. Maharashtra	0.3	55	0.2	3.6	58	2.1	0.8	35	0.3	0.1	38	..	0.8	21	0.2	5.4	51	2.7
10. Mysore	0.1	50	0.1	3.6	32	1.2	0.6	2,090	13.3	0.4	38	0.2	0.3	55	0.2	4.8	311	14.9
11. Orissa	0.1	300	0.4	1.6	113	1.8	0.8	37	0.3	0.1	3	..	0.1	10	..	2.6	95	2.5
12. Punjab	0.5	86	0.4	4.2	104	4.4	10.8	75	8.1	5.7	21	1.2	0.9	32	0.3	18.4	78	14.4
13. Rajasthan	0.6	259	1.5	5.4	21	1.1	2.3	60	1.4	—	—	—	0.4	13	0.1	8.1	49	4.0
14. Uttar Pradesh	0.5	390	1.8	7.5	32	2.4	4.8	33	1.6	0.6	22	0.1	0.9	91	0.8	12.5	54	6.7
15. West Bengal	0.6	78	0.4	3.5	86	3.0	1.7	184	3.2	0.2	5	..	1.3	23	0.3	6.4	108	6.9
All-India	0.4	164	0.7	4.6	58	2.7	2.3	125	2.8	0.7	36	0.2	0.7	41	0.3	7.7	88	6.8

ALL RURAL HOUSEHOLDS

1. Andhra Pradesh	0.2	108	0.2	1.7	57	1.0	0.4	123	0.6	..	50	..	0.2	98	0.2	2.4	78	1.9
2. Assam	0.3	188	0.6	1.3	76	1.0	0.6	106	0.6	0.3	25	0.1	0.2	14	..	2.4	98	2.3
3. Bihar	0.4	165	0.6	3.9	38	1.5	3.3	71	2.3	0.2	9	..	0.5	16	0.1	7.6	59	4.5
4. Gujarat	0.2	447	1.0	2.6	123	3.2	1.2	298	3.5	0.2	86	0.2	0.4	57	0.2	4.2	195	8.2
5. Jammu & Kashmir	0.2	380	0.8	1.0	72	0.7	0.2	178	0.4	..	600	0.2	0.1	439	0.6	1.5	173	2.6
6. Kerala	3.6	146	5.3	10.9	31	3.4	3.1	131	4.0	1.4	45	0.6	0.7	19	0.2	16.2	83	13.5
7. Madhya Pradesh	..	165	0.1	0.7	37	0.2	0.8	122	1.0	0.1	183	0.1	0.1	29	..	1.6	89	1.4
8. Madras	0.4	361	1.6	3.8	105	4.0	2.2	108	2.4	0.5	95	0.5	0.2	161	0.3	6.4	138	8.8
9. Maharashtra	0.3	149	0.4	2.1	162	3.3	1.5	424	6.5	0.1	40	0.1	0.4	37	0.2	4.0	258	10.4
10. Mysore	0.1	292	0.2	2.0	82	1.6	0.8	491	3.9	0.3	24	0.1	0.3	418	1.1	3.1	223	6.9
11. Orissa	0.2	256	0.4	0.8	95	0.8	1.0	69	0.7	0.1	18	..	0.1	7	..	2.1	93	1.9
12. Punjab	0.4	101	0.4	3.0	96	2.9	7.2	68	4.9	3.0	20	0.6	0.5	44	0.2	12.1	74	9.0
13. Rajasthan	0.2	908	1.4	1.9	54	1.0	2.5	108	2.7	0.1	34	..	0.3	172	0.5	4.6	123	5.6
14. Uttar Pradesh	0.4	1,302	4.6	3.9	49	1.9	5.2	51	2.6	0.7	10	0.1	0.5	55	0.3	9.4	100	9.4
15. West Bengal	0.6	123	0.8	3.0	59	1.8	2.4	103	2.5	0.2	26	0.1	1.1	16	0.2	6.7	79	5.3
All-India	0.4	357	1.5	2.9	65	1.9	2.5	103	2.6	0.4	30	0.1	0.4	60	0.2	6.0	106	6.4

STATEMENT No. 13—PERCENTAGE EXPENDITURE ON INDIVIDUAL ITEMS OF NON-FARM BUSINESS
(Per cent)

State/Item	Land and Buildings		Production equipment and accessories		Transport equipment		Furniture and Fixtures		Other Capital Expenditure in Non-farm business		Total Capital Expenditure in Non-farm business		Aggregate Expenditure (in crores of Rs.)
	Pro-portion of house-holds reporting	Per-centage to the ex-pendi-ture	Pro-portion of house-holds reporting	Per-centage to the ex-pendi-ture	Pro-portion of house-holds reporting	Per-centage to the ex-pendi-ture	Pro-portion of house-holds reporting	Per-centage to the ex-pendi-ture	Pro-portion of house-holds reporting	Per-centage to the ex-pendi-ture	Pro-portion of house-holds reporting	Per-centage to the ex-pendi-ture	
	1	2	3	4	5	6	7	8	9	10	11	12		13
CULTIVATORS													
1. Andhra Pradesh ..	0.2	0.8	1.2	36.9	0.6	47.6	—	—	0.1	11.7	1.2	100.0	0.6
2. Assam ..	0.3	7.9	1.2	58.5	0.6	28.9	0.3	3.5	0.1	1.1	2.2	100.0	0.3
3. Bihar ..	0.3	17.3	3.1	29.5	5.9	51.0	0.2	0.6	0.1	1.8	7.3	100.0	2.1
4. Gujarat ..	0.2	19.3	0.8	26.3	0.9	52.9	0.1	1.1	0.1	0.5	2.0	100.0	1.1
5. Jammu & Kashmir ..	0.2	31.6	0.7	23.6	0.2	10.8	..	7.3	0.2	26.7	1.3	100.0	0.1
6. Kerala ..	1.1	43.6	10.4	19.8	3.1	31.9	1.4	3.6	0.6	1.0	16.2	100.0	2.8
7. Madhya Pradesh ..	0.1	6.5	0.5	19.9	0.8	73.2	—	—	..	0.3	1.4	100.0	0.5
8. Madras ..	0.4	22.7	2.8	43.1	2.0	24.8	0.3	5.2	0.2	4.2	5.0	100.0	3.2
9. Maharashtra ..	0.2	3.7	1.4	28.1	1.9	66.8	0.1	0.4	0.2	1.0	3.4	100.0	5.3
10. Mysore ..	0.1	8.0	1.4	44.8	0.8	11.7	0.2	0.6	0.2	34.9	2.5	100.0	1.0
11. Orissa ..	0.2	24.9	0.5	21.1	1.1	52.0	0.2	1.8	0.1	0.2	1.8	100.0	0.4
12. Punjab ..	0.2	6.0	2.2	36.5	4.8	51.1	1.2	3.1	0.2	3.3	7.8	100.0	0.8
13. Rajasthan ..	0.1	23.0	1.4	17.3	2.5	49.4	0.1	0.3	0.3	10.0	4.0	100.0	1.6
14. Uttar Pradesh ..	0.3	52.0	3.0	17.4	5.3	28.6	0.7	0.5	0.4	1.4	8.7	100.0	9.8
15. West Bengal ..	0.7	21.5	2.8	27.2	2.7	47.2	0.2	1.7	1.0	2.4	6.9	100.0	1.5
All-India	0.4	28.2	2.3	25.8	2.6	41.0	0.3	1.4	0.3	3.6	5.4	100.0	31.4
NON-CULTIVATORS													
1. Andhra Pradesh ..	0.4	17.5	2.6	66.2	0.2	6.6	0.1	0.9	0.5	8.7	3.4	100.0	0.5
2. Assam ..	0.5	52.6	1.7	22.3	0.4	20.5	0.4	3.7	0.3	0.9	3.0	100.0	0.2
3. Bihar ..	0.7	8.0	6.6	37.4	1.2	53.0	0.2	0.1	0.8	1.5	8.5	100.0	1.3
4. Gujarat ..	0.3	6.3	6.4	52.1	1.7	33.6	0.4	3.0	1.1	4.9	8.8	100.0	1.2
5. Jammu & Kashmir ..	0.3	26.8	3.4	39.8	0.6	33.3	—	—	—	—	4.3	100.0	..
6. Kerala ..	1.6	16.6	13.1	51.5	1.8	20.3	1.4	10.5	1.4	1.1	16.5	100.0	0.6
7. Madhya Pradesh ..	—	—	1.2	12.4	0.6	60.2	0.3	21.4	0.4	6.0	2.3	100.0	0.3
8. Madras ..	0.6	9.7	5.1	49.9	2.5	32.8	0.7	5.3	0.3	2.2	8.7	100.0	1.6
9. Maharashtra ..	0.3	6.6	3.6	75.3	0.8	10.4	0.1	1.5	0.8	6.2	5.4	100.0	0.5
10. Mysore ..	0.1	0.4	3.6	7.8	0.6	89.6	0.4	1.1	0.3	1.2	4.8	100.0	1.3
11. Orissa ..	0.2	16.6	1.6	71.7	0.8	11.4	0.1	..	0.1	0.3	2.6	100.0	0.2
12. Punjab ..	0.5	2.9	4.2	30.3	10.8	56.3	3.7	8.5	0.9	2.0	18.4	100.0	1.6
13. Rajasthan ..	0.6	36.6	5.4	28.3	2.3	33.9	—	—	0.4	1.2	8.1	100.0	0.2
14. Uttar Pradesh ..	0.5	27.1	7.5	35.8	4.8	23.5	0.6	2.0	0.9	11.6	12.5	100.0	1.6
15. West Bengal ..	0.6	6.2	3.3	43.5	1.7	43.8	0.2	0.2	1.3	4.3	6.4	100.0	1.1
All-India	0.4	10.9	4.6	39.6	2.3	41.8	0.7	3.6	0.7	4.1	7.7	100.0	12.4
ALL RURAL HOUSEHOLDS													
1. Andhra Pradesh ..	0.2	8.4	1.7	50.2	0.4	28.9	..	0.4	0.2	12.0	2.4	100.0	1.2
2. Assam ..	0.3	26.7	1.3	43.3	0.6	25.4	0.3	3.6	0.2	1.0	2.4	100.0	0.5
3. Bihar ..	0.4	13.6	3.9	32.5	3.3	51.8	0.2	0.4	0.5	1.7	7.6	100.0	3.4
4. Gujarat ..	0.2	12.7	2.6	39.3	1.2	43.1	0.2	2.1	0.4	2.8	4.2	100.0	2.3
5. Jammu & Kashmir ..	0.2	30.8	1.0	26.2	0.2	14.5	..	6.1	0.1	22.3	1.5	100.0	0.1
6. Kerala ..	3.6	39.0	10.9	25.2	3.1	29.9	1.4	4.8	0.7	1.0	16.2	100.0	3.4
7. Madhya Pradesh ..	..	4.3	0.7	17.4	0.8	68.8	0.1	7.2	0.1	2.3	1.6	100.0	0.8
8. Madras ..	0.4	18.4	3.8	45.3	2.2	27.4	0.5	5.3	0.2	3.6	6.4	100.0	4.8
9. Maharashtra ..	0.3	4.0	2.1	32.0	1.5	62.1	0.1	0.5	0.4	1.5	4.0	100.0	5.8
10. Mysore ..	0.1	3.6	2.0	23.5	0.8	56.6	0.3	0.9	0.3	15.5	3.1	100.0	2.3
11. Orissa ..	0.2	21.7	0.8	40.5	1.0	36.5	0.1	1.1	0.1	0.2	2.1	100.0	0.6
12. Punjab ..	0.4	3.9	3.0	32.4	7.2	54.5	3.0	6.7	0.5	2.5	12.1	100.0	2.5
13. Rajasthan ..	0.2	21.3	1.9	18.3	2.5	47.0	0.1	0.3	0.3	9.2	4.6	100.0	1.8
14. Uttar Pradesh ..	0.4	48.5	3.9	20.0	5.2	27.9	0.7	0.8	0.5	2.8	9.4	100.0	11.4
15. West Bengal ..	0.6	11.9	3.0	34.2	2.4	46.6	0.2	1.1	1.1	3.2	6.7	100.0	2.6
All-India	0.4	23.3	2.9	29.6	2.5	41.2	0.4	2.1	0.4	3.8	6.0	100.0	43.8

STATEMENT No. 14—BORROWINGS AS SOURCE OF FINANCE FOR CAPITAL EXPENDITURE IN FARM BUSINESS

State/Item	Purchase of Land		Purchase of Land rights		Reclamation of Land		Bunding and other Land improvements		Orchards and Plantations		Wells	
	Average expenditure per household	Expenditure financed from borrowings	Average expenditure per household	Expenditure financed from borrowings	Average expenditure per household	Expenditure financed from borrowings	Average expenditure per household	Expenditure financed from borrowings	Average expenditure per household	Expenditure financed from borrowings	Average expenditure per household	Expenditure financed from borrowings
	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)
	1	2	3	4	5	6	7	8	9	10	11	12
CULTIVATORS												
1. Andhra Pradesh	63.2	44.2	1.1	53.6	3.8	26.7	15.8	27.0	0.2	55.6	12.2	42.3
2. Assam	10.5	38.4	0.4	—	6.1	11.1	2.9	2.2	0.9	37.8	1.0	—
3. Bihar	12.6	41.5	0.2	49.6	0.5	5.8	3.3	6.9	0.2	—	2.2	21.2
4. Gujarat	17.6	33.3	1.6	16.5	1.2	18.3	25.5	8.9	0.5	—	16.5	33.4
5. Jammu & Kashmir	10.5	8.7	—	—	2.9	10.9	8.1	11.2	2.0	6.3	2.2	—
6. Kerala	24.3	31.1	6.6	26.2	3.9	33.6	8.2	20.0	5.1	22.7	0.8	—
7. Madhya Pradesh	12.7	38.7	0.5	5.0	0.7	—	11.2	11.3	0.4	—	7.0	25.9
8. Madras	55.6	62.5	—	—	9.2	56.4	10.4	24.3	0.9	28.1	24.4	47.7
9. Maharashtra	26.3	37.2	1.3	46.4	4.6	5.4	23.5	31.4	1.0	20.9	20.6	23.1
10. Mysore	37.1	43.2	0.4	100.0	14.7	32.3	47.4	38.8	13.6	26.3	23.3	54.2
11. Orissa	10.4	20.8	—	—	8.8	29.2	8.7	6.3	0.1	—	0.9	—
12. Punjab	37.7	46.9	1.1	44.6	4.3	—	5.2	2.5	0.8	—	9.7	17.3
13. Rajasthan	13.4	61.9	5.4	73.8	0.8	47.2	3.3	23.5	0.1	—	11.0	61.0
14. Uttar Pradesh	10.8	29.5	1.2	12.5	2.2	21.2	5.2	10.5	0.7	10.5	5.3	28.9
15. West Bengal	17.1	29.3	—	—	1.0	12.7	4.5	4.1	0.7	—	0.2	24.2
All-India	23.4	42.9	1.2	39.6	3.6	28.0	11.1	20.5	1.4	21.3	8.9	37.4
NON-CULTIVATORS												
1. Andhra Pradesh	10.9	48.6	0.2	100.0	0.1	7.3	0.4	34.2	—	—	—	—
2. Assam	5.3	—	—	—	—	—	0.1	—	—	—	0.1	—
3. Bihar	2.0	5.3	0.2	33.3	—	—	—	—	—	—	—	—
4. Gujarat	—	—	—	—	—	—	0.2	—	—	—	—	—
5. Jammu & Kashmir	50.9	—	—	—	—	—	—	—	1.5	—	—	—
6. Kerala	14.4	—	—	—	—	—	0.1	—	—	—	—	—
7. Madhya Pradesh	1.0	73.8	—	—	—	—	0.3	65.8	—	—	—	—
8. Madras	2.6	53.4	—	—	0.6	42.1	0.2	—	—	—	0.2	71.4
9. Maharashtra	5.8	25.1	—	—	0.1	—	0.2	53.6	—	—	—	—
10. Mysore	4.5	51.9	—	—	0.2	100.0	1.8	49.9	—	—	1.5	22.8
11. Orissa	0.4	54.5	—	—	0.6	60.4	0.1	—	—	—	—	—
12. Punjab	3.8	15.8	0.4	—	0.1	—	0.1	—	—	—	1.4	44.9
13. Rajasthan	—	—	—	—	—	—	0.4	—	—	—	—	—
14. Uttar Pradesh	0.1	100.0	—	—	—	—	0.1	12.5	—	—	0.3	77.9
15. West Bengal	2.4	27.9	—	—	—	—	0.3	—	—	—	—	—
All-India	3.8	32.5	0.1	43.2	0.2	41.6	0.3	33.1	—	—	0.2	44.
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh	45.1	44.6	0.8	57.6	2.6	26.4	10.5	27.1	0.2	55.6	8.0	42.2
2. Assam	9.2	32.9	0.3	—	4.6	11.1	2.2	2.2	0.7	37.8	0.8	—
3. Bihar	10.3	39.9	0.2	46.8	0.4	5.8	2.6	6.9	0.1	—	1.7	21.2
4. Gujarat	11.9	33.3	1.1	16.5	0.8	18.3	17.4	8.9	0.3	—	11.2	33.4
5. Jammu & Kashmir	14.0	5.9	—	—	2.6	10.9	7.4	11.2	2.0	5.9	2.0	—
6. Kerala	22.4	27.2	5.3	26.2	3.1	33.6	6.6	19.9	4.1	22.7	0.7	—
7. Madhya Pradesh	10.2	39.5	0.4	5.0	0.6	—	8.8	11.6	0.3	—	5.5	25.9
8. Madras	36.0	62.3	—	—	6.0	55.8	6.6	24.1	0.6	28.1	15.4	47.8
9. Maharashtra	19.8	36.1	0.9	46.4	3.2	5.3	16.1	31.5	0.7	20.9	14.0	23.4
10. Mysore	28.4	43.6	0.3	100.0	10.8	32.7	35.2	29.1	10.0	26.3	17.5	53.4
11. Orissa	7.5	21.3	—	—	6.4	30.1	6.2	6.3	0.1	—	0.6	—
12. Punjab	23.8	44.8	0.8	35.2	2.6	—	3.1	2.5	0.5	—	6.3	19.7
13. Rajasthan	11.7	61.9	4.7	73.8	0.7	47.2	2.9	23.0	0.1	—	9.5	61.0
14. Uttar Pradesh	8.6	29.7	1.0	12.5	1.7	21.2	4.2	10.5	0.6	10.5	4.3	29.6
15. West Bengal	12.2	29.2	—	—	0.7	12.6	3.1	3.9	0.5	—	0.1	24.2
All-India	18.1	42.4	0.9	39.7	2.7	28.2	8.2	20.6	1.0	21.3	6.6	37.5

STATEMENT No. 14—BORROWINGS AS SOURCE OF FINANCE FOR CAPITAL EXPENDITURE IN FARM BUSINESS—Concl'd.

State/Item	Other Irrigation resources		Agricultural implements, Machinery, Transport equipment, etc.		Farm houses, Grain <i>golas</i> and Cattle sheds		Purchase of Livestock		Other Capital Expenditure in Farm Business		Total Capital Expenditure in Farm Business	
	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per-cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per-cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per-cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per-cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per-cent)	Average expenditure per household (Rs.)	Expenditure financed from borrowings (Per-cent)
	13	14	15	16	17	18	19	20	21	22	23	24
CULTIVATORS												
1. Andhra Pradesh	0.8	—	17.1	26.9	3.6	21.3	58.2	41.2	0.3	4.8	176.2	38.8
2. Assam .. ..	..	..	2.7	1.0	3.5	6.3	20.6	9.3	1.0	10.9	49.6	14.8
3. Bihar	0.8	28.8	5.3	7.9	1.4	1.8	31.8	20.9	0.1	14.8	58.4	22.9
4. Gujarat	3.9	18.4	61.5	39.9	7.9	37.0	51.5	35.2	0.5	33.4	188.2	32.2
5. Jammu & Kashmir	0.6	—	2.7	0.5	16.0	0.2	42.1	20.3	—	—	87.2	12.5
6. Kerala	2.0	89.4	5.2	9.9	2.7	1.9	22.1	18.5	1.5	35.2	82.4	21.7
7. Madhya Pradesh	0.1	—	6.8	5.3	2.5	6.6	48.8	44.2	0.4	87.2	90.9	33.4
8. Madras	0.4	—	28.6	43.1	2.2	9.6	52.7	37.3	1.8	15.9	186.0	46.7
9. Maharashtra ..	1.6	15.5	14.8	27.4	4.5	17.6	29.3	20.6	0.3	8.0	127.9	26.8
10. Mysore	2.3	37.2	27.7	18.2	5.3	26.6	64.6	25.9	7.3	12.3	243.6	31.2
11. Orissa	0.1	—	5.2	1.9	2.2	1.0	15.4	19.5	0.1	—	51.9	16.2
12. Punjab	2.9	—	36.8	11.3	8.9	15.5	156.9	29.1	0.1	—	264.4	26.9
13. Rajasthan	1.2	38.6	21.0	28.0	1.9	31.5	118.4	58.0	0.1	—	176.6	54.5
14. Uttar Pradesh ..	1.4	4.1	7.9	14.5	3.8	8.9	82.5	33.9	0.3	9.9	121.2	29.3
15. West Bengal ..	0.2	—	3.8	3.7	4.6	12.4	19.1	20.7	0.2	15.5	51.3	19.6
All-India	1.1	20.0	14.1	24.9	3.6	14.4	55.2	35.0	0.7	17.8	124.3	33.1
NON-CULTIVATORS												
1. Andhra Pradesh	2.0	77.1	0.2	12.8	0.1	—	8.8	38.2	—	—	22.8	46.3
2. Assam	—	—	0.1	—	0.2	—	3.6	—	0.2	—	9.5	—
3. Bihar	—	—	0.2	—	0.2	39.6	3.1	25.7	—	—	5.6	13.1
4. Gujarat	0.1	—	0.3	—	0.1	—	4.5	48.6	—	—	5.2	42.8
5. Jammu & Kashmir	0.4	—	0.5	—	0.7	—	17.4	—	—	—	71.4	—
6. Kerala	—	—	0.6	—	0.1	—	2.3	27.8	—	—	17.4	3.6
7. Madhya Pradesh	—	—	0.3	3.4	0.4	57.2	4.6	43.1	—	—	6.5	48.1
8. Madras	—	—	0.6	—	—	—	9.1	42.1	—	—	13.3	42.4
9. Maharashtra ..	—	—	0.2	—	0.2	—	4.2	20.1	—	—	10.7	22.6
10. Mysore	—	—	0.8	5.5	0.2	—	7.9	37.7	—	—	16.9	40.4
11. Orissa	—	—	0.3	—	0.2	—	1.6	12.9	—	—	3.1	25.0
12. Punjab	0.1	—	0.4	11.1	0.2	—	35.0	41.4	0.2	100.0	41.6	38.5
13. Rajasthan	—	—	0.2	—	0.5	—	20.0	27.6	—	—	21.0	26.2
14. Uttar Pradesh ..	—	—	0.2	7.1	0.6	—	20.4	49.1	—	—	21.7	48.0
15. West Bengal ..	—	—	0.3	—	0.9	3.2	3.4	37.7	—	—	7.3	27.5
All-India	0.2	74.8	0.3	3.3	0.3	8.0	9.7	40.5	..	78.5	15.0	37.6
ALL RURAL HOUSEHOLDS												
1. Andhra Pradesh	1.2	43.7	11.2	26.8	2.4	20.8	41.1	41.0	0.2	4.8	123.1	39.5
2. Assam .. ..	..	..	2.1	1.0	2.7	6.2	16.4	8.8	0.8	10.4	39.7	14.0
3. Bihar	0.6	28.8	4.2	7.8	1.1	2.9	25.6	21.0	0.1	14.8	46.9	22.8
4. Gujarat	2.7	18.3	41.8	39.8	5.4	36.7	36.4	35.8	0.3	33.4	129.2	44.8
5. Jammu & Kashmir	0.6	—	2.5	0.5	14.7	0.2	40.0	19.5	—	—	85.8	11.6
6. Kerala	1.6	89.4	4.3	9.6	2.2	1.9	18.2	18.7	1.2	35.2	69.7	25.6
7. Madhya Pradesh	..	..	5.4	5.3	2.1	8.6	39.4	44.1	0.3	87.2	72.9	33.7
8. Madras	0.3	—	18.2	42.6	1.4	9.6	36.6	37.8	1.1	15.9	122.2	46.5
9. Maharashtra ..	1.1	15.5	10.2	27.2	3.1	17.3	21.3	20.6	0.2	8.0	90.6	26.6
10. Mysore	1.7	37.2	20.5	18.0	3.9	26.2	49.4	26.4	5.3	12.3	183.1	31.4
11. Orissa	0.1	—	3.8	1.9	1.6	1.0	11.4	19.2	..	—	37.8	16.4
12. Punjab	1.7	—	21.8	11.3	5.3	15.2	106.8	30.7	0.2	56.3	172.9	28.9
13. Rajasthan	1.0	38.6	18.2	28.0	1.7	30.3	105.4	57.2	0.1	—	155.9	53.8
14. Uttar Pradesh ..	1.1	4.1	6.4	14.4	3.1	8.5	70.0	34.8	0.2	9.8	101.3	30.1
15. West Bengal ..	0.1	—	2.6	3.6	3.4	11.6	13.9	22.1	0.1	15.5	36.7	20.1
All-India	0.9	24.1	10.4	24.8	2.7	14.2	43.1	35.3	0.6	18.3	95.2	33.3

STATEMENT No. 15—BORROWINGS AS SOURCE OF FINANCE FOR CAPITAL EXPENDITURE IN NON-FARM BUSINESS

State/Item	Land and Buildings		Production equipment and accessories		Transport equipment		Furniture and Fixtures		Other Capital Expenditure In Non-farm business		Total Capital Expenditure in Non-farm business		
	Average expenditure per house-hold (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per house-hold (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per house-hold (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per house-hold (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per house-hold (Rs.)	Expenditure financed from borrowings (Per cent)	Average expenditure per house-hold (Rs.)	Expenditure financed from borrowings (Per cent)	
	1	2	3	4	5	6	7	8	9	10	11	12	
CULTIVATORS													
1. Andhra Pradesh	..	96.2	0.6	45.1	0.8	19.1	—	—	0.2	10.9	1.6	28.1	
2. Assam	..	0.2	9.7	1.0	25.7	0.5	31.3	0.1	—	—	1.8	24.8	
3. Bihar	..	0.6	64.6	1.0	16.8	1.8	11.6	..	0.1	16.4	3.5	22.3	
4. Gujarat	..	1.2	23.0	1.6	68.2	3.1	41.9	0.1	61.8	..	6.0	45.2	
5. Jammu & Kashmir	0.8	—	0.6	—	0.3	11.0	0.2	72.1	0.6	69.7	2.4	25.1	
6. Kerala	..	6.1	18.0	2.8	19.8	4.4	35.5	0.5	7.4	0.2	12.2	13.9	23.4
7. Madhya Pradesh	0.1	—	0.2	5.1	0.9	20.4	—	—	..	—	1.2	16.0	
8. Madras	..	2.1	52.8	4.0	62.9	2.3	20.3	0.5	73.6	0.4	78.8	9.4	51.3
9. Maharashtra	..	0.5	—	3.9	2.9	9.4	0.3	0.1	—	0.2	14.0	1.0	
10. Mysore	..	0.3	—	1.8	47.5	0.5	—	..	—	1.4	4.0	21.3	
11. Orissa	..	0.4	6.8	0.4	81.0	0.9	—	..	—	..	1.6	18.8	
12. Punjab	..	0.3	68.9	1.9	—	2.6	12.9	0.2	—	0.2	5.1	10.7	
13. Rajasthan	..	1.4	21.4	1.0	24.2	2.9	38.4	..	—	0.6	6.9	23.2	
14. Uttar Pradesh	..	5.3	3.3	1.8	33.9	2.9	14.8	0.1	—	0.2	24.6	10.1	12.2
15. West Bengal	..	1.0	—	1.2	12.4	2.1	28.7	0.1	—	0.1	4.5	16.9	
All-India	1.8	13.4	1.6	30.3	2.6	15.6	0.1	31.9	0.2	14.1	6.2	19.0	
NON-CULTIVATORS													
1. Andhra Pradesh	0.4	74.1	1.6	47.8	0.2	43.4	..	—	0.2	22.0	2.5	49.4	
2. Assam	..	2.1	—	0.9	2.9	0.8	38.0	0.2	—	..	4.0	8.4	
3. Bihar	..	0.6	—	3.0	17.9	4.3	2.4	..	0.1	14.0	8.0	8.2	
4. Gujarat	..	0.8	85.6	6.7	2.7	4.3	5.2	0.4	28.6	0.6	3.5	12.8	9.6
5. Jammu & Kashmir	1.3	—	2.0	—	1.6	—	—	—	—	—	5.0	—	
6. Kerala	..	2.0	34.4	6.1	0.1	2.4	3.3	1.2	—	0.1	11.8	6.5	
7. Madhya Pradesh	..	—	—	0.3	62.5	1.3	2.2	0.6	—	0.1	2.2	9.1	
8. Madras	..	0.8	27.5	3.9	8.8	2.6	10.4	0.4	21.6	0.2	7.8	11.6	
9. Maharashtra	..	0.2	—	2.1	23.8	0.3	—	..	86.3	0.2	17.5	20.3	
10. Mysore	..	0.1	100.0	1.2	1.9	13.3	2.4	0.2	—	0.2	14.9	2.7	
11. Orissa	..	0.4	—	1.8	36.2	0.3	—	..	—	..	2.5	26.0	
12. Punjab	..	0.4	36.4	4.4	42.9	8.1	19.4	1.2	—	0.3	14.4	25.0	
13. Rajasthan	..	1.5	64.4	1.1	—	1.4	7.1	—	—	0.1	45.0	4.0	26.4
14. Uttar Pradesh	..	1.8	17.5	2.4	27.8	1.6	6.2	0.1	—	0.8	25.4	6.7	19.1
15. West Bengal	..	0.4	—	3.0	8.9	3.2	4.4	..	—	0.3	6.9	5.9	
All-India	0.7	25.7	2.7	19.2	2.8	7.5	0.2	7.7	0.3	13.6	6.8	14.3	
ALL RURAL HOUSEHOLDS													
1. Andhra Pradesh	0.2	75.2	1.0	46.7	0.6	21.7	..	—	0.2	14.6	1.9	37.8	
2. Assam	..	0.6	1.7	1.0	20.8	0.6	33.5	0.1	—	..	2.3	17.9	
3. Bihar	..	0.6	49.8	1.5	17.3	2.3	7.9	..	0.1	15.6	4.5	16.9	
4. Gujarat	..	1.0	38.7	3.2	24.3	3.5	27.4	0.2	37.3	0.2	3.1	8.2	27.2
5. Jammu & Kashmir	0.8	—	0.7	—	0.4	6.9	0.2	72.1	0.6	69.7	2.6	21.0	
6. Kerala	..	5.3	19.2	3.4	12.4	4.0	31.8	0.6	4.6	0.2	10.1	13.5	20.5
7. Madhya Pradesh	0.1	—	0.2	18.9	1.0	15.1	0.1	—	..	—	1.4	13.6	
8. Madras	..	1.6	48.4	4.0	43.3	2.4	16.4	0.5	56.4	0.3	62.6	8.8	38.2
9. Maharashtra	..	0.4	—	3.3	7.0	6.5	0.3	0.1	23.4	0.2	6.1	10.4	2.6
10. Mysore	..	0.2	5.7	1.6	38.8	3.9	2.2	0.1	—	1.1	6.9	10.5	
11. Orissa	..	0.4	4.8	0.8	50.7	0.7	—	..	—	..	1.9	21.6	
12. Punjab	..	0.4	53.1	2.9	26.5	4.9	17.4	0.6	—	0.2	9.0	20.1	
13. Rajasthan	..	1.4	27.5	1.0	20.7	2.7	36.3	..	—	0.5	5.6	28.0	
14. Uttar Pradesh	..	4.6	4.5	1.9	32.4	2.6	13.8	0.1	—	0.3	25.1	9.4	13.2
15. West Bengal	..	0.8	—	1.8	10.4	2.5	18.4	0.1	—	0.2	5.3	12.1	
All-India	1.5	15.0	1.9	26.1	2.6	13.3	0.1	19.9	0.2	15.4	6.4	17.7	

STATEMENT No. 16—EXPENDITURE ON RESIDENTIAL PLOTS AND BUILDINGS AND DURABLE HOUSEHOLD ASSETS (CASH EXPENDITURE)

State/Item	Residential Plots and Buildings											
	CULTIVATORS				NON-CULTIVATORS				ALL RURAL HOUSEHOLDS			
	Proportion of households reporting	Average expenditure per household	Average expenditure per reporting household	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting	Average expenditure per household	Average expenditure per reporting household	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting	Average expenditure per household	Average expenditure per reporting household	Aggregate expenditure (in crores of Rs.)
	(Per-cent)	(Rs.)	(Rs.)	(in crores of Rs.)	(Per-cent)	(Rs.)	(Rs.)	(in crores of Rs.)	(Per-cent)	(Rs.)	(Rs.)	(in crores of Rs.)
	1	2	3	4	5	6	7	8	9	10	11	12
1. Andhra Pradesh	25.2	41.0	163	16.8	21.4	13.1	61	2.8	23.9	31.4	131	19.6
2. Assam	18.4	14.6	79	2.2	3.5	4.7	55	0.2	16.0	12.2	76	2.5
3. Bihar	48.7	37.3	77	22.3	37.0	10.9	29	1.8	46.2	31.5	68	24.1
4. Gujarat	19.0	43.0	226	8.2	12.9	13.4	104	1.2	17.1	33.5	196	9.5
5. Jammu & Kashmir	13.4	51.5	384	2.5	17.4	48.8	280	0.2	13.8	51.3	373	2.7
6. Kerala	79.0	60.2	76	12.1	66.4	22.6	34	1.1	76.5	52.9	69	13.2
7. Madhya Pradesh	30.7	21.0	68	9.3	22.2	18.3	82	2.2	28.9	20.4	71	11.5
8. Madras	16.7	33.1	198	11.3	11.4	23.5	207	4.7	14.7	29.6	201	16.0
9. Maharashtra	23.2	33.8	146	12.7	16.4	8.4	51	1.5	21.0	25.7	122	14.2
10. Mysore	12.6	45.9	364	11.3	8.4	16.2	193	1.5	11.5	38.0	331	12.8
11. Orissa	43.7	23.5	48	5.6	51.3	15.0	29	1.5	49.5	21.0	43	7.0
12. Punjab	27.1	69.0	255	11.2	17.2	26.8	156	3.0	23.0	51.7	224	14.3
13. Rajasthan	26.7	47.4	177	12.9	18.4	14.4	78	0.6	25.6	43.0	168	13.5
14. Uttar Pradesh	49.1	42.2	86	40.8	35.6	19.7	55	4.8	46.4	37.7	81	45.6
15. West Bengal	52.5	28.8	55	9.5	35.9	19.2	54	3.1	47.0	25.7	55	12.6
All-India	36.3	37.8	104	190.6	25.5	16.6	65	30.4	33.4	32.2	96	221.0

State/Item	Durable Household Assets											
	CULTIVATORS				NON-CULTIVATORS				ALL RURAL HOUSEHOLDS			
	Proportion of households reporting	Average expenditure per household	Average expenditure per reporting household	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting	Average expenditure per household	Average expenditure per reporting household	Aggregate expenditure (in crores of Rs.)	Proportion of households reporting	Average expenditure per household	Average expenditure per reporting household	Aggregate expenditure (in crores of Rs.)
	(Per-cent)	(Rs.)	(Rs.)	(in crores of Rs.)	(Per-cent)	(Rs.)	(Rs.)	(in crores of Rs.)	(Per-cent)	(Rs.)	(Rs.)	(in crores of Rs.)
	13	14	15	16	17	18	19	20	21	22	23	24
1. Andhra Pradesh	3.6	4.6	128	1.9	2.8	2.2	75	0.5	3.4	3.8	113	2.4
2. Assam	10.5	3.3	31	0.5	4.9	2.9	58	0.1	9.1	3.2	35	0.6
3. Bihar	11.9	11.7	99	7.0	10.0	2.8	28	0.5	11.5	9.8	85	7.5
4. Gujarat	9.9	11.2	114	2.1	8.2	5.0	60	0.5	9.3	9.2	99	2.6
5. Jammu & Kashmir	9.0	12.9	143	0.6	11.9	11.0	92	0.1	9.3	12.8	138	0.7
6. Kerala	15.8	10.6	67	2.1	10.0	2.4	25	0.1	14.6	9.0	61	2.2
7. Madhya Pradesh	9.2	5.7	62	2.5	6.9	3.2	46	0.4	8.7	5.1	59	2.9
8. Madras	4.1	5.6	135	1.9	4.6	3.3	71	0.7	4.3	4.7	110	2.6
9. Maharashtra	7.5	6.0	81	2.3	5.1	2.1	41	0.4	6.7	4.8	71	2.6
10. Mysore	3.2	10.3	125	2.5	6.9	2.9	41	0.3	7.9	8.3	106	2.8
11. Orissa	12.0	4.4	36	1.0	6.9	2.0	30	0.2	10.6	3.7	35	1.2
12. Punjab	29.4	19.9	68	3.2	18.2	8.0	44	0.9	24.8	15.0	61	4.1
13. Rajasthan	9.0	8.5	94	2.3	7.5	5.5	73	0.2	8.8	8.1	92	2.5
14. Uttar Pradesh	18.1	9.4	52	9.1	10.4	3.7	36	0.9	16.6	8.3	50	10.0
15. West Bengal	10.3	2.7	27	0.9	8.7	5.8	66	0.9	9.7	3.7	38	1.8
All-India	11.5	8.1	70	40.7	7.8	3.6	46	6.6	10.5	6.9	66	47.3

STATEMENT No. 17 BORROWINGS AS SOURCE OF FINANCE FOR EXPENDITURE ON RESIDENTIAL PLOTS AND BUILDINGS AND DURABLE HOUSEHOLD ASSETS

State	Cultivators				Non-cultivators				All rural households			
	Residential plots and buildings		Durable household assets		Residential plots and buildings		Durable household assets		Residential plots and buildings		Durable household assets	
	Average amount per household	Expenditure financed from borrowings	Average amount per household	Expenditure financed from borrowings	Average amount per household	Expenditure financed from borrowings	Average amount per household	Expenditure financed from borrowings	Average amount per household	Expenditure financed from borrowings	Average amount per household	Expenditure financed from borrowings
	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)	(Rs.)	(Per cent)
1	2	3	4	5	6	7	8	9	10	11	12	
1. Andhra Pradesh	41.0	44.8	4.6	19.0	13.1	37.9	2.2	10.7	31.4	44.1	3.8	17.6
2. Assam	14.6	5.5	3.3	..	4.7	—	2.9	—	12.2	4.9	3.2	..
3. Bihar	37.3	13.1	11.7	1.7	10.9	15.6	2.8	3.6	31.5	13.3	9.8	2.0
4. Gujarat	43.0	32.1	11.2	8.0	13.4	26.1	5.0	20.0	33.5	31.3	9.2	10.9
5. Jammu & Kashmir	51.5	9.3	12.9	7.8	48.8	2.5	11.0	—	51.3	8.8	12.8	7.0
6. Kerala	60.2	19.8	10.6	1.9	22.6	6.6	2.4	—	52.9	18.7	9.0	2.2
7. Madhya Pradesh	21.0	17.1	5.7	22.8	18.3	26.8	3.2	18.8	20.4	18.6	5.1	23.5
8. Madras	33.1	44.1	5.6	16.1	23.5	38.7	3.3	21.2	29.6	42.6	4.7	17.0
9. Maharashtra	33.8	18.6	6.0	1.7	8.4	3.6	2.1	4.8	25.7	17.1	4.8	2.1
10. Mysore	45.9	30.1	10.3	22.3	16.2	51.2	2.9	3.4	38.0	32.4	8.3	21.7
11. Orissa	23.5	7.2	4.4	4.5	15.0	2.0	2.0	—	21.0	6.2	3.7	2.7
12. Punjab	69.0	21.6	19.9	6.5	26.8	23.9	8.0	13.8	51.7	22.1	15.0	8.0
13. Rajasthan	47.4	28.9	8.6	29.4	14.4	29.9	5.5	9.1	43.0	29.1	8.1	27.2
14. Uttar Pradesh	42.2	12.3	9.4	15.8	19.7	16.8	3.7	24.3	37.7	12.7	8.3	15.7
15. West Bengal	28.8	10.8	2.7	—	19.2	12.0	5.8	—	25.7	11.3	3.7	—
All-India	37.8	21.7	8.1	11.6	16.6	23.6	3.6	11.3	32.2	22.0	6.9	11.6

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STATEMENT No. 18—FIXED CAPITAL FORMATION

State	Farm Business			Non-Farm Business			Residential Houses			Total Fixed Capital formation	
	Pro-portion of house-holds report-ing (Per cent)	Aver-age amount per house-hold (Rs.)	Aver-age amount per report-ing house-hold (Rs.)	Pro-portion of house-holds report-ing (Per cent)	Aver-age amount per house-hold (Rs.)	Aver-age amount per report-ing house-hold (Rs.)	Pro-portion of house-holds report-ing (Per cent)	Aver-age amount per house-hold (Rs.)	Aver-age amount per report-ing house-hold (Rs.)	Average amount per house-hold (2)+(5) (Rs.)	Aggre-gate amount in crores of Rs. + (6)
	1	2	3	4	5	6	7	8	9	10	11
CULTIVATORS											
1. Andhra Pradesh	17.4	44.3	255	1.1	1.2	110	3.1	26.2	840	71.7	29.1
2. Assam	25.2	22.6	90	1.2	1.0	82	4.5	8.3	187	31.9	4.9
3. Bihar	15.1	8.6	57	1.8	2.2	127	5.4	25.9	481	36.7	21.9
4. Gujarat	23.8	79.8	335	1.0	4.1	428	4.1	37.1	915	121.0	23.2
5. Jammu & Kashmir	9.9	27.4	277	0.8	1.7	212	4.9	47.8	971	76.9	3.7
6. Kerala	27.4	22.3	81	6.0	10.4	172	6.4	39.9	625	72.6	14.6
7. Madhya Pradesh	22.1	18.6	84	0.5	0.5	94	3.9	14.6	371	33.7	14.9
8. Madras	22.5	60.5	269	2.3	7.5	327	2.5	20.8	817	88.8	30.4
9. Maharashtra	22.0	56.3	255	1.5	9.0	607	3.2	24.8	772	90.1	33.9
10. Mysore	34.7	84.6	244	1.4	1.4	101	2.1	37.1	1742	123.1	30.5
11. Orissa	36.0	24.6	68	0.8	1.1	138	4.7	11.5	245	37.2	8.9
12. Punjab	45.3	50.4	111	3.0	3.0	99	6.7	57.5	863	110.9	18.0
13. Rajasthan	16.4	27.2	165	1.9	4.3	224	8.6	47.4	551	78.9	21.4
14. Uttar Pradesh	25.2	20.0	79	2.2	7.8	360	5.7	27.2	480	55.0	53.2
15. West Bengal	16.8	8.3	49	3.1	2.9	93	4.6	18.7	407	29.9	9.8
All-India	23.3	32.7	140	1.9	4.4	233	4.7	27.0	573	64.1	322.5
NON-CULTIVATORS											
1. Andhra Pradesh	1.9	2.6	139	2.0	1.6	80	2.4	4.7	199	8.9	1.9
2. Assam	2.9	3.1	108	1.6	3.0	185	0.8	1.8	226	7.9	0.4
3. Bihar	4.1	0.3	7	3.0	6.3	209	2.5	4.4	174	11.0	1.8
4. Gujarat	0.3	0.2	59	4.8	5.8	121	1.6	8.3	534	14.3	1.3
5. Jammu & Kashmir	0.9	1.2	129	3.7	4.9	132	5.5	42.1	765	48.2	0.2
6. Kerala	8.2	0.5	6	4.8	7.2	149	2.7	7.7	288	15.4	0.7
7. Madhya Pradesh	4.2	0.5	11	1.4	1.1	82	3.8	14.3	378	15.9	1.9
8. Madras	2.5	1.3	52	4.2	4.3	102	2.3	16.9	725	22.5	4.5
9. Maharashtra	2.8	0.4	16	2.6	2.0	76	2.3	5.0	219	7.4	1.1
10. Mysore	8.3	2.4	28	3.4	13.7	402	1.1	1.7	162	17.7	1.6
11. Orissa	10.0	1.0	10	1.1	1.0	94	1.8	3.3	180	5.3	0.5
12. Punjab	3.2	2.1	66	6.5	9.0	137	3.7	18.8	505	29.9	3.4
13. Rajasthan	1.7	0.3	15	4.5	2.9	64	3.2	9.2	287	12.4	0.5
14. Uttar Pradesh	2.7	0.6	23	4.9	4.6	94	3.4	8.8	255	14.0	3.4
15. West Bengal	3.6	1.0	27	2.9	2.7	92	3.7	11.2	304	14.9	2.4
All-India	3.6	1.1	32	3.4	4.3	127	2.7	8.8	330	14.2	26.0
ALL RURAL HOUSEHOLDS											
1. Andhra Pradesh	12.0	29.9	249	1.4	1.4	95	2.9	18.8	656	50.1	31.3
2. Assam	19.7	17.8	90	1.3	1.5	113	3.6	6.7	189	26.0	5.3
3. Bihar	12.7	6.8	53	2.0	3.1	154	4.8	21.2	446	31.1	23.8
4. Gujarat	16.2	54.1	334	2.2	4.6	211	3.2	27.8	857	86.5	24.5
5. Jammu & Kashmir	9.1	25.1	275	1.0	2.0	187	5.0	47.3	951	74.4	4.0
6. Kerala	23.6	18.0	76	5.8	9.7	169	5.7	33.6	594	61.3	15.4
7. Madhya Pradesh	18.3	14.7	81	0.7	0.6	89	3.9	14.5	373	29.8	16.8
8. Madras	15.1	39.7	256	3.0	6.3	221	2.5	19.3	785	64.3	34.9
9. Maharashtra	15.9	38.5	242	1.8	6.7	369	2.9	18.5	634	63.7	35.2
10. Mysore	27.6	62.7	227	2.0	4.7	240	1.8	27.7	1499	95.0	32.1
11. Orissa	28.5	17.8	62	0.9	1.0	122	3.9	9.1	236	27.9	9.4
12. Punjab	28.0	30.6	109	4.5	5.5	122	5.4	41.6	763	77.7	21.4
13. Rajasthan	14.5	23.6	163	2.2	4.1	181	7.9	42.3	537	70.0	21.9
14. Uttar Pradesh	20.7	6.1	78	2.7	7.2	264	5.2	23.5	450	46.8	56.6
15. West Bengal	12.4	5.8	47	3.0	2.8	93	4.3	16.2	378	24.8	12.2
All-India	18.1	24.3	134	2.3	4.4	191	4.2	22.1	531	50.8	348.5

STATEMENT No. 19--INDIVIDUAL ITEMS OF FIXED CAPITAL FORMATION IN FARM BUSINESS

(ALL RURAL HOUSEHOLDS)

State/Item	Percentage share in aggregate fixed capital formation of														
	Aggregate fixed capital formation in farm business (in crores of Rs.)	Reclamation of land	Bunding and other Land improvements		New plantations and additions to existing orchards and plantations	Wells		Other Irrigation resources		Purchase of new additional equipment of		Farm houses, Grain golas and Cattle sheds			Other items of Fixed Capital Formation
			Major alterations, additions and other improvements	Construction of new bunds and other land improvements		Major alterations	Construction	Major alterations	Construction	traditional type	improved type	Major alterations	Additions to existing structures	New construction	
1. Andhra Pradesh ..	18.7	12.7	12.6	8.3	0.1	3.4	21.4	2.7	0.1	11.8	20.4	0.7	0.2	5.6	—
2. Assam	3.6	61.4	2.0	4.9	3.4	0.3	1.4	7.0	0.9	2.1	0.3	0.5	1.5	11.8	2.5
3. Bihar	5.2	9.1	8.4	7.9	0.9	0.7	24.0	5.6	4.1	20.8	6.0	1.6	0.5	10.5	—
4. Gujarat	15.3	1.7	4.8	9.8	0.2	8.2	8.8	0.4	1.8	20.9	33.7	1.1	0.3	8.0	0.3
5. Jammu & Kashmir	5.3	14.1	4.4	2.1	6.0	0.4	9.4	0.5	—	1.0	0.3	1.3	1.1	59.3	—
6. Kerala	4.5	22.3	1.3	14.9	23.0	1.4	1.1	..	7.6	9.4	6.8	0.5	0.1	8.4	3.3
7. Madhya Pradesh	8.3	5.5	5.1	29.4	..	0.9	32.2	—	—	12.0	4.5	1.1	1.4	5.9	2.0
8. Madras	21.0	16.2	2.1	3.4	1.1	22.0	12.1	..	0.4	12.3	24.6	—	—	3.0	2.8
9. Maharashtra ..	21.3	11.2	8.6	16.9	1.2	3.3	29.6	1.9	0.6	6.2	12.9	1.5	0.4	5.3	0.4
10. Mysore	21.1	20.3	6.4	9.6	9.6	3.7	22.3	0.2	0.3	14.1	7.4	0.1	0.3	5.3	1.3
11. Orissa	6.0	56.5	20.6	6.3	0.1	0.2	2.9	0.1	0.3	8.9	0.1	0.1	0.6	3.2	0.1
12. Punjab	8.4	14.1	0.8	2.7	0.4	2.2	11.1	2.2	2.5	22.1	23.8	2.0	3.3	12.4	0.4
13. Rajasthan	7.4	4.4	1.4	5.4	0.2	9.8	31.3	—	4.4	23.6	11.5	0.7	2.2	4.8	0.3
14. Uttar Pradesh ..	19.5	21.5	4.2	5.4	2.5	3.9	17.9	0.3	4.2	17.7	8.7	3.2	2.4	7.9	0.2
15. West Bengal ..	2.9	12.1	4.4	8.2	4.4	0.8	1.3	0.1	1.4	16.3	4.0	11.7	1.8	31.2	2.2
All-India	166.8	16.7	6.2	9.3	2.7	5.9	18.0	1.1	1.5	13.8	14.6	1.2	0.9	7.1	0.9

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STATEMENT No. 20—INDIVIDUAL ITEMS OF FIXED CAPITAL FORMATION IN NON-FARM BUSINESS
(ALL RURAL HOUSEHOLDS)

State/Item	Aggregate Fixed Capital Formation in Non-farm business (in crores of Rs.)	Percentage share in aggregate fixed capital formation of						
		BUILDINGS			Purchase of new production equipment and accessories	Purchase of new Transport equipment	Purchase of new Furniture and Fixtures	Other items of Non-farm business
		Major alterations to existing structures	Additions to existing structures	Construction of new structures				
1	2	3	4	5	6	7	8	
1. Andhra Pradesh ..	0.9	—	—	3.4	55.2	32.3	—	9.1
2. Assam ..	0.3	0.8	—	48.0	25.6	23.4	1.8	0.4
3. Bihar ..	2.4	0.3	1.3	16.1	29.7	51.6	0.3	0.7
4. Gujarat ..	1.3	1.0	—	8.4	45.2	40.8	3.0	1.6
5. Jammu & Kashmir ..	0.1	21.6	—	22.5	31.4	16.2	8.2	—
6. Kerala ..	2.4	10.6	0.3	33.0	20.7	28.9	6.3	0.3
7. Madhya Pradesh ..	0.4	—	—	8.6	33.4	41.9	15.9	0.2
8. Madras ..	3.4	1.8	6.2	20.4	37.9	23.2	7.2	3.3
9. Maharashtra ..	3.7	—	0.7	6.3	39.6	51.8	0.6	1.0
10. Mysore ..	1.6	—	—	3.5	21.1	74.1	1.2	0.1
11. Orissa ..	0.4	—	24.8	1.9	41.1	30.6	1.5	—
12. Punjab ..	1.5	0.2	0.6	—	38.9	54.3	5.4	0.6
13. Rajasthan ..	1.3	0.2	—	32.8	14.3	42.3	0.4	10.0
14. Uttar Pradesh ..	8.7	1.1	2.0	55.7	18.2	20.8	0.4	1.8
15. West Bengal ..	1.4	3.0	—	18.9	40.6	34.1	1.8	1.6
All-India	29.9	1.7	1.8	26.9	29.0	36.1	2.4	2.1

STATEMENT No. 21—INDIVIDUAL ITEMS OF FIXED CAPITAL FORMATION
IN RESIDENTIAL HOUSING

(ALL RURAL HOUSEHOLDS)

State/Item	Aggregate Fixed Capital Formation (in crores of Rs.)	Percentage share in aggregate fixed capital formation of			
		Major alterations to existing structures	Additions to existing structures	Construction of new structures	
		1	2	3	4
1. Andhra Pradesh ..	11.7	8.3	8.2	83.5	
2. Assam ..	1.4	15.7	19.1	65.2	
3. Bihar ..	16.2	18.9	16.1	64.9	
4. Gujarat ..	7.9	41.5	10.5	48.0	
5. Jammu & Kashmir ..	2.5	25.7	9.6	64.7	
6. Kerala ..	8.4	25.3	10.5	64.2	
7. Madhya Pradesh ..	8.2	25.8	11.3	62.8	
8. Madras ..	10.5	11.4	5.7	83.0	
9. Maharashtra ..	10.2	19.5	10.1	70.4	
10. Mysore ..	9.3	18.2	3.3	78.5	
11. Orissa ..	3.1	15.2	20.4	64.4	
12. Punjab ..	11.5	12.9	23.5	63.6	
13. Rajasthan ..	13.2	26.6	16.0	57.5	
14. Uttar Pradesh ..	28.5	22.9	17.7	59.4	
15. West Bengal ..	8.0	18.8	12.8	68.4	
All-India	151.8	20.4	13.5	66.2	

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**CAPITAL FORMATION BY RURAL HOUSEHOLDS
OF GUJARAT**

V. V. DIVATIA

AHMEDABAD

9 - 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

CAPITAL FORMATION BY RURAL HOUSEHOLDS OF GUJARAT

V.V. Divatia

I. Object.

1.1 The main object of this paper is to examine the state level estimates of capital formation by the rural households of Gujarat State. These estimates became recently available from two sources, viz., (1) the results of the surveys conducted by the NSS in 1959-60 and (2) the All-India Rural Debt and Investment Survey (AIRDIS) 1961-62 conducted by the Reserve Bank of India. Although the reference periods are different, it is felt that a discussion of the concepts, definitions, methods of collection, results, etc., would prove useful in bringing out some interesting features related to capital formation. Earlier, for 1951-52, the Reserve Bank of India had conducted its Rural Credit Survey but the estimates of capital formation are available for only three districts of the State, viz., Junagadh, Ahmedabad and Broach as then constituted. There have been follow-up surveys by the Reserve Bank. However, these results have not been studied in the paper because of their limited geographical coverage.

1.2 In what follows, the individual surveys are examined separately. After stating the main object of this paper in Section I, Section II studies the NSS Survey and Section III the AIRDIS. Section IV brings out the differing aspects of these two surveys and suggests in what direction attempts to bring about comparabilities, to the extent possible, can be made. It then attempts to discuss these modified estimates which are placed in juxtaposition. Limitations have also been emphasised at the end of this section. Section V gives some concluding remarks.

1.3 It must be stated at the outset that the study pertains to the main aggregates, viz., the total capital formation, the per-household and per reporting household capital formation on fixed asset formation, and the proportion of households reporting capital formation in any one or more physical asset formation. Wherever possible, these figures are given by type of asset formation, and by class of household. No discussion about source of finance and such other aspects takes place in this paper. It should also be noted that since figures pertain to fixed assets, changes in financial assets and in stocks of materials are not included in the estimates of capital formation.

1.4 Furthermore, no observations have been made for the sampling designs, since, even with differing sampling designs, it is possible to get appropriate state-level estimates (which can then be compared or contrasted) through the use of appropriate estimational formulae so long as the design is such as to permit scientific, state-level estimation being done. Also, this is not a forum to discuss the efficiencies of the sampling designs of the NSS and the AIRDIS.

II. The National Sample Survey.

2.1 The fifteenth round of the multi-purpose NSS provided for the collection of data on some items of fixed assets to throw light on the extent of capital formation by the household sector in rural India on an exploratory basis. Before one proceeds to the results, some important points regarding concepts, coverage, etc. deserve to be noted. First, the

survey was conducted for a period of one year from July 1959 to June 1960. Since the data was asked for, for a period of one preceding year from the date of the interview, the data collected refers to a moving period of one year beginning anywhere from July 1958 to end of June 1959 and ending correspondingly anywhere from June 1959 to June 1960. The annual estimates are, therefore, an average of the two-year period July 1958 to June 1960. Secondly, a household is considered to have participated in capital formation if it has incurred expenditure during the reference period on purchase, construction and improvement of real assets, e.g. land, building, tools and implements, vehicles, livestock and other durable goods used for productive purposes. Buildings for residential purposes are included, but other durable non-productive assets and assets for domestic use are not included. Also, as a corollary of recording purchases, real assets manufactured for sale are excluded. In the above set of concepts, the only item requiring some explanation is 'construction of livestock', which has been defined as addition to stock by birth. It is not, however, clear whether such addition is net of removals through death of livestock. Major repairs to buildings, equipments, etc., which are likely to extend the life of the asset by more than a year are included as improvements. In all these creations of new assets or betterment of the old, imputed values of home-made materials and family labour are included.

2.2 The NSS has two sets of samples. One, which is known as the Central sample, for which the field and tabulation works are carried out directly by the NSS Organisation, the Central Statistical Organisation and the Indian Statistical Institute, Calcutta. The other sample is known as the State matching sample or simply, the State sample, the field and the tabulation works for which are carried out by the respective participating States. The NSS sample size for the Central sample is 106 villages and 636 households within these selected villages. The State sample has 106 villages and 641 households within these villages. The pooled results of both the samples are, therefore, based on 1277 households in 212 villages. For each of the samples, the selected households were further sub-divided into six sub-rounds of about equal divisions, and for each sub-round, two sub-samples of equal size were selected. Tables given here are based on the results of the six sub-rounds and sub-samples in each sub-round of the Central and the State sample. The combined results, wherever necessary, have been worked out by unweighted averaging of these separate results of both the Central and the State samples. For comparison, available All-India estimates based on the Central sample only are also drawn upon.

2.3 It is estimated on the basis of the State sample that the aggregate expenditure by households on capital formation items was Rs.25.62 crores in the rural areas of Gujarat State, the proportion of households reporting was about 40 per cent; the per reporting household (i.e. household reporting one or more items of capital formation) expenditure was Rs.265, and the per household expenditure Rs.106. According to the Central sample, the per reporting household expenditure was Rs.344 which does not compare well with the figure of Rs.265 given by the State sample. The percentage of households reporting capital formation was 43.67 which compares well with the figure of 40 per cent for the State sample. The aggregate expenditure as estimated through the Central sample is Rs.37.08 crores which is also high as compared to the figures of Rs.25.62 crores emerging from the State sample. The figures when examined according to items of expenditure show that the item 'lands and buildings' claims the first place in the per-household expenditure, with 'livestock' as second in importance. In the case of per household reporting specified item of expenditure, the power driven equipment, with a figure of Rs.3345 is first, followed by

land and buildings with a figure of Rs.1112. This set of figures is available in the State sample only. If figures are computed on the basis of per reporting household, 'lands and buildings' is first followed by 'livestock'. According to modes of expenditure, purchases account for the highest per reporting household figure of Rs.146 in the case of State sample and Rs.203.6 for the Central sample. Construction of real assets (including 'construction of livestock' - a term explained above), which takes the second place in the mode of bringing about capital formation, gives a figure of Rs.107.6 for the State sample and Rs.103.3 for the Central sample. Improvements take the last place with a meagre figure of Rs.11 per reporting household in the State sample and as much as Rs.74 in the Central sample.

The contribution to the total capital formation by each of these three modes is given in the table below.

(Rs. in crores)			
Mode	State	Central	Combined
Purchases	14.15	21.95	18.05
Construction	10.40	11.13	10.76
Improvement	1.07	4.00	2.54
Total	25.62	37.08	31.35

2.4 The above table shows close agreement for aggregate figures of purchases, construction only. An unweighted arithmetic average of these two sets of figures places the total capital expenditure at Rs.31.35 crores. As proportion of the annual average of agricultural and animal husbandry income of Gujarat for 1958-59 and 1959-60, this pooled figure of capital formation is seen to be 10.7 per cent. Annual average for these two years has been worked out because the moving reference period covers this two-year period. Price changes have been ignored since these are also ignored in recording capital formation figures.

2.5 A comparison of Gujarat's figures with All-India figures on the basis of the Central sample indicates the following position.

Item	Gujarat	All-India
1. % of households reporting capital formation	43.67	45.87
2. Aggregate capital formation (Rs. crores).	37.08 (5.22%)*	709.98
3. Aggregate capital formation as % of total agricultural & animal husbandry income (average of 1958-59 to 1959-60).	12.63	11.67
4. % of total capital formation in -		
(i) Lands & Buildings	40.67	48.16
(ii) Livestock	30.05	38.99
(iii) Others	29.28	12.85
5. % of total capital formation in -		
(i) Purchase	59.19	62.11
(ii) Construction	30.02	30.41
(iii) Improvements	10.79	7.48

(* indicates % of Gujarat's aggregate to All-India aggregate)

Thus, over 5 per cent of the total capital formation of the rural households - as defined by the NSS - is contributed by Gujarat's rural households. While bulk of the capital formation comes from lands and buildings, and livestock, in the case of Gujarat and All-India, the residuary categories' relative contribution is much higher for Gujarat (29.28%) as compared to that for India (12.85%).

III. The All-India Rural Debt and Investment Survey, 1961-62.

3.1 The AIRDIS conducted by the Reserve Bank of India gives estimates for 1961-62. The data was collected for two sub-periods, from 1st July 1961 to 31st December 1961 and 1st January 1962 to 30th June 1962. It has estimated inter alia capital expenditure and fixed capital formation at State and All-India levels. While the estimates of capital expenditure relate only to expenditure in cash, estimates of capital formation include expenditures in kind, value of owned assets and materials used and value of work done by members of the households and permanent servants, "all items having been suitably evaluated into monetary units". The calculations are done separately for cultivators and non-cultivators as well as for all rural households, and estimates for farm business, non-farm business and residential houses are separately worked out for each of these categories of households and types of business. The element of maintenance expenditure has been segregated from the total capital expenditure and it is only the expenditure "leading to asset formation" that has been included in the capital formation estimates. Furthermore, transfer items such as purchases of land, building and livestock are also excluded from the

estimates of capital formation. It is not quite clear whether net increment to livestock is taken as an item of capital formation, but unlike NSS, it seems to have been excluded. The estimates are built up on the basis of accretion to the fixed assets as calculated from the purchases, etc. on the one side and sales and losses due to natural calamities on the other.

3.2 For Gujarat, the sample size is 140 villages and about 40 selected households within each of these villages. The All-India sample comprises 2057 villages and about 40 selected households within each of these villages. Although, figures are available for cultivators and non-cultivators, for farm and non-farm business and residential properties separately, the focus here is on the global figures for all fixed asset formation and for all rural households, since the object is to compare the figures given by the NSS and the AIRDIS.

3.3. The average per-household figure of capital formation for the rural households of Gujarat is Rs.86 which compares very favourably with the corresponding All-India figure of Rs.50.8. This is principally due to the very high level of capital formation in farm business, which is second highest among the States in terms of average per household, and highest in terms of average per reporting households. The relevant comparative figures, by type of asset formation, are given below, for all rural households.

	Gujarat				All-India			
	Farm busi- ness	Non- farm busi- ness	Resi- dential Houses	Total	Farm busi- ness	Non- farm busi- ness	Resi- dential Houses	Total
1. Proportion of households reporting(percent)	16.2	2.2	3.2	-	18.1	2.3	4.2	-
2. Average amount per household (Rs.)	54.1	4.6	27.8	86	24.3	4.4	22.1	50.8
3. Average amount per reporting household	334	211	857	-	134	191	531	-

3.4 It should be noted here that overall figures per reporting household cannot be worked out, since the proportion of households reporting any one or more items of capital formation (unduplicated) is not as yet published. The comparative analysis for total capital formation can, therefore, be done in terms of average per household only. It is, however, clear that although the proportion of rural households reporting farm business capital formation is higher for All-India, the amounts per household, and per reporting household are much higher for Gujarat. Indeed, for each type, whether farm business, non-farm business or residential houses, both these averages are higher for Gujarat than for All-India.

3.5 The following table shows that aggregate fixed assets formation - as defined by the AIRDIS - is Rs.24.5 crores and forms 7 per cent of the All-India figure. As proportion of income from agriculture and animal

husbandry, fixed assets formation is 6.87 per cent in Gujarat as against a corresponding figure of 5.15 per cent for All-India. The estimates of tangible assets are also relevant to this study in so far as the capital formation can be seen as a ratio of the tangible assets. Item 2 of the table below shows that for Gujarat capital formation is 1.33 per cent of the tangible assets, as against the corresponding figure of less than 1 per cent for All-India. It may be stated, however, that the pricing procedure for tangible assets is not quite clear. The first report published in the December 1963 Bulletin of the RBI states that "physical assets were evaluated using the average market value prevalent at the time of the first round of visits". The second report published in the June 1965 Bulletin states that "in respect of each item of tangible assets, the market value as on 30th June 1962" has been taken into account in arriving at estimates. These two statements mean different pricing procedures. The estimates used in this study are, however, from the second report.

Total Fixed Capital Formation

	<u>Gujarat</u>	<u>All-India</u>
1. Aggregate capital formation (Rs. in crores)	24.5 (7.03) *	348.5
2. Tangible Assets:		
(1) Aggregate (Rs. in crores)	1836 (5.08) *	36155
(2) Per Household (Rs.)	6496	5267
3. % of 1 to 2(1)	1.33	0.96
4. % of 1 to Agricultural & Animal Husbandry income (for 1961-62)	6.87	5.15

(* % of Gujarat's figure to All-India figure)

IV. Comparative Analysis.

4.1 The figures given by the NSS and the AIRDIS give somewhat different pictures. Apart from the differing time periods, for the two surveys which would no doubt make for some differences in the aggregates and proportions that may be worked out for the comparative analysis, it seems necessary to bring into prominence certain conceptual and other differences which need to be noted before the results can be compared.

4.2 The concept of capital formation followed by the NSS involves inclusion of purchases of land and building as well as livestock. Live-stock increments by birth are also included. All these items are not included in the AIRDIS. This makes the biggest difference in the comparison of the estimates. The AIRDIS rightly excludes purchase and sales of lands, buildings and livestock which are mere transfer items. But in so far as the AIRDIS estimates pertain to rural households, such transfers to and from urban households should have been perhaps recorded. Perhaps difference between purchases and sales can be construed as net transfer from or to urban areas, depending upon whether there are net purchases or net sales. While AIRDIS can get these figures, if desired, the NSS has no provision

since sales are not recorded. Since the livestock is considered by AIRDIS as a reproducible tangible asset, its increase due to natural net growth (net of deaths) should have been included. Such a procedure would also ensure comparability with the national income concepts which include net growth of livestock population as an income item. The NSS should not have included purchases of lands and buildings or livestock, except in so far as they are by rural households from urban households and even then it should have netted out sales of their properties to urban households. In both these surveys net additions to stocks of raw materials, finished materials, etc. are not included and hence comparability is not impaired on this account. Both the surveys attempt to measure only fixed assets formation.

4.3 A moving reference period in the case of the NSS and a fixed set of two sub-periods adopted by AIRDIS could introduce incomparabilities due to differential response biases. Which method is superior cannot be discussed here. But in the case of the NSS, one obtains a two-year moving average series if surveys on the NSS pattern are continued every year. In the case of the method followed by the AIRDIS, it is specific one year period to which the data relate.

4.4 While capital formation in the case of NSS appears to be gross in the sense that depreciation on assets at the beginning of the period is not deducted, the AIRDIS claims that its figures are "expected to be nearer to net than to gross capital formation". While NSS includes major repairs which are expected to increase the life of an asset by over one year, the AIRDIS excludes repairs and includes only major alternations. How near to net this value is has not been mentioned but it seems that even in the AIRDIS estimates, depreciation of the assets at the beginning has not been subtracted out. In that sense, figures remain gross.

4.5 In order to make the figures comparable, to the extent possible, with each other and also with regard to concept of income followed in the national income accounts, it would appear that (i) the purchases of lands, buildings and livestock included by the NSS should be excluded from the estimates of capital formation and (ii) the net growth of livestock not covered by the AIRDIS should be included in its capital formation estimates. Here, what is really necessary is the net natural increase in livestock and not gross, whereas the figure recorded appears to be gross. No adjustment on this account, however, possible. In this regard, it is interesting to note that NSS gives for the whole of the country an aggregate of Rs.32.22 crores by "construction of livestock" - which means in its terminology, additions to livestock by birth - and by improvements, whereas the national income revised series gives for net increment of livestock a figure of Rs.24.40 crores per year without any change over the period of years 1955-56 to 1959-60 for which the Blue Book entitled "National Income Statistics : Proposals for a revised series of National Income Estimates for 1955-56 to 1959-60" published by the Central Statistical Organisation gives the revised estimates. It may be that part of the difference can be explained by the loss due to deaths of livestock but it is difficult to make any specific comment on this difference. If one examines the figures published by the National Council of Applied Economic Research, the amount of addition to income due to net increment in livestock is as high as Rs.64 crores for all States taken together.

4.6 The necessary adjustments to place the NSS and the AIRDIS figures on as comparable a basis as may be possible may now be attempted. For Gujarat the purchase of lands and buildings amounts to Rs.2.92 crores and that of livestock, to Rs.6.89 crores, according to the State matching sample. Corresponding figures for Gujarat according to the Central sample are Rs.3.51 crores and Rs.10.35 crores, respectively. These expenditures are to be allowed for in the capital formation estimates yielded by the NSS. These adjusted capital formation figures for the State sample, Central sample and their pooled averages are given in the following table. All-India figures similarly adjusted are also shown alongside.

Item	All-India	(Rs. crores)		
		Central Sample	Gujarat State Sample	Average of two samples
1. Lands and Buildings	207.06	11.57	9.85	10.71
2. Tools and Equipment	39.21	2.54	0.58	1.56
3. Vehicles,	26.78	5.11	1.42	3.26
4. Power Driven Equipment	22.08	3.05	2.61	2.83
5. Other Durable Goods	3.14	0.15	0.01	0.08
6. Livestock	32.22	0.80	1.34	1.07
Total	330.49	23.22	15.81	19.51

4.7 After adjustments, it is seen that fixed capital formation in physical assets amounts to Rs.19.51 crores, as against the unadjusted figure of Rs.31.35 crores. This adjusted figure constitutes 5.9 per cent of the similarly adjusted All-India figure (i.e. Rs.330.5 crores) if one considers the adjusted capital formation figure of Rs.23.22 crores on the basis of the Central sample, its proportion to All-India adjusted capital formation works out to a somewhat higher figure of 7 per cent. In terms of the proportion of the annual average of the agricultural and animal husbandry income for 1958-59 and 1959-60, gross capital formation of rural households is 0.6 per cent in Gujarat as compared to 5.4 per cent for All-India.

4.8 It is not possible to re-work the figures of proportion of persons reporting or the average amount per reporting household since the adjustments for only aggregates can be made and households reporting purchases of lands and buildings or livestock, or both but nothing else cannot be subtracted out from the number of households reporting any item of capital formation. The adjusted figure of capital formation per household as given by the State sample is Rs.65.78. Similar figure for the Central sample is not available.

4.9 As already mentioned, the AIRDIS figure requires only one adjustment and that is the addition for value of livestock increment by birth. This additional information is not available from the schedule on capital expenditure Schedule 2 of AIRDIS although it would seem possible to get some idea about the rate of increase in livestock from Schedule 1 relating to asset position collected at two points of time separated by a period of six months. This rate of increment will comprise net natural increment plus the balance position with regard to sales to and purchases from

households residing outside rural areas of Gujarat State so far as this State is concerned, or households residing outside rural areas of the country as a whole so far as All-India figures are concerned. In any case, as at present, these figures of natural increment in livestock are not available. A rough adjustment is sought to be made by using the NSS figures, which as already observed, appear to be gross increment and not net of deaths of livestock. For this purpose, an amount of Rs.1.07 crores is added for Gujarat and Rs.32.22 crores are added to the All-India figures. No changes in the figures as estimated by NSS have been made although time periods are different. This brings the aggregate capital formation figure for Gujarat to Rs.25.57 crores. For All-India, the adjusted figure is Rs.380.72 crores. In terms of relative magnitude, capital formation by Gujarat's rural households is 6.72 per cent of the All-India capital formation. Secondly, the former figure accounts for 7.17 per cent of agricultural and animal husbandry income of Gujarat State in 1961-62, whereas the latter figure is 5.62 per cent of the All-India agricultural and animal husbandry income in 1961-62.

4.10 The comparative position is brought out in the following table:-

Item	NSS (Average for 1958-59 & 1959-60)		AIRDIS 1961-62	
	Gujarat	All-India	Gujarat	All-India
1. Aggregate capital formation (Rs. crores)	19.51 (5.90)*	330.49	25.57 (6.72)*	380.72
2. Average amount per household (Rs.)	65.78	-	90.28	55.50
3. % of 1 to corresponding agricul- tural & animal husbandry income	6.64	5.43	7.17	5.62
4. % of 1 to aggregate tangible assets	-	-	1.39	1.05

(*Figure in bracket is % of All-India corresponding amount)

If these two sets of figures are accepted as comparable, then, it seems that in 1961-62, Gujarat's share in the All-India capital formation in rural areas increased slightly. The average amount per household also showed good increase. As percentage of income from agricultural and animal husbandry, capital formation for Gujarat has gone up from 6.64 to over 7 per cent in 1961-62 and the latter figure when compared with All-India's similar percentage indicates somewhat higher percentages. The AIRDIS enables computation of capital formation as proportion of tangible assets assessed at one point of time during the year 1961-62 (viz.31-12-61). This proportion can also be seen to be slightly higher for Gujarat than for All-India.

Limitations :

4.11 While an attempt at comparative analysis is done in this study, the limitations of the figures need to be specially mentioned. As has been stated by the NSS itself, the 15th round schedule for capital formation was provided on an exploratory basis. Its tentative nature should, therefore, be kept in view, and some features of this schedule mentioned

earlier are not meant to criticise the framing of the schedule itself. In fact, in the capital formation (urban) schedule framed in the 17th round, some of these features such as recording of both purchases and sales have been taken care of. Secondly, the size of the NSS sample for Gujarat State cannot be considered sufficiently large even when State and Central samples are combined. The sub-sample variations in both these types of samples show sizable variability in the data even as it relates to global estimates of total capital formation, and much more so in the case of individual items of capital formation. One would be on surer grounds if some idea could be had about the sampling errors of these estimates. The AIRDIS figures are based on a larger number of villages - 140 as against 106 in the NSS - and a much larger number of households within these villages about 5600 households as against 612 households in the NSS. At the All-India level, although NSS has a larger number of villages - 2604 as against 2057 in the AIRDIS - the number of households sampled by the AIRDIS is over 6 times the number sampled by the NSS. From the point of variability or the degree of precision, the AIRDIS would probably yield more precise results, though for either case, quantitatively, the co-efficient of variation or percentage standard errors are not yet known. The third limitation stems from the fact that in either case, it is difficult to say whether they are gross or net or nearer to gross or nearer to net. In effect they seem to be figures of gross depreciation, since depreciation of assets as at the beginning of the period is not deducted out. The nature of this figure i.e. whether it is gross or net, therefore, needs specific determination. It may be, therefore, that while some dimensionality is indicated by these figures, the temptation to read too much in them may not be quite in order and should be resisted. This is the case at the State level estimation, though the picture presented at All-India level may be more meaningful.

V. Concluding Remarks.

5.1 One main conclusion which emerges from this study is the need to use standardised concepts of fixed capital formation while conducting surveys to get comparable estimates of this economic aggregate. It is seen in the present study that in some important respects concepts of what constitutes fixed assets formation differ. It may be that different organisations may like to obtain estimates according to their own requirements but it is at least necessary to so frame the questionnaires and schedules and to so tabulate the data that estimates of fixed assets formation according to a standard definition of what that asset formation means can also be obtained. For instance, it is necessary to include both purchases and sales, so that net difference in respect of even transfer items like transactions in lands, buildings and livestock can be obtained so as to work out estimates of transactions between rural and urban households or rural households of a State and rest of the country, whenever necessary. It is also necessary to take into account estimates of net natural increase of livestock so as to conform to the national accounting concept. In the present study, it is clear that it is difficult to put the two sets of estimates obtained on the basis of surveys conducted by two official agencies on fully comparable basis vis-a-vis each other or either set vis-a-vis national income concept (e.g. in the case of live-stock, net natural growth is not available).

5.2 If the concepts are adhered to, it should be possible to obtain estimates of gross capital formation through large-scale sample surveys. Such estimates, obtained independently, will go a long way to fill an important gap in setting out national income and expenditure tables.

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N.B.:- The figures used in the study from references 1 and 5 are to be treated as provisional.

Preliminary & Confidential

IARNIW/66/2-3

**INDIAN ASSOCIATION FOR RESEARCH
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**THE CONCEPT, NATURE AND PATTERN OF CAPITAL FORMATION IN A
FARM ECONOMY WITH SPECIAL REFERENCE TO EAST INDIAN VILLAGES**

G. C. MANDAL

AHMEDABAD

9 – 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily
of the Organisations or Institutions to which they belong.

THE CONCEPT, NATURE AND PATTERN OF CAPITAL FORMATION IN A FARM ECONOMY WITH SPECIAL REFERENCE TO EAST INDIAN VILLAGES

G.C. Mandal

I

The problem of capital formation involves a lot of theoretical considerations. The question of foremost importance is how to distinguish between income and capital. Secondly there is the question of forms of capital, e.g., fixed capital and working capital. Thirdly arises the question of acquisition of capital from the point of view of the individual and society giving rise to a conflict between the two. Fourthly we have to tackle the question of two different aspects of capital, e.g., (a) financial capital and (b) physical capital and the relationship between the two which amounts to the question of the process of capital formation. Fifthly we have to consider the question of aggregation of capital and construction of indices of capital formation. This implies an analysis of capital into different categories and elements in a scientific perspective. At the end an analysis of the outlook for capital formation in a farm economy and a national policy for the purpose will be examined. It is proposed to perform the task in this paper with an empirical bias.

Concept of capital can be best formulated by reference to its distinction from income. Income has been conceived as the maximum consumable surplus, that is, the maximum amount of surplus that can be consumed this week without tending to reduce consumption in the next week to a lower level. Thus Professor Hicks writes:

"The purpose of income calculations in practical affairs is to give people an indication of the amount which they can consume without impoverishing themselves. Following out this idea, it would seem that we ought to define a man's income as the maximum value which he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning"*

Such a conception of income is possible when there is no encroachment on capital. Thus maintaining consumption at a fixed level is inseparable from the task of maintaining capital intact. Raising the level of consumption on a stable basis means maintaining capital at a higher level.

While income at the current moment is the maximum consumable surplus, capital is conceived to be an asset from which a stream of future incomes emerge. It is the discounted present value of the total stream of future incomes which it

* Hicks, J.R., Value and Capital, p.172.

generates. Thus if the series of income accruing in $(n+1)$ years is : $A_0, A_1, A_2, \dots, A_n$, the rate of interest is 100 r per cent per year, the capital value of this sum of incomes at the present moment is :

$$A_0 + \frac{A_1}{1+r} + \frac{A_2}{(1+r)^2} + \dots + \frac{A_n}{(1+r)^n}$$

An addition to capital means an addition to the income-stream which is currently equivalent to

$$\Delta A_0 + \frac{\Delta A_1}{1+r} + \frac{\Delta A_2}{(1+r)^2} + \dots + \frac{\Delta A_n}{(1+r)^n}.$$

Capital as a generator of a stream of future incomes conveys the idea of a durable asset like a tractor or a pumping set or a storage-building. As such working capital like fertilizer or seeds may be taken as lying outside the boundary of such definition. But though physical components of what is called working capital are exhausted in a single use giving an income once only - as a fund it must necessitate maintaining itself intact for maintaining the income from it at a constant level. An addition to working capital adds to the stream of future income and may, therefore, be taken as part of capital formation. Thus capital formation need not be interpreted to mean addition to the stock of fixed capital only but to the stock of working capital as well.

Again, addition to the stock of capital may be looked at both from the point of view of the individual and society. For society as a whole capital formation is effective only when there is an addition to its productive capacity. It is quite possible that capital accumulation on the part of an individual or a group of individuals is the result of transfer of wealth to him from another group of individuals. Thus individual acquisitions of old lands are not capital formation but mere transfer of assets. On the other hand land-reclamation is surely an act of capital formation, since it augments the productive capacity of society. Similarly an individual's purchase of an old machinery is not an act of capital formation, because it is merely a change of ownership. Capital formation is indeed a matter for macro-economic studies. A micro-economic study would only indicate the process but fail to get at the root of the real thing. Can consumer goods, say, food grains held in stock be regarded as capital? The answer would depend upon the character of the stock. If the stock is in a productive activity it is surely capital and any addition to the stock in curtailment of present consumption for the financing of a constructive project would be a part of capital formation. Capital formation is a substitution of future enhanced consumption for a given amount of current consumption. But in the absence of such a motivation a stock of consumer goods held just for speculative hoarding may be in the nature of a deterrent to capital formation in so far as it drives up cost of production or delays the bringing of some resources into productive use. Hence just an observable stock of consumer goods divorced from the unobservable motive of further production cannot be considered as capital in the social perspective, though this may be means of augmenting income of the individual by transfer of wealth through an inflationary process.

This naturally leads us to the distinction between financial capital and physical capital. The mere act of money-saving on the part of an individual or a group of individuals, is not capital formation. Money savings of an individual or a group of individuals may be the result of transfer of savings from another individual or a group of individuals. Unless savings are matched by investments capital formation cannot materialize. Savings passing into disuse are equivalent to hoarding and deterrent to effective capital formation in the same sense as that of holding an idle stock of consumer goods. Finance may be viewed as the process - but not an index of capital formation. On the other hand no new savings are possible unless there has been an addition to wealth of the community.

Thus arises the distinction between capital and capital formation. While capital transactions causing mere transfer of capital from one individual or a group of individuals to another individual or a group of individuals may put on a deceptive appearance of capital formation, net capital formation is impossible without new productive investments or new addition to the stock of capital which would eventually be used for further production. While capital as such is a static concept capital formation is a dynamic concept - it is a growth over time.

Further clarification of the concept of capital formation can be made by trying to set up indices for the measurement of capital formation. Obviously capital is composed of heterogeneous elements - broadly each being differentiated from other by the extent of durability and value. These may be enumerated as machineries, tools and implements, houses, houses working capital represented by a fund of goods and services which contributed to the working of fixed capital. In a farm economy fixed capital consists of all machineries, tools and implements having their use in farm production, farm buildings and land. But it may be noted here that while land may be treated as part of fixed capital as a static concept - as a part of capital formation this item would mean nothing but reclamation of new lands, construction of canals for irrigating lands and various land-improvement measures permanently or **quasi-permanently raising the productive capacity of land.** Working capital comprises seeds, manures, fertilizers, human and bullock labour which are required for keeping the farm in operation. Addition to or improvements of any of these items would mean more intensive operation of the farm to produce more. So long as the level of such inputs remains at a constant level no capital formation is recorded on working-capital-account. If consumption is raised so far as to encroach upon the fund of working capital, there would be impoverishment of the farm. Any reduction of present consumption to raise the working capital fund would result in increased consumption at a future date to compensate the present sacrifice of consumption. Utilization of idle labour-resource in productive activity is a contribution to capital formation. Thus working capital as mentioned earlier is an indispensable element in capital formation. It is all the more so in an underdeveloped economy where addition to farm working capital is not less important than addition to fixed farm capital.

In the light of what is stated above capital formation can be described in terms of some new investments as listed below for purposes of construction of indices:

1. Fixed capital -

- (a) Installation of machines
- (b) Increase in the number of tools and implements
- (c) Increase in cultivated area by reclamation of waste lands
- (d) Land-improvements
- (e) Irrigation works
- (f) Construction of new houses
- (g) Addition to the number of productive livestock
- (h) Any progressive innovation of machines, tools, implements and livestock reflected in their enhanced value.

2. Working capital -

- (a) Increase in seed input
- (b) Increase in manure and fertiliser input
- (c) Increase in labour input
- (d) Increase in use of plant-protection-materials
- (e) Progressive innovation of the above materials reflected in their enhanced value.

In a planned economy capital formation is determined by the national planning of production. It is inherent in the very allocation of resources between consumption and investment for each planning period.

If Y_{t-1} = National Income in period t-1

Y_t = National Income in period t

C_{t-1} = National consumption output in period t-1

C_t = National consumption output in period t

I_{t-1} = National Investment output in period t-1

I_t = National Investment output in period t,

then $Y_t - Y_{t-1} = (C_t - C_{t-1}) + (I_t - I_{t-1})$ or substituting ΔY_t for $(Y_t - Y_{t-1})$, ΔC_t for $(C_t - C_{t-1})$ and ΔI_t for $(I_t - I_{t-1})$ we can say $\Delta Y_t = \Delta C_t + \Delta I_t$ or in words planned increment of national income = planned increment of consumption output plus planned increment of investment output.

Thus irrespective of the spendable incomes in the hands of the consumers additional consumer spending in period t is limited to ΔC_t , ΔI_t (minus cost of replacement of worn out capital) is net capital formation on the assumption that this entire amount is brought into use or to the point of use.

Considering labour as the basic resource we can express consumption and investment in terms of labour input. Where incremental labour ΔL_t is absorbed in incremental national

income ΔY_t , l_t^c may denote labour-units absorbed in consumption output and l_t^i may denote those devoted to investment, $\Delta l_t^c + \Delta l_t^i$ being equivalent to Δl_t .

Now ΔI_t is distributed among a number of sectors composing the economy including the agricultural sector. Hence we can say that

$$\Delta I_t = \sum_1^n K_i^t \quad i = 1, \dots, n.$$

where K_i^t denotes net investment in a sector in period t , the subscript i stands for a sector and n the number of sectors.

K_a^t which we take as net investment in the agricultural sector is distributed among various items of new investment activities described in section I.

One question arises here: Does increase in labour input in the production of food-grains fit into the model? Apparently it does not. But on the individual farmer's working-capital-account it would appear as a capital-item. Thus the commodity-wise aggregative approach differentiating consumption-output from investment-output may differ from the aggregation of the individual producers' capital accountings. In national planning wage-fund is the determinant of consumption though a substantial part of it is related to investment. On individual accounts wage-fund is entirely a part of working capital. In an economy where private enterprise is dominant its motivation should be taken into account in a capital formation study. Thus wage fund comes into the picture.

III

A most generalised conception of capital formation can be derived from the dynamised Leontief model of input-output analysis where output of each industry passes partly as an input for current production and partly as a stock for future production to other industries, the rest going to meet demand of the consumers.* This is algebraically shown as follows :*

It is assumed that there are n industries of which one, say, the n th industry is households supplying labour services to other industries in exchange of goods they require.

* Leontief W.W., The structure of American Economy, 1919-39 (1951)

* Allen, R.G.D., Mathematical Economics (1957), pp.362-63.

X_r = total output of r th industry ($r = 1, 2, \dots, n$)

X_{rs} = output of r th industry passing to s th industry.
($r, s = 1, 2, \dots, n$)

a_{rs} = input-coefficients, that is, rates at which output of r th industry in s th industry.

b_{rs} = capital coefficients, that is, rates at which output of r th industry is held as stock in the s th industry.

x_r = demand of the consumers

S_{rs} = aggregate output of r th industry held as stock in s th industry

$$X_{rs} = a_{rs} X_s$$

$$S_{rs} = b_{rs} X_s$$

$\frac{dS_{rs}}{dt} = b_{rs} \frac{dX_s}{dt}$ = rate of change of stock i.e. capital-formation in terms of stock of r th commodity in s th industry following change in output of the s th industry.

It follows from the above definitions that

$$\begin{aligned} X_r &= x_r + \sum_s X_{rs} + \sum_s \frac{dS_{rs}}{dt} \quad (r = 1, 2, \dots, n) \\ &= x_r + \sum_s (a_{rs} X_s + b_{rs} \frac{dX_s}{dt}) \end{aligned}$$

Since $a_{rr} = -1$

and $x_{rr} = a_{rr} X_r = -X_r$ by convention, we have

$$x_r + \sum_s (a_{rs} X_s + b_{rs} \frac{dX_s}{dt}) = 0$$

($r = 1, 2, \dots, n$)

Again, since the n th industry is households, the term x_r is dropped and the expression is reduced to

$$\sum_s (a_{rs} X_s + b_{rs} \frac{dX_s}{dt}) = 0$$

In this model there is no differentiation between consumer goods and capital goods. Each commodity is conceived to have three-fold functions: as an input on current account, as an input on capital account (as a capital good) and as a consumer good. The process of capital formation is linked to change in output. This is dynamics of a short-period (say, a year) but does not indicate change in the input coefficients over time. A series of input-output matrix over a number of years can, however, be very good indicative of capital formation both in the input and stock aspects. The concept of capital formation used in the Leontief model is useful in

the analysis of general equilibrium which is greatly dependent upon stock position. An underdeveloped economy is, however, more interested in the dichotomic view of consumption and investment - an appropriate balance between which is expected to play a major role in long-term development.

IV

Empirical assessment of capital formation in our farm economy is a difficult task in view of the great paucity of time series data to indicate growth of capital in the farm sector over time. A brief review of some capital-formation studies conducted by the Visva-Bharati Agro-Economic Research Centre in the recent past will be made in this section before we pass on to consideration of some fresh material.

One of these studies is a part of the Report on re-survey of the village of Kashipur (W. Bengal) conducted in 1959-60. The salient points emerging from the study are as follows:*

A little more than half of the cultivating households in the village had new investment activity of some type or other. The new investments undertaken by the villagers were, however, not spectacular like installation of machinery or introduction of any new method of production - but mostly rudimentary expression of striving for improvement of their farming enterprise. Taking singly construction of houses was the most important act of new investment followed by reclamation of waste land, increased use of hired labour, acquisition of livestock, introduction of new fertilizers or increased use of manures and fertilizers. Most of the new investment activities were initiated by owner cultivators, they were larger for households with bigger land-holdings and smaller family size. Size of holding and family appear to have been the major determinants of new investments. The investments were mostly self-financed either by past savings or savings coming out of current incomes.

Another capital formation study for 150 farm-households in the district of Shahabad, Bihar was undertaken as a part of the Farm Management Investigation conducted by the Centre in this district.** The findings of the study indicate that capital formation in the economy of sample farms was characterised by preponderance of gross investments in draught cattle. Other items in order of importance were house construction, milch cattle and agricultural implements. No new investment was reported in respect of introduction of new crops, reclamation of waste land or any new business. The

* Mandal, G.C. and Sengupta S.C., Kashipur, W. Bengal 1956-60. A Report on Resurvey of a village (1961).

** Mandal, G.C. and Ghosh S.K., Studies in the Economics of Farm Management in Bihar, 1960-61 (Unpublished), Chapter 9.

scope of investment in land-reclamation was virtually nil in the district owing to absence of cultivable waste lands. Absence of investment in new business was indicative of little diversion of enterprise from farm to non-farm business. The meagre investment in milch cattle showed that efforts for combination of livestock with crop-enterprise were not developing satisfactorily. There were cases of construction of over-head capital like tanks, wells and irrigation channels. But self-labour had insignificant contribution to such activities. The most important source of finance for whatever new investments were undertaken was current or past savings of the farmers, a negligible part having been due to credit. Wherever credit helped capital formation, it was almost absolutely private credit from the money lenders.

in
Another study of three villages Chadiapalli in the Sanjam district of Orissa, Pabakhali in the Nadia district of W. Bengal and Hussainabad in Saharsa district of Bihar (1960-61) also revealed predominance of either construction of houses or purchase of land in the capital formation scene and paucity of investment in the machineries, tools and implements. Epidemic diseases by taking heavy toll of cattle lives worked as a capital decumulating factor. Hoarding in ornaments very adversely affected capital formation in the farm economy of the comparatively backward village of Hussainabad. Migration of a community to and its resettlement in the village of Pabakhali brought about a greater degree of capital formation (which took mostly the form of setting up irrigation arrangement in this village in the wake of new patterns of living). Growth of market, urbanisation and greater progress of development efforts around Chandiapalli induced new investments in the village comprising introduction of new crops on a large scale, introduction of improved variety of sugarcane and enhanced rate of application of fertilizers.*

In the three above-mentioned studies data were collected by making use of a questionnaire relating to new investments undertaken by farm-households during the last five years. The questionnaire was prepared on the basis of indices of capital formation mentioned in section I. It is, however, admitted that the data collected in respect of innovations or change in inputs were only qualitative. The farm households could not furnish information regarding the actual increased rates of inputs. We had to be satisfied in this regard only by data about the number of participant farmers. Besides the investments in draught animals were not always net investments which were equivalent to purchase minus sale plus appreciation minus depreciation in value terms due to age-factors of the animals. The difficulty of estimating net value of acquisition of livestock could not be overcome in many cases.

* Bhanja Prasanta Kumar, Capital Formation in Agriculture at the Farm Level (A Case Study of Three Villages in Eastern India), Indian Journal of Agricultural Economics, Vol. XX No.1, 1965).

The empirical aspect of farm capital formation is viewed here afresh in the light of data obtained from 5 villages as noted below all of which were resurveyed following a first survey some 5 years back:

1. Sahajapur in the district of Birbhum, W.Bengal; first surveyed in 1956-57, resurveyed in 1961-62.
2. Ranabigha in the district of Patna, Bihar; first surveyed in 1956-57, resurveyed in 1961-62.
3. Sahpur-Panapur in the district of Patna, Bihar; first surveyed in 1956-57, resurveyed in 1962-63.
4. Darlimunda in the district of Kalahandi, Orissa; first surveyed in 1957-58, resurveyed in 1963-64.
5. Teliband in the district of Phulbani, Orissa; first surveyed in 1956-57, resurveyed in 1962-63.

Some general characteristics of the villages are given in the appendix.

It may be noted that this study is restricted to assessment of inventory of draught animals and implements at two points of time with an interval of 5 or 6 years between them and new investments in some constructional activities, e.g. land reclamation, land-improvements, irrigation works and construction of new houses which were not accessible to inventory approach. Thus a combination of inventory and expenditure approach has been attempted in this study. The capital items were selected to be those which had close connection with agricultural production and which were amenable to measurement with least difficulty so as to serve as good indices of farm capital formation. In the case of two villages assessment of working capital and value of total output at two points of time was also brought within the scope of the study. Output was brought into the picture to examine the character of the capital formation as evident from its bearing on production. This aspect of the study could not be extended to the other villages for limitation of time and space at the disposal of the present paper. But more or less similar results are expected in these villages also.

Tables 1.1, 1.2, 1.3, 1.4 and 1.5 present data relating to amounts of fixed capital in the inventory of the farm households of the villages under study at two points of time - the first and the second survey. Such inventory comprises draught animals and implements both being evaluated at constant prices. Along with this are also presented in the tables data of capital expenditures on land-reclamation, land-improvements, irrigation works and construction of new houses wherever these expenditures were incurred during the five years preceding the 2nd survey.

In none of the villages under study increase in the inventory of draught animals or implements is much during the

interval between the two surveys. In some villages rather a decrement is observed. Capital expenditure on construction of new houses surpasses by far new investment in any of the aforesaid items. Net capital formation in the shape of draught animals is meagre, even though it has already been explored that considerable investments in these animals are made mostly by way of replacement.

In Sahajapur, W.Bengal there was a decrease in the inventory of draught animals and implements by a value of Rs.24.36 per acre. New investments in constructional activities which amounted to Rs.18.30 only per acre were not big enough to compensate the loss of fixed capital. Positive increase in the inventory of fixed capital (draught animals and implements) was, however, observed in the case of 5 holding-groups including the lowest one. Taken singly land improvements were the biggest new-investment-activity. For larger farms, however, largest amount of new investment was undertaken in the construction of new house.

In Ranabigha, Bihar, again the inventory of fixed capital (draught) animals and implements per acre) declined by Rs.29.24 per acre. But new investments in constructional activities (Rs.93.54 per acre) were large enough to exceed this decrement. Construction of new houses was the largest new investment. Inventory of fixed capital increased in the case of two holding groups out of four.

In Sahpur-Panapur in Bihar, and Darlimunda and Teliband in Orissa inventory of fixed capital increased by a value of Rs.3.47, Rs.4.57 and Rs.6.27 per acre respectively. New investments in constructional activities in these three villages amounted only to Rs.28.55, Rs.12.69 and Rs.40.08 per acre. In the village of Teliband new investments in land-improvements assumed a substantial magnitude (Rs.24.46 per acre).

In Sahpur-Panapur the largest increase in the inventory of fixed capital occurred in the case of the holding group 25-30 acres. In Darlimunda largest addition to the inventory was affected by the group 1.26-2.50 acres. In Teliband this was done in the case of the holding-group 5.00 - 7.50 acres. Next to Ranabigha this village is remarkable for having given a good account of new investments largest amount of which was accomplished by the group 10-15 acres.

In general new investments in constructional activities were much greater in amounts than additions to the inventory of fixed capital (draught animals and implements). It is also disclosed that there was no definite relationship between the per acre rate of capital formation and the size of holdings.

Table 2.1 presents data relating to incremental fixed capital comprising additions to inventory of draught animals and implements plus new investments in constructional activities (derived from Table 1.1 and 1.2) for the village of Sahajapur and Ranabigha as well as output-data for these villages during two years one preceding the 1st and the other

preceding the 2nd survey. The data are related to value of total crop-output per acre estimated at constant prices. Ratios of incremental fixed capital to incremental output (i.e. excess of output in the later year over that in the earlier one) are also worked out and given in the table.

It is apparent from Table 2.1 that these ratios are quite small. For the village Sahajapur as a whole the ratio is negative, though for most of the holding groups it is positive. The overall negative ratio is accounted for by the negative ratio of the two lower holding groups 0.01 - 1.25 and 1.26 - 2.50 acres.

Larger total outputs and incremental outputs of the village Ranabigha are due to its potato-cultivation on a commercial scale covering nearly 30 per cent of the cropped area. Overall incremental capital-output ratio of the village is larger than that of Sahajapur. In the cases of individual groups the ratios are lower in Ranabigha than for the corresponding groups in Sahajapur. But this is obviously for much greater output of the former compared to that of the latter.

In general the low incremental capital-output ratios are indicative of low degree of capital formation in relation to increase in output which in all probability is due/increase in the overall input-level or some specific inputs data of which are presented in Table 3.1.

In Ranabigha there was a sharp increase in the level of inputs between the two surveys in which all the holding-groups shared. The change was too pronounced to be accidental. Here the increase in output seems to be clearly due to increase in the level of inputs. Sahajapur, however, did not experience an overall increase in the level of inputs contrary to an experience of increase in four holding-groups in this village of which the holding-group 10-15 acres had the largest share in the rise of the input-level. Increase in the manure and fertilizer input, however, occurred among all the holding groups showing that this was not an erratic tendency. The increase in output in Sahajapur might have been mainly due to manures and fertilizers.*

* While in Sahajapur the inputs were evaluated at constant prices, in Ranabigha the inputs were evaluated at actual prices prevailing at the two different points of time when the surveys were conducted. But even after appropriate adjustment for price-change the increase in the input-level in Ranabigha would remain significantly high.

V

From whatever findings it has been possible to assemble here one thing is apparent : this is that the capital-formation-situation is rather gloomy. So far as indigeneous draught animals of a village are concerned the question is more of their utilisation and improvement by better feeding and breeding than that of increase in number. The position of implements is slightly better. This may have been warranted by expansion of crop-output or crop-intensification. In the case of implements also capital formation is to come about more as an improvement of quality than as an increase in number. The scope of improvement of draught animals and implements seems to be rather vast.

On the other hand addition to working capital or improvement of the level of inputs (particularly manures and fertilizers) would probably continue for some time to play a more important part in the capital formation scene than addition to fixed capital excepting, of course, the new improvements in constructional activities like land-improvements or irrigation works. This is why a picture of capital formation in a farm economy particularly of an underdeveloped country cannot be complete without giving a rightful place to working capital as well as constructional activities.

VI

According to an economist's analysis capital formation is motivated by desire of the individual to augment his income. The rate of capital formation would, therefore, depend upon how quickly he proposes to maximise the total stream of satisfaction from his future incomes derivable from his investments, data relating to productivity of capital being given.

Mathematically this is expressed as follows :*

$$Y_t = Y_0 \frac{1-c}{pk} t$$

[where Y_0 = income in the current year

Y_t = income in year t

C = marginal propensity to consume

1-c = marginal propensity to save

k = capital per unit of output

$\frac{1}{k}$ = productivity of a unit of capital]

$$\Delta Y_t = C \cdot Y_0 \frac{1-c}{ek} t$$

* Timbergen, J., The Optimum Rate of Saving, Economic Journal (London), December 1956.

Now utility or satisfaction is a function of consumption. If it is a logarithmic function such as $\log(cY_0 \frac{1-c}{e^k} t)$, its present value is expressed as $\log(cY_0 \frac{1-c}{e^k} t)$

where $\frac{1}{nt}$ is the discounting factor.

Let U denote the integral

$$\int_0^{\infty} \log \left(cY_0 \frac{1-c}{e^k} t \right) \frac{1}{nt} dt;$$

we have to find out what value of c will maximise the integral, values of n and k being given.

The outlook of the farmer with his meagre resources does not work in the way described above. His vision is focused on the fullest utilisation of the physical resources at his disposal. He examines whether there is any unutilized resource before him. It may be a piece of waste land, a unit of draught animal, some implements or a part of his own labour-capacity. He would then plan getting some cooperant inputs with a view to making best use of the idle resource in question. His real saving is mainly the idle resource and his investment is securing combination of cooperant inputs with the idle resource. Thus here the optimum saving or investment is centred around the issue of maximizing output by fuller utilization of the unused resource.

If I = investment,
R = fixed resource at the disposal of the farmer,
output = $f\left(\frac{I}{R}\right)$,

saving or investment is motivated by the integral $\int f\left(\frac{I}{R}\right) d\left(\frac{I}{R}\right)$
The outlook is for finding a value of I (say I_m) that would maximize the integral $\int f\left(\frac{I}{R}\right) d\left(\frac{I}{R}\right)$. Now if I changes with time t or I is a function of time: I(t), t reflecting annual availability of money savings, credit and real inputs, then we can write the maximum integral as

$$\int_0^{t_m} f\left(\frac{I}{R} \frac{dI}{dt}\right) dt,$$

t_m being defined as the year by which maximum total investment giving maximum production can be attained.

A national capital formation and credit policy may be formulated with a view to minimizing the t_m of the integral stated above. The bearing of the empirical data of section IV on this analysis is obvious.*

* It should be mentioned here that Surveys of 5 villages under the present study were conducted by Sarvashri M.G. Ghosh, S. Bhattacharjee, M.N. Singh, G. Patnaik and G. Ojha who, specially Shri Bhattacharjee and Ghosh, and Shri N.K. Roy also liberally helped in the preparation of the paper.

SAHAJAPUR, West Bengal

Table 1.1 - Farm Inventory of Draught Animals and Implements

Size group of operational holdings (acres)	Ownership holding (acres) per farm		Draught Animals (per acre)				Implements (per acre)		Total (per acre)		Increase (+) or Decrease (-)
	1956	1961	1956		1961		1956	1961	1956	1961	
			No.	Value (Rs.)	No.	Value (Rs.)	Value (Rs.)	Value (Rs.)	Rs. Col. 5,8	Rs. Col. 7,9	
	2	3	4	5	6	7	8	9	10	11		12
0.01 - 1.25	0.14	0.30	--	--	0.23	16.30	2.91	--	2.91	16.10	+13.19
1.26 - 2.50	0.73	1.55	0.14	37.80	0.29	20.30	10.29	30.18	78.09	50.43	-27.67
2.51 - 5.00	1.35	1.26	0.30	21.00	0.37	25.90	23.62	27.12	44.62	33.02	-11.40
5.01 - 7.50	1.56	2.75	0.19	14.25	0.34	25.50	17.42	27.72	31.67	57.22	+21.55
7.51 - 10.00	2.87	6.00	0.01	1.25	0.24	30.00	7.69	18.09	8.94	48.07	+39.15
10.01 - 15.00	12.25	10.50	0.86	86.00	0.26	26.00	21.94	24.03	107.94	50.03	-57.91
15.01 - 20.00	9.80	14.53	0.89	89.00	0.24	24.00	13.00	16.59	102.00	40.59	-61.41
20.01 - 25.00	67.39	23.24	1.07	1.07	0.23	23.00	11.19	28.53	12.26	51.53	+39.27
Total	2.78	4.64	0.69	55.20	0.29	23.00	17.30	24.45	72.50	47.65	-24.85

Table 1.2 New Investments in Constructional Activities at the Farm Level, 1956-61

Size group of operational holding (acres)	Land reclamation (cost per acre) (Rs.)	Land improvements (cost per acre) (Rs.)	Irrigation works (cost per acre) (Rs.)	Construction of new house (cost per acre) (Rs.)	Total (Rs. per acre)
1	13	14	15	16	17
0.01 - 1.25	--	4.54	--	22.72	27.26
1.26 - 2.50	--	--	--	--	--
2.51 - 5.00	--	3.83	--	9.20	13.03
5.01 - 7.50	--	3.97	--	2.64	6.61
7.51 - 10.00	--	7.14	--	--	7.14
10.01 - 15.00	--	12.32	18.79	36.99	68.10
15.01 - 20.00	--	32.64	--	30.60	63.24
20.01 - 25.00	--	11.56	--	69.33	80.89
Total	--	10.93	18.79	2.40	18.30

RANABIGHA, BIHAR

Table 1.2 - Farm Inventory of Draught Animals and Implements

Size group of operational holdings (acres)	Ownership holding (acre) per farm		Draught Animals (per acre)				Implements (per acre)			Total (per acre)		Increase(+) or Decrease(-)
	1955	1961	1955		1961		1955		1961			
			No.	(Rs.)	No.	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)		
			4	5	6	7	8	9	10	11	12	
0.01 - 1.25	0.32	-	0.55	137.50	-	-	12.28	-	149.78	-	-149.78	
1.26 - 2.50	1.47	1.31	0.63	157.50	0.63	157.50	11.69	28.86	169.19	186.36	+ 17.17	
2.51 - 5.00	3.37	3.96	0.53	132.50	0.58	145.00	58.86	34.27	191.36	179.21	- 12.09	
5.01 - 7.50	4.24	5.95	0.32	80.00	0.35	87.50	28.18	34.18	108.18	212.68	+ 13.50	
Total	1.57	1.38	0.52	130.00	0.45	112.50	38.53	26.79	168.53	139.29	- 29.24	

New Investments in constructional Activities at the Farm Level, 1956-61

Size group of operational holding (acres)	Land reclamation	Land improvements	Irrigation works	Construction of new work	Total
	(cost per acre) Rs.	(cost per acre) Rs.	(cost per acre) Rs.	(cost per acre) Rs.	(Rs. per acre)
1	13	14	15	16	17
0.01 - 1.25	-	-	-	-	-
1.26 - 2.50	4.43	-	-	13.71	18.14
2.51 - 5.00	8.81	-	-	167.04	175.85
5.01 - 7.50	7.11	-	-	123.20	130.31
Total	4.91	-	-	88.63	93.54

SAHAPUR-PANAPUR, BIHAR

Table 1.3 - Farm Inventory of Draught Animals and Implements

Size group of operational holding (acres)	Ownership holding (acres) per farm		Draught Animals per Acre				Implements (per acre)		Total (per acre)		Increase (+) or Decrease (-)
	1956	1962	1956		1962		1956	1962	1956	1962	
			No.	Value Rs.	No.	Value Rs.	Value Rs.	Value Rs.	Col.5+8	Col.7+9	
	2	3	4	5	6	7	8	9	10	11	12
0.01 - 1.25	-	-	-	-	-	-	-	-	-	-	-
1.26 - 2.50	0.10	0.24	0.11	17.60	0.07	11.20	0.96	2.73	18.56	13.93	- 4.63
2.51 - 5.00	2.42	2.81	0.18	28.80	0.22	35.20	1.67	6.35	30.47	41.55	+11.08
5.01 - 7.50	7.66	4.35	0.15	24.00	0.19	30.40	1.41	5.12	25.41	35.52	+10.11
7.51 - 10.00	9.63	8.28	0.18	28.80	0.19	30.40	2.67	4.43	31.47	34.83	+ 3.36
10.01 - 15.00	11.74	10.99	0.16	25.60	0.15	24.00	2.99	3.00	28.59	27.00	- 1.59
15.01 - 20.00	17.74	15.79	0.08	12.80	0.13	20.80	0.93	2.71	13.73	23.51	+ 9.78
20.01 - 25.00	-	-	-	-	-	-	-	-	-	-	-
25.01 - 30.00	-	33.92	-	-	0.15	24.00	-	3.45	-	27.45	+27.45
30.01 & above	64.65	73.65	0.11	17.60	0.13	20.80	0.84	3.12	18.44	23.92	+ 5.48
Total	4.72	8.17	0.15	24.00	0.16	25.60	2.01	3.88	26.01	29.48	+ 3.47

New Investments in Constructional Activities at the Farm Level 1957-62.

Size group of operational holding (acres)	Land reclamation (cost per acre) Rs.	Land improvements (cost per acre) Rs.	Irrigation works (cost per acre) Rs.	Construction of new houses (cost per acre) Rs.	Total (Rs. per acre)
1	13	14	15	16	17
0.01 - 1.25	-	-	-	-	-
1.26 - 2.50	-	-	-	7.26	7.26
2.51 - 5.00	-	-	-	45.30	45.30
5.01 - 7.50	-	14.52	-	16.13	30.65
7.51 - 10.00	-	-	-	23.47	23.47
10.01 - 15.00	3.72	14.67	-	4.86	23.25
15.01 - 20.00	6.54	44.15	-	65.40	116.09
20.01 - 25.00	-	-	-	-	-
25.01 - 30.00	-	-	-	-	-
30.01 & above	11.92	7.15	-	7.94	27.01
Total	3.71	8.51	-	16.33	28.55

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Table 1.4 - Farm Inventory of Draught Animals and Implements

Size group of operational holding (acres)	Ownership holding (acre) per farm		Draught Animals per Acre				Implements (per acre)		Total (per acre)		Increase(+) or Decrease(-)
	1957	1963	1957		1963		1957	1963	1957	1963	
			No.	Value Rs.	No.	Value Rs.	Value Rs.	Value Rs.	(Rs.)	(Rs.)	
1	2	3	4	5	6	7	8	9	10	11	12
0.01 - 1.25	-	-	-	-	-	-	-	-	-	-	-
1.26 - 2.50	0.50	2.17	0.10	6.20	0.62	38.44	4.56	5.69	10.76	44.13	+33.37
2.51 - 5.00	2.39	4.16	0.36	21.70	0.39	24.18	3.40	4.50	25.10	28.68	+ 3.58
5.01 - 7.50	6.25	6.24	0.45	27.90	0.22	13.64	5.63	2.50	33.53	16.14	-17.39
7.51 - 10.00	9.20	8.82	0.30	18.60	0.18	11.16	3.83	4.49	22.43	15.65	- 6.78
10.01 - 15.00	11.20	13.29	0.14	8.68	0.30	18.60	2.74	4.15	11.42	22.75	+11.33
15.01 - 20.00	-	19.00	-	-	0.24	14.88	-	0.92	-	15.80	+15.80
20.01 - 25.00	25.00	25.00	0.33	20.46	0.16	9.92	4.28	5.76	24.74	15.68	- 9.06
25.01 - 30.00	60.00	56.00	0.40	24.80	0.53	32.86	6.08	9.60	30.88	42.46	+11.58
30.00 & above	105.00	97.77	0.15	9.30	0.16	9.92	1.91	3.50	11.21	13.42	+ 2.21
Total	14.70	13.59	0.19	11.78	0.24	14.88	2.39	3.86	14.17	18.74	+ 4.57

New Investments in Constructional Activities at the Farm Level, 1958-63

Size group of operational holding (acres)	Land reclamation	Land improvements	Irrigation works	Construction of new houses	Total
	(cost per acre) Rs.	(cost per acre) Rs.	(cost per acre) Rs.	(cost per acre) Rs.	(Rs. per acre)
1	12	13	15	16	17
0.01 - 1.25	-	-	-	-	-
1.26 - 2.50	-	-	-	-	-
2.51 - 5.00	2.87	10.87	-	-	13.54
5.01 - 7.50	-	-	-	-	-
7.51 - 10.00	-	0.45	-	-	0.45
10.01 - 15.00	-	1.07	-	-	1.07
15.01 - 20.00	11.02	-	-	-	11.02
20.01 - 25.00	16.00	-	-	-	16.00
25.01 - 30.00	-	6.67	-	-	6.67
30.00 & above	1.70	23.87	-	-	25.57
Total	2.15	10.49	-	-	12.69

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Table 1.5 - Farm Inventory of Draught Animals and Implements

Size group of operational holding (acres)	Ownership holding (acre) per farm		Draught Animals per Acre				Implements (per acre)		Total (per acre)		Increase(+) or Decrease(-)
	1956	1962	1956		1962		1956	1962	1956	1962	
			No.	Value Rs.	No.	Value Rs.					
1	2	3	4	5	6	7	8	9	10	11	12
0.01 - 1.25	-	-	2.00	110.00	-	-	30.00	-	140.00	-	-140.00
1.26 - 2.50	1.25	1.04	0.46	25.30	0.74	40.70	7.00	3.11	32.30	43.61	+ 11.51
2.51 - 5.00	3.44	3.56	0.50	27.50	0.54	29.70	6.83	9.58	34.33	39.28	+ 4.95
5.01 - 7.50	5.26	4.37	0.35	19.25	0.57	31.35	8.27	13.91	27.52	45.26	+ 17.74
7.51 - 10.00	8.14	7.88	0.39	21.45	0.38	20.90	7.71	14.53	29.16	35.43	+ 6.27
10.01 - 15.00	11.33	10.74	0.32	17.60	0.49	26.95	6.02	12.39	23.62	39.34	+ 15.72
15.01 - 20.00	-	-	-	-	-	-	-	-	-	-	-
20.01 - 25.00	-	23.00	-	-	0.17	9.35	-	-	-	9.35	+ 9.35
25.01 - 30.00	-	-	-	-	-	-	-	-	-	-	-
30.01 & above	54.00	62.82	0.22	12.10	0.15	8.25	4.07	6.56	16.17	14.81	- 1.36
Total	56.28	52.24	0.38	20.90	0.45	24.25	6.99	9.88	27.89	34.13	+ 6.24

New Investments in Constructional Activities at the Farm Level, 1957-62

Size group of operational holding (acres)	Land reclamation (cost per acre) Rs.	Land improvements (cost per acre) Rs.	Irrigation works (cost per acre) Rs.	Construction of new house (cost per acre) Rs.	Total (Rs. per acre)
1	13	14	15	16	17
0.01 - 1.25	-	-	-	-	-
1.26 - 2.50	-	16.32	9.21	-	25.53
2.51 - 5.00	4.44	23.42	6.97	1.68	36.51
5.01 - 7.50	-	22.01	11.85	1.46	35.32
7.51 - 10.00	-	18.77	11.63	-	30.40
10.01 - 15.00	2.73	53.54	31.01	-	87.28
15.01 - 20.00	-	-	-	-	-
20.01 - 25.00	-	13.04	-	-	13.04
25.01 - 30.00	-	-	-	-	-
30.01 & above	-	9.45	13.24	-	22.69
Total	2.32	24.46	12.44	0.86	40.08

Table 2.1 - Incremental Capital Output-Ratio

Sahajapur : West Bengal

Size-group of operational holdings (acres)	Incremental fixed capital (Rs.)	Value of output per acre (Rs.)		Increment output (Rs.)	Incremental fixed capital output ratio
		1955	1951		
		1	2			3	4	5	6
0.01 - 1.25	+ 40.45	174.70	169.77	-4.93	-8.20
1.26 - 2.50	- 27.61	147.69	173.14	25.45	-1.08
2.51 - 5.00	+ 21.43	158.95	185.34	26.39	+0.81
5.01 - 7.50	+ 28.16	162.09	187.62	25.53	+1.10
7.51 - 10.00	+ 46.29	188.69	231.19	42.50	+1.09
10.01 - 15.00	+ 10.19	202.93	228.39	25.46	+0.49
15.01 - 20.00	+ 1.83	184.21	229.20	44.99	+0.04
20.01 - 25.00	+120.16	221.26	241.17	19.91	+6.04
total	- 6.55	177.34	211.62	34.28	-0.19

Ranabigha : Bihar

0.01 - 1.25	-149.78	958.00	869.09	-88.91	-
1.26 - 2.50	35.31	665.99	708.75	39.76	0.89
2.51 - 5.00	101.49	606.56	1003.64	396.98	0.40
5.01 - 7.50	143.81	606.95	811.48	204.53	0.70
total	64.30	672.59	869.06	196.47	0.33

Table 3.1 : Level of Inputs : All Crops
(Ranabigha, Bihar)

Size group of operational holding (acres)	* Year	Value of Per acre inputs (in Rupees)				Total
		Seeds	manures	fertilizers	hired labour	
1	2	3	4	5	6	7
0.01 - 1.25	1956	37.41	26.55	91.58	21.27	176.79
	1961	80.80	4.26	84.07	33.96	203.09
1.26 - 2.50	1956	29.52	14.61	52.19	16.06	112.38
	1961	61.54	11.16	63.90	39.05	175.65
2.51 - 3.75	1956	39.72	20.18	56.22	39.75	155.87
	1961	91.41	9.29	123.07	67.21	310.98
3.76 - 5.00	1956	33.23	16.41	67.86	48.75	166.25
	1961	75.46	21.14	98.32	99.30	294.22
5.01 - 7.50	1956	34.61	20.89	54.77	23.84	134.11
	1961	73.57	22.91	82.44	39.54	218.46
Total	1956	34.98	19.20	64.28	32.78	151.24
	1961	70.89	12.11	89.08	58.38	231.25

(Shajapur, W. Bengal)

0.01- 2.50	1956	5.60	4.50	2.50	32.00	44.60
	1961	4.53	8.42	4.61	5.53	29.09
2.51 - 5.00	1956	4.80	4.90	4.50	19.00	33.20
	1961	5.35	10.85	5.20	12.42	33.32
5.01 - 7.50	1956	4.90	5.40	5.00	30.50	45.80
	1961	5.96	8.78	5.58	31.09	51.41
7.51 - 10.00	1956	6.40	3.00	6.40	35.60	51.40
	1961	6.49	10.00	7.95	44.11	68.55
10.01 - 15.00	1956	4.30	5.80	6.70	44.20	61.00
	1961	6.32	12.64	16.64	58.10	87.70
15.00 - 20.00	1956	6.90	7.80	4.40	105.50	124.60
	1961	6.97	11.43	12.12	62.93	93.45
20.01 - 25.00	1956	6.40	4.30	8.70	103.20	122.60
	1961	7.17	13.18	14.38	91.31	126.04
Total	1956	5.70	4.90	6.20	62.50	79.30
	1961	6.21	11.15	9.05	46.68	73.09

* Survey year; data, however, relate to the year preceding the survey.

APPENDIX A

Some General Features of the Selected Villages under Study

1. Name of village	Saha Japur	Ranabigha	Sahpur-Panapur	Darlimunda	Talibandh
2. Predominant occupational group (in respect of number of households)					
(a) 1st Survey	Agricultural labour and non-owner cultivators	Wholly or mainly owner cultivator	Agricultural labour	Wholly or mainly owner cultivator	Mainly owner cultivator
(b) 2nd Survey	-do-	-do-	-do-	-do-	Wholly owner cultivator
3. Predominant social group (in respect of number of households)					
(a) 1st Survey	Backward scheduled castes	Backward class Hindus	Caste Hindus	Backward Class (Kulta)	Backward Class
(b) 2nd Survey	-do-	-do-	-do-	-do-	-do-
4. Total No. of household.					
(a) 1st Survey	133	111	94	69	66
(b) 2nd Survey	136	117	118	81	77
5. Av. size of households.					
(a) 1st Survey	4.19	6.20	6.92	5.81	4.6
(b) 2nd Survey	4.68	6.23	7.09	5.68	4.3
6. Growth of population	14.2%(during 1956-61)	6.6%(during 1956-61)	10.3%(during 1956-62)	14.7%(during 1958-64)	9.15%(during 1956-62)
7. Growth of working force	7.0%(during 1956-61)	1.3%(during 1956-61)	12.7%(during 1956-62)	24.0%(during 1958-64)	16.4%(during 1956-62)
8. Development project in operation in or around the village during the interval between the 1st and the 2nd survey.	Expansion of irrigation works.	C.D.P. Expansion of storage and transport.	Drainage and Irrigation (The scheme was completed in 1960), inception of a C.D. Block (1st stage) in 1953; metalled road with bus services; a marketing society at a distance of 1 mile from the village and multipurpose credit society at a distance of 3 miles.	C.D.P., development of a market centre, communication and transport facilities.	C.D.P., development of marketing, road and communication facilities.

APPENDIX B

A Note on The Optimum Rate of Formation of Working Capital

The practical implications of the concept of optimum investment dealt with in section VI of the paper are worked out here in terms of input and output data of Sahajapur (W. Bengal) (Tables 2.1 and 3.1). A second degree production function of the form $Y=a+bx+Cx^2$ is fitted to the cross-section-data of total inputs and outputs of the village for the year 1956. The actual function derived from these data is :

$$Y=10.57 + 5.11x - 0.03x^2$$

where x = total input (Rs.) per acre

Y = total output (Rs.) per acre

The relationship between input and output represented by the function has been found to be significant at one per cent level.

Optimum input which is expected to yield an optimum output in the present state of technology and resource-allocation obtaining in the village has been estimated from the function at Rs.85 per acre, the corresponding optimum output being estimated at Rs.228 per acre.

In 1956 the input-levels of farms belonging to five holding-groups out of seven were short of the optimum by an amount ranging from Rs.24 to 52 per acre. Of these five, one group, namely, 10-15 acres reached the optimum and slightly exceeded it by 1961; others remained short of the optimum by an amount ranging from Rs.19 to Rs.56 per acre. The best of the deficient group 7.51 - 10 acres increased the level of input from Rs.51 per acre in 1956 to Rs.69 per acre by 1961 at the annual rate of Rs.3.60 per acre.* It would take another 4 years to reach the optimum at this rate of input-formation. If we assume that this is the feasible optimum rate of saving for the other deficient groups, namely, 2.51 - 5 acres and 0 - 2.50 acres, they would then take 14 or 15 years to raise input level from Rs.33 or Rs.29 per acre of 1961 to the optimum of Rs.85 per acre. The average input-level of all farms taken together was found to be short of the optimum only by Rs.12 per acre and the average output was less than the optimum by Rs.17 only in 1961. This deficiency might be made up in the course of 3 years at the rate of Rs.4 per acre of input-formation. Thus the outlook for input-formation in the village under reference is not gloomy.

The optimum input-level would, however, radically change if the technology or even the pattern of resource-allocation as between different crops is altered. This is evident from the case of village Ranabigha, Bihar where the input-level is revolutionized and sharply distinguished by a higher level from that of Sahajapur, the difference being explained by the importance of potato in the cropping pattern of Ranabigha.

It may, however, be mentioned at the end that this note does not claim to serve anything more than the purpose of an illustrative model.

* This group, however, attained optimum output in 1961 rather accidentally.

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**A NOTE ON THE VARIATIONS IN FARM INVESTMENT
ON INDIVIDUAL HOLDINGS**

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AHMEDABAD

9—11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

A NOTE ON THE VARIATIONS IN FARM INVESTMENT ON INDIVIDUAL HOLDINGS

M. Meenakshi Malya .

This study is a micro-economic analysis of the variations in investment pattern of individual farmers in capital accumulation. Due to limitations of data availability, the objectives have been restricted to the following:-

(i) To study the variations in the pattern of agricultural investment by different classes of cultivators in varying agro-economic environment,

(ii) To examine the investment - income ratios in relation to size of holdings under differing agro-economic conditions, and

(iii) To investigate the nature of dependence of investment on existing capital-stock and current income, as a case study regression analysis.

The relevance and justification of a farm level study in the present context is based on the fact that even with vast outlays for capital expenditure by the Government in the five year plans, "about two-thirds of total investment in productive capital applied to agriculture is provided for by private individuals and only one-third by public sources"(1)

II

Problems of Definitions and Methodology

The concept of capital is complex and the discussions on definitions, numerous. (2)

The purpose is not so much the estimation of capital formation as the study of investment variations. Investment is the third and last of the interdependent activities that constitute 'Capital Formation'. The first is "Saving" the activity by which part of current consumption is deferred and the resources set aside for other purposes. Second is 'finance' an activity by which resources either from saving

1. As estimated by Hoselitz "Capital Formation, Saving and Credit in Indian Agricultural Society" in 'Capital, Saving and Credit in Peasant Societies' ed. Firth and Yamey. George Allen & Allen & Unwin Ltd. 1964.
2. For the most recent studies in the Indian context; refer to the papers and the Rapporteur's reports - Ind. Jr. of Ag. Econs. Vol. XX No.1. Jan-March 1965. The problem attains further complexity when 'human' capital and investment in human resources is also included in the definition; S. Kuznets "On the Measurement of National Wealth" in "Studies in Income and Wealth" Vol. Two N.B.E.R. New York 1938 and the discussion on it by Gerhard Colm and Copeland.

or borrowings are assembled. Investment is "the activity by which resources are actually committed to the production of Capital goods". (3) Obviously the pattern and volume of Capital Formation depends on the intensity and efficiency with which these activities are carried on.

The present study confines itself to the third activity, viz. investment. As such only capital expenditure on farms is considered in the following analysis. Investment on farm is delimited to four major items viz. land, livestock, implements and machinery and permanent improvements to land. (4) The 'net' expenditure (purchases less sales) on these items on a farm is defined as the "farm investment".

Undoubtedly the list is incomplete for estimation of capital formation as no account is taken of farm buildings, the items of expenditure are identical with the five categories of capital analysed by Tostlebe. (5) Since dis-investments in the form of depreciation, obsolescence, death and accidental damages are not (6) considered the farm investment discussed here is only "gross" investment. It is to be admitted that this functional or operational definition has a serious shortcoming in the sense that investments of a purely replacement nature and new investments are inseparable. However, to determine the exact amount for depreciation, obsolescence, methodological difficulties arise. For instance, the depreciation ratios used for arriving at net capital formation in agriculture in India vary from 20% on the total to 2.5% for rural housing, 10% for land and implements and 15% for transport equipment. (8) There has

3. Abramovitz in his introduction to "Capital Formation and Economic Growth" N.B.E.R. Princeton University Press 1955.

4. This is similar to the fixed farm capital expenditure as defined in the 'Rural Debt and Investment Survey 1961-62' conducted by the Reserve Bank of India.

5. "Capital Formation in Agriculture" Tostlebe, N.B.E.R. Princeton University Press 1957 - PP. 3-4.

6. According to U.N. definition to arrive at Net Capital Formation.

7. "Empirically however it is usually difficult or impossible to distinguish net and replacement investment, like for like replacement being very rare". Two different approaches are through comparison of output and depending on the age distribution of the capital stock-See J.R.Meyer & E.Kuh: The Investment Decision, Harvard U.P. 1959.

8. Papers on 'National Income and Allied Topics' /ed. V.K.R.V.Rao, S.R. Sen, M.V. Divatia and Uma Datta, Asia Publishing House 1960. Estimates by K.S. Rao (PP 77) and Baldev Kumar (PP 122-134).

not been any empirical determination of the depreciation rate for capital stock in agriculture in India, as yet, the method used here is to aggregate the purchases of land, livestock implements and machinery and add/expenditure on any permanent improvements to land (digging and deepening of wells, bunding, land reclamation, planting of groves or orchards and any other connected activities that enhances the productive value of the land) in the operational holding for the period of 5 years. From this the total value of sales in the 5 years period has been deducted, and the "Farm Investment" per year is obtained as the average for 5 years. The empirical data analysed in this paper have been obtained by the Survey method. This raises two problems; one, of a practical nature: what would be the component of response errors in the estimates of purchases and sales of farm assets due to memory lapses?(9) Secondly due to price variations, trends and other systematic fluctuations, will the aggregation and averaging of 5 year data at current prices be a valid procedure?(10) The first of these viz. inaccuracy due to memory lapses, it is argued, cannot be of a high order. For, it is not often that major items of capital investment particularly land livestock and machinery are overlooked or forgotten within a span of five years. Minor implements may present difficulties but since the proportion of investment on these items in the total is relatively low, the figures will not be too vitiated. Moreover, by taking the five year period, the purely replacement type of investments tend to get cancelled specially when the frequency of purchases and sales is less than one per year, as is usually the case with livestock and land.

Price variations present difficulties and the possible inflation or deflation of the amount of investment in Rs. cannot be ruled out. Absence of an index for price of capital goods in agriculture makes one abandon any attempts at adjustments for price changes. Other short-coming is the presence of a possible autocorrelation in the series of investments. If all the 5 observations were independent through time, the effect of averaging would be an equiproportional reduction in the variance. The hypothesis of independent observations may not be acceptable especially when the yearly investments may be interdependent - as purchase of land would be followed by purchase of more equipment and improvements on land. This may be the general pattern, but not necessarily so. Meyer and Kuh opine that "when durable goods and 'lumpy' sorts of expenditure are involved and one is seeking an explanation of long-run behaviour, the corresponding unit may be an average or aggregate taken over many years!"(11)

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9. Sri V.M. Jakhade's comments in Rapporteur's Report on Investment on farm and Capital formation in Agriculture PP.229 Ind.Jr. of Ag.Econs, Vol.XX No.1.
 10. Meyer and Kuh - in "The Investment Decision" Harvar U.P. 1959 PP.80-81.
 11. Meyer and Kuh. Ibid. P.81.

Before averaging, the very validity of aggregation may be questioned. If the quantities of old and new capital goods are to be aggregated, will mere addition of their values reflect the total worth of capital stock? "The aggregation of capital goods of all ages into a single index implies that capital goods, whatever their age, lose in any one period equal fractions of their values through depreciation".⁽¹²⁾ It is assumed that the current market values of the capital goods would reflect their productivity and age differences and hence aggregation overtime and types of capital goods is permissible. Problems of aggregation is only a minor one in the present context but in the study of capital formation, and growth, productivity differences would have to be reckoned with.

III

Source of Data:

The continuous village surveys of the Agricultural Economics Research Centre, University of Madras are the source of data for the present study. The villages have been selected purposively with differing agro-economic, climatic and locational characteristics. All the households in the villages were contacted and information elicited, through survey method. Since no attempt will be made to pool the data from different villages, it is obvious that non-random selection of the villages presents no problem. The period of reference varies between villages, adding yet another limitation to this study. It is surmised that there would not have been a drastic change in the conditions of these villages within a period of 4 years (1956-57 to 1959-60) such that the major variations in investments between villages is due to the time variable alone.

Nine South Indian Villages have been chosen to study the variations in per holding investments. Three of these villages have assured water supply, situated as they are in fertile regions, adequately served by canals in the Cauvery (Madigai Village) and Godavari (Villages Kumudavalli and Tetali) deltas. Paddy is the main crop - food as well as the cash crop. Improved agricultural practices such as use of improved seeds, chemical fertilizers and pesticides are well established.

Pathikonda in Andhra and Aralikottai in Madras State are in dry regions, dependent on rainfed tanks for irrigation.

12. H.A. John Green, 'Aggregation in Economic Analysis - An Introductory Survey' (Princeton University Press 1964) PP. 91-93. He argues that the basis for the construction of an index of capital goods must be productivity.

Two villages (Pallipuram and Kudumaloor) are in the urban fringe, in Kerala having strong economic links with the adjoining towns. Consumption expenditure mainly on hotels, cigarettes, clothing, education and recreation is conspicuously high in these villages. The last category of two villages, both in Kerala (Vechoor and Panancherry) have a high degree of uncertainty in agriculture; both villages are in the interior with comparatively isolated economies. Inundation of paddy fields is a frequent occurrence in Vechoor and cultivators in Panancherry are illegally cultivating Government lands at the edge of reserved forests. Both the villages depend on seasonal rains for irrigation.

These four categories by no means exhaust the types of villages nor are they mutually exclusive representatives of different systems of farming in South India. Nevertheless, these different environments may help explain some of the variations in the extent and pattern of farm investment.

Physical Environment and Investment Variations:

In a study of the investment behaviour in industry Meyer and Kuh investigated and tested for possible regularities in the investment process. One of their inferences is that industries in like economic situations do make similar investment decisions. Whether this could be so in agriculture is a hypothesis that will have to be tested if there is some empirical evidence.

Table 1*
Per holding investment

Year of Survey	State	Village	Land	Live-stock	Imple-ments and machinery	Rs.	
						Permanent Improve-ments to land	Total
1957-8	A.P.	Kumudavalli	113	95	6	83	297
1956-7	Madras	Madigai	8	57	9	25	99
1958-9	A.P.	Tetali	38	13	6	4	66
1958-9	Madras	Aralikottai	29	15	3	6	53
1956-7	A.P.	Pathikonda	3	19	7	18	47
1958-9	Kerala	Kudumaloor	26	5	1	11	43
1956-7	Kerala	Pallipuram	10	7	5	20	42
1960	Kerala	Panancherry	3	10	2	1	16
1959-60	Kerala	Vechoor	2	4	2	6	14

* The assistance of Sri R. Rajagopal, T. Ramakrishna Rao and B.V. Subbarao in the processing of data is gratefully acknowledged.

The level of investment is comparatively higher in stable agricultural environments, with assured water supply and lesser degree of natural hazards. In Madigai village (Tanjore) land is extremely scarce and land transactions are few and far between. In the first group, the relatively low investment in Tetali is perhaps the result of high tenorial uncertainty - 40% of the cultivated land in Tetali is under tenancy compared to about 15% in Kumudavalli and 8% in Madigai.

In Pathikonda which faces periodic draught conditions, the investment is on livestock and on digging of wells, a prudent precaution against failure of monsoons. The comparatively high interest in land investment in Aralikottai is attributable to land purchases on behalf of emigrants who send regular remittances from abroad. (13)

In Pallipuram, planting of Coconut trees is the main form of investment and in Kudumaloor, it is the land. Investment per holding is the lowest in villages with a high degree of risk confirming the observation that "An awareness of the peril (risks), however dim it may be in any individual investor's mind is one of the greatest obstacles to positive investment decisions". (14)

With the exception of Kumudavalli, all the estimates of investment per holding fall far short of the estimate of Rs.220 per household (15) based on the N.S.S. data for 1950-51. A second estimate, is provided for the year 1961-62^{this is} by the All India Rural Debt and Investment Survey of the Reserve Bank of India. The average capital expenditure per farm b^{howeve} cultivator's household (all-India) is Rs.32 in farm business. as wel^b This does not include housing, depreciation or maintenance charges. The estimates for Madras, Kerala and Andhra Pradesh are respectively Rs.40, Rs.19 and Rs.29 per household. Though comparison between these values and the nine villages' estimates is not strictly rigorous, the expenditure approaches of the R.B.I. Survey and the AERC Village surveys, are similar in concept. Variations of the village estimates from these

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13. This type of investment - buying land and constructing houses in the native village by outmigrants who hope to return is by no means uncommon. See for instance "Capital Saving and Credit among indigenous Rice farmers and immigrant vegetable farmers in Hongkong's New Territories". Marjorie Topley in "Capital Saving and Credit in Peasant Societies" ed. Firth and Yamey George Allen and Unwin Ltd. 1964.
 14. Henry Aubrey "Investment Decisions in underdeveloped countries" P.404 in "Capital formation and Economic Growth" N.B.E.R. Princeton University Press, 1955.
 15. As computed by B.F.Hoselitz "Capital Formation, Saving and Credit in Indian Agricultural Society" in "Capital, Saving & Credit in Peasant Societies" edited by Firth & Yamey, 1964, P. 349.

mean values high-light the influence of environment and location. There can be no generalisations or conclusions based on the data for these nine villages. There is some evidence, however, for the formulation of a hypothesis viz. it is the stability in agro-economic conditions that influences both the extent and pattern of farm investment rather than the exposure to urban economy and a higher degree of monetization.

V

Economic conditions and level of investment

Income:

The association between the investment level and income can be seen from Table 2. Income from farm is the residual from Gross Value (at harvest time prices) of agricultural and livestock production after deducting the expenditure on seed, manures and fertilizers, net maintenance cost of bullocks, land tax, irrigation and other charges; to this is added the net income from milch and other cattles. (feed, fodder, veterinary charges and cost of hired labour for cattle maintenance are deducted as items of cost to arrive at the net income). Income from other sources include wages, rents and remittances. Total income of the household is the aggregate of the incomes of all members of the household, through all sources.

Table 2
Income and level of investment

Village	(in rupees)						
	Aver- age size of hold- ing	farm in- come	Non- farm in- come	Total in- come	Concentra- tion ratio of income distribu- tion	Invest- ment per holding	% of investment to income
Kumudavalli	10.39	2238	205	2493	.48	297	11.9
Madigai	3.97	473	342	820	.30	99	12.1
Tetali	3.35	772	463	1235	.29	66	5.3
Aralikottai	3.78	296	150	446	.25	53	11.9
Pathikonda	6.24	302	497	799	.36	47	5.9
Kudumaloor	11.74	183	963	1146	.13	43	3.8
Palliparam	2.24	521	30	551	.40	42	7.6
Pananchery	3.24	481	118	599	.18	16	2.7
Vechoor	2.91	435	456	891	.16	14	1.6

Concentration of income distribution (over size groups) as given by Gini's ratio of mean difference is associated with investment levels. It seems possible that greater farm investment is seen in areas having higher inequalities of income.⁽¹⁶⁾ Pathikonda, Kudumaloor and Pallipuram seem to be the stray points from the general pattern of association between income concentration and investment. Average size of holding and per holding income do not seem to be closely associated with the level of investment. The widely differing types of land makes the comparison between villages difficult to effect. In Pathikonda one cultivator whose main occupation is money-lending has invested more in cash loans and buildings (Cinema houses) in urban area than on the farm. His income of nearly Rs.24,000 per year is about four times the next highest income in the village. This accounts for the greater inequality in income distribution in Pathikonda with a comparatively low farm investment. Besides, inequality alone is not sufficient to assure productive capital accumulation; the inequality must favour those who know how to and are willing to invest their surplus income productively. Pathikonda's money-lender seems to be a case in the point, a contrast to Kumudavalli's owners of productive equipment. Proportion of investment to total net income is comparatively low in villages where proportion of farm income in the total is also less.

The argument that (i) lack of knowledge - of technology, investment opportunities, market intelligence etc., (ii) awareness of risk and uncertainties and (iii) expectation of higher profits in alternative investments are the three major factors influencing investment decisions in industry⁽¹⁷⁾ is applicable to agriculture as well.

Size of holding:

The variations in investment between villages have been discussed above. Large variations exist within villages in farm investment, between classes of cultivators. The data is available for seven of the nine villages. The cultivators are arbitrarily classified into "below 5 acres" (small) between "5 and 15 acres" (Medium) and "above 15 acres" (Big) groups according to the extent of their operational holdings. By virtue of larger size, the 'big' cultivators may have comparative advantage of economy of scale for 'lumpy' investments, a greater

16. For theoretical treatment of this thesis see Jacob Viner in "The Economics of Development".

Burton, H.J. "Growth models and underdeveloped Economics" PP.231-32 and Arthur Lewis "Economic Development with unlimited supply of labour" PP.419-420 in "The Economics of Under-development" Ed. Singh & Agarwala, Oxford University Press, 1958.

17. Aubrey, Henry O.P. Cit. PP 408-10.

risk bearing capacity, higher credit worthiness and perhaps the knowledge of alternative investments as well. On the other hand, conspicuous consumption, proportionately greater number of dependents and a higher non-farm investment may also be characteristic of large-sized holdings.

Table 3
Size of holding and investment

		Big		Medium		Small	
		Rs.	% to income	Rs.	% to income	Rs.	% to income
Kumudavalli	...	1377.3	14.8	148.2	8.8	52.1	7.0
Total	...	379.1	9.3	91.1	4.1	51.2	4.9
<hr/>							
Aralikottai	...	308.0	10.0	130.2	24.4	21.4	6.2
<hr/>							
Kudamaloor	...	-	-	-484.8	-	70.4	6.5
Pallipuram	...	818.2	14.3	-112.3	-	31.9	7.3
<hr/>							
Pananchery	...	-	-	31.8	3.1	12.5	2.5
Vechoor	...	148.7	10.6	140.0	10.1	-146.3	-

In the seven villages studied, in absolute terms as well as a percentage of income, investment per holding is greater on 'Big' holdings except in Aralikottai and Vechoor. Small cultivators invest proportionately more of their income than the medium cultivators in three out of the seven villages. Within a homogeneous area (village), size of holding and investment are positively correlated.

The pattern of investment differs between classes of cultivators according to locations (See Appendix). In urban fringe villages, small holdings are on the increase; in delta villages, judging from the land investment activities of 'big' cultivators, the inequality in land distribution would tend to increase.

Assets, income, and investments:

The two delta villages where farm investment is comparatively high/further examined for relationship between assets income and investment at the holding-level. For this purpose, the data collected during 1961-62 for the resurvey of Madigai village is used. In Kumudavalli, the survey was conducted during 1957-58. Assets are evaluated at current market prices and comprise the total value of land, livestock and implements. There have been numerous theories of investment behaviour put forth in recent times. Edwin Kuh (1962)

and Meyer and Kuh (1959) deal and test the applicability of some of these theories including the expectation, capacity and profit models, in the context of American industry. (18)

Edwin Kuh (1963) has tested as many as 31 models for a sample of 60 firms in U.S.A. and both cross-sectional and time series (1935-1955) analysis have been done. The variables included are Gross Investment, Capital intensity index, Capital stock, sales, Gross retained profits, Capital coefficient (reciprocal of capital intensity index) and Dividends. Absolute gross investment as well as annual increase (or decrease) in gross investment is the dependent variable, variations in which are sought to be explained by the other variables and functions (such as first differences, averages and ratios) of these variables. Logs and log models are also tested. A complex price deflation procedure is evolved for the time series analysis. The conclusions are broadbased and many issues are discussed, which are of particular relevance to industry.

In the present study; four of Kuh's simpler, linear models with suitable modifications have been tested for two villages:

- I = Annual Gross expenditure on purchases of (i) land, (ii) live-stock, (iii) implements and machinery and (iv) permanent improvements to land (5 year average)
- X = Annual Value of Sales of items (i) to (iii)
- I' = I-X, farm investment (net)
- K = Total value of assets on the farm
- S = Total net income of the household
- Y = Farm income of the household
- Z = Income through other sources
- M = Total value of sales of agricultural produce in the holding

The equations are :

$$I = \alpha_0 + \alpha_1 K + \alpha_2 S - \alpha_3 X \quad (1)$$

$$I = \alpha_0 + \alpha_1 K + \alpha_2 M + \alpha_3 X \quad (2)$$

$$I' = \alpha_0 + \alpha_1 K + \alpha_2 S \quad (3)$$

$$I' = \alpha_0 + \alpha_1 K + \alpha_2 Y + \alpha_3 Z \quad (4)$$

Equation (1) relates to gross capital expenditure to the existing capital stock, net income, and sales or disinvestment. The hypothesis is that gross investment is higher in holdings with greater capital stock, higher income and lower disinvestment. The second equation reflects the sources of finance i.e., gross investment in relation to sales of produce and capital items.

18. Edwin Kuh in "Capital-stock Growth : a micro-econometric approach" (North-Holland Publishing Company, 1963 pp. 50-59) has critically reviewed theories by Duesenberry, Chenery and Modigliani.

The last two equations relate farm investment with capital stock and income - total, farm and from other sources.

The parameters of the equations were estimated and the results are as follows:

KUMUDAVALLI.

$$I = 277.8 + 0.0197 K - 0.23 S + 0.05 X$$

$$I = 14.0 + 0.0211 K - 0.27 M + 0.05 X$$

$$I' = 170.9 + 0.0173 K - 0.21 S$$

$$I' = 159.6 + 0.0179 K - 0.23 Y + 0.05 Z$$

MADIGAI

$$I = - 131.7 + 0.0439 K + 0.14 S + 0.02 X$$

$$I = - 39.9 + 0.0160 K + 0.49 M + 0.03 X$$

$$I' = - 632.6 - 0.1336 K + 1.44 S$$

$$I' = - 3080.2 - 0.8111 K + 8.41 Y + 5.04 Z$$

The models tried are simple regression ones. The volume of existing capital and further investment are directly correlated. Sales of capital goods is associated with greater gross purchases indicating perhaps a high incidence of capital replacement. In Kumudavalli, higher incomes - farm or from other sources and cash income from sales of farm products do not contribute positively to greater investment. It is the other way round in Madigai. In Madigai net investment is not positively correlated with the existing capital stock.

Income inequalities are higher and unequal wealth distribution seems to be conducive to greater investment in Kumudavalli. The insignificant relationship between income and net purchases is perhaps due to the fact that at higher income levels, the obligations to be met - (due to greater number of dependents) are many, conspicuous consumption and non-farm investments are also higher. Madigai on the other hand exhibits the dependence of investment more on income than on existing capital stock, an understandable phenomenon in a village where land market is very tight and further investments on farm by the rich is not feasible at the present level of technology and resource use.

These equations are not, however, statistically ideal fits. Moreover, they are tested on data that are far from perfect. The exercise, however, was attempted to explore the possibilities of a micro-economic analysis of farm investment. No general conclusions can be drawn on results of two villages, selected purposively. There is a need for development of an investment theory and investment behaviour of farmers, using stochastic and expectation models, uncertainty playing a great role in investment decisions.

VII

Conclusions

Low investment stems from an absolute shortage of total income which in turn makes the supply of savings limited. However, the supply of savings is perhaps a less significant limitation on investment than the demand for productive investment and investment opportunities. Even with low levels of income, investment in permanent improvements to land can be made by mobilizing idle family labour during slack periods. Uncertainty is the major deterrent in increasing farm investments; smaller size of holdings are also not conducive to 'lumpy' or large investments. With the increase in technical knowledge and rural electrification, the share of implements and machinery in the total investment may perhaps show an increase. Concentration of wealth and income are usually associated with higher levels of investments on farm, given stable conditions in agriculture.

Urban orientation leads more to conspicuous consumption than desire to invest more on productive assets. In a review of 'Capital Formation and foreign investment in underdeveloped areas' (19) various research needs in the countries of North-East, South and South-East Asia have been listed. One of these is the need to examine whether in underdeveloped countries the savings and investment functions the consumer and the entrepreneur behaviour would be the same as can be inferred from Western experience.

The interaction of risk and uncertainty with size of holding, and existing capital as a factor influencing farm investment is perhaps a fruitful topic for further investigation. Creating conditions of stability, increasing the technological knowledge and providing opportunities for investment may be the proper steps towards creating a demand for capital thus stimulating savings to result in a higher level of farm investment on holdings.

19. By Charles Wolf Jr. and Sidney Sufrin, Syracuse University Press, 1958.

Appendix
Size of holdings and net farm investment

(in rupees)

Village	BIG					MEDIUM					SMALL				
	Land	Live-stock	Imple-ments	Perma-nent impro-vements	% in-vest-ment to income	Land	Live-stock	Imple-ments	Perma-nent impro-vements	% in-vest-ment to income	Land	Live-stock	Imple-ments	Perma-nent impro-vements	% in-vest-ment to income
Kumudavalli	386.1	720.0	9.7	261.5	14.8	18.1	65.6	5.9	58.6	8.8	14.5	22.6	4.2	10.8	7.0
Tetali	263.8	61.1	26.4	27.8	9.3	12.3	49.8	12.7	16.3	4.1	36.4	10.2	4.3	0.3	4.9
Aralikottai	150.0	46.7	8.0	103.3	10.0	92.6	26.5	4.5	6.6	24.4	5.6	10.1	2.5	3.2	6.2
Kudumaloor	-	-	-	-	-	600.0	22.0	3.2	90.0	-	57.0	4.6	1.5	7.3	6.5
Pallipuram	-	94.6	191.6	532.0	14.3	180.0	29.5	12.2	26.0	-	20.8	4.4	1.8	4.9	7.3
Panancherry	-	-	-	-	-	2.7	27.5	4.2	2.8	3.1	3.7	6.3	1.7	0.8	2.5
Vechoor	75.0	39.5	3.7	30.5	10.6	109.7	9.0	2.9	18.4	10.0	154.4	2.4	1.8	3.9	-

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**INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH**

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**FORMATION AND FINANCING OF CAPITAL
IN AGRICULTURE**

B. W. CHAVAN

AHMEDABAD

9 – 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

FORMATION AND FINANCING OF CAPITAL IN AGRICULTURE IN MAHARASHTRA

B.W. Chavan

0.1 Economic growth depends by and large on the investment of current resources in physical assets. Capital formation which measures the additions to the stocks of physical assets is one of the major determinants of the income growth. In this paper, attempt is made to present the estimates of capital formation in agriculture which is the largest single income generating sector in Maharashtra as in other States in India. Estimation of capital formation encounters various difficulties, due to inadequacy of relevant statistical resources. The methods of estimation are, therefore, explained in detail in Section IV. Contribution of various sectors to the capital formation is discussed in Section II and financing of capital formation is brought out in Section III. The estimates presented here pertain to the year 1961-62.

I. The concepts

1.1 The concepts of capital goods and capital formation followed here are the same as enunciated in the Statistical Papers of the United Nations.* Capital goods are those goods which are produced for future use in productive process. These, therefore, cover machinery, tools and equipment, buildings and other constructions and producer's stock of goods including raw material, semi-finished and finished goods. Capital formation measures the additions to the stock of capital goods. The estimates presented here are those of gross capital formation in the sense that no allowance is made for depreciation, obsolescence and accidental damage to the fixed capital. The estimation is confined to agriculture sector which covers cultivation activities as well as animal husbandry and ancillary activities. Capital formation in agriculture as such is not easy to define. If the purpose of preparing estimates of capital formation is to throw light on the future growth in income, then all capital formation which would result in the generation and growth of income will have to be taken into account. In such a case, capital formation in agriculture would include additions to all capital goods which are used either in the process of agricultural production or in the manufacture of inputs in the agricultural operations. In other words, capital formation will signify not only the asset formation in farm business but also asset formation in other sectors which provide inputs to agricultural production. Thus, capital formation in agriculture will include investment in fertiliser industry as this industry provides inputs to agriculture which increases productivity. In this paper, however, we have taken a narrow view and confined ourselves to the asset formation in the farm business alone. Capital formation, is, therefore, taken to mean additions to farm inventories where the farm business includes animal husbandry. Hence expenditure on irrigation works is included under capital formation as irrigation works are deemed to form inventories in farm business; but investment in the establishment

The author is grateful to Shri S.M. Widwans, Director, Bureau of Economics and Statistics, Maharashtra State for the stimulating discussion which he had on the first draft of the paper and the guidance. The Director, however, is not responsible for the views presented in this paper.

* 'Concepts & definitions of capital formation' Statistical Papers Series F.No.3, United Nations.

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of a fertiliser plant has not been included even though the fertiliser is an input in agriculture, as fertiliser plant is considered as an inventory in the industrial sector. Capital formation, therefore, represents all gross expenditure leading to asset formation in agriculture sector and it covers expenditure on reclamation, bunding, irrigation, construction of farm houses, cattle sheds, purchase of agricultural equipment etc. In the case of expenditure in kind or value of owned assets, materials and household labour, imputed values are included. Moreover, the estimates presented are of fixed capital formation, restricted thereby to the additions to fixed capital (i.e. buildings and other constructions, equipment and machinery) and additions to working capital or producers' stocks are ignored. However, increment in livestock is included.

1.2 Even though, increment in livestock is included under capital formation, while presenting and comparing estimates of capital formation in agriculture in rural household sector pertaining to various States, increment in livestock has not been included as the estimates of increment in livestock for other States are not readily available.

II. Capital Formation in Agriculture in Maharashtra

2.1 Gross fixed capital formation in agriculture is estimated at Rs.45 crores during 1961-62 in Maharashtra. State Income generated in agriculture during 1961-62 was of the order of Rs.673* crores. Thus, capital formation in agriculture is to the extent of 6.7 per cent of the income arising from the sector. Considering the fact that capital formation in agriculture is not entirely financed from the income generated in agriculture, the rate of capital formation in Maharashtra appears to be rather low. The rural household sector contributed Rs.29 crores or nearly two-thirds of the capital formation. The direct expenditure (apart from loan expenditure) on capital formation incurred by Government and local bodies was to the tune of Rs.15 crores or one-third of the capital formation in agriculture. The following table gives a synoptic view of the capital formation in agriculture in Maharashtra.

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Table No. 1

Gross Fixed Capital Formation in agriculture in Maharashtra State

Sector (1)	Rs. lakhs (2)	Percentage to the total (3)
1. Rural household sector	29,14	64.4
2. Urban household sector	1,26	2.8
3. Government and local bodies	14,84	32.8
<u>Total</u>	<u>45,24</u>	<u>100.0</u>

* Estimated according to revised method of estimation.

2.2 As expected, rural household sector contributes the highest share in capital formation in agriculture. The capital formation in agriculture (excluding increment in livestock) per rural household is estimated at Rs.38.5 in Maharashtra as compared to Rs.24.3 in India. Though the rate of capital formation in agriculture may not appear very high in the State, it is significant to note that capital formation per household in the State exceeds that in India by more than 58 per cent, considering the fact that the irrigation facilities are quite meagre in the State, cropping pattern is more favourable to the inferior crops like jowar and bajra and yield rates of most of the crops are quite low. In India, the State stands fourth next to Mysore, Gujarat and Madras and above Punjab when ranked according to the capital formation per rural household as will be seen from the following table.

Table No.2

Average gross fixed capital formation in agriculture
per rural household in various States

State	Average amount per household (in Rs.)	Index with All- India = 100
(1)	(2)	(3)
1. Mysore	62.7	258.0
2. Gujarat	54.1	222.6
3. Madras	38.7	159.3
4. Maharashtra	38.5	158.4
5. Punjab	30.6	125.9
6. Andhra Pradesh	29.9	123.0
7. Jammu & Kashmir	25.1	103.3
8. Rajasthan	23.6	97.1
9. Kerala	18.0	74.1
10. Orissa	17.8	73.3
11. Assam	17.8	73.3
12. Madhya Pradesh	14.7	60.5
13. Bihar	6.8	28.0
14. Uttar Pradesh	6.1	25.1
15. West Bengal	5.8	23.9
All India	24.3	100.0

Note:- Increment in livestock is not included in the above estimates of capital formation.

2.3 In the rural household sector, the most important item of capital formation was construction of wells which accounted for nearly 30 per cent. of the total capital formation in agriculture. Next in importance was purchase of equipment accounting for 19 per cent. Construction of new bunds accounted for 17 per cent while reclamation constituted 11 per cent of the capital formation in agriculture in the State. At the national level, the foremost item of capital formation was purchase of equipment; construction of wells and reclamation followed in that order as will be seen from Table No. 3.

Table No.3

Percentage Share in aggregate fixed capital formation in agriculture of various constituents in the rural household sector.

Item	Percentage to the total fixed capital formation in farm business	
	Maharashtra	India
(1)	(2)	(3)
1. Reclamation of land	11.2	16.7
2. Bunding and other land improvements		
(a) Major alterations, additions and other land improvements	8.6	6.2
(b) Construction of new bunds and other land improvement	16.9	9.3
3. New plantations and additions to existing orchards and plantations	1.2	2.7
4. Wells		
(a) Major alterations	3.3	5.9
(b) Construction	29.6	18.0
5. Other irrigation sources		
(a) Major alterations	1.9	1.1
(b) Construction	0.6	1.5
6. Purchase of new additional equipment of		
(a) traditional type	6.2	13.8
(b) Improved type	12.9	14.6
7. Farm houses, grain golas and cattle sheds		
(a) Major alterations	1.5	1.2
(b) Additions to existing structures	0.4	0.9
(c) New construction	5.3	7.1
8. Other items of fixed capital formation	0.4	0.9
<u>Total</u>	<u>100.0</u>	<u>100.3</u>
Total capital formation/agriculture per rural household (in Rs.)	38.5	24.3

(N.B. Increment in livestock is not included.)

2.4 In absolute terms, the aggregate fixed capital formation in agriculture (including increment to livestock) was of the order of Rs.29 crores in the rural household sector. Increment in livestock alone accounted for Rs.8 crores. Expenditure on construction and major alternations of irrigation wells was of the order of Rs.7 crores. In addition, other irrigation sources accounted for about half a crore of rupees. Capital formation by way of reclamation, bunding and other land improvement was to the extent of Rs.8 crores. The rural households incurred an expenditure of Rs.4 crores on the purchase of new additional equipment. Table No. 4 shows the capital formation in agriculture according to different constituents in rural household sector.

Table No. 11

Capital Formation in agriculture according to different constituents
(Rural household sector)

Item	Capital formation (Rs. lakhs)	Percentage to the total
(1)	(2)	(3)
1. Reclamation	241.0	8.3
2. Bunding & other land improvements		
(a) Major alterations & additions and other land improvements	185.1	6.4
(b) Construction of new lands and other land improvements	363.6	12.5
3. New plantations & additions to existing orchards and plantations	25.8	0.9
4. Wells :- (a) Major alterations	71.0	2.4
(b) Construction	636.9	21.8
5. Other irrigation resources		
(a) Major alterations	10.9	0.4
(b) Construction	12.9	0.4
6. Purchase of new additional equipment of		
(a) Traditional type	133.4	4.6
(b) Improved type	277.6	9.5
7. Farm houses, grain golas and cattle sheds		
(a) Major alterations	32.3	1.1
(b) New construction	114.0	3.9
(c) Additions to existing constructions	8.6	0.3
8. Other items of fixed capital formation	8.6	0.3
9. Sub-total of items (1) to (8)	2151.7	73.8
10. Increment in rural livestock	762.8	26.2
11. Total of (9) & (10)	2914.5	100.0

2.5 In the rural household sector, irrigation works claimed the highest share (more than one third) in the capital formation in agriculture in the State.* This phenomenon is quite encouraging since Maharashtra with its 6.2 per cent of net sown area irrigated ranks almost the last among the States in irrigation facilities. The average capital formation by way of irrigation works was Rs. 14 per household in Maharashtra next only to Mysore and which is more than twice the average for India as a whole. Being a household sector, the bulk of the expenditure on irrigation works is on construction of wells.

* Excluding increment in livestock.

Table No. 5

Capital formation by way of irrigation works per household
(Rural household sector)

State	Average per household (in Rs.)						Total (4) + (7)	Percentage of col.(8) to the total fixed capital formation in farm business
	Wells			Other irrigation resources				
	Major al- terations	Construc- tion	Total : (2)+(3)	Major al- terations	Construc- tion	Total : (5)+(6)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Mysore	2.3	4.0	16.3	0.1	0.2	0.3	16.6	26.5
2. Maharashtra	1.3	1.4	12.7	0.7	0.2	0.9	13.6	35.4
3. Madras	8.5	4.7	13.2	-	0.2	0.2	13.4	31.5
4. Rajasthan	2.3	7.4	9.7	-	1.0	1.0	10.7	45.5
5. Gujarat	4.4	4.8	9.2	0.2	1.0	1.2	10.4	19.2
6. Andhra Pradesh	1.0	6.4	7.4	0.8	-	0.8	8.2	27.6
7. Punjab	0.7	3.4	4.1	0.7	0.8	1.5	5.6	18.0
8. Madhya Pradesh	0.1	4.7	4.8	-	-	-	4.8	33.1
9. Jammu & Kashmir	0.1	2.4	2.5	0.1	-	0.1	2.6	10.3
10. Bihar	-	1.6	1.6	0.4	0.3	0.7	2.3	34.4
11. Kerala	0.3	0.2	0.5	-	1.4	1.4	1.9	10.1
12. Assam	0.1	0.2	0.3	1.2	0.2	1.4	1.7	9.6
13. Uttar Pradesh	0.2	1.1	1.3	-	0.3	0.3	1.6	26.3
14. Orissa	-	0.5	0.5	-	0.1	0.1	0.6	3.5
15. West Bengal	-	0.1	0.1	-	0.1	0.1	0.2	3.6
All India	1.4	4.4	5.8	0.3	0.4	0.7	6.5	26.5

Note:- While taking percentages, increment in livestock is not included in the total capital formation in agriculture.

2.6 Purchase of new additional equipment was another significant constituent accounting for a little less than 1/5th of the capital formation in agriculture, in rural household sector. The State ranked seventh when measured by the average capital formation by way of purchase of new additional equipment per household which was Rs.7 and which exceeds the national average of a little less than Rs.7. It is interesting to note that in Maharashtra, the expenditure on the purchase of improved type of additional equipment was nearly twice the expenditure on the traditional type of equipment. In most of the States in India, the rural households have spent more on traditional type of implements than on the improved type. In West Bengal, for instance, the rural households have spent on traditional equipment nearly four times their expenses on improved type. Similarly in M.P and Bihar the expenditure on traditional equipment was about three times while in Mysore, Rajasthan and U.P it was nearly twice the expenditure on improved type of equipment.

Table No.6

Capital formation by way of purchase of new additional equipment per household (Rural household sector)

State	Average per rural household (in Rs.)			Percentage of col.4 to the total fixed capital formation in farm business
	Traditional type of equipment	Improved type of equipment	Total (2) + (3)	
(1)	(2)	(3)	(4)	(5)
1. Gujarat	11.3	18.2	29.5	51.6
2. Madras	4.8	9.5	14.3	36.9
3. Punjab	6.8	7.3	14.1	45.9
4. Mysore	8.8	4.6	13.4	21.5
5. Andhra Pradesh	3.5	6.1	9.6	32.2
6. Rajasthan	5.6	2.7	8.3	35.1
7. Maharashtra	2.4	5.0	7.4	19.1
8. Madhya Pradesh	1.8	0.7	2.5	16.5
9. Kerala	1.7	1.2	2.9	16.2
10. Bihar	1.4	0.4	1.8	26.8
11. Orissa	1.6	-	1.6	9.0
12. Uttar Pradesh	1.1	0.5	1.6	20.4
13. West Bengal	0.9	0.2	1.1	20.3
14. Assam	0.4	0.1	0.5	2.4
15. Jammu & Kashmir	0.3	0.1	0.4	1.3
All India	3.4	3.5	6.9	28.4

2.7 The rural households spent Rs.4.3 per household in the State as compared to Rs. 4.1 in India. But the reclamation accounted for 11 per cent of capital formation in agriculture in Maharashtra as against 17 per cent in India.

Table No.7

Capital Formation by way of reclamation per household
(Rural household sector)

State	Average per rural household (in Rs.)	Percentage to the total capital formation in farm business
(1)	(2)	(3)
1. Mysore	12.7	20.3
2. Assam	10.9	61.4
3. Orissa	10.1	56.5
4. Madras	6.3	16.2
5. <u>Maharashtra</u>	<u>4.3</u>	<u>11.2</u>
6. Punjab	4.3	14.1
7. Kerala	4.0	22.3
8. Andhra Pradesh	3.8	12.7
9. Jammu & Kashmir	3.5	14.1
10. Uttar Pradesh	1.3	21.5
11. Rajasthan	1.0	4.4
12. Gujarat	0.9	1.7
13. Madhya Pradesh	0.8	5.5
14. West Bengal	0.7	12.3
15. Bihar	0.6	9.1
All India	4.1	16.7

2.8 Nearly one-fourth of the capital formation in agriculture in Maharashtra was by way of bunding and other land improvement and the State topped the list among other States according to the average expenditure per household. In fact, the average per household in the State was more than twice the average obtained in the country. It will, thus, be evident that considerable attention is being paid to soil-conservation and other land improvement activities in the rural household sector mainly because of financing of such programmes by Government.

Table No. 8

Capital formation by way of bunding and other land
improvement per household
(Rural household sector)

State	Average per rural household (in Rs.)	Percentage to the total fixed capital formation in farm business
(1)	(2)	(3)
1. Maharashtra	9.8	25.5
2. Mysore	9.4	15.0
3. Gujarat	7.9	14.6
4. Andhra Pradesh	6.3	20.9
5. Madhya Pradesh	5.0	34.5
6. Orissa	4.8	26.9
7. Kerala	2.9	16.2
8. Madras	2.1	5.5
9. Jammu & Kashmir	1.6	6.5
10. Rajasthan	1.6	6.8
11. Assam	1.3	6.9
12. Bihar	1.1	16.3
13. Punjab	1.0	3.5
14. West Bengal	0.8	12.6
15. Uttar Pradesh	0.6	9.6
All India	3.8	15.5

2.9 The capital formation in agriculture by government and local bodies was of the order of Rs. 15 crores, most of which was under irrigation. The major and medium irrigation schemes undertaken by the Government was the major item of capital formation by the Government. Next in importance was the minor irrigation by Government. Besides the direct expenditure of Rs. 15 crores incurred by the Government and local bodies for capital formation in agriculture, government advanced Rs. 2 crores to the cultivators for financing capital formation in the household sector. The following table shows the direct capital formation in agriculture in Government and in local bodies sector.

Table No. 9

Capital formation in agriculture in Government and
in local bodies sector

Item	Rs. in lakhs	Percentage to the total
(1)	(2)	(3)
I. Irrigation		
(a) Major & medium	10,96	73.9
(b) Minor	2,46	16.5
(c) Wells	13	0.9
(d) <u>Sub-total</u>	<u>13.55</u>	<u>91.3</u>
II. Soil conservation and other land improvement	31	2.1
III. Other agricultural proper	36	2.4
IV. Animal husbandry	62	4.2
V. <u>Grand Total</u>	<u>14.84</u>	<u>100.0</u>

Note:- Excludes government expenditure by way of
loans for financing capital formation.

in
III. Financing of capital formation/agriculture in Maharashtra

The gross fixed capital formation in agriculture in Maharashtra was of the order of Rs. 45 crores. The Government and local bodies incurred an expenditure of Rs. 15 crores for their participation in economic activities leading to capital formation. In addition, government advanced loans to the tune of Rs. 2 crores. In the credit programme, the co-operative societies played a significant role and advanced loans to the tune of Rs. 4 crores for financing capital formation in agriculture. The households, however, continued to borrow from other agencies to a small extent and the borrowings from other agencies by the household sector for financing capital formation amounted to Rs. 70 lakhs. In other words, of the total capital formation in agriculture of Rs. 45 crores, capital formation to the extent of Rs. 7 crores or 16 per cent, was financed from borrowings by the household sector and the households incurred an expenditure of Rs. 23 crores or 52 per cent of the capital formation (inclusive of increment in livestock) was raised from their own resources. So far as household sector alone is concerned, the total capital formation was of the order of Rs. 30.4 crores out of which Rs. 7 crores or 23 per cent was financed from borrowings. Table No. 10 gives a bird's eye view of the financing of capital formation in agriculture.

Table No. 10

Financing of capital formation in agriculture in Maharashtra by various agencies

Source	Amount (Rs. in lakhs)	Percentage to the total
(1)	(2)	(3)
1. Loans by co-operative societies	4,10	9.06
2. Loans by government	2,21	4.89
3. Loans by other agencies	70	1.55
<u>Total loans for financing capital formation</u>	<u>7,01</u>	<u>15.50</u>
4. Expenditure by government and local bodies (excluding loans)	<u>14,84</u>	<u>32.80</u>
5. Expenditure by household sector from its own resources	23,39	51.70
<u>Grand Total</u>	<u>45,24</u>	<u>100.00</u>

3.2 Co-operative society is the leading credit agency in the rural areas. The total loans issued by the agricultural credit societies and land mortgage banks in Maharashtra amounted to Rs. 45 crores. Out of these, nearly Rs. 39 crores was for meeting current expenses on seasonal agricultural operations. Loans to the extent of Rs. 4 crores were issued by the co-operative societies for financing capital formation in agriculture. Out of these nearly Rs. one crore was advanced by agricultural societies as medium term loan and the land mortgage banks issued loans to the tune of Rs. three crores for financing capital formation. Nearly half of the credit advanced by the co-operative societies for financing capital formation was for land improvements as will be seen from the following table.

Table No. 11

Loans issued by the co-operative societies for financing capital formation in agriculture in Maharashtra

Purpose	Amount (Rs. in lakhs)	Percentage to the total
(1)	(2)	(3)
1. Land improvement	2,01	49.0
2. Purchase of pumps for irrigation purposes	64	15.6
3. Purchase of other agricultural implements and machinery	1,08	26.3
4. Sinking of and repairs of wells	33	8.1
5. Others	4	1.0
<u>Total</u>	<u>4,10</u>	<u>100.0</u>

3.3 During the year 1961-62, the major loans advanced by the government for financing capital formation in agriculture, were through community development programme. The government advanced loans to the tune of Rs.1,34 lakhs mainly for construction of irrigation wells, through their block agency. In addition, an expenditure of Rs.5 lakhs was incurred by the government for advancing loans for improvement of wells and installations of engines and pumping sets. In other words, the government spent Rs.1,39 lakhs, by way of loans for financing capital works connected with irrigation. Besides, the government advanced loans to the tune of Rs.82 lakhs for soil conservation and land improvement purposes.

3.4 Agencies other than government and co-operative societies* played a very minor part in advancing loans for financing the capital formation in agriculture. The loans advanced by other agencies such as commercial banks, money lenders, relatives etc., amounted to Rs.70 lakhs only or hardly 10 per cent of the total loans. The loans from other agencies financed the capital formation to the extent of 1.5 per cent only. It is interesting to note that though the loans advanced by other agencies were quite insignificant for financing the capital formation in agriculture, these agencies continue to have a major share in the cash loans borrowed by cultivators for various purposes.

Table No. 12

Percentage distribution of cash loans borrowed for all purposes by cultivator households according to credit agency
(Rural household sector)

Agency	Percentage to the total
(1)	(2)
1. Government	8.46
2. Co-operative societies	38.16
3. Agricultural money lenders	16.12
4. Professional money lenders	8.44
5. Trades & commission agents	3.58
6. Commercial banks	0.12
7. Land lords	0.26
8. Relatives	15.46
9. Others	9.40
<u>Total</u>	100.00

It will thus be evident that the cash loans advanced by the agencies other than government and co-operative societies formed more than half of the loans taken by the cultivator households for all the purposes, the loans advanced by other agencies were only 10 per cent. of the loans advanced by all agencies for financing capital formation in agriculture by the household sector.

3.5 The capital formation in agriculture by the household sector which was financed from its own resources amounted to Rs.23 crores which was 52 per cent of the capital formation in agriculture. The capital formation in agriculture in the household sector was of the order of Rs. 30 crores out of which capital works to the extent of Rs.7 crores or 23 per cent was financed from borrowings and the remaining 77 per cent

* Hereafter called other agencies

was financed from its own resources. It may, however, be mentioned here that though increment in livestock is considered as a constituent of capital formation, loans taken for purchase of livestock are not included in the estimates of borrowings for financing capital formation presented above.

IV. Methods of Estimation

4.1 As stated in Section I, the capital formation measures the additions to the stock of capital goods. The estimation is confined to the agriculture sector but agriculture is considered in a wider sense to include animal husbandry and ancillary activities. The estimates pertain to the fixed capital formation excluding thereby additions to working capital and no allowance is made for depreciation, obsolescence or accidental damage to fixed capital. The estimates of capital formation presented in this paper are, therefore, of gross fixed capital formation.

4.2 Capital formation can be measured at three different stages in the process viz. expenditure of funds, accumulation of funds or the production of capital goods. All the three approaches will lead to the same estimate of capital formation if the economy is closed or if the suitable adjustments are made for excess of exports over imports of capital goods. While preparing the estimates of capital formation for Maharashtra State, 'expenditure of funds' approach is adopted. Thus attempt is made to measure expenditure on various constituents of capital formation viz. machinery, tools and equipment, increment in livestock and construction. Construction includes improvement of land also. Reclamation, contour bunding, terracing, construction of new wells, irrigation works and their improvement, construction and major alterations of farm houses, grain golas and cattle sheds, dairies, additions to livestock, new orchards and plantations and additions and purchase of new implements including transport equipment used for animal husbandry and agricultural purposes are all covered under capital formation. The term expenditure is used in a wider sense to include payments made to others whether in cash or in kind, value of owned assets and materials used and value of family labour. Though land is regarded as a capital asset, purchase of land is ignored in our estimates since for the community or the State as a whole, such purchases result only in transfers. Similarly, purchase of used assets resulting in transfers and not additions for the community are ignored. The transfers between enterprises or individuals of used assets do not add to the domestic capital formation. However, transfer costs incurred for transport or installation constitute part of new capital formation. These transfer costs are not covered in the estimates presented here.

4.3 The estimates of capital formation are prepared separately for rural household sector, urban household sector and government and local bodies sector to suit availability of statistical data. For household rural sector, the results of the All India Rural Debt and Investment Survey 1961-62 conducted by the Reserve Bank of India are extensively used. The Reserve Bank of India published, inter alia, the estimates of fixed capital formation in farm business in rural household sector as revealed by the Survey, in June 1965 Bulletin (R.B.I. Bulletin). The estimates are available statewise. The estimate of capital formation per rural household is multiplied by the number of rural households ascertained from the 1961 census. Estimates pertaining to Maharashtra

are based on a sample of 144 villages. In each selected village, a sample of 40 households was selected. For urban household sector, results of the National Sample Survey are used. During the seventeenth round of the N.S.S., a schedule designed to collect information on capital formation by household sector was canvassed. The information was collected from 324 urban blocks in the State Sample. In each selected urban block, 6 households were selected for the enquiry. Only state sample estimates are available and these are used here. The estimates of capital formation are available according to different constituents and only those pertaining to agriculture sector, are considered. The 'per household' estimates are blown up for the state by multiplying the same by the total number of urban households in the state as determined from the 1961 Census data. Purchase of livestock is not considered as capital formation and hence ignored. However, in the economy, there is annual growth of livestock. By interpolating the 1956 and 1961 livestock census population figures, increment in livestock is estimated for the year 1961-62. These are then evaluated at wholesale prices. The value of increment in livestock so obtained is included in the estimates of capital formation.

4.4 For Government sector, accounts of the State Government are analysed and expenditure incurred by the Government on different constituents of the capital formation is determined. The accounts of the Government of Maharashtra for the year 1961-62 are presented in the 'Civil Budget Estimates for the year 1963-64' (White Book). The details of the expenditure under plan schemes are available in the 'Detailed Estimates of the Third Five Year Plan Schemes for the year 1963-64' (Brown Book). While estimating capital formation, expenditure of administrative activities is ignored even if it is shown under capital budget head. Thus, the establishment expenditure shown under the budget head '100 capital outlay on irrigation, navigation, embarkment and drainage works' on major and medium irrigation schemes is not considered. Certain details of the Government accounts are not available in the budget publications cited above. Attempt was made to obtain the missing detail from the Departments concerned and the Office of the Accountant General, Bombay. In certain cases, the details were not available readily even with these sources. In most of these cases, however, the budget or the revised estimates are available in considerable details but accounts figures are available only for broad groups. The budget or the revised estimate in such cases for a particular item was adjusted by the ratio of budget or revised estimates of the corresponding broad groups to the accounts of that group. For certain plan schemes, the break up of the expenditure into expenditure on staff, equipment, subsidy etc. is not available. The total expenditure is distributed over various components in the 'Schemes in the Third Five Year Plan, Maharashtra State'. Expenditure incurred on loans is not considered under Government capital formation but is shown separately under financing of capital formation. For village panchayats, their accounts for the year 1961-62 are received in the returns prescribed for the Annual Administration Report on the working of Village Panchayats. From these, the expenditure incurred by the village panchayats on different constituents of the capital formation is ascertained.

4.5 The sources of finance for the capital formation are determined in the following manner. Reserve Bank of India Bulletin gives the capital expenditure on various items financed from borrowing. All capital expenditure does not constitute capital formation nor does the capital formation correspond exactly with the capital expenditure. The estimates of capital expenditure released by the Reserve Bank of India pertain only to cash expenditure and it includes expenditure on certain items like purchase of land or purchase of livestock, repairs and maintenance which are not considered under the capital formation. On the other hand, imputed value of capital expenditure in kind, family labour, value of owned assets and material used are included in capital expenditure. The Reserve Bank of India Bulletin does not give the estimates of capital formation financed from borrowings. / The amount of capital expenditure on capital works which constitute capital formation and which is financed from borrowing is taken as the amount of capital formation financed from borrowings, the underlying assumption being that the amount of capital expenditure which is financed from borrowings and which is on repairs and maintenance or which is not incurred in cash is negligible. The loans given by the Government for expenditure on various constituents of capital formation is determined by analysing the accounts of the State Government. Various loans given by the Government are indicated in the budget publications. Certain details of the loans are available in the 'Finance Accounts of the Government of Maharashtra for the year 1961-62' presented by the Comptroller and Auditor General of India. Most of the details required for ascertaining the loans given by the Government for capital formation in agriculture are available in these publications. In the case of tagal advances for (i) land, improvement of seeds, cattle and (ii) 'advances to cultivators - Nagpur area', further details are not available either in the above publications or with the Departments concerned. In the former case, it is assumed that one third of the advances are for land improvement. As far as 'advances to cultivators - Nagpur area' are concerned, informal enquiries revealed that the major portion of these advances are made to meet expenses on current agricultural operations, like purchase of fodder, seed, fertilisers etc. Hence no part of these advances is considered for financing of capital formation. As regards advances given by the credit societies and land mortgage banks, the purposewise classification of advances was obtained from the Department of Co-operation, Maharashtra State. In urban household sector, the capital formation in agriculture is quite small as compared to rural household sector. Estimates of financing of capital formation from borrowings are not forthcoming. Hence, the same percentage of borrowings to capital formation in rural household sector is assumed for urban household sector. From the total amount of capital formation financed from borrowings, loans by Government and co-operative societies are deducted to yield the amount financed from other agencies.

**INDIAN ASSOCIATION FOR RESEARCH
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**A CRITIQUE OF THE AVAILABLE ESTIMATES OF CAPITAL
FORMATION IN AGRICULTURE**

K. A. ANTONY & NAROTTAM SHAH

AHMEDABAD

9—11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

A CRITIQUE OF THE AVAILABLE ESTIMATES OF CAPITAL
FORMATION IN AGRICULTURE IN INDIA

By

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The Economic Times, Bombay

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According to the Planning Commission, during the Second Five Year Plan the investment in agriculture was Rs. 625 crores in the private sector and Rs. 210 crores in the public sector, making a total of Rs. 835 crores for the economy as a whole (Third Five Year Plan, p.59). But neither in the Third Five Year Plan nor in any other published document has the Planning Commission revealed how these figures were arrived at. On the other hand, it is generally agreed that dependable estimates of investment in agriculture cannot be built up without extensive, countrywide surveys.

As is well known, no countrywide survey of the sort was undertaken during the Second Plan. The Rural Credit Follow Up Surveys, which were conducted during this period, were not meant to throw up such estimates. The results of the other surveys reviewed in this paper became available even to the authorities only during recent years. It is obvious, therefore, that the Planning Commission figures quoted above are no more than somebody's intelligent guesses. The naive belief that we can somehow go ahead with planning without statistics should be considered as one of the major reasons for the grave debacle of the Indian planning.

Some efforts have been initiated of late to fill up the statistical gap in respect of investment in agriculture. In recent years three all-India surveys have been conducted to collect data, on the basis of which estimates for investment in agriculture or in the rural areas as a whole have been built up. The following are the three surveys:

.....2)

Conducted by	Reference year	Results published
(1) Reserve Bank of India	July 1961 to June 1962	December 1963
(2) National Council of Applied Economic Research	1962	July 1965
(3) National Sample Survey	July 1959 to June 1960	February 1966

In this critique, we have tried to concentrate only on those aspects of the above surveys which have a bearing on the estimation of investment in agriculture (or rural sector) and we have refrained from commenting upon other merits or demerits of these surveys. Even then, we had to leave unnoticed many other points in order to concentrate on some issues which we think are more important from the methodological point of view.

In the following sections we deal with each of the three surveys separately. In the fourth section, some suggestions of ours on the problem of estimation of investment in agriculture are put forward.

We had to drop our original idea of comparing the three sets of estimates of capital formation, because there are large difference in the coverage and concepts; the years of reference are also different. Further, as shown in the following sections, in a fundamental sense, these estimates are so unreliable that it is no use comparing one unreliable estimate with another unreliable estimate, even if they were comparable in terms of the years of reference, coverage and concepts. When the estimates per se are highly unreliable, it is no use comparing them inter se.

I. RESERVE BANK ESTIMATES

The first comprehensive effort at collecting data on various aspects of farm economics in India was the Rural Credit Survey (RCS) carried out by a Committee of Direction appointed by the Reserve Bank of India. The survey related to the year 1951-52; and massive reports on the survey appeared at various intervals between 1954 and

1957. But as admitted by Dr. N.S.R. Sastry, in the course of his rejoinder to Dr. Daniel Thorner's criticism, it would be "incorrect to assume that the Reserve Bank expects from the Rural Credit Survey, firstly all-India estimates, and secondly, their break-down by major regions." (The Economic Weekly, September 10, 1960). In other words, the RCS was not designed to yield any all-India estimates, inter alia, for capital formation.

After the controversy which followed the publication of the RCS reports, a new approach was adopted later, when the Reserve Bank of India decided to have All-India Rural Debt and Investment Survey relating to the year 1961-62. "This survey was statistically designed to yield estimates of debt, borrowings, capital formation, etc., in the rural household sector for all-India and the individual States." (Reserve Bank of India Bulletin, December 1963, p. 1512).

Although the field work relating to this Survey was conducted during 1961 and 1962, the full report on the Survey has not yet been published. Provisional summary results, however, have been released intermittently in the articles published in the Reserve Bank of India Bulletin (December 1963, June 1965, September 1965 and December 1965).

The Survey covered about 82 thousand households from 2,057 sample villages selected from all the States and four Centrally administered areas. During the field work, information was collected through four schedules. The fact that these schedules have not been published along with the articles mentioned above severely handicaps any outsider who wants either to critically evaluate the results or even interpret them.

The data on capital formation by rural households is given in Sections II and III and the statistical appendix of the June 1965 article. This article has been drafted in such a way that one has to read it back and forth repeatedly and literally hunt for the relevant material relating to capital formation in obscure corners amidst a mass of less relevant material. In the process, one has to do quite a few computations of his own to get at the central results of the Survey in so far as capital formation is concerned. The

article opens with an introduction followed by Section I "Tangible Wealth of Rural Households." In Section II relating to "Capital Expenditure of Rural Households", we are given various data on what the Reserve Bank calls "cash expenditure" on capital formation. We are told that "data on capital expenditure collected by the Survey include payments in cash and kind, value of owned assets and material used and value of work done by household labour." (p.813). Yet for some inexplicable reason, the Reserve Bank decided to present in Section II only a portion of these data, pertaining "only to the cash components of expenditure." Break-ups of various sorts are presented. The data relevant to our discussion are presented in Table 1 below:

Table 1. Capital Expenditure on Individual Items of Farm Business — All-India
(Cash expenditure by all households)

Item	Aggregate expenditure (Rs. crores)	Share in total expenditure (per cent.)
1. Purchase of land ...	124.5	19.1
2. Purchase of land rights ...	6.0	0.9
3. Reclamation of land ...	18.5	2.8
4. Bunding and other land improvements ...	56.4	8.6
5. Orchards and plantations ...	6.9	1.1
6. Wells ...	45.1	6.9
7. Other irrigation resources	6.0	0.9
8. Agricultural implements, machinery, transport equipment, etc.	71.8	11.0
9. Farm houses, grain <u>golas</u> and cattle sheds ...	18.7	2.9
10. Purchase of livestock ...	295.7	45.2
11. Other capital expenditure in farm business ...	3.8	0.6
<hr/>		
Total capital expenditure in farm business ...	653.5	100.0

Source: R.B.I. Bulletin, June 1965, p.816.

Here we might note, in passing, that while purchases are shown in respect of item 1, 2 and 10, sales in respect of these items have not been shown. But it is obvious that it is wrong to take the purchase figures without adjusting them for sales. The magnitude of the error can be judged from the fact that these three items account for 65.2 per cent. of the total cash expenditure shown in Table 1.

Explaining the type of estimates (of fixed capital formation) presented in Section III, the opening paragraph of this section says: "While the estimates of capital expenditure presented in the preceding section relate only to expenditure in cash, the estimates presented in this section include expenditure in kind, value of owned assets and materials used and value of work done by members of the household and permanent servants, all items having been suitably evaluated into monetary units." (p.827). But as we read on through Section III, we do not find anywhere the basic data on the components of fixed capital formation similar to those given in Table 1 above.

Strange as it may seem, the most important table (on components of fixed capital formation) is thus missing from the June 1965 article. All that we can surmise from Table XX given in the article is that, fixed capital formation on farm business in 1961-62 was Rs.164.7 crores by cultivators and Rs.2.1 crores by non-cultivators, totalling up to Rs.166.8 crores by all rural households.

Going through the 21 statistical statements which follow the June 1965 article, we come across Statement 19, which gives Statewise data on the percentage share in aggregate fixed capital formation of various components, in respect of which all-India absolute figures are nowhere given. Tugged away in the line for all-India totals in this Statement 19, we find the percentage shares of each component, corresponding to the all-India estimates for fixed capital formation in farm business which, as mentioned above, has been put at Rs.166.8 crores. Using these percentage shares along with the total figure (Rs.166.8 crores) we worked back to derive the absolute value of

each component of fixed capital formation. The data thus worked out by us are presented in Table 2 below:

Table 2. Individual Items of Fixed Capital Formation
In Farm Business 1961-62

(Combined estimates for cultivating and non-cultivating Households)

Item	Amount (Rs. crores) (1)	Per cent. (2)
1. Reclamation of land ...	27.9	16.7
2. Bunding and other land improvements		
(a) Major alterations, additions and other land improvements	10.3	6.2
(b) Construction of new bunds and other land improvements ...	15.5	9.2
3. New plantations and additions to existing orchards and plantations	4.5	2.7
4. Wells		
(a) Major alterations ...	9.8	5.9
(b) Construction ...	30.0	18.0
5. Other irrigation resources		
(a) Major alterations ...	1.8	1.1
(b) Construction ...	2.5	1.5
6. Purchase of new additional equipment of		
(a) Traditional type ...	23.0	13.8
(b) Improved type ...	24.4	14.6
7. Farm houses, grain <u>golas</u> and cattle sheds.		
(a) Major alterations ...	2.0	1.2
(b) Additions to existing structures ...	1.5	0.9
(c) New Construction ...	11.8	7.1
8. Other items of fixed capital formation ...	1.5	0.9
Aggregate fixed capital formation in agriculture ...	166.8	100.0

And now we come to the crucial question: how reliable are these estimates of fixed capital formation? The Reserve Bank has withheld from us all the relevant material, but all available indirect evidences discussed below strongly point to a conclusion that these estimates are not reliable.

In Table 3 below, we juxtapose two sets of data. Column (1) of the table gives the itemwise data on fixed capital formation as derived by us in Table 2 above. Column (2) gives the corresponding data on the cash expenditure on the same items as given explicitly by the Reserve Bank in the June 1965 article. Normally, one would expect that for each item, the figure in column (1) would be generally higher than the figure in column (2), because column (1) figures include, apart from cash expenditure, also the labour of family members and permanent servants and the use of self-produced material. Even in the extreme case where any such non-cash inputs were not involved, the figures in column (1) should be at least equal to the figures in column (2). But actually we find that barring the first item (reclamation of land) in respect of all other items, column (1) figures are lower than column (2) figures.

Why this apparent paradox? It is there because for some reason, the Reserve Bank experts have shirked placing before the public the key estimates shown by us in column (1) of Table 3. To do so, they would have had to explain how these were derived. This the Reserve Bank probably did not want to do, for, any explanation of the derivation of these figures would have revealed a number of dubious aspects of the derivation of this key estimate.

At this stage, we may quote in full a small paragraph from the June 1965 article which gives us a clue to the error of the Reserve Bank experts in their attempt to work out all-India estimates for fixed capital formation in agriculture: "In respect of each of the items of capital expenditure in farm business, barring purchase of land, land rights, livestock and farm houses, cattle sheds, etc., a classification of the total expenditure into

Table 3. Individual Items of Fixed Capital Formation in Farm Business : 1961-62

(Combined estimates for cultivating and non-cultivating households)

Item	All Expendi- ture	Cash Expendi- ture	(1) minus (2)
	(1)	(2)	(3)
(..... Rs. crores.....)			
1. Reclamation of land ...	27.9	18.5	+ 9.4
2. Bunding and other improvements ...	25.8	56.4	- 30.6
3. Orchards and plantations ...	4.5	6.9	- 2.4
4. Wells ...	39.8	45.1	- 5.3
5. Other irrigation resources	4.3	6.0	- 1.7
6. Agricultural implements, machinery, transport equipment, etc. ...	47.4	71.8	- 24.4
7. Farm houses, grain <u>golas</u> and cattle sheds ...	15.3	18.7	- 3.4
8. Other capital expenditure in farm business ...	1.5	3.8	- 2.3

Total capital expenditure in farm business ...	166.8	227.2	- 60.7

Source: Col. (1) Reserve Bank of India Bulletin, June 1965. Statement 19 for total. Individual items were derived by us.

Col. (2) ibid., Table VI, last column.

Note: Constituent items do not add up to the total because of rounding.

the two components, viz. maintenance expenditure and expenditure leading to assets formation was attempted. The gross expenditure leading to assets formation on all items together has been presented under the head 'fixed capital formation in farm business.'"(p.827

So it appears that in our Table 3, column(1) figures are generally smaller than column(2) figures because they appear to have been derived from column(2) by the Reserve Bank through two operations of crucial importance which can notionally be represented as under:

<u>To</u>	Cash Expenditure
<u>Add</u>	Unpaid labour and self-owned material
<u>And deduct</u>	Allowances deemed as maintenance expenditure in respect of some of the enumerated items
<u>To get</u>	Fixed capital formation.

How exactly both these or some such operations were carried out has not been mentioned anywhere. Obviously, arbitrary judgment and ad hoc ratios must have necessarily loomed too large in all these. Whatever it may be, the Reserve Bank certainly cannot expect public to take its final figures on faith, unless all these behind-the-door operations are revealed to the public in all their details.

The concepts of grossness, capital consumption and netness are of the greatest importance in the case of fixed capital formation: they are too crucial to the reliability of final estimates to be hushed up or evaded in this manner. This is generally true of all sectors: but when we come to agriculture, this contention acquires hundred-fold force.

It may be recalled that when the first instalment of the current series of provisional summary reports on AIRDIS was first published in the Reserve Bank of India Bulletin, December 1963, a very significant statement was made in that article, about the exact nature of the estimates of fixed capital formation. It was stated that "the estimates presented in the note, arrived at as they are after allowing for maintenance and replacing or capital consumption expenditure in the case of most of the items, are expected to be nearer to net than to gross capital formation." Had the range between net and gross figures in this matter been very small, perhaps, it would not have made much of a difference for practical purposes. But as is known, depreciation in agriculture is generally so large in relation to the total fixed capital formation that the difference between net and gross fixed capital formation in any year is bound to be very large. In view of the largeness of this difference, an estimate which is "nearer to net than to gross capital

formation" is as good as useless. From the June 1965 article, we learn that the aggregate value of assets of cultivators amounted to Rs.36,156 crores. Even one per cent. of this would amount to Rs.362 crores. Against this, we may recall that the "nearer to net than to gross capital formation" in agriculture in 1961-62 as estimated by the Reserve Bank amounts to only Rs.166.8 crores. On a point of illustration, it may be noted that an under-allowance for depreciation of even 0.5 per cent. would mean that the actual fixed capital formation when adjusted for this under-allowance (implied in the term "nearer to net than to gross") would be negative. Obviously, since the estimate of Rs.166.8 crores contains some unestimated element of grossness, something like this has certainly happened. If so, the true figure of net fixed capital formation in agriculture might even be a sizable negative figure — a picture entirely different from what Reserve Bank has tried to depict.

Finally, we may note one more element of confusion on the crucial question of the character of these estimates of capital formation. In the first article on the subject (December 1963), the Reserve Bank declared that in arriving at the final estimate for fixed capital formation, allowance had been made for "maintenance and replacing or capital consumption expenditure in the case of most of the items" (p.1517). But in the course of a comparatively detailed presentation of the results in the June 1965 article, we are told quite a different story. Here there is no mention of "replacing or capital consumption expenditure." It merely says that "a classification of the total expenditure into two components, viz. maintenance expenditure and expenditure leading to assets formation was attempted. The gross expenditure leading to assets formation on all items together has been presented under the head 'fixed capital formation'." (p.827. emphasis ours). Thus the very estimate which was presented in December 1963 as "nearer to net than ^{to} gross" was later presented as "gross", although, for the obvious reasons, the use of the term "gross"

was still avoided: it was vaguely called just 'fixed capital formation.'

II. NATIONAL SAMPLE SURVEY ESTIMATES

Another important estimate of capital formation, not in agriculture but in the rural sector, is that obtained by the National Sample Survey in its 15th round covering the agricultural year July 1959-June 1960. The NSS data on rural capital formation were recently published in the NSS Report No. 97. This survey covered 15,706 sample households selected from 2,604 villages.

The type of data collected and the overall method of estimation are indicated by the following table:

Table 4. Per Household Expenditure in Regard to Purchase, Construction and Improvement for Some Broad Items of Capital Goods

				(In Rupees)			
				Purchase	Construct- ion	Improve- ment	Total
1.	Land and Building	...	47.41	59.05	13.73	120.19	
2.	Tools and Implements	...	7.89	3.52	2.37	13.78	
3.	Vehicles	... ..	6.27	1.85	1.31	9.43
4.	Power-driven Equipments		6.81	0.27	0.68	7.76	
5.	Durable Goods	...	0.64	0.39	0.07	1.10	
6.	Livestock	... ..	85.98	10.82	0.50	97.30
Total				155.00	75.90	18.66	249.56

Source: N.S.S. Report No. 97, p.64.

A basic flaw of the NSS data is that while they attempt to cover all the purchases and constructions, they do not at all cover sales or discarding of assets. It is obvious that unless these latter two are also taken care of, the totals of items shown in the above tables would give a misleading picture of the magnitude of capital formation.

More specifically, of the figure of Rs. 250 per household, more than 85 % is accounted for by the two items purchase of "land and building" and purchase of "livestock", each of which when

adjusted for sales should have been nil.

Further, those who designed the schedules seem to have fallen victim to a general tendency to skirt around the baffling problem of capital consumption by some ingenious argument. Like some others, the NSS has assumed that minor repairs and major repairs which may extend the life of the building (and presumably other fixed items also) by one year or less, cover the capital consumption fully and exactly, so that if these two items are excluded, the whole of the rest of capital formation can be taken to be net capital formation. But perhaps the NSS has an uneasy heart on this question; for, quite discreetly, it has entirely avoided any explicit mention (let alone any discussion) of the problem of capital consumption. Interestingly, even the terms 'net' and 'gross' are scrupulously avoided throughout the report. All the introductory notes and the presentation of data in this report are given in terms of "capital formation" without indicating anywhere explicitly whether what is meant is net capital formation or gross capital formation.

In this context, we might quote a significant passage from the Introduction to the Report: "The estimates presented here form a part of the value of addition to capital during the reference year by the household sector. But these do not exhaust all additions. Neither any account has been taken of factors that could make these estimates net of appropriate deductions necessary to arrive at net capital formations in the household sector" (para 1.15). If this is so, what meaning, at all, can one attach to all the data presented in the Report. Whatever else they give, they do not give us any estimate of "capital formation" as implied in the title of the Report ("Tables with Notes on Capital Formation").

III. THE NATIONAL COUNCIL'S ESTIMATES

One more set of estimates of capital formation in rural areas (not agriculture only, has emanated from the National Council of Applied Economic Research. The estimate is one of the end products of the National Council's All India Rural Household Saving Survey (AIRHS). The National Council has released two volumes dealing with its AIRHS: Vol. I: Methodology and Vol. II: Saving, Income and Investment.

One cannot but appreciate the effort of the National Council to expose to the public view its "statistical kitchen" through its exhaustive volume on methodology. It is also creditable that most of the methodological problems involved have been well tackled by the National Council; in designing the questionnaire and in processing the data great care has been taken to arrive at estimates which are conceptually precise. In particular, the problems of current maintenance expenditure and capital consumption expenditure have been carefully tackled at the designing stage.

The Survey covered 8,655 households selected from 320 places in rural areas (the term 'rural' having been defined in a specific manner, different from the Census definition), drawn, in turn, from 60 districts.

The basic concept of capital formation, as defined for the purpose of this Survey, has been explained by the National Council in the following manner:

"In the present Survey ... the net addition to the physical assets (capital formation) is measured by a series of questions pertaining to acquisitions and liquidations after making the necessary adjustments for capital transfers received and bequeathed. ... The difference between increases and decreases aggregated over all households provides a measure of the net additions to physical assets or capital formation for the entire rural household sector" (Vol. II, p.56-57).

In arriving at what the National Council calls "net increase of physical assets" of the rural households, three items would be

required:

- (a) Increase in physical assets (gross value)
- (b) Decrease in physical assets (gross value)
- (c) Depreciation.

The National Council has not published the item-wise magnitudes of (a) and (b) in its reports; this is a very serious drawback. The data for (c) are given in a separate appendix at the end of Vol.II.

The item-wise data given in Volume II (p.57) relate only to the net capital formation, i.e. the final result of the computation (a) - (b) - (c). In other words we are asked to take all the final data as processed by the National Council on faith: This is not in keeping with the accepted tradition.

The basic results of this Survey, so far as capital formation is concerned, are practically given in one sentence and one table. The sentence reads: "The estimates of gross and net capital formation in the rural household sector during 1962 stand respectively at Rs.766 crores and Rs. 514 crores" (p.57). The National Council has nowhere given the breakup of the amount of Rs.766 crores which constitutes the basic data collected by the Survey in respect of (gross) capital formation.

However, in order to scrutinise the National Council's estimates, we have attempted to reconstruct the estimates of gross capital formation. We have done this by adding back the item-wise depreciation assumed by the National Council (Vol.II, Appendix 3) to the item-wise data on net increase of physical assets as given in the same volume (p.57). The results alongwith some additional computations are presented in Table 5 below:

Table 5.- Gross And Net Increase of Physical Assets
of Rural Households : 1962

Item	Gross Increase	Depreciation	Net Increase	
	(Rs. crores) (2 + 3)	(Rs. crores)	(Rs. crores)	% to total
	(1)	(2)	(3)	(4)
<u>A. Items assumed to be depreciable</u>				
1. Buildings and business premises	243.20	149.22	93.98	18.3
2. Means of irrigation	60.80	38.25	22.55	4.4
3. Means of transport	25.87	13.85	12.02	2.3
4. Farm tools and equipment	55.30	14.45	40.85	8.0
5. Separate farm structures	19.00	10.49	8.51	1.6
6. Business machinery & other assets	37.52	9.82	27.70	5.4
7. Consumer durables	35.83	15.83	20.00	3.9
Sub-Total (1 to 7)	477.52	251.91	225.61	43.9
<u>B. Items assumed to be non-depreciable</u>				
8. Land improvement	57.20	nil	57.20	11.1
9. Livestock	87.92	nil	87.92	17.1
10. Land	67.77	nil	67.77	13.2
11. Farm inventory	58.52	nil	58.52	11.4
12. Business inventory	16.73	nil	16.73	3.3
Sub-Total (8 to 12)	288.14	nil	288.14	56.1
T o t a l	765.66	251.91	513.75	100.0

Source: Col.2: All-India Rural Household Survey, Vol.II, p.139.

Col.3: ibid. p.57.

Other columns derived as indicated.

It is true that estimating depreciation essentially implies assumptions, but that is all the more reason why the assumptions should be fully discussed and justified by the estimators while making a particular set of assumptions. For, even a small change in

the assumed rate of capital consumption can make a big difference in the final figure for net capital formation. The schedules^{me} by the NCAER provide for ample data required to estimate the life of the various assets. But such data are not tabulated and presented. On this account, it is difficult to assess the dependability of figures relating to life of assets in years indicated in column (4) of Appendix 3 of the Report (Vol.II, p.139).

Of the amount of net capital formation of Rs.514 crores, Rs.57.2 crores is estimated as "land improvements" such as bunding, fencing, levelling, terracing, reclamation, etc. The National Council has not provided any such depreciation for this. As is well known, such land improvements are fast depreciating assets, and on this account the estimate which does not provide for depreciation is questionable. Another questionable item is the figure shown against land, viz. Rs.67.8 crores. This item relates to purchase of land (net of sale). The purchases should automatically be equal to the sales provided all the transfers are taking place between the rural households. The NCAER, however, justifies the position by arguing that this represents "the value of land purchased by rural households from other sectors during the reference year". This appears to be prima facie unbelievable, since, with increasing tempo of industrial development more and more rural land must also have been purchased from rural households by urban investors .

However, the NCAER itself has taken care to give the caution: "the high standard errors of some components of physical investment need to be kept in mind while the data are further analysed by household types." (Vol.II, p.59).

While the National Council has done well to give the item-wise standard errors, it has not discussed the effect of non-sampling errors. These latter errors are likely to be very large because of the rather massive and complicated character of its schedules.

In conclusion, we would like to note three things: (i) The National Council has done much better than the other two organisations, (ii) The presentation of the data suffers from some drawbacks

indicated above (iii) The confidence with which the results^s presented to public and the implicit claim for their accuracy^{me} to some extent, misleading.

IV. SOME SUGGESTIONS

Conducting surveys to collect data for estimation of capital formation in the agricultural or the rural sector is an unusually difficult job. But the sheer enormity of the difficulty should not drive us into an escapist view that we can, somehow, derive the required estimates without any survey whatsoever, i.e. the view that other available data can be pressed into service to derive reasonably dependable estimates. The fate of a number of such attempts* leaves no doubt about the utter futility of such an approach. If, then, surveys are indispensable, how should we go about them?

(1) Lack of coordination and wasteful overlapping are implicit in a multiplicity of agencies trying to do the same job. In view of the paucity of financial resources and trained personnel, the present state of affairs should be regarded as impermissible in India. The need for centralisation of the survey work cannot, therefore, be overemphasised. The fact that most of the funds for such surveys conducted by a multiplicity of agencies come directly or indirectly from the Government further reinforces the need for centralisation of the survey work.

(2) A survey of this type should not be an occasional affair. It should be undertaken on a regular basis. The Reserve Bank seems to have decennial surveys in mind. But this interval seems to be rather too long. Our long-term goal should be a survey every alternate year, but looking to the likely availability of finances, it may best be made a quinquennial survey.

(3) The year of reference of quinquennial surveys should coincide with that for the livestock census, and ipso facto, every alternate quinquennial survey should coincide with the population census. This would enable us to subject the survey results to some independent checks. The schedules of the surveys should be drawn up with this end also in view.

(4) An indispensable pre-requisite of such surveys is clarification of the concepts involved and the methods of their measurement at an operational level, under specific Indian condition. The Reserve Bank and the NSS came to grief because they rushed to measure capital formation without the necessary conceptual clarity. Clarification in this respect is a huge unfinished task. We suggest, therefore, that a conference should be convened to discuss this problem exhaustively. Apart from the experts who were, at various levels, connected with the above-mentioned three surveys, others who can make a useful contribution to the discussion should also be invited to the conference (e.g. those connected with Agro-economic Centres, Farm Management Surveys, etc., and agronomists who have first hand knowledge of the conditions of Indian agriculture).

(5) Following the established tradition, all the raw data originally collected through the surveys and tabulated should be regarded as more important (than the derived or processed data), and should ^{be} published in full in the reports on the surveys. In the case of derived data, each step of derivation should be fully explained together with all the relevant statistics.

(6) Sampling errors should, of course, be estimated and their significance for the final results explained. But as is generally agreed, non-sampling errors are far bigger: they usually swamp the sampling errors. Non-sampling errors perhaps, cannot be assessed quantitatively. But nonetheless, in view of their enormous importance, the non-sampling errors should, as Oskar Morgenstern rightly insists, be fully discussed in the survey reports, with special reference to their significance for the final estimates. We should shun spurious accuracy.

(7) Even if we do have quinquennial surveys, the task of deriving annual capital formation estimates from these still remains. All the problems that arise in such derivation can also be discussed in the conference suggested above. A very important aspect calling for investigation in this connection is the relationship between good or bad monsoons on the one hand and the variations in the rate of capital formation in agriculture on the other.

Preliminary & Confidential

IARNIW/66/31

**INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH**

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**TREATMENT OF CONSUMER DURABLES IN THE ESTIMATES
OF SAVING IN INDIA**

M. PATHAK

AHMEDABAD

9—11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

TREATMENT OF CONSUMER DURABLES IN THE ESTIMATES OF SAVING IN INDIA

Dr. Mahesh Pathak

I

A quantitative estimate of saving is necessary in order to have some idea about the saving capacity and saving potentiality of an economy in the context of its growth requirements. In the nature of things, such a quantification of saving poses intricate and sometimes insoluble problems of estimation. The concept of saving in the economic sense is, more or less, clear. However, when we consider it in the accounting sense, we are confronted with many difficult problems. One such controversial problem is of the treatment to be accorded to consumer durables in the estimates of saving.

In the past, as also at present, the decisions regarding the inclusion or exclusion of consumer durables have been considerably influenced by factors such as the established conventions, the availability of data and the practical problems involved in accepting a particular definition of consumer durables.

Whenever a question for the inclusion or exclusion of consumer durables from the estimates of saving is debated the first major consideration has been of the availability of relevant data. In order to estimate saving in the form of durables we require data regarding the value and durability of various consumer durables which cannot be obtained very easily. In many cases it is the non-availability of data which necessitates its exclusion from the saving estimates.

However, apart from the non-availability of data, several other arguments are usually advanced for excluding consumer durables from the estimates of saving. One such argument has been that the outlay on consumer durables does not directly add to the stock of productive capital. Therefore, unlike the productive capital, consumer durables do not directly help in generating income. Conceptually, therefore, it has been argued, this outlay cannot be treated as saving. This argument does not seem to be convincing on several grounds. Firstly, if consumer durables are not similar to productive capital goods, so also, they are not similar to other consumer goods. They distinctly differ from current consumption in the sense that they provide services over a fairly long period of time. They are not consumed within the normal accounting period. Second, the inclusion or exclusion of consumer durables in the estimates of saving should not depend upon their supposed productivity, which cannot be easily measured. The consumer durables may or may not apparently help in generating income, however, the estimate and study of saving, especially in an underdeveloped economy, need not be confined to the limited purpose of finding out the income generating saving and investment in the economy. A study of the forms of saving, irrespective of their income generating impact, by itself, throws useful light on the nature and problems of underdevelopment. If outlay on financial assets such as gold and silver or on physical assets such as residential housing can be included in saving, the expenditure on consumer durables should also be included in these estimates. Such outlay can appropriately be shown in the capital account which reflects the relative positions regarding the assets and liabilities of an economic entity. There is another added advantage in treating these outlays as saving. Since the consumer durables are included in the estimates of national wealth, its inclusion in the estimates of saving makes it possible to relate accumulated saving with national wealth.¹

¹ I. Goldsmith R.W. "Saving in the United States", Vol.I p.28.

If the consumer durables are excluded from the estimates of saving on the ground that they do not directly help in generating income, then logically the outlay on residential housing should also be excluded. The outlay on housing is included on the ground that their services can be marketed. However, if the consumer durables are excluded on the ground that their services cannot be marketed, then, outlay on owner occupied houses whose services are not marketed should also be excluded from these estimates. If they are retained in the estimates of saving, the case for excluding consumer durables is to that extent weakened.

The case for including or excluding consumer durables is at times examined on the basis of the attitude of the consumers towards such expenditure. Though such a concept is not usually accepted for estimating saving, it may prove useful in a study of the motivations governing individual saving. If the consumers regard them as saving, that is, if the substitutability between consumer durables and other forms of saving is relatively greater, they should be treated as saving. The Friend-Jones analysis suggests that the consumers allocate their income between saving and consumer durables on the one hand and consumption on the other. The expenditure on consumer durables is more substitutable or competitive with saving than with consumption.² This interesting hypothesis deserves further examination on the basis of comprehensive and systematic data regarding the consumption-saving preferences.

II

In India, both the Reserve Bank and the National Council of Applied Economic Research have accepted the validity of including consumer durables in the estimates of saving. The Reserve Bank has not estimated saving on this form since reliable data are not available regarding consumer durables.³ In the earlier estimate, the Reserve Bank had estimates of saving in the form of gold. However, in the revised series, (Reserve Bank Bulletin, March, 1965) gold has been/dropped from the estimates. This exclusion, of course, has not been due to the non-availability of data. In the earlier estimates, expenditure on gold was treated as an investment in liquid assets. The Reserve Bank has not offered reasons, if any, for the change in the treatment of gold. Again, when the outlay on owner occupied houses is treated as saving, the exclusion of gold, even when it is treated as consumer durables, is difficult to explain.

The National Council wanted to include the outlay on consumer durables. In the absence of requisite data, however, it included only the outlay on automobiles, trucks and other transport equipment. The National Council feels that in India "the treatment of consumer durables is not so significant statistically as in more advanced economies".⁴ However, it would not be proper to infer from this that in an underdeveloped economy the inclusion or exclusion of consumer durables will not be meaningful or significant. Such a view-point does not seem to be valid for two reasons. (1) Consumer durables may provide an important form of holding wealth. Again, in an underdeveloped economy the outlay on consumer durables may be less as compared to an advanced economy, however, it may be significant in relation to the total saving, especially when such an economy experiences an acute scarcity of saving. The Urban Saving Survey of the National Council provides some estimates regarding the income and saving in the urban sector during the year 1960. The adjusted figures suggest that gross investment in the form of consumer durables formed nearly 10 per cent of the total gross saving of

2. Friend and Jones R, (Eds.) "Consumption and Saving", Vol.II

3. Reserve Bank Bulletin - March 1960 - p.298.

4. NCAER "Saving in India" - p.7.

the urban sector in 1950.⁵ (2) In a developing economy, the more important reason for taking note of consumer durables is that with increasing income people are likely to prefer larger outlays on consumer durables. Goldsmith's study of saving in the United States, for example, shows significant increase in the importance of saving through consumer durables. If only the normal periods are taken into account, the share of consumer durables increased from 11 per cent in 1897-1908 to 24 per cent of total personal saving in 1946-49.⁶ The National Council has provided the estimates of saving through consumer durables. Though the coverage is restricted (only transport equipment) the figures for 1948-49 to 1956-57 suggest that, on the whole, the investment in consumer durables is increasing.

The National Council has tried to collect data regarding consumer durables in its Urban and Rural Saving Surveys. In so far as the survey methodology is concerned, perhaps, it is desirable to have some clarification regarding the definition of consumer durables to be adopted. The surveys conducted by the Reserve Bank (Rural credit survey, 1951 and Rural Debt and Investment Survey, 1961-62) do not give any specific indication on this point. The National Council document on the methods and technique of the Urban Saving Survey suggests that consumer durables worth Rs.50 or more should be included.⁸ The same criterion was accepted for the Delhi Saving Survey also.⁹ In the document on the methodology for Rural Saving Survey, the consumer durables to be included have not been defined in the same manner; however, it can be presumed that, here too, the Council has followed the same criterion, that is, consumer durables worth Rs.50 or more have been included. Thus while defining consumer durables the National Council has taken into account the price factor. Perhaps, it would have been better, if apart from the price factor, the Council had taken into account the durability of the assets to be included; the reason is that when a decision is taken to include these goods in saving durability is as much important, if not more important, as the value of these assets. In the United States, for example, the convention has been to include all those goods which have a useful life of approximately three years or more.¹⁰ Though it will be difficult to stick to a particular time period, it would be better if, as far as possible, the data collected are consistent with the specific time period accepted. Normally it should also be consistent with the norms accepted for international usage. This precaution is necessary in the case of price factor also. For example, while the National Council has taken into account consumer durables worth Rs.50 or more, the Oxford Saving Survey (which did not include consumer durables in the definition of saving) collected data on the major durables worth £ 25 or more.¹¹

5. NCAER "Urban Income and Saving". see table No.38 p.66.

6. Goldsmith - *ibid.* p.146.

7. NCAER *ibid.* see table 3.1 p.40-41.

8. NCAER "Urban Household Saving Survey - Methods and Techniques" p.50.

9. NCAER "Delhi Saving Survey" - p.86.

10. Goldsmith R.W. "A Study of Saving in the United States", Vol. II - p.412.

11. Lydall, H.F. "British Incomes and Saving" - p.139.

**INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH**

**FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME**

**PRELIMINARY ESTIMATES OF TOTAL CONSUMPTION
EXPENDITURE IN INDIA, 1950-51 TO 1963-64**

S. M. KANSAL

AHMEDABAD

9 - 11 APRIL 1966

The views expressed in the papers are those of the authors and not necessarily of the Organisations or Institutions to which they belong.

Preliminary not to be quoted

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S.M.Kansal

A C K N O W L E D G E M E N T

The author is grateful to Dr. B.S.Minhas for his valuable suggestions and guidance in the preparation of the paper. The author also has greatly benefitted by the discussions he had with Dr. Mahfooz Ahmed. The author alone is, however, responsible for any shortcomings that may remain.

He also wishes to place on record his appreciation of the computational assistance rendered by Mr. S.D.Verma.

Preliminary Estimates of Total Consumption
Expenditure in India, 1950-51 to 1963-64

Introduction

In this paper an attempt has been made to estimate the total consumption expenditure for the period 1950-51 to 1963-64. The estimates have been worked out by following mainly the 'production approach'. Some other similar estimates also exist but they relate only to the years 1949-50, 1950-57 and 1957-58 to 1960-61. In fact, this study is an extension of the previous estimates made by the author in collaboration with M.R. Saluja. The data used in preparing these estimates and the sources are mainly the same as those used for the latter paper. However, in some cases, use has been made of the new sources of data such as the Annual Survey of Industries for the years 1959 to 1961. Furthermore, we have worked out two additional estimates of aggregate private consumption expenditure: one on the basis of the data from the National Sample Surveys (NSS), and another, as a residual item, on the basis of national income statistics.

The study has been divided into two parts. Part one presents a brief description of the method of estimation and a summary of the estimates of total consumption expenditure by certain broad groups. Part two compares the aggregate estimates of private consumption expenditure based on the "production approach" with those obtained from the use of two other methods.

1/ 'Private Consumption Expenditure in India 1949-50' by S.P. Dhar, H.G. Kanbur, K.N.C. Pillai and V. J. Puri, (Published in the First Volume of papers on National Income and Allied Topics, I.C.R.N.I.); 'Private Consumption Expenditure in India 1956-57' by S.P. Dhar (unpublished, C.S.O. Staff paper), 'Preliminary Estimates of total consumption expenditure in India, 1957-58 to 1960-61, S.H. Kansal and M.R. Saluja. (Paper presented at the Third I.C.R.N.I.).

Part I

Method of Estimation

The annual estimates of consumption or the availability for consumption of a given product can be worked out by using the relation: $\text{Consumption} = \text{Production} + \text{Imports} - \text{Exports} - \text{Increase in stocks} - \text{Intermediate uses}$. The estimation procedure presumes the availability of detailed statistics of all consumer goods and services regarding production, foreign trade, inventories and intermediate uses. However, data are not always available for all sectors of the economy. The main gaps in the commodity sectors are the non-availability of the all-India production figures of different consumer goods produced in the small scale and cottage industries and the absence of data regarding stocks of different consumer goods held by producers (for agriculture and small scale enterprises) and wholesale and retail traders for all commodities. The major consumer goods produced in small scale and cottage industries, however, have been taken into account in an indirect way, i.e. by working out the availability of their raw materials in the primary sectors. For example, the estimates of the production of gur, vegetable-oils, tobacco products, milk products etc. have been worked out on the basis of the availability of their raw materials in agricultural sector. For other consumer goods produced in small scale industry we have used the scattered production data given in different small scale industry reports issued by the Ministry of Commerce and Industry and the NSS. In the absence of the data on stocks we have adjusted our estimates only for the stocks of foodgrains held by the government and the stocks of the manufactured products held by the mills in the organised manufacturing industries. The quantities so obtained are then evaluated at the prices paid by the final consumers. In India there is hardly any published

data regarding retail prices and the available price data are limited to wholesale prices (and that too for selected commodities) and producers prices for the manufactured products. We have therefore worked out the retail prices by adjusting them for wholesale and retail trade margins. The different consumer goods available for consumption have been evaluated at the 1960-61 prices, thus showing the real change in consumption overtime. The consumption expenditure on different services is worked out indirectly by first estimating the total expenditure on a particular service and then allocating it between consumption and other uses. In estimating the total expenditure on different services frequent use has been made of the CSO's white paper on national income which gives the total net earnings of persons engaged in different services. The details of the methods of estimation, sources and the assumptions made and the detailed tables are given in the appendix.

Estimates

Tables 1 and 2 below present the estimate of total consumption expenditure and their percentage distribution by certain broad groups of goods and services for the period 1950-51 to 1963-64. It may be noted from table 2 that the total expenditure on commodities has remained more or less unchanged at about 82 per cent of the total consumption expenditure during the first plan but has slightly declined over the second plan. It has further gone down to about 78 per cent during the period 1960-61 to 1963-64. It is, perhaps, due mainly to the relative increase in expenditure on government services which has increased from 5.0 per cent (1960-61) to 6.5 per cent (1963-64) of the total expenditure on goods and services.

Within consumer goods, however, the proportion of expenditure on manufactured products has increased considerably at the cost of primary products. It has increased from about

21 per cent in 1950-51 to about 25 per cent in 1955-56 and has remained at the same level during the Second Plan. It has again increased to 27 per cent in 1963-64. The expenditure on primary products has gone down from about 61 per cent in 1950-51 to 58 per cent in 1955-56, 55 per cent in 1960-61 and 51 per cent in 1963-64. Food grains alone account for about 27 per cent of total expenditure and have more or less, remained at the same level during the first two plans. It has gone down to about 25 per cent in 1963-64 mainly due to very little increase in supplies during 1960-61 to 1963-64. Taking the three groups namely, primary (agriculture and allied) products, manufactured goods and services one can conclude that there is some change in consumption pattern over time in favour of manufactured goods and services at the cost of primary products.

The estimates of total consumption expenditure given in table 1 include private as well as government current expenditure on goods and services. The latter is available only in aggregate form and it is very difficult to work out its break-down by different goods and services. Services of government employees alone account for about 60 per cent of the total. The rest includes expenditure on stationary, transport, fuel and light, rent, etc., which could not be separated. However, overall estimates of private consumption expenditure can be derived by subtracting the government current expenditure from the total. Table 3 below gives the estimates of total and per capita private consumption expenditure for the period 1950-51 to 1963-64.

With the exception of 1957-58 and 1962-63 the total private consumption expenditure has consistently increased every year. It has increased by about 20 per cent during the First Plan and 17 per cent during the Second Plan period. The average annual rate of growth works out to be about 3 per cent

during the two plan periods. The annual rate of growth during 1960-61 to 1963-64 is only about 2 per cent which is smaller than the rate of growth of population. In terms of per capita consumption expenditure the average annual rate of growth is only about one per cent during the period under review; for the First Plan it works out to be a little less than 2 per cent, it is about one per cent during the Second Plan and has been found to be negative during the period 1960-61 to 1963-64.

Part II

Private consumption expenditure can also be obtained as a residual item from the net domestic expenditure at market prices. The different components of the net domestic expenditure are government current expenditure, net domestic capital formation, surplus of the nation on current account and private consumption expenditure. Recently estimates of the net domestic capital formation have been made by Tiwari and others and the RBI.^{2/} We have used the former estimates for the period upto 1961-62 and have extended them for 1962-63 with the help of the RBI estimates. The other components viz. government current expenditure and the surplus of the nation on current account can be taken from the CSC's white paper on national income. These estimates have been presented below in table 4.

The private consumption expenditure can also be worked out from the successive rounds of the NSS data on household consumption.^{3/} The concepts, definitions, etc. have more or less

2/ Estimates of capital formation in India for 1950-51 to 1961-62 by S.G. Tiwari, B. Kumar and Jagdish Kumar (presented before the fourth ICNFI).

Estimates of savings and capital formation in India 1950-51 to 1962-63 (published in the monthly bulletin of the RBI, March 65).

3/ Periods covered in different rounds are given below:

1st round July 49 to June 50	11th round July 56 to Feb. 57
2nd round April to June 51	12th round Feb. to August 57
3rd round August to Nov. 51	13th round August 57 to May 58
4th round April to Sep. 52	14th round June 58 to June 59
5th round Dec. 52 to March 53	15th round June 59 to June 60
6th round May to Sep. 53	16th round June 60 to June 61
7th round Oct. 53 to March 54	17th round June 61 to June 62
8th round July 54 to March 55	
9th round May to Nov. 55.	
10th round December 55 to May 56	

remained the same over the different rounds. However, in the initial rounds different reference periods were used which have made the estimates incomparable. For example, in the first round fixed period of one year (July 1949 to June 1950) was used as the reference period, while in the subsequent rounds the moving reference period of either a week or a month preceding the date of enquiry has been used. It was only from the seventh round onwards that the standard reference period of one month preceding the date of enquiry has been adopted and therefore it is only from that round (i.e. 1953-54) onwards that the estimates are comparable.

In table 5 below we have presented the estimates of private consumption expenditure for the period 1951-52 to 1961-62 based on the NSS data. The different rounds have been combined suitably so that the estimates relate to the financial years. For 1953-54, though we should have taken sixth and seventh rounds, we have not considered the sixth round due to its different reference periods for different items of consumption (e.g. one week for food, tobacco, fuel and light, year for clothing and other durable and semi-durable goods and one month for miscellaneous services like education, medical services etc.). Possibly, difference in reference period is one of the many reasons for the very high estimates for 1951-52 and 1952-53 as compared to the subsequent years.

Our estimates of private consumption, given in Part I are at 1960-61 prices, while the other two estimates presented in this section are at current prices. To make them comparable, we have to change our estimates of the previous section to current prices or convert the other two estimates to 1960-61 prices. We have taken the former course to compare all the three estimates and latter course for comparing our estimates with those obtained as a residual item from national income

statistics. The available price indices appropriate for necessary adjustments are either the all-India working class consumer price index (CPI) or the implicit price index used for deflating the national income. We have, however, preferred the latter over the former. This is because the CPI is limited to working class and excludes a large part of services, while the implicit national price index has greater scope and coverage. Moreover the latter takes into consideration both the relatively sharper rise in the prices of consumer goods and the slower rise in that of services as implied in the official estimates. This is particularly relevant for us because our estimate of services are heavily based on the CSO white paper. Table 6 below gives the different estimates of private consumption expenditure along with their percentage increase with 1953-54 as base.

Our estimates (estimate I), both at current as well as at constant prices are generally on the lower side than the estimates obtained as residual (estimate II). The movements of both the estimates are quite comparable over time except for 1950-51 to 1953-54, when estimate I shows relatively higher rate of growth compared with the estimate II. The other notable difference between the two estimates at current prices is that while consumption has remained more or less the same in 1956-57 and 1957-58 according to estimate I, it shows an increase of about 5 per cent according to estimate II. At constant prices the former shows a decline of about 2 per cent while the latter an increase of about 3.5 per cent. The estimate III based on the NSS data is the lowest among the three in absolute terms for all the years from 1952-54 to 1961-62, however, its rate of growth for all the years is the highest as compared with the other two estimates. As pointed out earlier, the comparison of estimate III based on the NSS data with estimates I and II is at current prices and therefore is valid only if the movements of implicit NSS prices over time are the same as that of wholesale and

producer's prices which have been used in estimate I after marking them up for trade and transport margins. In conclusion, it may be worthwhile to point out some of the major differences between our estimates and those based on the NSS data. Although the consumption estimates based on the NSS data are consistently lower than our estimates, the absolute expenditure on cereals and pulses is substantially higher in the former. It works out to be about 40 per cent compared to about 25 per cent in our estimates. This suggests that our estimate of total consumption might be underestimated if the NSS figures of foodgrains are to be relied upon. On the other hand the NSS estimate of total consumption will be still lower if official foodgrains production are taken into account, thus widening the gap between the two estimates. The other notable difference is about the expenditure on rent. While it constitutes about 5 per cent of the total expenditure in our estimates in the NSS estimate it accounts for only one per cent. It may, possibly, be explained by the fact that the NSS takes into account only the actual expenditure on rent incurred by the households residing in rented houses, and no allowance is made for the imputed rent in respect of the owner-occupied houses. There are also wide differences between our estimates of individual items (like fruits, vegetables, milk and milk products, etc.) and those based on the NSS. Some of these differences, to an extent, might be due to the difference in scope, coverage and definitions. Therefore, before making any comparison it would be essential to examine carefully the NSS scope and coverage, which however, is beyond the limited scope of this study.

Table 1 : Total consumption expenditure by certain broad groups of goods and services

No.	Items	(Rs. million)													
		1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Food grains		25740	25550	27820	31450	31110	30840	32550	30350	35480	34720	36980	37330	35740	37360
Sugarcane (inc.gur etc.)		1740	1800	1340	1210	1670	1580	1770	1770	1960	1990	2840	2600	2510	2830
Fruits,vegetable & spices		9640	9620	8970	9310	9440	10080	10220	9970	10120	10530	10880	10780	11140	10920
Tobacco,prodts.(ex.cigts)		3840	2540	3660	4280	3780	4720	4660	3300	4720	4280	4260	5140	5040	2460
Other agricultural prodts.		1500	1390	1570	1730	1760	1750	1810	1710	1800	1720	1760	1770	1790	1780
Milk & milk products		10240	10510	10790	11060	11340	11620	11890	12040	12180	12320	12470	12610	12760	12900
Meat,fish and eggs		3020	2930	2960	3090	3130	3180	3490	3880	3630	3260	3850	3550	3660	3670
Other livestock products		1180	1200	1160	1230	1200	1200	1200	1200	1220	1200	1260	1250	1270	1270
Forestry products		400	360	320	320	350	370	350	380	410	400	400	430	430	430
Sub-total (Primary Prodts.)		57300	55900	58590	63680	63780	65340	67940	64500	71520	70420	74900	75460	74340	75840
Food,drinks, & tobacco		6370	7100	7490	7860	8420	8860	9360	9920	10290	10240	11040	11430	11940	12680
Textiles		5470	6990	8090	8710	8980	9520	9910	10170	10270	10530	10640	11380	11580	12460
Other non-metallic prodts.		3800	4220	4240	4450	4730	5090	5590	5680	5800	6250	6660	7230	7830	8120
Metallic products		1540	1680	1560	1630	1610	2080	2240	2380	2320	2590	2820	2980	3120	3210
Other manufacture products (n.e.s.)		1760	2000	2140	2270	2400	2560	2700	2820	2870	2970	3120	3310	3450	3660
Sub-total (manufactured products)		19540	21990	23520	24920	26340	28110	29700	30970	31550	32580	34280	36330	37920	40130
Total consumer goods		76840	77890	82110	88600	90120	93450	97640	95470	103070	103000	109180	111790	112260	115970
Transport Communication		2300	2270	2330	2300	2460	2630	2790	2770	3140	3460	3670	3910	4090	4350
House rent		5120	5120	5380	5500	5620	5750	6000	6120	6250	6500	6620	6880	7000	7120
Govt. services		3360	3400	3600	3840	4020	4320	4740	5520	5940	6240	6840	7740	8400	9600
Other services		6160	6540	6640	6850	6950	7160	7460	7960	8450	8660	9460	10170	10720	11570
Sub-total (services)		16940	17410	17950	18570	19050	19860	20990	22370	23780	25060	26590	28700	30210	32720
Total consumption expnd.		93780	95300	100060	107170	109170	113310	118630	117840	126850	128060	135770	140490	142470	148690
Total (Rounded)		93800	95300	100100	107200	109200	113300	118600	117800	126800	128100	135800	140500	142500	148700

Table 3 : Estimates of private, total and per capita consumption expenditure 1950-51 to 1963-64

year	(in Rs. billion)						
	total	consumer expenditure		popula- tion in million	per-capita consti- mer expenditure		
		govt.	private		in Rs. billion	indices 1955-56 = 100	in Rs.	indices 1955-56 = 100
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1950-51	93.8	5.6	88.2	83.1	358	246	90.8
1951-52	95.3	5.8	89.5	84.4	364	246	90.8
1952-53	100.1	6.0	94.1	88.7	370	254	93.7
1953-54	107.2	6.4	100.8	95.0	377	267	98.5
1954-55	109.2	6.7	102.5	96.6	384	267	98.5
1955-56	113.3	7.2	106.1	100.0	391	271	100.0
1956-57	118.6	7.9	110.7	104.3	399	278	102.6
1957-58	117.8	9.2	106.6	102.3	407	267	98.5
1958-59	126.8	9.9	115.9	110.1	416	281	103.7
1959-60	128.1	10.4	117.7	110.9	425	277	102.2
1960-61	135.8	11.4	124.4	117.2	434	287	105.9
1961-62	140.5	12.6	127.9	120.5	444	288	106.3
1962-63	142.5	15.7	126.8	119.5	454	279	103.0
1963-64	148.7	17.3	131.4	123.9	464	283	104.4

Table 4: Estimates of private consumption expenditure at current prices 1950-51 to 1962-63

		(in Rs. billion)												
S.No.	Items	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Net domestic products at factor cost	95.5	99.9	98.3	104.8	96.1	99.8	113.0	114.0	126.2	129.8	141.9	148.6	154.8
2	Indirect taxes net of subsidies	5.0	5.9	5.2	5.6	6.2	6.8	7.7	8.9	9.5	10.5	11.9	13.4	14.4
3	Net domestic products at market prices	100.5	105.8	103.5	110.4	102.3	106.6	120.7	122.9	135.7	140.3	153.8	162.0	169.2
4	General government expenditure	5.6	5.8	6.0	6.4	6.7	7.2	7.9	9.2	9.9	10.4	11.4	12.6	15.7
5	Net domestic capital formation	4.8	7.9	5.7	8.4	8.7	10.0	15.2	11.9	13.5	13.7	17.3	16.6	18.4
6	Surplus of the nation on current account	0.4	-1.6	0.6	0.5	0.1	0.1	-3.1	-4.3	-3.3	-1.8	-3.9	-3.1	-3.4
7	Private consumption expenditure	89.7	93.7	91.2	95.1	86.8	89.3	100.7	106.1	115.6	116.0	129.8	135.9	138.5

kka.

Table 5: Estimates of private consumption expenditure based on N.S.S. data 1951-52 to 1961-62

year	N.S.S. per capita expenditure (in Rs.)		population		total private consumption expenditure (Rs. billion)	index 1960-61 =100			
	survey for 30 days	yearly	(in mil.)	(in mil.)					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1951-52	2nd, 3rd	23.10	29.50	281	359	301	63	107.2	88.5
1952-53	4th, 5th	20.69	28.92	252	352	306	64	99.5	82.2
1953-54	7th	17.24	23.88	210	290	311	66	84.4	69.7
1954-55	8th	14.96	24.69	182	300	316	68	77.9	64.3
1955-56	9th, 10th	16.40	24.46	200	298	321	70	84.9	70.1
1956-57	11th, 12th	17.14	25.77	209	313	327	72	90.8	75.0
1957-58	13th	18.59	25.68	226	313	333	74	98.4	81.3
1958-59	14th	20.13	28.06	245	341	340	76	109.2	90.2
1959-60	15th	20.30	27.51	247	335	347	78	111.0	92.0
1960-61	16th	21.43	29.60	261	360	354	80	121.1	100.0
1961-62	17th	20.85	30.36	254	369	361	82	121.9	100.7

clb.

Table 6: Comparison of different estimates of private consumption expenditure

year	price indi- ces at 1960- 61 prices	(value in Rs. billion)									
		estimates at constant prices (1960-61)				estimates at current prices					
		absolute value		indices (1953-54=100)		absolute value			indices (1953-54=100)		
		I	II	I	II	I	II	III	I	II	III
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1950-51	97.0	88.2	82.5	87.5	91.4	85.6	89.7	-	90.3	94.3	-
1951-52	98.6	89.5	95.0	88.8	93.9	88.2	93.7	107.7	93.0	98.5	127.0
1952-53	93.5	94.1	97.5	93.4	96.3	88.0	91.2	99.5	92.8	95.9	117.9
1953-54	94.0	100.8	101.2	100.0	100.0	94.8	95.1	84.4	100.0	100.0	100.0
1954-55	84.2	102.5	103.1	101.7	101.9	86.3	86.8	77.9	91.0	91.3	92.3
1955-56	85.8	106.1	104.1	105.3	102.9	91.0	89.3	84.9	96.0	93.9	100.5
1956-57	92.6	110.7	108.7	109.8	107.4	102.5	100.7	90.8	108.1	105.9	107.6
1957-58	94.2	108.6	112.6	107.7	111.3	102.3	106.1	98.4	107.9	111.5	116.0
1958-59	97.5	116.9	118.6	116.0	117.2	114.0	115.6	109.2	120.2	121.5	129.0
1959-60	96.3	117.7	120.0	116.8	118.6	115.7	118.0	111.8	122.0	124.1	132.5
1960-61	100.0	124.4	129.8	123.4	128.3	124.4	129.8	121.1	131.2	136.5	143.0
1961-62	102.1	127.9	133.1	126.9	131.5	130.6	135.9	121.9	137.8	142.9	144.0
1962-63	104.2	126.8	132.9	125.8	131.3	132.1	138.5	-	139.3	145.6	-
1963-64	111.3	131.4	-	130.4	-	146.2	-	-	154.2	-	-

- I = Estimates based on detailed production data.
- II = Estimates derived as residual from net domestic products.
- III = Estimates based on H.S.S. data on household consumption.

APPENDIX

The total consumption expenditure can be divided into three broad groups namely, primary products, manufactured products and services. In the following paragraphs we have given the method of estimation, assumptions made and sources of data used for working out total consumption expenditure.

I. Primary Products:

The availability for consumption of different primary products includes not only those products which are consumed directly but also some manufactured products, produced in small scale sector. The itemwise details of estimation of different products are given below:

Foodgrains: The availability of cereals and pulses for human consumption has directly been taken from the, 'Bulletin of Food Statistics', issued annually by the Ministry of Food and Agriculture. The availability is worked out as the sum total of net production, net imports and fall in government stocks, net production being 87.5 per cent of gross production. Wheat flour produced in the organized industries has been considered under manufactured goods and, therefore, a corresponding quantity of wheat has been deducted from the net availability of foodgrains under primary products.

Tobacco and tobacco products: Availability of tobacco for consumption is derived by adjusting production figures for exports, imports and industrial uses. Under manufactured products we have included only cigarettes and have considered all other tobacco products under primary products. Therefore deduction for industrial uses has been made only for the tobacco used for making cigarettes.

Sugarcane (gur etc): The availability of sugarcane for gur, khandhari etc. have been worked out as a residual item by subtracting seed, feed and wastage and the sugarcane used for

making crystal sugar. The later are available in the published form for all the years under consideration.

Fruits and vegetables: The available production data cover only selected items of fruits and vegetables. However acreage figures are available for all fruits and vegetables. We have worked out the estimates of production of all fruits and vegetables by using the acreage figures and the average production per acre of other fruits and vegetables. The average production of other fruits and vegetables have been taken as 2.5 tonnes and 4.0 tonnes per acre respectively on the basis of the data collected by the Directorate of Economics and Statistics. The production figures so obtained are adjusted for seed, feed and wastage, imports and exports, in order to arrive at their availability for consumption. Deductions have also been made for the fruits and vegetables used in the production of preserved fruits and vegetables in the organised manufacturing sector.

Oilseeds and oils: The production data of most of the oilseeds are available in the publication, 'Oilseeds in India', issued annually by the Ministry of Food and Agriculture. It also gives the percentage utilisation of different oilseeds and vegetable oils by domestic, industrial and other uses. We have made full use of these data in working out the estimates of availability for consumption of different oilseeds and vegetable oils. In addition we have worked out the supplies of copra and coconut oil by adjusting the production figures for imports and other uses. The production of copra has been worked out by assuming that about 46 per cent of coconuts are used for extraction of copra and rest are consumed in other ways. The availability of copra for extraction of coconut oil has been taken to be about 80 per cent with an average oil recovery from copra at about 62 per cent.^{1/}

^{1/}These ratios have been taken from the chapter on vegetable oils given in 'Programme of Industrial Developments, 1961-66', Planning Commission.

Milk and milk products: In estimating the consumption of milk and milk products we have assumed that it is equal to their milk equivalent and therefore we have taken into consideration the total milk production adjusted for exports and imports of milk equivalent of different milk products.

Other Primary Products: The different products covered in this group are cotton, spices, meat, fish, wool fuel wood etc. The production figures of different products have been suitably adjusted for arriving at the consumption estimates. For cotton however, it is revealed in the 'Indian Textile Statistics', issued annually by the Textile Commissioner, that a fixed quantity of about 48 thousand tonnes has been allocated every year for direct consumption. We have therefore taken this quantity alone under primary products and have considered rest of the cotton as input for making yarn. For a number of commodities like, wool, dung, meat, etc. we have used the production data given in the CSO's Blue Book on Revised series of National Income estimates. For want of data we could not take into account the fire wood produced in the vicinity of villages and fruits and vegetable grown in the kitchen gardens that are consumed without any monetary transactions.

II Manufactured Products:

The production of different manufactured goods have been worked out by adding together the production in organized manufacturing industries and small scale industries. The former has been taken mainly from the different issues of 'Monthly Statistics of the Production of selected Industries of India', issued by the Department of Statistics C.S.O., Calcutta. In addition a number of other publications have also been used in getting the relevant information regarding production of different

2/
manufactured products. The production of small scale industries is worked out on the basis of a number of reports giving scattered information. 3/
The production figures thus arrived at are adjusted for imports, exports, changes in stocks (held by the mills only) and industrial uses. The adjustment for industrial uses in manufactured products is very limited as most of the items considered here are consumed directly. Annual Survey of Industries has provided quite detailed data on industrial uses. We have used this data for estimating the total quantities of different consumer goods used as intermediate products. The data on exports and imports are available in detail in the publication 'Monthly Statistics of Foreign Trade of India' issued by the Department of Commercial Intelligence and Statistics. In addition detailed Indian Foreign Trade Statistics are readily available for the period 1953-54 to 1962-63 in the Annual volume No. VII, issued by the office of Economic Advisor, Ministry of Commerce and Industry. We have used both of these sources in working out the imports and exports figures of different consumer products.

The valuation of different consumer goods, both primary as well as manufactured products has been made at constant prices of 1960-61. For primary products we have used mainly the wholesale prices as published by the office of the Economic Advisor, Ministry of Commerce and Industry and for manufactured

2/ The different publications used are given below:

- a) Programme of Industrial Development, 1956-61 and 1961-66, Planning Commission.
- b) Annual reports of Development Wing, Ministry of C. and I.
- c) Indian Textile Bulletin, Office of Textile Commissioner.
- d) Census of Manufacturing Industries.
- e) Annual Survey of Industries.
- f) Economic Survey, issued annually by Ministry of Finance.

3/ The different publications other than given in footnote 2/ are given below:

- a) NSS report on small scale industries (no.21).
- b) Planning and Analysis reports, issued by Development Commissioner, Commissioner, Small Scale Industry.
- c) Evaluation Report of the working group on Small Scale Industries issued by Ministry of Commerce and Industries.
- d) Annual Reports of Khadi and Village Industries Commission.

products use has been made of the ex-factory prices as given in the Annual Survey of Industries 1960. Both sets of prices have been marked up for trade and transport margins given in the working paper (no. 190) of Planning Division, Indian Statistical Institute, Calcutta.

III Services:

The methods of estimation of consumption expenditure on different services differ from one service to another and have therefore been given below separately:

Transport: Expenditure on transport includes expenditure on different modes of transport used for travelling and for the carrying of luggage. The different type of transport used are railways, motor transport, air transport and other. The expenditure on transport is worked out indirectly by first estimating passenger earnings separately for different modes of transport and then deducting a certain percentage for business purposes. The consumption expenditure on railways and air transport thus arrived at for the year 1960-61 are carried backward and forward to other years with the help of their total passenger kilometers. For motor transport the expenditure has been worked out by considering the total number of buses and taxis on the road and their average gross earnings in 1960-61.^{4/} The consumption expenditure on other transport is taken to be a certain percentage of total transport as given in the final report of the National Income committee.

Communications: It includes expenditure on postage, stamps, telegrams, telephones, radio licences etc. The total expenditure on all these items is taken indirectly as the total postal earnings which are given itemwise in the Monthly abstract

^{4/} The number of buses and taxis on road are taken from the 'Basic Road Statistics', issued by the Ministry of Transport. The annual earnings of a bus are calculated by assuming that the total passenger kilometers covered by a bus in a year are 0.9 billion upto 1955-56 and 1.0 billion for the rest of the period. The rate at which earnings have been calculated is Rs.27.00 per thousand kilometers. The gross earnings of a taxi are assumed to be Rs.40.00 per day with 300 working days in a year.

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of Statistics, issued by the CSO. The overall consumption expenditure on communication is worked out to be about 40 percent of the total earnings in 1960-61. The 1960-61 figures of consumption thus arrived at are carried forward and backward for other years with the help of some quantitative indicators like number of letters, telegrams, radio licences, etc.

5/
Professions and arts. The total expenditure on these services is worked out indirectly by estimating the gross earnings of all persons engaged in these services. The gross earnings are estimated by adjusting the net earnings, given in CSO's white paper on national income. The adjustment is for the working expenses and depreciation if any and is assumed to be 15 per cent of gross. The consumption expenditure is assumed to be about 80 per cent of the total gross earnings, 20 per cent being for the purposes of business.

Domestic Services. The income of the persons engaged in this sector is taken to be the household expenditure on domestic servants. This might have been underestimated as no provision has been made for the free boarding and lodging of the domestic servants. However, it will not make any difference in the estimates of total expenditure as food part has been taken care of under food group and rent under total expenditure on house rent.

House rent. It is the sum total of the actual and the imputed gross rent of urban and rural house property. The gross rent is worked out by adding the cost of repair and maintenance to the net rental income which is given in the CSO's white paper on national income.

Amusement: This includes mainly the expenditure on Cinema theatres etc. and has been taken on the basis of the NSS data on entertainments for the years 1952-53, 1955-56 and 1957-58.

5/ The different services included here are medical, educational, legal, religious, sanitary, barbers etc.

The figures have been adjusted for expenditure on toys , sport goods etc. which are included under entertainments in NSS.

Services of Government Employees: These are measured by the sum total of wages, salaries, etc. paid to all government employees engaged in public administration. We have estimated them by deducting the wages, salaries etc. paid to persons engaged in new construction in the public sector from the income originating in government services (administration) as given in the CSO's white paper on national income.

The estimates of availability for consumption of different goods and services are given in greater details in the following tables.

Table 1 : Estimates of the different agricultural products available for consumption (value)

		(in Rs. million)																	
Sl. No.	item	price in 60-61	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64			
(0)	(1)	Unit	value Rs.	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1.	Cereals	tonne	492	21520	21358	23301	26366	25830	25505	27006	25633	29441	29313	31168	31950	30514	32836		
2.	Pulses	"	523	4221	4189	4519	5084	5282	5340	5544	4613	6035	5403	5811	5376	5225	4519		
3.	Oilseeds	"	958	421	413	393	449	528	464	508	437	497	413	449	476	490	489		
4.	Coconuts	th.no.	180	322	300	298	349	347	380	400	405	414	418	417	402	404	404		
5.	Copra	tonne	1620	76	71	70	83	83	89	94	96	99	99	99	96	96	96		
6.	Sugarcane	"	442	1738	1804	1341	1206	1673	1578	1772	1766	1957	1986	2838	2596	2510	2826		
7.	Cotton	"	2000	96	96	96	96	96	96	96	96	96	96	96	96	96	96		
8.	Tobacco	Kg.	20	3840	2540	3660	4280	3780	4720	4660	3300	4720	4280	4460	5140	5040	4480		
9.	Chillies	tonne	2800	885	888	729	779	978	912	897	902	841	907	939	950	1061	1043		
10.	Black peper	"	4500	24	34	45	48	52	64	52	57	62	24	48	28	24	17		
11.	Betelnuts	"	4515	716	781	746	716	739	870	922	866	836	914	1175	1188	1192	1201		
12.	Ginger	"	3200	43	39	51	39	39	43	43	43	39	43	46	46	54	54		
13.	Turmeric	"	2040	279	267	190	207	242	276	300	235	192	168	171	176	182	184		
14.	Cardamom	quantal	2085	40	40	44	44	46	48	55	59	59	62	62	64	64	64		
15.	Other spices	tonne	3216	979	1118	925	895	846	1128	1285	840	883	910	917	917	917	917		
16.	Banana	"	690	1154	1135	936	912	955	1079	1067	1129	1172	1215	1234	1253	1259	1259		
17.	Papaya	"	690	89	98	70	47	61	110	110	125	130	111	110	118	117	118		
18.	Sweet potatoes	"	344	223	336	263	378	449	307	322	308	282	362	351	331	328	338		
19.	Potatoes	"	413	494	509	591	581	524	554	513	595	698	814	818	759	993	733		
20.	Topioca	"	344	378	372	490	591	533	526	480	505	517	572	579	557	529	542		
21.	Cashewnuts	"	1650	18	57	-	14	18	30	14	77	107	86	95	95	137	128		
22.	Other fruits	"	690	1931	1994	2056	2403	2397	2452	2471	2503	2497	2516	2516	2540	2521	2546		
23.	Other vegetables	"	-	2437	1962	1838	1658	1571	1679	1686	1726	1804	1826	1820	1844	1854	1860		
24.	Other food crop	"	-	580	510	710	750	710	720	710	680	690	700	700	700	700	700		
Total agriculture products				42504	40911	43362	47975	47770	48970	51007	98003	54068	53228	56919	57698	56307	57450		

Table 2 : Estimates of different primary products (other than agriculture) available for consumption (value)

(in Rs. million)

Sl.no.	Item	Price in 1960-61	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64	
(0)	(1)	(2) Unit	(3) value (Rs)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1.	Milk	tonne	600	10236	10512	10788	11064	11340	11616	11892	12036	12180	12324	12468	12612	12756	12900
2.	Meat	"	2000	1300	1310	1322	1336	1350	1364	1382	1398	1412	1434	1454	1476	1498	1520
3.	Poultry	th.nos.	3000	363	372	384	393	402	414	423	432	444	453	465	474	501	495
4.	Eggs	"	150	2.2	2.2	2.4	2.4	2.4	2.6	2.6	2.7	2.7	2.7	2.8	3.0	3.0	3.2
5.	Dung (fuel)	tonne	11	1078	1078	1078	1089	1089	1089	1089	1100	1100	1111	1111	1122	1122	1133
6.	Wool	"	6500	70.8	96.2	46.2	106.0	78.7	77.4	78.0	61.8	78.6	48.8	102.0	83.2	94.9	85.8
7.	Other livestock			20	20	20	20	21	22	21	22	22	22	25	25	26	27
8.	Wood	cub.mtr.	31	372	335	291	288	316	335	316	341	372	363	360	388	388	388
9.	Other forest products			27	28	29	30	31	32	32	34	35	38	40	42	44	45
10.	Fish (commercial)	tonne	1500	1164	1070	1071	1167	1180	1196	1442	1756	1517	1173	1654	1370	1425	1568
11.	Fish (subsistence)	"	1000	194	178	178	194	197	199	240	293	253	195	276	228	232	261
12.	Other sea products			10	10	12	13	14	14	16	18	18	20	22	24	25	25
	Sub-total			14837	15011	15220	15702	16021	16361	16934	17494	17434	17184	17980	17847	18115	18451

Table 3 : Estimates of primary products available for consumption

(in Rs. million)

Sl.No.	Item	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1.	Agricultural products	42504	40911	43362	47975	47770	48970	51007	46996	54068	53228	56919	57698	56307	57450
2.	Other primary products	14837	15011	15222	15702	16021	16361	16934	17494	17434	17184	17980	17847	18115	18451
3.	Total primary products	57341	55922	58584	63677	63791	65331	67941	64490	71502	70412	74899	75545	74422	75901

Table 4 : Estimates of the different manufactured products available for consumption (value)

(in Rs. million)

S.No.	Item	Price in 1960-61		1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
		Unit	Value (Rs.)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
I Food, drinks & tobacco																	
1.	Sugar	tonne	1120	1187	1310	1859	2027	1926	2173	2229	2285	2330	2262	2374	2498	2610	3013
2.	Salt	"	100	227	231	235	239	234	248	253	258	264	270	276	282	287	293
3.	Wheat flour	"	520	252	257	270	256	226	252	287	382	429	471	506	592	606	733
4.	Vanasapati ghee	"	2992	500	539	595	601	655	793	769	901	901	984	1002	996	1068	1161
5.	Vegetable oils	"	2250	2205	2228	2092	2385	2812	2542	2902	2902	3105	2745	3060	2925	3218	3060
6.	Tea	"	5700	445	524	502	370	496	627	422	650	598	621	690	826	701	758
7.	Coffee	"	5000	90	95	95	110	90	130	135	150	135	195	170	185	145	190
8.	Fruits & vegt. preserved	"	2800	28	28	28	28	34	39	64	73	76	90	112	126	140	154
9.	Biscuits	"	4500	63	72	54	50	50	54	63	76	81	90	108	117	130	144
10.	Confectionary	"	4000	40	48	40	36	32	32	40	44	40	56	68	72	72	80
11.	Alcoholic beverages	-	-	190	200	205	210	215	225	235	250	265	280	300	320	340	360
12.	Non-alcoholic beverages	-	-	60	65	70	75	80	85	90	100	110	120	130	140	150	160
13.	Other food products	-	-	875	900	925	950	975	1000	1030	1050	1100	1150	1200	1250	1350	1450
14.	Cigarette	th.no.27.5	632	605	522	522	550	660	742	798	852	908	1045	1100	1123	1128	
	Sub-total			6794	7102	7492	7858	8425	8860	9261	9919	10286	10242	11041	11428	11945	12684
II Textiles																	
1.	Cotton cloth	th.mtr.1300	4038	5190	6464	6855	6881	7274	7326	7567	7782	7766	7795	8412	8390	9001	
2.	Woollen cloth	meter	21	244	267	288	307	317	326	349	351	336	294	275	302	391	380
3.	Woollen yarn	Kg.	27	85	77	72	95	105	115	145	165	145	142	145	190	223	288
4.	Art silk fabrics	th.mtr.2600	520	767	491	634	819	894	1144	1108	993	1264	1331	1305	1352	1485	
5.	Pure silk fabrics	"	6500	73	74	75	75	88	91	88	94	97	103	99	109	116	115
6.	Hosiery & other knitted goods	-	-	125	130	139	140	145	155	165	175	200	225	250	270	290	320
7.	Other textile products (incl. tailoring)	-	-	381	488	564	608	627	664	691	710	716	735	742	794	808	869
				5466	6993	8089	8714	8982	9519	9908	10170	10269	10529	10637	11382	11575	12458

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17)

III Leather and rubber products

1. Footwear	per pair	6.5	624	670	670	689	754	780	812	825	845	884	942	988	1053	1053
2. Bicycle tyre	th.no	5600	18	21	17	21	23	26	30	21	35	41	45	46	50	62
3. Bicycle tubes	"	2250	9	10	8	9	11	10	12	12	15	18	25	23	21	22
4. Car tyre	no.	125	14	14	14	15	16	18	19	21	24	25	27	30	32	34
5. Car tubes	"	25	3	3	3	3	3	4	4	4	5	5	6	6	6	7
6. Scooter, motorcycle tyre	"	80	2	2	2	2	2	2	3	4	4	5	6	7	8	9
7. scooter, motorcycle tubes"	"	15	-	-	-	-	-	1	1	1	1	1	1	1	2	2
8. Dipped rubber goods	Doz.	2	20	25	26	27	41	48	46	44	49	61	63	50	51	52
9. Repair of shoes etc.	-	-	40	42	44	48	52	57	62	68	75	82	90	98	105	115
10. Other rubber & leather products	-	-	75	85	80	85	95	100	107	100	116	130	145	146	153	163
Sub-total			805	872	864	897	997	1046	1096	1100	1169	1252	1350	1395	1481	1519

IV Paper and wood products

1. Matches	th.do.	750	244	260	287	264	280	313	322	289	315	367	339	308	288	308
2. Paper	tonne	2500	58	68	70	70	85	95	100	110	132	158	175	182	200	238
3. Wood, furniture and fixtures	-	-	50	51	52	54	56	58	60	63	67	72	76	80	85	90
4. Pencils	th.no	125	2	2	2	3	4	6	8	9	11	12	14	14	18	13
5. Other stationary	-	-	5	5	6	7	7	8	9	11	13	15	18	20	24	30
6. Printing & binding	-	-	290	310	330	345	360	380	400	430	455	485	490	465	515	545
7. Other paper and wood products	-	-	70	73	76	80	85	90	95	100	105	117	128	140	155	170
Sub-total			719	769	823	823	877	950	994	1012	1098	1226	1240	1209	1285	1394

V Other non-metallic products

1. Soap	tonne	2250	491	522	531	533	558	596	628	654	682	720	758	792	812	860
2. Drugs & pharmaceutical	-	-	718	852	786	836	884	940	975	1024	996	1046	1164	1310	1311	1326
3. Kerosene oil	th.ltr.	410	408	452	474	529	560	623	906	800	727	818	841	1093	1350	1286
4. Motor spirit	"	750	176	226	219	242	220	249	256	297	249	245	266	270	312	347
5. Soft coke	tonne	80	67	65	66	76	79	85	85	88	91	91	90	94	110	120

(Table 4 cont.)

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
6. Electricity	th.kwh	180	116	132	140	154	170	191	211	248	279	312	338	383	433	477	
7. Other toilets	-	-	51	60	66	78	80	88	98	104	110	120	135	155	170	195	
8. Glass bangles	Kg.	6	90	93	93	95	96	96	99	102	105	108	111	114	117	120	
9. Other glass products	tone	1000	13	15	18	18	22	26	28	32	39	37	37	40	42	45	
10. Earthenware & pottery	-	-	125	128	130	133	136	140	144	150	157	165	175	185	200	220	
11. Sports goods and toys	-	-	15	17	18	20	22	25	29	34	38	42	48	58	65	75	
12. Plastic & cellulose products	-	-	5	8	12	18	25	32	40	48	58	67	100	116	140	160	
Sub-total	-	-	2275	2570	2543	2732	2852	3091	3499	3561	3531	3871	4163	4618	5065	5211	
VI Metallic products																	
1. Sewing machines	no.	180	8	11	11	12	15	18	25	31	28	38	44	46	46	42	
2. Electric fans	no.	160	22	24	21	23	27	30	42	57	68	99	110	112	118	93	
3. Electric lamps	th.no.	1250	18	20	27	25	30	35	40	39	39	44	52	58	74	86	
4. Miniature lamps	th.no.	330	5	10	8	6	5	10	10	8	6	8	11	12	13	15	
5. Electric tubes	no.	7.50	4	3	4	6	7	8	10	10	8	9	12	15	18	22	
6. Radio receivers	no.	280	26	35	29	25	23	27	48	62	60	70	83	99	106	119	
7. Razor blades	th.no	30	-	1	-	1	5	5	10	9	12	14	18	21	21	24	
8. Hurrican lanterns	no.	4	13	16	14	18	20	21	20	16	14	19	21	22	23	20	
9. Enamelwares	th.no	1250	5	5	7	6	10	10	9	9	9	9	9	16	18	21	
10. Stoves and parts	no	20	5	5	5	6	6	7	8	10	12	14	18	22	23	26	
11. Domestic refrigerators	no	1650	5	11	6	7	8	9	11	6	6	9	16	15	20	28	
12. Air conditioners and watercoolers	no.	2000	-	-	-	-	-	3	7	13	14	11	13	16	19	14	
13. Cars	no.	13500	108	155	78	70	122	180	181	186	148	186	209	209	197	174	
14. Scooters etc.	no.	2500	8	8	6	9	6	16	23	45	32	33	82	98	80	56	
15. Automobile ancillaries	-	-	9	9	9	9	10	11	12	14	16	17	19	21	24	26	
16. Bicycle complete	no.	160	42	66	67	63	82	107	142	183	169	191	212	214	233	212	
17. Bicycle parts	-	-	16	23	22	18	29	31	33	33	28	27	37	57	60	70	
18. Repair of bicycle and automobile	-	-	13	16	20	24	28	35	46	55	65	76	88	100	113	127	

(Table 4 : cont.)

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
19. Clock and watches	no.	90	99	104	40	69	105	180	152	119	16	27	18	14	11	18	
20. Typewriters	no.	850	8	8	8	5	4	14	20	19	8	9	10	14	15	18	
21. Thermos flask	no.	10	2	2	2	5	3	5	6	6	9	15	13	16	15	18	
22. Dry cells	th.no.	333	29	30	26	32	31	36	42	35	36	40	45	45	48	53	
23. Storage batteries	no.	300	20	22	16	19	22	21	30	35	35	43	48	48	50	63	
24. Domestic utensils	Kg.	10	445	460	475	490	505	520	535	560	590	620	666	680	715	750	
25. Flash light torches	th.no.	4320	3	4	5	5	6	8	9	11	12	24	28	32	37	43	
26. Steel furniture	-	-	38	39	41	43	46	48	50	52	54	59	62	68	72	80	
27. Umbrellas	Doz.	75	46	50	54	57	63	69	76	85	94	104	117	125	138	150	
28. Cuttlery and domestic hardwares	-	-	10	10	12	14	16	19	21	25	28	33	37	50	60	70	
29. Precious metals and jewellery	-	-	510	515	525	535	550	565	580	598	651	682	652	650	650	650	
30. Elect, household appliances	-	-	8	8	9	10	11	13	15	18	22	26	30	35	40	50	
31. Scientific instruments	-	-	5	6	7	8	8	9	10	11	13	15	25	28	35	45	
32. Musical instruments	-	-	5	6	7	8	10	11	13	15	16	18	20	22	25	30	
Sub-total	-	-	1535	1682	1561	1631	1813	2181	2236	2375	2318	2689	2825	2980	3117	3213	
Other consumer goods(n.e.s)			1760	2000	2140	2270	2400	2560	2705	2820	2870	2970	3120	3310	3450	3660	
Total: (manufactured products)			19534	21988	23522	24925	26346	28097	29699	30957	31541	32579	34376	36322	37918	40139	

Table 5 : Estimates of different services available for consumption

(value in Rs. million)

Sl.No.	Item	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.	Transport services														
	A. Railway transport	1102	1058	1000	1001	1037	1055	1137	1179	1162	1263	1334	1410	1465	1504
	B. Motor transport	863	874	973	1019	1043	1163	1191	1108	1458	1634	1738	1855	1906	1973
	C. Air transport	53	57	51	53	50	69	91	105	116	127	151	171	195	227
	D. Other transport	104	103	105	107	110	118	125	121	127	141	138	142	148	155
	Sub-total	2122	2092	2132	2180	2250	2405	2544	2516	2863	3165	3361	3578	3714	3926
2.	Communication	173	181	195	204	211	229	249	256	275	292	308	331	375	421
3.	Professional & liberal arts	4420	4700	4890	4990	5080	5270	5460	5840	6210	6490	6960	7440	7900	8470
4.	Domestic services	1300	1400	1300	1400	1400	1400	1500	1600	1700	1800	1900	2100	2200	2400
5.	House property	5125	5125	5375	5500	5625	5750	6000	6125	6250	6500	6625	6875	7000	7125
6.	Government services	3360	3480	3600	3840	4020	4320	4740	5520	5940	6240	6840	7740	8400	9600
7.	Amusements (incl. cinema)	440	445	450	460	470	485	500	520	540	570	600	630	615	700
	Total (Services)	16940	17423	17942	18574	19056	19859	20993	22377	23778	25057	26594	28694	30204	32721

Table 6 : Estimates of different agricultural products available for consumption (Quantity)

sl.no.	Items	Unit	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1.	Cereals	m. tonnes	43.74	43.41	47.36	53.59	52.50	51.84	54.89	52.10	59.84	59.58	63.35	64.94	62.02	66.74
2.	Pulses	"	8.07	8.01	8.64	9.72	10.10	10.21	10.60	8.87	11.54	10.33	11.11	10.28	9.99	8.64
3.	Oil seeds	th. tonnes	439	431	410	469	551	484	530	456	519	431	469	497	511	510
4.	Coconuts	million no	1791	1669	1655	1940	1928	2113	2224	2249	2301	2319	2319	2234	2246	2246
5.	Copra	th. tonnes	47	44	43	51	51	55	58	59	61	61	61	59	59	59
6.	Sugarcane	"	3931	4082	3035	2729	3785	3570	4008	3996	4427	4494	6421	5874	5680	6393
7.	Cotton	"	48	48	48	48	48	48	48	48	48	48	48	48	48	48
8.	Tobacco	"	192	127	183	214	189	236	233	165	236	214	223	257	252	224
9.	Chillies	"	316	314	260	278	350	326	320	322	300	324	335	339	379	372
10.	Black peper	"	5.3	7.7	10.1	10.6	11.6	14.2	11.6	12.7	13.8	5.3	10.5	6.4	5.2	3.8
11.	Betelnuts	"	159	173	165	159	162	193	204	192	185	202	260	263	260	266
12.	Ginger	"	13	12	16	12	12	13	13	13	12	13	14	14	17	17
13.	Turmeric	"	137	131	93	102	119	135	147	115	94	83	84	86	89	90
14.	Cardamom	th. quantals	19	19	21	21	22	23	27	28	28	29	29	30	30	30
15.	Other spices	th. tonnes	289	348	288	278	263	256	400	261	275	283	285	285	285	285
16.	Banana	"	1674	1647	1359	1323	1386	1566	1548	1638	1701	1764	1791	1818	1827	1827
17.	Papaya	"	130	142	102	68	89	159	159	182	190	161	159	171	170	171
18.	Sweet potatoes	"	648	976	765	1098	1305	891	936	896	819	1053	1022	702	693	720
19.	Potatoes	"	1197	1233	1431	1408	1269	1341	1242	1440	1692	1971	1980	1836	2403	1776
20.	Topioca	"	1098	1080	1426	1719	1548	1530	1395	1467	1503	1665	1683	1620	1539	1575
21.	Cashewnut	"	11	34	-	9	9	18	9	47	65	52	58	58	83	77
22.	Other fruits	"	2799	2889	2979	3483	3474	3555	3582	3627	3618	3645	3645	3681	3654	3690
23.	Other vegetables	"	7065	5688	5328	4806	4554	4869	4887	5004	5229	5292	5274	5346	5373	5409
24.	Other food crops	Rs. million	585	508	710	749	706	718	712	678	692	690	700	700	700	700

Table 7 : Estimates of different primary products (other than agriculture) available for consumption
(Quantity)

Sl.No.	Items	Unit	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1.	Milk	ml. tonnes	17.06	17.52	17.98	18.44	18.90	19.36	19.82	20.06	20.30	20.54	20.78	21.02	21.26	21.50
2.	Meat	th. tonnes	650	655	661	668	675	682	691	699	706	717	727	738	749	760
3.	Poultry	Million no	121	124	128	131	134	138	141	144	148	151	155	158	167	165
4.	Eggs	"	15	15	16	16	16	17	17	18	18	18	19	20	20	21
5.	Dung (fuel)	ml. tonnes	98	98	98	99	99	99	100	100	101	101	102	102	103	103
6.	Wool	th. tonnes	10.9	14.8	7.1	16.3	12.1	11.9	12.0	9.5	12.1	7.5	15.7	12.8	14.6	13.2
7.	Other livestock	Rs. million	20	20	20	20	21	22	21	22	22	22	25	25	26	27
8.	Wood	mil. cub. mtr.	12.0	10.8	9.4	9.3	10.2	10.8	10.2	11.0	12.0	11.7	11.6	12.5	12.5	12.5
9.	Other forest products	Rs. million	27	28	29	30	31	32	32	34	35	38	40	42	44	45
10.	Fish (commercial)	th. tonnes	776	713	714	778	787	797	961	1171	1011	782	1103	913	950	1045
11.	Fish (Subsistance)	"	194	178	178	194	197	199	240	293	253	195	276	228	232	261
12.	Other sea products	Rs. million	10	10	12	13	14	14	16	18	18	20	22	24	25	25

Table 8 : Estimates of different manufactured products available for consumption (Quantity)

S.No.	Items	Unit	1950-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
I Food,drinks & tobacco																
1.	Sugar	th. tonnes	1060	1170	1660	1810	1720	1940	1990	2040	2080	2020	2120	2230	2330	2690
2.	Salt	"	2270	2310	2350	2390	2340	2480	2530	2580	2640	2700	2760	2820	2870	2930
3.	Wheat flour	"	485	494	520	492	435	485	552	735	825	906	974	1138	1166	1409
4.	Vanaspati ghee	"	167	180	199	201	219	265	257	301	301	329	335	333	357	388
5.	Vegetable oils	"	980	990	930	1060	1250	1130	1290	1290	1380	1220	1360	1300	1430	1360
6.	Tea	"	78	92	88	65	87	110	74	114	105	109	121	145	123	133
7.	Coffee	"	18	19	19	22	18	26	27	30	27	39	34	37	29	38
8.	Fruits & vegetable(preserved)"	"	10	10	10	10	12	14	23	26	27	32	40	45	50	55
9.	Biscuits	"	14	16	12	11	11	12	14	17	18	20	24	26	29	32
10.	Confectionary	"	10	12	10	9	8	8	10	11	10	14	17	18	18	20
11.	Alcoholic beverages	Rs. million	190	200	205	210	215	225	235	250	265	280	300	320	340	360
12.	Non-alcoholic beverages	"	60	65	70	75	80	85	90	100	110	120	130	140	150	160
13.	Other food products	"	875	900	925	950	975	1000	1030	1050	1100	1150	1200	1250	1350	1450
14.	Cigarettes	billion No.	23	22	19	19	20	24	27	29	31	33	38	40	41	41
II Textiles																
1.	Cotton cloth	ml. meter	3106	3992	4972	5273	5293	5595	5635	5821	5986	5974	5996	6471	6454	6924
2.	Woollen cloth	"	12	13	14	15	15	16	17	17	16	14	13	14	19	18
3.	Woollen yarn	million kgs	3	3	3	4	4	5	6	7	6	6	6	8	9	12
4.	Art silk fabrics	ml. meter	200	295	189	244	315	344	440	426	382	486	512	502	520	571
5.	Pure silk fabrics	"	11	11	12	12	14	14	14	14	15	16	15	17	18	18
6.	Hosiery & other knitted goods	Rs. million	125	130	135	140	145	155	165	175	200	225	250	270	290	320
7.	Other textile products	"	255	325	375	405	415	440	460	475	480	490	495	530	540	580
III Leather & rubber products																
1.	Footwear	ml. pairs	96	103	103	106	116	120	125	127	130	136	145	152	162	169
2.	Bicycle tyre	million no.	3.3	3.7	3.1	3.7	4.2	4.7	5.4	3.3	6.2	7.4	8.1	8.1	9.0	11.0
3.	Bicycle tubes	"	3.8	4.4	3.7	3.9	4.7	4.6	5.4	5.3	6.5	8.2	11.2	10.2	9.4	9.9
4.	Car tyre	th. no.	111	112	116	120	128	141	153	171	188	197	219	236	255	274
5.	Car tubes	"	111	112	116	120	128	141	153	171	188	197	219	236	255	274

Table 2 (cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
6. Scooter-motorcycle type th.no.			20	20	22	22.5	25	31	34.5	44	50	58	72	86	97.5	112.5
7. Scooter, motorcycle tubes "			20	20	22	22.5	25	31	34.5	44	50	58	72	86	97.5	112.5
8. Dipped rubber goods	million no.		123	148	156	164	245	289	278	265	293	365	378	300	308	315
9. Repair of shoes etc.	Rs. million		40	42	44	48	52	57	62	68	75	82	90	98	105	115
10. Other rubber and leather products	"		75	85	80	85	95	100	107	100	116	130	145	145	153	163
IV Paper and wood products																
1. Matches	million doz.		325	347	383	352	373	417	430	385	420	449	452	411	384	410
2. Paper	th. tonnes		23	27	28	28	34	38	40	44	53	63	70	73	80	95
3. Wood, furniture and fixtures	Rs. million		50	51	52	54	56	58	60	63	67	72	76	80	85	90
4. Pencils	million no		16	18	20	22	34	46	67	69	89	98	115	110	146	101
5. Other stationary	Rs. million		5	5	6	7	7	8	9	11	13	15	18	20	24	30
6. Printing & binding	"		290	310	350	345	360	380	400	430	455	485	490	465	515	545
7. Other paper and wood products	"		70	73	76	80	85	90	95	100	105	117	128	140	155	170
V Other non-metallic products																
1. Soap	th. tonnes		218	232	236	237	248	265	279	282	303	320	337	352	361	382
2. Drugs & pharmaceuticals	Rs. million		718	852	786	836	884	940	975	1024	996	1046	1164	1310	1311	1336
3. Kerosene oil	ml. litre		995	1102	1156	1290	1365	1519	2210	1951	1774	1996	2051	2665	3300	3064
4. Motor spirit	"		235	301	292	322	294	332	342	396	332	327	355	371	416	463
5. Soft coke	th. tonnes		836	814	834	952	991	1057	1058	1102	1142	1140	1122	1181	1378	1494
6. Electricity	th. kwh		645	731	777	855	947	1062	1170	1377	1550	1735	1878	2128	2407	2652
7. Other toilets	Rs. million		51	60	66	78	80	88	98	104	110	120	135	155	170	195
8. Glass bangles	million kgs		15.0	15.5	15.5	15.8	16.0	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0
9. Other glass products	th. tonnes		13.0	15.3	17.9	17.6	22.0	25.5	28.2	31.8	39.0	36.6	37.4	40.0	42.0	45.0
10. Earthenware & pottery	Rs. million		125	128	130	133	136	140	144	150	157	165	175	185	200	220
11. Sports goods & toys	"		15	17	18	20	22	25	29	34	38	42	48	58	65	75
12. Plastic & cellulose products	"		5	8	12	18	25	32	40	48	58	67	100	116	140	160

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
VI Metallic products																	
1. Sewing machines	th. no.	45	62	59	67	82	102	139	172	156	210	245	255	257	235		
2. Electric fans	th. no.	140	150	132	146	171	185	264	356	428	617	688	699	737	581		
3. Electric lamps	million no.	14.5	16.1	21.3	19.9	23.6	27.8	32.2	31.1	31.1	35.3	41.9	46.8	59.1	68.9		
4. Miniature lamps	"	16.1	31.0	25.6	19.6	16.4	30.7	30.9	23.9	18.8	23.8	31.9	35.0	40.0	45.0		
5. Electric tubes	"	0.5	0.4	0.6	0.8	0.9	1.11	1.26	1.31	1.05	1.17	1.66	1.95	2.46	2.87		
6. Radio receivers	th. no.	92	126	103	88	81	131	170	220	215	250	294	355	377	426		
7. Razor blades	million no.	15	18	11	38	173	166	335	301	391	468	600	693	695	795		
8. Hurricane lanterns	"	3.2	4.0	3.5	4.5	5.1	5.3	5.1	4.1	3.7	4.8	5.2	5.5	5.8	5.0		
9. Enamelwares	"	4.2	3.8	5.5	4.8	8.0	8.3	7.3	7.6	7.6	7.5	7.2	12.5	14.8	16.8		
10. Stoves & parts	th. no.	200	210	225	250	280	307	366	382	464	552	743	898	945	1100		
11. Domestic refrigerators	"	3.2	6.4	3.8	4.1	4.6	5.2	6.4	3.5	3.6	5.4	9.7	9.0	11.9	16.9		
12. Air conditions & water cooler	"	-	-	-	-	-	1.4	3.4	6.3	7.2	5.5	6.3	7.8	9.7	7.0		
13. Cars	"	8.0	11.5	5.8	5.2	9.0	13.3	13.4	13.8	11.0	13.8	15.5	15.5	14.6	12.9		
14. Scooters etc.	"	3.0	3.2	2.2	3.7	2.4	6.4	9.3	18.1	13.0	13.3	32.9	39.0	31.8	22.4		
15. Automobile ancillaries	Rs. million	9	9	9	9	10	11	12	14	16	17	19	21	24	26		
16. Bicycle complete	th. no.	265	410	420	395	510	669	888	1145	1057	1193	1322	1340	1458	1326		
17. Bicycle parts	Rs. million	16	23	22	18	29	31	33	33	28	27	37	57	60	70		
18. Repair of bicycles and automobiles	"	13	16	20	24	28	35	46	55	65	76	88	100	113	127		
19. Clock and watches	th. no.	1100	1153	440	762	1163	2001	1692	1327	182	305	195	150	125	200		
20. Typewriters	"	10	10	9	6	5	17	24	22	10	11	12	16	18	21		
21. Thermos flask	"	170	180	187	490	288	518	576	648	864	1483	1300	1565	1500	1800		
22. Dry cells	million no	86	91	78	95	94	108	126	104	108	121	135	136	144	160		
23. Storage batteries	th. no.	65	72	52	62	72	70	99	116	116	142	159	160	166	210		
24. Domestic utensils	th. tonnes	44	46	48	49	50	52	54	56	59	62	67	68	72	75		
25. Flash light torches	th. no.	750	900	1100	1350	1500	1750	2000	2500	2880	5580	6510	7500	8500	10000		
26. Steel furniture	Rs. million	38	39	41	43	46	48	50	52	54	59	62	68	72	80		
27. Umbrellas	th. doz.	610	660	715	765	838	920	1010	1130	1250	1380	1560	1670	1840	2000		
28. Cutlery & domestic hardware	Rs. million	10	10	12	14	16	19	21	25	28	33	37	50	60	70		
29. Precious metals and jewellery	"	510	515	525	535	550	565	580	598	651	682	652	650	650	650		
30. Elect. household appliances	"	8	8	9	10	11	13	15	18	22	26	30	35	40	50		
31. Scientific instruments	"	5	6	7	8	8	9	10	11	13	15	25	28	35	45		
32. Musical instruments	"	5	6	7	8	10	11	13	15	16	18	20	22	25	30		
Other consumer goods (n.e.s)	"	1760	2000	2140	2270	2400	2560	2705	2820	2870	2970	3120	3310	3450	3660		

**MONTHLY STATISTICS OF THE PRODUCTION OF SELECTED
INDUSTRIES OF INDIA FOR SEPTEMBER 1965**

1. Sources.- The monthly production statistics in this publication were furnished by the following sources:-

Industry	Sources	Weights
1. Coal	Coal Controller, Calcutta.	7.09
2. Iron Ore	Chief Inspector of Mines in India, Dhanbad, and Indian Bureau of Mines, Nagpur.	0.38
3. Sugar	Vegetable Oil Products Controller, New Delhi.	4.52
4. Vegetable Oil Products (Vanaspati)	Vegetable Oil Products Controller, New Delhi.	0.57
5. Coffee	Indian Coffee Board, Bangalore.	0.33
6. Tea	Tea Board, Calcutta; United Planters' Association of Southern India, Coonoor; and Indian Tea Association, Calcutta.	7.42
7. Salt	Salt Commissioner, Jaipur.	0.64
8. Cotton and Wool	Textile Commissioner, Bombay	36.47
9. Art Silk Fabrics		
10. Looms, Complete Ring Spinning Frames and Carding Engines.		
11. Jute	Indian Central Jute Committee, Calcutta.	5.62
12. Iron and Steel	Iron and Steel Controller, Calcutta.	7.48
13. Gold	Geological Survey of India, Calcutta and Indian Bureau of Mines, Nagpur.	0.53
14. Electricity	Central Water and Power Commission (Power Wing), New Delhi.	3.68
15. Petroleum Products	Ministry of Petroleum and Chemicals, New Delhi.	3.79
16. Other Industries	Department of Technical Development, New Delhi.	21.48
TOTAL		100.00

The monthly production of the different industries was estimated by these sources from returns received from occupiers of factories. The returns were submitted voluntarily by the producers except in the case of coal, sugar, vegetable oil (Vanaspati), salt, cotton textiles, iron and steel, iron ore and gold where the collecting agencies have powers to call for returns.

2. Scope and coverage.- The production statistics relate to most major industries. Except in the case of the three industries mentioned below, the tables relate to production in all States in the Indian Union other than Jammu and Kashmir. In the case of "Woollen Textiles" (233), "Matches" (3180) and "Electricity Generated" (510), the tables relate also to production in that State. In the case of well organised industries like cotton and jute textiles, iron and steel, and sugar, they cover almost the entire output. In the case of the remaining industries they cover production of all except small units for which the collection of monthly statistics is not practicable. The number of units to which the figures for the latest month relate are shown on the contents page.

The current month's production of units which failed to submit returns in time was estimated. Figures for the current month are, therefore, subject to revision.

INDIAN ASSOCIATION FOR RESEARCH

IN

NATIONAL INCOME AND WEALTH

DELEGATES' REGISTRATION PROFORMA

1. Name, designation
and Address

V. M. DANDekar

2. At whose expense are: i) your Office _____
you attending the _____
Conference ? (Write : ii) The IARNIW _____
'Yes' against the _____
correct answer) : iii) Your own _____

3. Have you availed of
the Railway concession
to attend the Conference _____

4. If you are attending the Conference at the expense of the
IARNIW, please give details of the Journey.

a) Place of departure
for Conference _____

b) Time and date of
departure _____

c) Time and date of arrival
at Ahmedabad _____

d) Time and date of departure
from Ahmedabad _____

e) Time and date of arrival
at place of origin _____

f) Class by which travelled _____

g) Railway fare (concession rate)
paid Rs. _____

.....

LRN/12466

Preliminary draft
4 April 1966

FIFTH SESSION OF
INDIAN ASSOCIATION FOR RESEARCH IN NATIONAL INCOME AND WEALTH

PAPERS ON DEFLATION OF NATIONAL PRODUCT AND ITS COMPONENTS

1. The seven papers on estimates of national product and its components at constant prices can be grouped into four categories: (i) a purely methodological paper, A new approach to the problem of deflating national income by S. Subramanian and G.D.Mathur; (ii) two partly methodological papers on deflation of articulated sets of national accounts, An articulated system of national accounts for India at constant prices by Mahfooz Ahmed and An articulated set system of national accounts at constant prices for India by S. Chattopadhyay; (iii) three papers, Estimation of national income in real terms by B.W. and A.B.Chavan, Deflation of income originating in non-commodity sectors of the Indian economy by Narottam Shah and Certain thoughts on the deflation of national product in India by M. Mukherjee and Bina Roy, making certain critical observations on the available estimates of national output at constant prices and (iv) a paper, Problems of deflating the current price series on national income and related aggregates by S.G.Tiwari and B. Kumar. This note excludes the last paper because it was not available by 4 April 1966 when the note was finalised.

2. Before I proceed to review the papers, I would like to make a few general points. First, I would like to make it clear that due to lack of time, the review is based on an inadequate study of the subject matter. In particular, I have not been able to go into all the intricacies involved in obtaining national accounts in real terms. Second, the main object of the review is to highlight certain points on which discussion is likely to be fruitful and important. Thus, the review is not thorough; it is somewhat selective. Third, I have personally done little work in this particular field. If I had done this, then probably I would have been more aware of the difficulties and less critical. But I hope to be excused for this because my critical observations are intended simply to provoke discussion. Finally, I have inserted a few expository paragraphs; however, they are for clearing my own ideas.

3. I shall take up the papers in the sequence considered earlier. Subramanian and Mathur's paper presents a particular method of deflation of national product with illustrative calculations for manufacturing industries.

I am not sure whether I have understood the method. It appears that the method is not logically distinct from carrying the base period added value by an index number of physical production. Let P, p stand respectively for prices of product and inputs, Q, q the corresponding quantities, and subscripts 1, 0 respectively for current and base periods. Then, carrying base period added value by a quantity index can be represented by

$$(P_0 Q_0 - P_0 q_0) \cdot \frac{Q_1}{Q_0} \quad \dots \quad \dots \quad (1)$$

In the method suggested, the base period and current period added value per unit of total output are respectively given by

$$\frac{P_0 Q_0 - P_0 q_0}{Q_0} \quad , \quad \frac{P_1 Q_1 - P_1 q_1}{Q_1}$$

and the deflated figure is

$$(P_1 Q_1 - P_1 q_1) \cdot \frac{\frac{P_0 Q_0 - P_0 q_0}{Q_0}}{\frac{P_1 Q_1 - P_1 q_1}{Q_1}} \quad \dots \quad (2)$$

which is identical with (1). In the illustrations given, both the methods give identical results. I do not know whether I have missed some subtle points, but I feel that we need clearer demonstration before we can accept the method as more advantageous than standard methods.

4. The papers by Mahfooz Ahmed and S. Chattopadhyay present, for the first time in India, deflated systems of national accounts for India, and discuss some of the methodological questions. The authors are to be congratulated for embarking on a new field of research.

5. Give a national accounts in current prices, it is obviously of interest to translate the figures to some constant price base. For most of the flows included in national accounts, for which the quantity and price elements can be separated, this does not call for any fresh principle. A flow X at current price is simply replaced by the corresponding flow X' at constant prices where $X' = \frac{X}{P_x}$, P_x being the relevant price associated with the flow. Second, when the accounting system is articulated, some of the current price flows, for example, savings or factor incomes for which it is conceptually difficult to obtain volume and price components separately, can be obtained at constant prices.

as residuals in the accounting system. Thus, if income (Y) is defined as sum of consumption (C) and investment (I), the flows C and I at constant prices will respectively be C' and I' and Y' will be given by $C' + I'$, thus avoiding a separate deflation of Y. I do not think any difficulty attaches to this notion. However, this procedure does not always give theoretically satisfactory results, and it is sometimes necessary to introduce new principles. For example, when E is export, M, import and N, balance of trade, we have $E - M = N$. The corresponding equation at constant prices will be $E' - M' = N'$. It is quite possible that while N is positive N' is negative. In this case, the implicit deflator of N becomes negative, and it becomes difficult to interpret a negative deflator. To steer clear of this difficulty, the procedure followed is to deflate N separately by some reasonable deflator, and to add a new balancing variable T' in the deflated system, representing trading gains (or losses), which does not exist in the current price system. Thus, corresponding to the current price equation $E - M = N$, we have the constant price equation $E' - M' + T' = N'$. Since $Y = C + I + E - M$, we have $Y' = C' + I' + E' - M' + T'$. This shows that T' is added to real income. Suppose that $E = M$ at the base period, volumes of export and import remains unchanged, but export prices increase and import prices reduce, then $T' = M' - E' = \frac{M}{P_M} - \frac{E}{P_E} > 0$. This shows that under the circumstances, real income available to the country increases simply because of an improvement in the terms of trade.

6. Mahfooz Ahmed's paper presents a simplified national accounts for the period 1955-56 to 1960-61 at current prices and then translates the figures to constant 1960-61 prices. His first account gives NNP at market prices by the usual expenditure breakdowns, while his second account distinguishes some factor income flows and relates the product at factor cost with incomes. The third account shows the identity between savings and investment. The fourth account equates various income flows with expenditures, saving coming as the residual. The external transactions are presented in the last account. In the deflated version, trading gains and the transfer effect of indirect taxes and subsidies appear in the second account, the former coming again in the 5th and the latter in the 4th account. The author proceeds to discuss the procedure estimation for obtaining the estimates both at current and at constant prices, and briefly

explains the need of introducing the balancing items. He uses only Burge-Geary method to obtain his estimates of trading gains.

7. S. Chattopadhyay gives his accounts for the years 1951-52 to 1954-55. His estimates at current prices are taken from Barpujari's well known paper, with some consolidation and adjustment. He then proceeds to get suitable deflators and obtains his accounts at constant 1951-52 prices. He uses only one balancing items, trading gains. The framework adopted by him is almost similar to the one used by Mahfooz Ahmed. He also discusses his procedure of estimation as well as the conceptual issues connected with balancing items. He uses all available methods to obtain estimates of trading gains, and suggests a new deflator, the price of imported capital goods. He feels that this is suitable for India where trading loss, by and large, results from imports of capital goods.

8. The papers do not attempt any interpretation of the results. This is probably all right because the estimates are unlikely to have a reasonable margin of uncertainty. I feel that the deflators used are weak and casual. The share of income from business and property in Mahfooz Ahmed's paper, for example, moves from 24 to 27 p.c. of national income between 1955-56 to 1960-61 at current prices, the corresponding movement is from 16 to 27 p.c. at constant prices. Such a large real shift is not possible; this shows the weakness of the deflator used. Consumer price and wholesale price index numbers, which are known to be urban in character, are not satisfactory deflators for all-India aggregates. My general impression is that the authors were not primarily interested in getting reasonable estimates of the various flows in real terms; they were more interested in obtaining a complete accounting framework at constant prices. Conceptual and methodological questions engaged their attention more than purely estimational problems.

9. I do not propose to dilate further on this topic, because this field of research is unlikely to become important until we have (i) a national accounts at current prices published regularly, and (ii) there are more acceptable annual estimates of national product, consumption, investment and other major breakdown at constant prices. If these estimates are given, then only it will pay to deflate the residual items and to worry about the balancing items. When there is uncertainty about real movements in large components of national product, it is not possible to work out satisfactory national accounts in real terms. The

effort made by the authors, however, is welcome. They have raised some methodological questions. It will be useful to go on solving such problems, so that the conversion of a current price account into a constant price account will be a quick process when taken up.

10. I now pass on to the third category of papers, those dealing with available estimates of national product and its large chunks at constant prices. This I consider to be a very important field in which urgent critical attention is needed. Is the rate of growth of national product in real terms shown by our official statistics plausible? Are the real rates of growth of major sectors accurate enough? Are the real movements in investment and consumption which can be worked back from official or almost official data realistic? It is necessary to have unequivocal answers to such queries, and this is possible only when there is some sort of a consensus.

11. B.W. and A.B.Chavan's paper goes into some details about the measurement of real net output in the revised series of national income and tries to segregate main gaps, suggesting ways and means for improvement. They feel that inadequate attention has been paid to this field by the CSO. They first outline different methods of estimating real output and discuss their relative usefulness. This part of their paper appears to be somewhat inadequate. For example, I do not see any logical difference between carrying forward base year values by quantity indicators and obtaining the current period values at base period prices. Data permitting, both can be applied for double deflation. Applied to added value, both neglect variation in real cost ratio and differential movements of input and output prices. Secondly, deflation of final expenditure is probably more satisfying, at least in principle, than either of the two above methods, applied to added value.

12. The authors discuss in some details the deflation procedure used for agriculture. Availability of data, according to them, permits deflation of a sizable part of the cost. They also think that the estimate output at base year prices should be built up regionally, instead of being tackled at a very aggregate level. I have no quarrel with the first point. I would, however, like to point out that when estimates of both output and input are subject to large margins of uncertainty, the error of the difference is expected to be considerably larger than the error of either the output or the input. Regarding

detailed statewise or regional calculations, this is all right when proper measurements of characters are available regionally. But this is hardly true for animal husbandry and certain components of agriculture for which even the all-India estimates are unsatisfactory and cannot be seriously regarded as an outcome of a proper measurement procedure. Even for mining, estimates at national level will be more accurate than those at regional level. Proper double deflation method can be attempted for factory establishments provided we have better data on quantity and price of inputs. This will require collection of more detailed information through Survey of Industries. Their suggestions about small enterprises and construction can easily be accepted; they recommend collection of data on quantities and prices of outputs and inputs. Their suggestion about 'other commerce and transport' also reduces to this. I do not clearly see the distinction between deflating current period passenger earnings by passenger fare and carrying a base period passenger earning by a quantity index of passenger traffic. Estimates in service sector are no doubt weak in the absence of proper output indicators, and probably a repetitive survey is needed to solve the problem, as the authors suggest. But we have learnt from experience that it is our think to start a survey and it is another thing to get out of this what we need. Good deal of thought has to be given to decide about the sub-sectors by which the estimates have to be prepared and to obtain the output indicators to govern the estimates. Since the second step is not easy, it may be even desirable to reclassify the industrial categories, provided this help in getting proper indicators.

13. Narottam Shah develops a single point in his paper. Since the implicit deflators in the service sectors do not move up while those in commodity producing sectors show a large rise, the price movements in the service sectors appear to be understated. If an adjustment is made for this, and the deflators are allowed to rise reasonably, the use of altered deflators would reduce the rate of growth of real net output in these sectors. As a consequence, the rate of growth of net national output at constant prices would fall substantially. The author has taken pains to establish this proposition. Unfortunately, Shah's proposition holds only on the assumption that the official income estimates at current prices are reasonably accurate. But, it is quite probable that the sectoral estimates at current prices, particularly in the service sectors, are subject to large margins of uncertainty. If we grant this, then the constant price estimates of

the service sectors may be approximately correct, and since it is reasonable to expect that the price rise in these sectors has some parallelism with that in the commodity producing sectors, the rate of growth of income at current prices in the service sectors, and consequently the rate of growth of net national output is probably underestimated. Shah's analysis does not establish that real growth in India has been lower than what GSO estimates convey; more corroborative evidence is needed to establish this claim.

14. In Mukherjee and Roy's paper, an attempt has been made to justify the reported rate of growth of real net output in India. They have examined the procedure of deflation sectorwise for possible overestimation or underestimation. In the sectors in which current added values are deflated by base period prices, the possibility of large error as a consequence of non-application of double deflation is remote. In the service sectors, in which base period added value is moved up by production indicators, some overestimation of the real rate of growth is expected for professions and liberal arts and government administration. But this is probably compensated by underestimation in smaller enterprises and probable underestimation in 'other commerce and transport'. Thus, the reported real growth in services may be more or less all right. On the balance, the suspicion is that the real rate of growth of national product is probably slightly underestimated rather than over estimated. Consideration of the population growth also does not require our changing this conclusion. While it has not been discussed in the paper, some extraneous evidence also indicates that the real rate of growth indicated by official statistics is plausible. The real rate of growth given in the revised estimates of national income also supports the proposition. In view of this, the official national income deflators, both for aggregate income and for its major breakdowns, are open to criticism. The overall national income deflator require for its acceptability postulation of slow price rise in the rural agricultural sector, on the justifiable assumption that consumer price index number and whole sale price index number reflect faithfully the urban price movements. But internal evidence of national income statistics violates this postulate because agricultural prices rise more sharply than non-agricultural prices. The conclusion which emerges out of this is that the rates of growth at current prices of the non-agricultural sector in general and services in particular, are understated in the official data. A

fresh consumer price index number for 1956-57, 1958-59 and 1960-61 constructed by the authors supports the above analysis, in a general way,

15. In conclusion, I would like to indicate fields in which discussion and further work is likely to be fruitful. As I have pointed out earlier, the most important of these is the real rate of growth of national product in India. In spite of the shortcomings in the procedure of deflation, I feel that, here, the real rate of growth depicted by official data is more plausible than the rate of growth at current prices. Thus, we need not only an improvement of the deflation procedure but also an examination of the entire body of national income statistics and introduction of improvements so that both current price and constant price estimates become more realistic. I do not think we can solve the problem if we accept our current price estimates as correct. Secondly, finer refinements in the deflation procedure and calculations at disaggregated level, while important, are unlikely to solve the basic problem. The first task should be to assess the movement of the large components of national product at current and at constant prices. For this, the work should concentrate on suitable production and price indicators, and here there is room for fairly detailed work and collection of fresh data, particularly for distributive and other services. I think a separate estimate of real movement of NNP by its major expenditure breakdowns will furnish important corroborative material because here a new set of price data, collected and systematised in connection with surveys of the family budget type and for construction of cost of living index numbers, can be effectively utilised. Next, it will be useful to take up some analytical studies with an aim to establish meaningful relations between the global and sectoral national income deflators and the other available price index numbers in the country. Wide inconsistency between these two sets of estimates should be resolved. Finally, while estimates at constant prices are important, estimates at current prices are no less so because one principal difficulty a growing economy has to face is the inflationary pressure. With realistic sectoral deflators, it will be possible to locate where imbalances occur and think about ways and means for their eradication. Until these tasks are undertaken, refinements such as double deflation in manufacturing industries and partially in agriculture, or calculations at more disaggregated level, would

remain relatively unimportant. The same remark also applies to construction of national accounts in real terms which probably should have even lower priority. A very large part of the work which I have in my mind can be taken up on the basis of existing data, which may need some marginal processing. Collection of fresh data, when considered necessary, should be carefully planned by the user and may be taken up if we are reasonably certain that we will get what we really want.

M. MUKHERJEE

Preliminary & Confidential

JARNIW/66/1.4

INDIAN ASSOCIATION FOR RESEARCH
IN NATIONAL INCOME
AND WEALTH

FIFTH INDIAN CONFERENCE ON
RESEARCH IN NATIONAL INCOME

An estimate of capital formation in Agriculture in Bihar

S.B. SRIVASTAVA

AHMEDABAD

9- 11- April, 1966.

AN ESTIMATE OF CAPITAL FORMATION IN AGRICULTURE IN BIHAR
by
S.B. SRI VASTAVA, SENIOR DEPUTY DIRECTOR OF STATISTICS
BIHAR, PATNA

INTRODUCTION: -

The studies on capital formation have acquired an important position in the system of social accounting of the country. The monetary and financial policies in a developing economy are being decided on the basis of relative size of aggregate saving and investment. The extent of deficit financing and borrowing both internal and external, are largely governed by the size of capital formation having been achieved by the economic system.

2. Studies on capital formation have been taken up by the Reserve Bank of India (1), The National Council of Applied Economic Research (2) New Delhi, the Central Statistical organisation (3) and some of the State Statistical Bureau in the country (4). The estimates of gross capital formation differed slightly in the three studies (i) (ii) (iii), in the first instance but the conceptual differences have been ironed out and it is now agreed that roughly ~~8%~~ 10% of the National Income is utilised for capital formation in the economy.

3. It is agreed that an estimate of gross net capital formation in the economy of the country can be obtained with some accuracy but inter-State flow of goods makes the task of estimation of capital formation in the individual states comparatively difficult. This will be evident after we know the constituents of the aggregate. They are (a) Construction

(1) All India Rural debt and investment survey R.B.I. 1961-62

2) Studies on capital formation- Survey taken up by NCAER

3) National Income Statistics Estimates of Gross Capital Formation India 1948-49 to 1960-61.

4) Assam and U.P.

b) Machinery and other equipments (c) Change in stock

d) Private corporate sector and (e) Public Sector.

Statewise data are normally not available in any of the constituents noted above. However, data on construction, and improvement in rural areas in general and Agriculture, particular have been estimated by sample surveys.

4. The present study is based on the data collected in the National sample survey (State Sample) during the 15th round.

5. The object of the study was to collect information on capital formation by the households in the rural areas by interview method. Special care was taken to collect data on real assets acquired and constructed by the household during the reference period of one year. It was assumed that buildings and construction activities form a major part of the activity leading to capital formation. The expenditure on (a) reclamation of land, (b) building etc., (c) clearing of jungles (d) major part of existing lands and similar activities account for a major of total capital formation in agriculture. The construction activities like ~~during~~ digging of ponds and wells etc., are also covered under agriculture.

DESIGN:-

6. A list of households reporting capital formation was prepared in all the six villages forming a sub-sample according to the terminology of the National Sample Survey. This schedule was canvassed in all the 6 villages allotted to the investigator. In villages 1, 2 and 3 the sample households with odd order of selection were surveyed in the same sub-round, while the sample households with even order of selection were surveyed after a lapse with of three sub-rounds of two months each. In villages 4, 5 and 6 the sample households with even order of selection were surveyed in the same sub-round, while sample households with odd order of selection were surveyed after a lapse of three sub-rounds. The present study is based on 228 villages covering 560 households. The sample size is therefore adequate and representative at the State level.

7. The schedule was divided into 11 blocks. The information on expenditure was collected in blocks 7, 8 and 10. However other ancillary data on indebtedness and source of finance etc. was also collected.

8. Data on construction covered residential as well as non-residential buildings. The materials purchased for construction purposes during the reference period were included although ~~during~~ all of them might not have been consumed. Construction referred to addition of floor space and improvement was related to betterments of existing structure. Structures which extended the life of the building for more than one year were treated as improvement-

Repairs of a regular nature were excluded from the survey.

In case of Live stock the term construction meant addition of newly born stock to the household during the reference period provided they were not meant for sale.

LIMITATIONS :-

9. The estimates of gross domestic product, and gross capital formation reveals that 12.93% of the income from agriculture and construction sectors is devoted to gross capital formation in the rural sector in the State. It is not possible to compare this percentage with corresponding percentage for the country as a whole or for different states as the constituents of the aggregate do not agree. Neither it is possible to check the estimates of capital formation arrived at by expenditure approach with those obtained through production approach. The present study has another limitations the movement of aggregate capital formation over time as the study was not continued in subsequent years. Other limitations of the present study are those inherent in interview approach. It has been admitted that previous experiences of collection of such information by interview technique or through expenditure approach have not been very encouraging.

THE RESULTS

10. It is estimated that 65.6% of the rural households have reported capital formation of one type or the

capital in agriculture Rs. 2.41 crores is spent on purchase Rs. 10.66 crores on construction and remaining Rs. 2.34 crores on improvements. In other words 16.31% of the total capital formation is accounted for by purchase 67.95% by constructions, and 15.74% by improvements. It may be observed that purchase of land does not constitute Capital formation, because it is a transfer transaction, not leading to increase in assets of the State. A breakup of the total Capital expenditure into constituent items indicates that 36.27% of the total expenditure goes to land and buildings 46.55% on tools and implements 15.30% on live stock and the remaining 1.87% on ~~vehicles~~ vehicles and other goods.

13. A comparative study of the structure of capital expenditure on agriculture and allied items indicates that 54.8% of the total capital expenditure on farm Business at all India level goes to Improvement of land and Building (Table VI R B I. June 1965). Compared to this about 36.27% of the total capital expenditure (expenditure on purchase of land is excluded) is incurred on those items in Bihar. The capital expenditure on tools and equipments at all India Level accounts for 11% of the total expenditure, where as 46.55% of the total expenditure goes to equipments in Bihar. As regards Live-stock 45.2% of the total capital expenditure is incurred at all India Level where as only 15.30% is accounted for by this item in Bihar.

Sources of finance:- The following sources of finance have been considered in case of Bihar survey (a) own account (b) Borrowing (c) Gifts and (d) other sources 69% of the total capital expenditure has been financed from borrowing and another 28.5% of the total expenditure has been met out of own savings.

KEY DATA

Description	Value.
1. Total number of households reporting capital formation	- 5478620
2. Total households reporting capital formation in land building.	- 1525670
3. Total households reporting capital formation in building construction.	- 3952950
4. Percentage of households reporting capital formation to the total number of households.	- 65.6%
5. Percentage of households reporting capital formation in land and building to the total households.	- 27.85%
6. Percentage of households reporting capital formation in building construction to the total households.	- 37.75%
State Income under agriculture including enterprises and building.	- Rs. 523.33 crores
Capital formation in agriculture and building construction.	- Rs. 67.70 Crores
7. Percent of capital formation to state income from Agriculture and construction.	- 12.93%
8. Percentage of capital formation to total State Income	- 7.57%
9. Capital formation in Real Assets (i.e. Agriculture and building construction).	- Rs. 14.81 crores
10. Capital formation in building construction % (crores)	

	Value	Percentage
a) Construction	51.68	97.73%
b) Improvement	1.21	2.27%
Total	52.89	100.00%

Percentage distribution of sources of finance for construction and improvement of land and building.

Source	Construction	Improvement	Combined.
1. Own account	25.0	24.0	24.5
2. Borrowing	65.0	73.0	69.0
3. Gift etc.	0	0	0
4. Other sources	10.0	3.0	6.5
Total	100.0	100.0	100.0

Expenditure on Individual Items of Farm Business - Average per reporting household

Items	Average per reporting households in Rs.	Share expenditure on individual items of Farm Business.
1. Purchase of land	79.4	21.9
2. Purchase of land rights	285	0.4
3. Reclamation of land	101	0.8
4. Bunding and other Land improvement	31	5.6
5. Orchards & Plantation	32	0.3
6. Wells	217	3.6
7. Other Investment on Resources	154	1.4
8. Agricultural implements machinery, transport equipments	13	9.0
9. Farm houses, grain sheds & cattle shed	45	2.4
10. Purchase of Live stock	183	54.5
11. Other capital expenditure on	27	0.1
Total	445	100.0

Total capital expenditure on farm business

-
TABLE NO. 6
TABLE SHOWING EXPENDITURE ON REAL ASSETS (In Rs.)

Items	Expenditure under sub heads				Total value
	Purchase	Construction	Improvement		
1.	2.	3.	4.	5.	
<u>Land & Buildings</u>					
i. Agricultural land -		3876623	169273		4045896
ii. Residential land -		475562	-		475562
iii. Wells -		3693560	-		3693560
iv. Orchards	3462362	-	-		3462362
v. Non residential building constructed during last year.	-	16245607	604858		16850465
vi. Levelling of grounds	-	804240	1097140		1901380
vii. Bringing new land under cultivation	-	3534345	1794550		5328895
viii. Bunding	-	-	1398000		1398000
ix. Others	-	-	16545460		16545460
Total	3462362 (23.3847)	28629937 (19.3364)	21609281 (14.5945)		53701580 (36.2698)
<u>Tools & Implements</u>					
i. Ploughs- wooden	9571255	36915415	431610		46918280
ii. Iron	235225	19102	-		254327
iii. Harrows wooden	800153	213756	15853		1029762
iiii. Iron	302463	45928	5123		352614
v. Harress equipments	3285551	524494	25834		3835879
vi. Other cutting Implements	1440048	12193569	18013		13651630
vii. Water Lifts	383134	56455	-		439589
viii. Husking implements.	192030	-	-		192030
ix. Contained Looms	-	-	-		-
x. Carpentry	82076	-	-		82076
<u>Smithy</u>					
i. Smithy	469432	284794	-		754226
ii. Others.	1281969	125363	-		1407332
Total	18043336 (12.1860)	50377976 (34.0240)	496433 (.3353)		68917745 (46.5466)

Item	Purchase	Construction	Improvement	Total value
1.	2.	3.	4.	5.
C. Vehicles				
xxii. Carts	47650	-	-	47650
xxiii. Bullock carts	1754203	-	79475	1833678
xxiv. Cycle	290510	-	-	290510
xxv. Other transport equipment	148840	-	-	148840
Total	2241203 (1.5136)	-	79475 (.0536)	2320678 (1.5674)
D. Power Driven equipments.				
xxvi. Oil Engines	-	950	-	950
Total	-	950 (.0006)	-	950 (.0006)
E. Other durable goods				
xxvii. Furniture	-	46752	-	46752
xxviii. Others	403044	12596	-	415640
Total	403044 (.2722)	59348 (.0401)	-	462392 (.3123)
F. Live Stock				
xxix. Bulls	-	4317666	88552	4406218
xxx. Cows	-	8239922	459028	8691950
xxxi. He-Buffaloes	-	1378195	-	1378195
xxxii. She-Buffalow	-	3438195	572775	4010970
xxxiii. Goats	-	3076256	-	3076256
xxxiv. Horses	-	-	-	-
xxxv. Other Animals	-	25192	-	25192
xxxvi. Poultry	-	1070140	-	1070140
Total	-	21538566 (14.5472)	1120355 (.75668)	22,658,921 (15.3037)
Grand Total	24149945 (16.3107)	100606777 (67.9491)	23305544 (15.7400)	148062266 (100.0000)

T a b l e

Statement showing the total capital expenditure on Rural
Business.

	Proportion of house holds reporting (percent)	Average for reporting house holds(₹)
1. Andhra Pradesh	32.2	332
2. Assam 38	30.1	102
3. Bihar	42.3	111
4. Gujrat	42.5	364
5. Jammu & Kashmir	21.5	273
6. Kerala	55.7	125
7. Madhya Pradesh	43.1	169
8. Madras	35.6	343
9. Maharashtra	36.9	245
10. Mysore	55.4	330
11. Orissa	40.5	93
12. Punjab	49.4	350
13. Rajasthan	48.6	320
14. Uttar Pradesh	53.3	190
15. West Bengal	41.9	82
All India	43.8	217

Source: R.S.I. Bulletin June, 1965.

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INDIAN ASSOCIATION FOR RESEARCH
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RESEARCH IN NATIONAL INCOME

An estimate of capital formation in Agriculture in Bihar

S.B. SRIVASTAVA

AHMEDABAD

9- 11- April, 1966.

AN ESTIMATE OF CAPITAL FORMATION IN AGRICULTURE IN BIHAR
by
S.B. SRIVASTAVA, SENIOR DEPUTY DIRECTOR OF STATISTICS,
BIHAR, PATNA

INTRODUCTION: -

The studies on capital formation have acquired an important position in the system of social accounting of the country. The monetary and financial policies in a developing economy are being decided on the basis of relative size of aggregate saving and investment. The extent of deficit financing and borrowing both internal and external, are largely governed by the size of capital formation having been achieved by the economic system.

2. Studies on capital formation have been taken up by the Reserve Bank of India (1), The National Council of Applied Economic Research (2) New Delhi, the Central Statistical Organisation (3) and some of the State Statistical Bureau in the country (4). The estimates of gross capital formation differed slightly in the three studies (i) (ii) (iii), in the first instance but the conceptual differences have been ironed out and it is now agreed that roughly 8% to 10% of the National Income is utilised for capital formation in the economy.

3. It is agreed that an estimate of gross net capital formation in the economy of the country can be obtained with some accuracy but inter-State flow of goods makes the task of estimation of capital formation in the individual states comparatively difficult. This will be evident after we know the constituents of the aggregate. They are (a) Construction

- (1) All India Rural debt and investment survey R.B.I. 1961-62
- 2) Studies on capital formation- Survey taken up by NCAER
- 3) National Income Statistics Estimates of Gross Capital Formation India 1948-49 to 1960-61.
- 4) Assam and U.P.
 - b) Machinery and other equipments (c) Change in stock
 - d) Private corporate sector and (e) Public Sector.

Statewise data are normally not available in any of the constituents noted above. However, data on construction, and improvement in rural areas in general and Agriculture particular have been estimated by sample surveys.

4. The present study is based on the data collected in the National sample survey (State Sample) during the 15th round.

5. The object of the study was to collect information on capital formation by the households in the rural areas by interview method. Special care was taken to collect data on real assets acquired and constructed by the household during the reference period of one year. It was assumed that buildings and construction activities form a major part of the activity leading to capital formation. The expenditure on (a) reclamation of land, (b) building etc., (c) clearing of jungles (d) major part of existing lands and similar activities account for a major part of total capital formation in agriculture. The construction activities like digging of ponds and wells etc., are also covered under agriculture.

DESIGN:-

6. A list of households reporting capital formation was prepared in all the six villages forming a sub-sample according to the terminology of the National Sample Survey. This schedule was canvassed in all the 6 villages allotted to the investigator. In villages 1, 2 and 3 the sample households with odd order of selection were surveyed in the same sub-round, while the sample households with even order of selection were surveyed after a lapse with of three sub-rounds of two months each. In villages 4, 5 and 6 the sample households with even order of selection were surveyed in the same sub-round, while sample households with odd order of selection were surveyed after a lapse of three sub-rounds. The present study is based on 228 villages covering 560 households. The sample size is therefore adequate and representative at the State level.

7. The schedule was divided into 11 blocks. The information on expenditure was collected in blocks 7, 8 and 10. However other ancillary data on indebtedness and source of finance etc. was also collected.

8. Data on construction covered residential as well as non-residential buildings. The materials purchased for construction purposes during the reference period were included although during all of them might not have been consumed. Construction referred to addition of floor space and improvement was related to betterments of existing structure. Structures which extended the life of the building for more than one year were treated as improvement-

Repairs of a regular nature were excluded from the survey.

In case of Live stock the term construction meant addition of newly born stock to the household during the reference period provided they were not meant for sale.

LIMITATIONS :-

9. The estimates of gross domestic product, and gross capital formation reveals that 12.93% of the income from agriculture and construction sectors is devoted to gross capital formation in the rural sector in the State. It is not possible to compare this percentage with corresponding percentage for the country as a whole or for different states as the constituents of the aggregate do not agree. Neither it is possible to check the estimates of capital formation ~~xxx~~ arrived at by expenditure approach with those obtained through production approach. The present study has ~~another~~ another limitations the movement of aggregate capital formation over time ^{is not possible} as the study was not continued in subsequent years. Other limitations of the present study are those in event in interview approach. It has been admitted that previous experiences of collections of such information by interview technique or through expenditure approach have not been very encouraging.

THE RESULTS

10. It is estimated that 65.6% of the rural households have reported capital formation of one type or the

other. There are 27.85% of the households where capital formation has been in the nature of construction and improvement in land and building. Compared to those figures the Reserve Bank of India survey indicates that 43.8% of the households had reported capital formation on Farm Business in the State.

Capital expenditure on Building Construction:-

11. The estimates of gross capital formation in building and construction activities have been arrived at mainly from expenditure data. Three types of structures were visualised pucca, Kuchha, and semi pucca. The expenditure incurred during the last one year preceding the date of enquiry was recorded for the purpose. The estimates were obtained by the investigators with the help of floor area covered under the three types of constructions. It is seen that of the total amount spent ~~on~~ on construction activities 97.73% is spent on construction and the remaining 2.27% improvement of buildings.

12. CAPITAL EXPENDITURE ON REAL ASSETS.

*12. The capital expenditure on the following items have been covered under the head :- (a) Agriculture land (b) residential (c) wells (d) orchards (e) tools and equipment including various types of ploughs narrow water lift equipment husking implements, looms, carpentry etc. (f) vehicles and transport equipments (g) other durable goods (h) livestock.

It is estimated that capital formation on ~~land~~ real assets worth about Rs. 14.81 crores had taken place in the state. Out of 14.81 crores worth of

capital in agriculture Rs. 2.41 crores is spent on purchase Rs. 10.06 crores on construction and remaining Rs.

2.34 crores on improvements. In other words 16.31% of the total capital formation is accounted for by purchase 67.95% by constructions, and 15.74% by improvements.

It may be observed that purchase of land does not constitute Capital formation, because it is a transfer transaction, not leading to increase in assets of the State. A break up of the total Capital expenditure into constituent items indicates that 36.27% of the total expenditure goes to land and buildings 46.55% on tools and implements 15.30% on live stock and the remaining 1.87% on vehicles and other goods.

13. A comparative study of the structure of capital expenditure on agriculture and allied items indicates that 54.8% of the total capital expenditure on farm Business at all India level goes to Improvement of land and Building (Table VI T.B I. June 1965). Compared to this about 36.27% of the total capital expenditure (expenditure on purchase of land is excluded) is incurred on these items

in Bihar. The capital expenditure on tools and equipments at all India Level accounts for 11% of the total expenditure, whereas 46.55% of the total expenditure goes to equipments in Bihar. As regards Live-stock 45.2% of the total capital expenditure is incurred at all India Level whereas only 15.30% is accounted for by this item in Bihar.

Sources of finance:- The following sources of finance have been considered in case of Bihar survey (a) own account (b) Borrowing (c) Gifts and (d) other sources 69% of the total capital expenditure has been financed from borrowing and another 24.5% of the total expenditure has been met out of own savings.

Description	Value
1. Total number of households reporting capital formation	-5478620
2. Total households reporting capital formation in land building.	-1525670
3. Total households reporting capital formation in building construction.	-3952950
4. Percentage of households reporting capital formation to the total number of households.	- 65.6%
5. Percentage of households reporting capital formation in land and building to the total households.	- 27.35%
6. Percentage of households reporting capital formation in building construction to the total households.	- 37.75%
7. State Income under agriculture including enterprises and building.	-Rs. 523.53 crores
Capital formation in agriculture and building construction.	-Rs. 67.70 crores
8. Percentage of capital formation to state income from Agriculture and construction.	- 12.93%
9. Percentage of capital formation to total State Income	- 7.57%

1. Capital formation in Real Assets (i.e. Agriculture and building construction). - Rs. 14.81 crores
 2. Capital formation in building construction Rs. (crores)

	Value	Percentage
a) Construction	51.68	97.73%
b) Improvement	1.21	2.27%
Total	52.89	100.00%

Percentage distribution of sources of finance for construction and improvement of land and building.

Source	Construction	Improvement	Combined
1. Own account	25.0	24.0	24.5
2. Borrowing	65.0	73.0	59.0
3. Gift etc.	0	0	0
4. Other sources	10.0	3.0	6.5
Total	100.0	100.0	100.0

Expenditure on Individual items of Farm Business - Average per reporting household

Items	Average per reporting households in Rs.	Percentage on individual items of Farm Business
1. Purchase of land	79.4	21.9
2. Purchase of land rights	285	0.4
3. Reclamation of land	101	0.8
4. Bunding and other Land improvement	31	5.6
5. Orchards & Plantation	32	0.3
6. Wells	217	3.6
7. Other Irrigational Resources	154	1.4
8. Agricultural implements machinery, transport equipments	13	9.0
9. Farm houses grain golas & cattle shed	45	2.4
10. Purchase of Live stock	183	54.5
11. Other capital expenditure on Farm Business	27	0.1

Total Capital expenditure on farm business 355 100.0

TABLE NO. 6
TABLE SHOWING EXPENDITURE ON REAL ASSETS (In Rs.)

Items	Expenditure under sub heads			Total value
	Purchase	Construction	Improvement	
1.	2.	3.	4.	5.
Land & Buildings				
i. Agricultural land -		3876623	169273	4045896
ii. Residential land -		475562	-	475562
iii. Wells		3693560	-	3693560
iv. Orchards	3462362	-	-	3462362
v. Non residential building constructed during last year.	-	16245607	604858	16850465
vi. Levelling of grounds	-	804240	1097140	1901380
vii. Bringing new land under cultivation	-	3534345	1794550	5328895
viii. Bunding	-	-	1398000	1398000
ix. Others	-	-	16545460*	16545460
Total	3462362 (23.3847)	28629937 (19.3364)	2169281 (14.5945)	53701580 (36.2698)
Tools & Implements.				
i. Ploughs- wooden	9571255	36915415	431610*	46918280
ii. Iron	235225	19102	-	254327
iii. Harrows wooden	800153	213756	15853	1029762
iv. Iron	302463	45928*	5123	352614
v. Harress equipments	3285551	524494	25834	3835879
vi. Other cutting Implements	1440048	12193569	18013	13651630
vii. Water Lifts	383134	56455	-	439589
viii. Husking implements.	192030	-	-	192030
ix. Contained- Looms	-	-	-	-
x. Carpentary	82076	-	-	82076
xxxx				
xi. Smithy	469432	284794	-	754226
xii. Others.	1281969	125363	-	1407332
Total	18043336 (12.1860)	50377976 (34.0240)	496433 (.3353)	68917745 (46.5466)

Item	Purchase	Construction	Improvement	Total value
1.	2.	3.	4.	5.

C. Vehicles

xxii. Carts	47650	-	-	47650
xxiii. Bullock carts	1754203	-	79475	1833678
xxiv. Cycle	290510	-	-	290510
xxv. Other transport equipment	148840	-	-	148840
Total	2241203 (1.5136)	-	79475 (.0536)	2320678 (1.5674)

D. Power Driven equipments.

xxvi. Oil Engines	-	950	-	950
Total	-	950 (.0006)	-	950 (.0006)

E Other durable goods

xxvii. Furniture	-	46752	-	46752
xxviii. Others	403044	12596	-	415640
Total	403044 (.2722)	59348 (.0401)	-	462392 (.3123)

F. Live Stock

xxix. Bulls	-	4317666	88552	4406218
xxx. Cows	-	8232922	459028	8691950
xxxi. He-Buffaloes	-	1378195	-	1378195
xxxii. She-Buffalow	-	3438195	572775	4010970
xxxiii. Goats	-	3076256	-	3076256
xxxiv. Horses	-	-	-	-
xxxv. Other Animals	-	25192	-	25192
xxxvi. Poultry	-	1070140	-	1070140
Total	-	21538566 (14.5472)	1120355 (.75668)	22,658,921 1070140 (15.3037)

Grand Total	24149945 (16.3107)	100606777 (67.9491)	23305544 (15.7400)	148062266 (100.0000)
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T a b l e

Statement showing the total capital expenditure on Wear and Tear Business.

	Proportion of house holds reporting (percent)	Average for reporting house holds (₹)
1. Andhra Pradesh	32.2	392
2. Assam	39.1	102
3. Bihar	42.3	111
4. Gujrat	42.5	304
5. Jammu & Kashmir	31.5	273
6. Kerala	55.7	125
7. Madhya Pradesh	43.1	169
8. Madras	35.6	343
9. Maharashtra	36.0	245
10. Mysore	55.4	330
11. Orissa	40.5	93
12. Punjab	49.4	350
13. Rajasthan	48.5	320
14. Uttar Pradesh	53.5	190
15. West Bengal	41.9	87
All India	43.8	217

Source: R.B.I. Bulletin June, 1965.

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INDIAN ASSOCIATION FOR RESEARCH
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AN APPROPRIATE SYSTEM FOR DEFLATION OF NATIONAL
INCOME IN A DEVELOPING ECONOMY WITH
ILLUSTRATION OF VALUATION OF THE PRODUCT
OF THE INDUSTRIAL SECTOR OF INDIAN
ECONOMY FROM 1950-51 to 1962-63.

P. N. MATHUR

AHMEDABAD

9 - 11 APRIL 1966

The views expressed in the papers are those of the
authors and not necessarily of the Organisations
or Institutions to which they belong.

An Appropriate System for
Deflation of National Income in a developing Economy with
Illustration of Valuation of the Product of the Industrial
Sector of Indian Economy from 1950-51 to 1962-63

By P. N. Mathur.

Introduction

The technique of national income accounting is primarily a part of what Hicks has termed as "The Fixprice Method".¹ "When prices are constant", writes Sir John, "quantities of goods and services can be added by adding their money values; money values becomes volume indexes. By its own inner logic, and without any deliberate decision having been taken to slew it in that direction, the model becomes a macro model. The fixprice method has an inherent tendency to go macro".²

Deflation is an attempt to approximate a real economy to a fixprice economy so that the techniques developed for analysing a fixprice system can be used. But, what price structure should be chosen to convert an economic series from actual changing prices to the one approximating a system having fixprices? The usual method is to deflate the whole series to a historically given price structure. The point to consider is whether that historically given price structure of the base period reflects the scarcity or constraints of a growing economy. For, then/^{and}only then the fixprice system will prove to be analytically useful. (See appendix).

1 J.R.Hicks, Capital and Growth, Oxford University Press, 1965

2 Hicks *ibid* p. 78.

2. Fixprice Structure with Stable Technology

If at the base period, the economy had been in a state of stationary equilibrium (or in a steady state of growth) the base period price structure would have reflected the technological complex corresponding to the then prevalent stationary state. It is ideal to deflate an economic series from the actual market prices of an economy to the price structure corresponding to the above base if the basic technological complex remain the same over the relevant period. This will iron out all the price variations due to transient market forces delineating the progress of an economy in the terms of its basic structure.

If there is no such historical period in which the economy has been in a stationary state, the corresponding price system will not be available as a historical datum. In that case, the best thing to do would be to construct one with the help of a given technological relations. To take any year as a base period and take the price relations prevailing in that year as the norm to deflate the national income would be arbitrary. For as pointed out above, the prevailing price system in any year, which is not in a stationary equilibrium, will be effected by transient market conditions, distortions due to monopoly practices etc., and will thus, not reflect the basic economic conditions.

But, as is well known, the technological relation by themselves are not able to determine the price-structure uniquely.³

3 For fuller discussion see author's, "A Modified Leontief Dynamic Model and Related Price System" Econometric Annual of the Indian Economic Journal 1965.

There remains, what H. Frisch has aptly termed, one degree of freedom. That is to determine the price structure uniquely, it is necessary to fix either wage rate or profit rate for the economy. Empirically that may not pose an insuperable difficulty provided profit rate has been stable in the economy. If not, the analytical tools depending on fixprice methods are suspect.

3. Fixprice for a Developing Economy

In a developing economy the problem seem to be more intractable for not only the profit rate is likely to be much more instable in a developing economy, but the underlying technological base of the economy will also change significantly. In fact the development of an economy is primarily to change the economy from one technological complex to another, more efficient, one. The process of development consists mainly in accumulating the capital equipment necessary for the working of modern technological complex. In a developing economy two types of techniques of production - traditional and modern - exist side by side. In the process of development the modern technological complex increases in the economy.

Thus it is clear that the technological complex underlying the production in the developing economy will be constantly changing, until and unless, the whole of the labour force is employed with the capital of the modern vintage. The point to consider is whether in such circumstances any analytical tool based on fixprice method can be useful at all. And if the answer is in the affirmative, what then is the price structure which should be used in the evaluation the national product or the components

thereof? According to Hicks, "When the price ratios that are appropriate to the new equilibrium and the old are not the same, a corresponding 'fixprice' policy would presumably imply that prices are adopted at once (or sought to be adopted at once) to the new equilibrium"⁴. He further says, "The stationary equilibrium could only be stationary because its continuance was expected; the change in technology was not expected. The new values that were set (or should have been set) were based on an expectation of permanence of the new technology"⁵. Thus we see that Hick's answer to our question is that the fixprice methods may be useful in a developing economy, and the price structure adopted for that should be that corresponding to the new technology. We may consider Hicks to be over optimistic in so far as he thinks that the new price system will be 'adopted at once' or even 'will be sought to be adopted at once'. His important contention may be taken that prices 'should have been set' corresponding to the new technological complex.

The primary use of a price system is to give guidance for resource allocation. This is accomplished by putting a valuation on scarce resources and their products denoting the intensities of scarcity. When a new technological complex appears at the horizon, the problem of resource allocation throws itself up mainly in relation to it. After that there remains no question about the investment in the old technology. The new price system

4 Hicks, ibid p. 196.

5 Hicks, ibid p. 305.

based on the new technological complex should be the guiding
^{6,7}
 star.

Even after deciding that price system should be one relating to the new technological relations, to determine the price structure uniquely it is necessary to find out the relevant profit rate, or the wage rate. As the price system should reflect the implications of the "factor" scarcities, the problem boils down - to put it in known terminology - to find out the opportunity cost of different factors during the process of development. As we have already seen, the process of development consists mainly in accumulating the capital equipment of the modern vintage. For that labour is not the limiting factor, until the time the whole of labour force starts working on the new technology. The labour required on the new capital equipment can always be got transferred from that working with the capital of the older vintage and/or that which has been unemployed or underemployed previously. Thus, as far as, the growth of modern technological complex within the economy is concerned the opportunity cost of labour should be put as equivalent to zero. Thus it will be the prices derived from a capital theory of

-
- 6 This should automatically lead to the revaluation of existing fixed capital goods also, as the relative unsuitability of the old equipment to the new technology should lead to a fall in its value.
- 7 This should be the guide line even for the working or closing the firms having capital of the older vintage. However, how long should an old firm should continue will depend not on relative price structure, but the rate of interest. For detailed discussion see author's "Interest Rates in a Developing Economy" (to be published).

value for the new technology that will be most appropriate. By the capital theory of value we may understand that the price system is such as would be prevalent if all the other factors except capital are available at zero price. Only shadow prices determined on this hypothesis are the ones that are relevant for taking decisions for the growth of the modern sector on the economy, which is in the process of transformation from the traditional economic system to the modern one.⁸ This is the price system, which is the appropriate one if fixprice method of analysis is to be used. In other words, a constant price national income series in a developing economy should be expressed in the price system derived as above rather than in any historically given one. This is the price system in which components and aggregates of national income should be expressed.

4. Calculation Procedure of the Appropriate Fixprice Structure

From the criteria discussed in the preceding section the fixprice structure for a developing economy A can be derived as follows. Let A be the Input-Output flow matrix corresponding

8 It will be clear that such a price system will be purely of an accounting character. It can never be actually prevalent in the economy irrespective of the competitive character of the economy. It can only prevail if whole of the labour force is subsidised by the central planning authority and then free competition prevails in equalising the rate of return to all the entrepreneurs engaged in production with the technology of the modern vintage. This highlights vividly the different price systems that should govern the actions of individual entrepreneurs and the planning authority in a country experiencing technological transformation. In such circumstances a pure *laissez-faire* is not likely to deliver goods, nor a controlled economy unguided by the shadow price system described above.

to the modern sector (new technological complex) of the economy. And let B be the corresponding capital coefficient matrix, of which the element b_{ij} will represent the amount of commodity i required for creating an unit capacity for the production of commodity j. Then if P is the price vector, then PB will give a vector of capital costs for the individual sectors of the economy. The value added in individual sectors is given by $P(I-A)$. From the viewpoint of the capital theory of value, this should be proportionate to PB. As pointed out earlier, it is only the capital theory of value that is relevant for deriving appropriate fixprice structure for a developing economy. Let r be this proportionality factor. Then we get

$$P(I-A) = rPB \quad \text{or} \quad P \left((I-A) - rB \right) = 0$$

$$\text{or, } P(I-A) \left[I - (I-A)^{-1} rB \right] = 0 \quad \dots (1)$$

This shows that $Z = P(I-A)$ is an eigen row vector of the matrix $(I-A)^{-1} B$. As Z denotes the value added, it must be non-negative in all its elements. By Frobenius's Theorem, it will be true for the eigen row vector corresponding to the greatest eigen value only. Thus the vector Z is uniquely determined determining P the price vector in its turn. The corresponding r will give the common Value ^{Added} /capital ratio.

5. An Appropriate Fixprice Structure for Industrial Sector of Indian Economy

The above method enables us to calculate the appropriate fixprice structure for different commodity groups that are distinguished in an input-output table. For India an Input-Output table for the year 1959 has been prepared by the

Economics Division of the Planning Commission which distinguishes 21 different industrial commodity groups, including transport. The coefficients in it have been derived from the data thrown up by Annual Survey of Industries for the large scale sector. They can be taken as pertaining to the modern technological complex of the industrial sector. Corresponding to this, we at Gokhale Institute have prepared a capital coefficient matrix.⁹ With the help of these two tables, we have calculated the appropriate fix-price structure for the Indian Economy. These are given in table No. 1. These give the percentage adjustment necessary to 1959 prices to arrive at the appropriate fixprice system. These have been normalised in such a way that the total output for the year 1959, when calculated by using these prices will be equal to the total output calculated by using the prevalent market prices in 1959. The proportion that different commodity groups form of the total output is also given in the same table. Table No. 2 gives the total output of various commodity groups in 1959 constant prices over the years 1951 to 1965. Corresponding figures in fixprices are given in Table No. 3. Output of each group for each year have been estimated by the help of the relevant index number of sectoral industrial production prepared by C.S.C. and the output for 1959 is taken from the Input-Output table.

Table No. 4 gives the yearly growth rate of industrial output calculated with these two price systems. It will be seen

9 "An Inter-Industry Capital Table for India - First Approximation", by P. N. Mathur, presented at Input-Output Seminar, Poona 1965.

that the average growth rate during the last five years turn out to be more than that surmised on the basis of constant price series, though there is not much difference in pre 1958 growth rates. This signifies that it is mainly after 1958 that the structure of industrial production have become significantly growth oriented and now we are able to sustain a much higher rate of industrial growth than was possible before 1958.

6. Deflation of Value Added

Once the fixprice structure is given the proportion of the value added to the value of total output is fixed if underlying technological complex remains the same. But as pointed out above, in a developing economy, it is this technological complex that will be changing from year to year as the proportion of the capital of the modern vintage will go on increasing over years. This implies that the proportion of value added to the total output at the fixprice system described above is to be calculated every year for constructing a series of value added in each commodity group at fixprices. It will be seen that the total value added thus derived will be equal in each year to the total value of commodities available for use in the final demand at fixprices. This is a very important requirement that must be satisfied by all deflation schemes for their being analytically useful.

The construction of this requires the availability of average Input-Output tables of the economy for each year, so that differences in the proportion of value added due to technological change can be estimated. Unfortunately no average Input-Output

table is available for India. In the Input-Output table prepared by the Economic Division of the Planning Commission for the year 1959, the input coefficients for the manufacturing sector were derived from the data available for the large scale sector, from the census part of Annual Survey of Industries and the same coefficients were applied to the total output of the sectors to derive the total inputs. Therefore, this table cannot be taken as an average one for the purpose. Thus at present it is not possible to deflate the value added series in this manner due to the paucity of relevant information.

However, for the present paper, we have constructed a series of value added according to industrial origin in fix-¹⁰ prices, on the assumption that the Input-Output table prepared by the Planning Commission is an average table and the average structure have remained the same. This is given in Table 5. As pointed out above, both these assumptions are very tenuous in our circumstances which leaves the series more as an illustrative exercise rather than a substantive piece. It can be considered only a counterpart in fixprice system of the usual constant price series, where the net value added is carried forward by an index of industrial production. Both involve the assumption of constant ratio of value added to total production during the relevant period, which is unlikely to be satisfied in the context of a developing economy.

10 The fixprice system has been only derived for industrial sector. The shadow prices of other sectors have been taken as zero.

TABLE NO. 1 : Appropriate Fixprice Structure of Industrial Sector 1959.

Sr. No.	Commodity	Appropriate Fixprice Structure	1959 Production at Market Prices.	1959 Production at Appropriate Fixprices	Percentage of 1959 production at market price.	Percentage of 1959 production at Appropriate fix-prices.
I	II	III	IV	V	VI	VII
1	Coal	0.548434	94.9	52.046306	1.707879	0.9366
2	Iron ore and Iron & Steel	1.683783	243.3	409.664522	4.378577	7.3725
3	Other Minerals	0.678056	61.7	41.835980	1.110391	0.7529
4	Other Metals	1.109715	18.6	20.640769	0.334737	0.3715
5	Non-Electrical Equipments	1.049073	318.9	334.549609	5.739121	6.0207
6	Electrical Equipments	1.032469	101.8	105.105193	1.832056	1.8915
7	Transport Equipments	0.966744	237.9	229.988376	4.281395	4.1390
8	Chemicals	0.917944	212.0	194.604138	3.815283	3.5022
9	Petroleum & Crude Oil	1.283788	72.0	92.432745	1.295756	1.6635
10	Fertilizers	3.190709	25.6	81.682172	0.460713	1.4700
11	Cement	1.449592	44.4	64.361937	0.799050	1.1583
12	Glass, Wood, Non-metallic etc.	1.119183	180.9	202.460217	3.255588	3.6435
13	Food Industry	0.404913	1451.0	587.528197	26.113091	10.5734
14	Cotton & Other Textiles	0.760956	852.6	648.791246	15.343916	11.6760
15	Jute Textiles	0.541014	161.7	87.481861	2.910053	1.5744
16	Leather & Rubber Products	0.500473	153.6	76.872791	2.764280	1.3836
17	Paper & Products	1.468730	130.3	191.375537	2.344959	3.4441
18	Electricity generation	2.838343	124.6	353.657421	2.242378	6.3646
19	Other Industry	0.942413	100.7	94.900982	1.812259	1.7079
20	Railway Transport	2.256079	426.5	962.217488	7.675557	17.3166
21	Road Transport	1.332629	543.6	724.417144	9.782961	13.0372
			5556.6	5556.614631	100.000000	100.0000

TABLE - 2 : Industrial Production at 1959 Constant Prices.

(in crore rupees)

Nb*	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1	69.2	72.4	72.1	74.1	77.1	79.5	87.7	91.5	94.9	104.4	111.4	122.2	132.8	127.0	137.1
2	146.4	151.9	143.3	165.7	167.1	173.7	171.6	182.0	243.3	333.6	326.5	411.1	468.0	470.4	487.6
3	43.7	46.2	45.5	46.9	48.8	50.3	55.1	58.3	61.7	69.0	74.1	81.1	88.5	85.0	91.9
4	11.3	11.0	10.5	13.2	13.9	14.1	14.5	16.2	18.6	20.5	21.8	28.3	30.4	30.7	30.6
5	77.6	61.3	64.7	98.7	142.9	171.6	222.3	254.5	318.9	406.3	461.2	503.2	625.6	704.7	843.6
6	33.3	37.7	39.8	44.6	54.9	76.3	90.5	95.1	101.8	134.2	139.8	161.3	181.4	215.3	240.2
7	111.6	96.1	100.7	119.8	176.9	242.0	255.1	231.1	237.9	289.0	316.6	366.4	365.2	466.1	502.7
8	117.9	126.8	135.4	136.6	155.7	161.7	162.5	188.2	212.0	238.8	253.5	311.5	383.6	366.3	386.2
9	3.5	3.3	3.4	9.0	42.3	54.4	62.2	66.7	72.0	80.3	85.1	92.0	106.9	118.1	123.9
10	4.4	11.4	15.9	18.8	20.1	20.4	22.0	23.2	25.6	28.2	36.2	40.0	46.4	51.2	53.1
11	20.8	23.0	24.6	28.6	29.2	32.1	36.4	39.5	44.4	50.2	52.8	55.0	59.9	62.0	66.9
12	79.8	85.6	87.0	99.1	108.4	123.9	142.0	159.5	180.9	208.3	224.0	272.8	253.5	267.3	286.2
13	1044.1	1097.8	1061.1	1063.7	1212.9	1308.4	1397.4	1414.4	1451.0	1564.8	1717.9	1702.2	1640.7	1823.9	1973.0
14	651.7	672.4	733.9	757.1	775.4	830.2	836.0	819.4	852.6	877.5	924.0	946.4	1008.7	1083.4	1427.9
15	129.6	139.5	131.1	139.5	153.8	164.5	155.8	160.0	161.7	163.3	147.4	181.6	192.8	199.0	207.1
16	101.3	90.7	94.6	110.4	120.7	131.1	135.6	140.8	153.6	187.0	203.3	218.9	242.3	255.2	280.6
17	59.6	62.0	64.6	72.9	85.9	89.6	98.1	114.1	130.3	155.4	163.0	170.8	203.2	213.1	221.5
18	50.1	52.4	56.8	63.7	72.5	82.2	92.8	104.8	124.6	140.7	163.6	183.9	212.2	243.5	264.4
19	63.5	65.5	67.2	71.8	79.4	86.4	90.0	92.7	100.7	112.5	120.3	130.8	141.6	151.0	159.7
20	294.7	273.5	273.3	289.7	319.7	350.3	387.1	392.3	426.5	462.0	505.4	574.6	632.8	640.8	705.8
21	301.5	309.4	336.7	364.2	384.4	438.6	454.3	490.2	543.6	576.9	617.3	684.6	784.8	N.A.	N.A.
	3415.6	3489.9	3562.2	3788.1	4242.0	4681.3	4669.0	5134.5	5556.6	6202.9	6695.2	7238.7	7801.3	7574.0*	8490.0*

N.A. = Not Available

* = Sum of first twenty sectors.

** = Serial Nos. of Commodities are same as Table No. 1.

TABLE NO. 3 : Industrial Production At Fixprice Structure.

(in crore rupees)

**	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1	37.9	39.7	39.5	40.6	42.2	43.6	48.1	50.1	52.0	57.2	61.0	66.9	72.8	69.6	75.1
2	246.5	255.9	241.3	279.0	281.3	292.4	288.9	306.5	409.7	561.8	549.8	692.2	788.1	792.2	821.2
3	29.6	31.3	30.8	31.7	33.1	34.1	37.3	39.5	41.8	46.7	50.2	54.9	59.9	57.6	62.2
4	12.5	12.2	11.6	14.6	15.4	15.6	16.0	17.9	20.6	22.7	24.2	31.3	33.6	34.0	35.9
5	81.4	64.3	67.9	103.5	150.0	180.0	233.1	267.0	334.5	426.1	483.7	527.9	656.2	739.2	884.9
6	34.4	38.9	41.1	46.0	56.6	78.8	93.4	98.2	105.1	138.6	144.3	166.5	187.3	222.3	248.0
7	107.9	92.9	97.3	115.8	171.0	234.0	246.6	223.4	230.0	279.4	306.0	354.2	353.1	450.6	486.0
8	108.2	116.4	124.2	125.4	142.9	148.4	149.2	172.8	194.6	219.2	262.2	285.9	352.1	336.2	354.5
9	4.5	4.2	4.4	11.5	54.2	69.8	79.8	85.6	92.4	103.1	109.2	118.1	137.2	151.6	159.0
10	14.1	36.4	50.7	59.8	64.0	65.0	70.3	74.0	81.7	90.0	115.4	127.6	148.0	163.4	169.4
11	30.1	33.4	35.7	41.5	42.3	46.5	52.8	57.2	64.4	72.9	76.6	79.7	86.9	90.0	97.1
12	89.3	95.8	97.4	111.0	121.4	138.7	158.9	178.5	202.5	233.2	250.8	305.4	283.8	299.2	320.4
13	422.7	444.5	429.6	430.7	491.1	529.8	565.8	572.7	587.5	633.6	695.6	689.2	664.3	738.5	798.9
14	495.9	511.7	558.5	576.1	590.0	631.7	636.2	623.5	648.8	667.8	703.1	720.2	767.6	824.4	1086.6
15	70.1	75.5	70.9	75.5	83.2	89.0	84.3	86.6	87.5	88.4	79.8	98.3	104.3	107.7	112.1
16	50.7	45.4	47.4	55.2	60.4	65.6	67.9	70.5	76.9	93.6	101.8	109.6	121.3	127.7	140.5
17	87.5	91.1	94.9	107.2	126.2	131.6	144.1	167.6	191.4	228.3	239.4	250.9	298.6	313.0	325.4
18	142.3	148.8	161.2	180.8	205.8	233.6	263.5	297.6	353.7	399.5	464.4	521.9	602.5	691.3	750.6
19	59.9	61.7	63.3	67.7	74.9	81.5	84.9	87.3	94.9	106.0	113.4	123.2	133.4	142.3	150.5
20	664.8	617.0	616.7	653.6	721.4	790.3	873.4	885.1	962.2	1042.3	1140.2	1296.2	1427.7	1445.8	1592.3
21	401.8	412.2	448.6	485.3	512.2	584.4	605.5	653.2	724.4	768.8	822.6	912.2	1045.8	N.A.	N.A.
	3192.1	3229.3	3333.0	3612.5	4039.6	4484.4	4800.0	5014.8	5556.6	6279.2	6793.7	7532.3	8324.5	7796.6	8668.6*

N.A. = Not available

* = Sum of first twenty sectors.

** = Serial nos. of commodities are same as table No.1.

Table 4 : Yearly Industrial Growth Rate from 1951 to 1963

From	1951	1952	1953	1954	1955	1956	1957	Aver- age yearly growth rate	1958	1959	1960	1961	1962	Aver- age yearly growth rate
To	1952	1953	1954	1955	1956	1957	1958		1959	1960	1961	1962	1963	
At Appro- priate Fix- prices	3.54	3.20	8.25	11.41	10.84	6.80	4.69	6.96	11.32	15.44	9.09	10.27	9.82	11.19
At Constant 1959 prices	3.14	1.74	5.93	12.32	10.60	6.04	3.03	6.11	7.87	12.57	7.06	8.20	6.75	8.49

Table 5: Gross Value Added (At Fixprice)

(in Crore Rupees)

**	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1	21.7	22.7	22.6	23.3	24.2	25.0	27.6	28.7	29.8	32.8	35.0	38.4	41.7	39.9	43.1
2	145.9	151.5	142.8	165.1	166.5	173.1	171.0	181.4	242.5	332.5	325.4	409.7	466.5	468.9	486.0
3	22.3	23.6	23.2	23.9	24.9	25.7	28.1	29.8	31.5	35.2	37.8	41.4	45.2	43.4	46.9
4	5.3	5.2	4.9	6.2	6.5	6.6	6.8	7.6	8.7	9.6	10.2	13.2	14.2	14.4	14.3
5	46.9	37.0	39.1	59.6	86.4	103.7	134.2	153.7	192.6	245.4	278.5	303.9	377.8	405.6	509.5
6	17.4	19.7	20.8	23.2	28.6	39.8	47.2	49.6	53.1	70.0	72.9	84.1	94.6	112.3	125.3
7	57.8	49.8	52.1	62.0	91.6	125.3	132.1	119.7	123.2	149.6	163.9	189.7	189.1	241.4	260.3
8	54.0	58.1	62.0	62.6	71.3	74.1	74.4	86.7	97.4	109.4	129.8	142.6	175.8	167.8	176.9
9	3.1	2.9	3.1	8.0	37.7	48.5	55.4	59.5	64.2	71.6	75.9	82.0	95.3	105.3	110.5
10	8.4	21.8	30.4	35.8	38.3	38.9	42.1	44.3	48.9	53.9	69.1	76.4	88.6	97.8	101.4
11	19.6	21.7	23.1	26.9	27.5	30.2	34.3	37.2	41.8	47.3	49.7	51.8	56.4	58.4	63.0
12	58.0	62.3	63.3	72.1	78.9	90.1	103.3	116.0	131.6	151.5	163.0	198.5	184.4	194.4	208.2
13	296.5	311.8	301.4	302.1	344.5	371.6	396.9	401.7	412.1	444.4	487.9	483.4	466.0	518.0	560.4
14	284.8	293.9	320.7	330.9	338.9	362.8	365.3	358.1	372.6	383.5	403.8	413.6	440.8	473.5	624.0
15	43.3	46.6	43.8	46.6	51.4	54.9	52.0	53.5	54.0	54.5	49.2	60.6	64.4	66.5	69.2
16	24.7	22.1	23.1	26.9	29.5	32.0	33.1	34.4	37.5	45.7	49.6	53.4	59.2	62.3	68.5
17	60.6	63.0	65.7	74.1	87.3	91.1	99.7	115.9	132.4	157.9	165.6	173.6	206.5	216.5	225.1
18	109.5	114.5	124.0	139.1	158.3	179.7	202.7	229.0	272.1	307.3	357.3	401.5	463.5	531.8	577.4
19	31.8	32.8	33.6	36.0	39.8	43.3	45.1	46.4	50.4	56.3	60.2	65.4	70.9	75.6	79.9
20	616.8	572.4	572.1	606.4	669.3	733.2	810.3	821.2	892.7	967.0	1057.8	1202.6	1324.6	1341.3	1477.3
21	317.7	326.0	354.7	383.7	405.0	462.1	478.7	516.5	572.8	607.9	650.5	721.3	827.0	N. A.	N. A.
	2246.1	2259.4	2326.5	2514.5	2806.4	3111.7	3340.3	3490.4	3861.6	4333.3	4693.1	5207.1	5752.5	5255.1	5827.2*
Rates of Growth %	0.59	2.97	8.10	11.61	10.88	7.35	4.49	10.63	12.22	8.30	10.95	10.47			

N.A. = Not Available.

* = Sum of first twenty sectors.

** = Serial Nos. of commodities are same as Table No. 1.

MATHEMATICAL APPENDIX

The suitability of the Appropriate Fixprice System for Macro-Analysis of a Developing Economy

Let A and B denote Input and Capital Coefficient matrices respectively. And let \bar{P} denote the Fixprice system appropriate for developing economies developed in the text. Then irrespective of the composition of the output vector X,

$$\bar{P} (I - \rho A - B) X = 0 \quad \dots\dots (1)$$

where ρ is the value-added-capital ratio which is same in each activity (industry) with \bar{P} price-structure. Let π_j be the rate of profit in j-th industry and π be the diagonal matrix having π_j as an element in its j-th row and j-th column. Further, let r_j be the rate of growth of the output of j-th industry and R be the diagonal matrix having r_j as an element in its j-th row and j-th column. Further, let S_c be the rate of savings of the profit earners and S_w that of wage earners.

The total profits earned will be $\bar{P} B \pi X$ while the wages will be equal to the remaining output viz. $\bar{P} (I - A - B \pi) X$.

Therefore, the total savings of the economy will be $\bar{P} (B \pi S_c X + (I - A - B \pi) S_w X)$.

Further, the investment requirements for the output of j-th good to grow at the rate r_j ($j=1, 2 \dots n$) is $\bar{P} B R X$.

For this to be equal to the savings of the economy

$$\bar{P} [BR - B \pi (S_c - S_w) - (I - A) S_w] X = 0 \dots (2)$$

$$\text{or, } \bar{P} [(BR - B \pi (S_c - S_w) - \rho B S_w - (I - A - \rho B) S_w] X = 0 \dots (3)$$

$$\text{But by (1) } \bar{P} (I - A - \rho B) X = 0.$$

Therefore (3) gives

$$\bar{P} B R X = \rho \bar{P} B S_w X + \bar{P} B \pi (S_c - S_w) X \quad \dots\dots (4)$$

Dividing both sides by $\bar{P} B X$ the value of the total capital - in the economy, we get

$$\bar{r} = \rho S_w + \bar{\pi} (S_c - S_w) \quad \dots\dots (5)$$

where \bar{r} is the rate of growth of capital and $\bar{\pi}$ is the rate of profit in the economy.

We know from (1), that

$$\bar{P}B = 1/\rho (\bar{P} (I-A)) \dots\dots\dots (6)$$

Substituting this in (4), we get,

$$\bar{P}(I-A)RX = \rho \bar{P} (I-A) S_W X + \bar{P} (I-A) \pi (S_C - S_W)X \dots (7)$$

Dividing both side $\bar{P} (I-A)X$, the amount of value added in the economy, we again get eq. (5)

$$\bar{r} = \rho S_W + \bar{\pi} (S_C - S_W) \dots\dots\dots (5)$$

This means that \bar{r} and $\bar{\pi}$ may as well be considered as average rate of growth of value added and average profit rate.

Equation (5) is the classical macro-economic equation of growth theory. If there is a common rate of savings in the economy, viz. $S_C - S_W = S$. This becomes $\bar{r} = \rho S \dots (6)$ - the Harrod-Domar equation for growth rate.

Further, if the rates of growth and rates of profits are same in all the sectors of the economy, the equation (4) becomes

$$r\bar{P}BX = \rho \bar{P}B S_W X + \pi \bar{P}B(S_C - S_W)X \dots\dots\dots (8)$$

Dividing both side by $\bar{P}BX$, we get

$$r = \rho B_W + (S_C - S_W) \pi \dots\dots\dots (9)$$

While equation (5) refers to the rate of growth of capital or of value added, equation (8) gives the same relationships for the rate of growth of output.

The point to note is that the above simple relationships are based on the equation (1) above, which is true if and only if the price structure used for valuation is that derived from capital theory of value.¹

¹This equation also holds if output structure is proportional to the Eigen column vector. But that condition will be rarely satisfied in practice. See author's op.cit., p. 334.

Further, it may be noted that if rates of growth and/or rates of profit are different for different industries the macro growth relation will hold good for capital goods or for value added but not for total output.²

2

It may be noted that in the above demonstration not only rate of growth and profit rate can be taken different for different industries, but even rates of savings - both from profits and wages - can be taken as differing from industry to industry. In that case, S_c and S_w will have to be conceived as corresponding diagonal matrices. Further, matrices R , π , S_c , and S_w may be taken as full rather than only diagonal introducing interrelatedness between growth rates, profit rates and saving rates in different industries. None of these complications will distract from the main result.

AN EXERCISE IN DEFLATING COMPARATIVELY
LONG PERIOD VALUE OF OUTPUT SERIES

1. The question of deflation of a series of sectoral or aggregate national income comes up repeatedly and offers many vexing problems. The difficulties tend to be less tractable the longer the income series. The broad theoretical issues involved in the proposition is fairly well known but not always amenable to simple solutions. The actual issues faced by the national income workers are invariably not of a theoretical type at all. They relate to choice between available alternatives that are much below the second best level in relation to the most satisfactory solution. The difficulties are thus primarily data difficulties. They are also often intractable because general theoretical proposition based on an entire set of time-series data cannot be effectively applied to them, as the periodoc. that is, most often yearly estimates are to be produced any way. As Goldsmith put it, the only remedy for an unsatisfactory national income estimate is to produce another estimate for the same magnitude and establish directly on the basis of use of information itself that it is a better one.

2. The choice in national income deflation is usually between the use of what is designated the constant price estimate and an actual deflation by an index number of prices. The available index numbers of prices are almost always of the Laspeyres type with weights more or less approximating to but seldom corresponding exactly to the value added by production, in respect of the various items. From actual use it is not always easy to indicate which method of deflation tends to more satisfactory results. This is partly due to the fact that there is no standard or third series to which the deflated series could be compared with. For national income as a whole or in respect of any sub-aggregates involving heterogeneous aggregations such a third reference series is hardly likely to exist. In limited cases, however, it is possible to have such a reference or standard series, and it is therefore possible to make a comparison, in an effort to arrive at a judgement about the relative effectiveness of the alternative methods.

3. The present paper is concerned with attempting such a comparison in respect of the composite value of output of seven major food crops in India over the period 1900-01 to 1957-58. In essence, the effort is to juxtapose the index numbers representing three series standing for the movement of production of these seven food crops, namely, (a) a constant price series, (b) a current price series deflated with a constant weight index number and finally, (c) a series directly representing the physical volume of output. The third series is found possible in this case because the

physical output of the seven kinds of foodgrains are considered directly additive, in the same sense that two tons of wheat or rice are. The method of aggregation involved in the third series may be called the constant food-value or constant technical weights. The advantage with the third series is that it is free from the price element and is thus not affected by the index number problem. Quite obviously the technical quality of jowar as a substitute of, say, wheat as a food may be expected to remain constant with greater plausibility than their relative prices. The disadvantage of this assumption is, however, that by implication all shifts in relative prices are assumed to be irrational. The only justification for this is that shifts in relative prices within individual crops are, in any case, ignored in any aggregative handling, except insofar as, the average prices are affected by them. No greater violence to common sense is, therefore, perpetrated in the present assumption.

4. The data on which the comparison is based is derived from a multiplicity of sources. The production data for seven crops, namely, rice, wheat, jowar, bajra, maize, barley and gram, are based on Mukerji's estimates for the present Indian Union territory for 1900-01 through 1952-53,² extended on the basis of Government of India figures upto 1957-58. An adequate set of prices are more difficult to come by. What has, therefore, been done is to produce a simple average of the wholesale prices upto 1922 free from the Pakistan and Burma elements as available from the Prices and Wages in India.³ Similarly the wholesale prices available from 1934 onwards is summed up over the centres afresh to exclude the Burmese and Pakistani centres. These two series have been joined together with index number derived from the appropriate prices in respect of the year 1923 through 1934. The reason for the particular form of linking is that for six out of the seven price series the available data relates to retail prices. In consequence it was necessary to adjust the level rather than direction of their movements. The actual details of the resultant valuation procedure is the same as in Mukerji and Mukerji.⁴ It is obvious that these all-India average prices, while relating to the Indian Union territory, are not weighted except through the inclusion of price quotations for a number of centres each year. The frequency of the price quotations, however, broadly correspond to the output in various states and a rough and ready sort of weighted average is actually produced by this method. The valuation of the output is actually done, under these circumstances, only at the aggregate level.

5. The basic data is given in Table I. The basis of the derivation of the figures has already been given. The area under the seven major food-grains have not been given.

There are considerable annual and periodic fluctuations in the area figures. But insofar as possible the area figures have been corrected for reporting area coverage and, in consequence the figures are not affected by any secular rise in the total area accounted for in the land-statistics. The actual price figures have likewise been omitted as they do not seem to be relevant in the present context. The average weighted rupee prices for all food-grains can, however, be derived, if necessary. As regards the two index numbers, it is necessary to note that the current weight index number is derived by dividing the current value of the output by the yield and not by combining the current relatives with current weights. Similarly, the constant price index number has been derived by combining the actual prices per ton with fixed weights derived from 1924-25 to 1928-29 average values for the seven crops and reducing the average prices into an index with 1900-01 as base; and not by converting the prices into price relatives first and then combining them. For wholesale price indices this way of combining the prices is usually considered more satisfactory.

6. The results are presented in Table II. The deflation of the current value of output series by the changing weight index number of prices, considering the structure of the index number, obviously leads back to the physical output series, when it is also considered as an index number series. No persistent difference is revealed by the comparison of the other two series with the physical output series. For several years the series obtained by deflating the current value series with a fixed weight index number correspond better to the physical volume index. It must, however, be recalled that in the present case, the weights of the relevant index number series are derived from value into quantity relationships for five years falling in the middle of the period. Thus the problem relating to the shift in the weights for the Paasche and the Laspeyres formulas are partially avoided. This advantage, however, accrues equally to the constant price series. Even then both in respect of the number of deviations and their relative magnitudes, the deflated series deviates from the volume series to a greater degree than the constant price series. It is difficult to indicate whether this difference in quality between the two series is significant. Neither it is clear that the volume index can unquestionably be regarded as standard. But in case it can be so regarded, it seems that there may be a slight advantage in using a constant price series rather than deflating an estimate with fixed weight index numbers, particularly when long time periods are involved.

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TABLE I

Output, Value and Prices of Seven Principal Food-grains in
India from 1900 to 1958

Year	Current value of seven food grains in millions of rupees	Index number of prices with constant 1925-29 ave- rage weights Base: 1900-01 = 100	Index number of prices with changing weights Base: 1900-01 = 100	Output of the seven food grains in millions of tons
(1)	(2)	(3)	(4)	(5)
1900-01	4044.02	100.00	100.00	48.6
1901-02	3479.39	92.17	91.90	45.5
1902-03	3671.92	84.41	85.03	51.9
1903-04	3316.51	81.09	80.36	49.6
1904-05	3859.26	93.91	94.65	49.0
1905-06	4730.47	117.81	118.69	47.9
1906-07	5242.75	126.99	126.78	49.7
1907-08	5119.29	164.52	158.57	38.8
1908-09	4763.62	124.02	121.80	47.0
1909-10	4827.11	106.44	107.03	54.2
1910-11	4593.17	104.19	104.75	52.7
1911-12	5395.32	128.22	126.39	51.3
1912-13	5524.67	132.51	130.70	50.8
1913-14	5353.88	142.71	145.57	44.2
1914-15	5896.11	144.21	143.15	49.5
1915-16	6221.05	133.84	132.33	56.5
1916-17	6224.79	126.50	128.76	58.1
1917-18	7625.91	159.60	163.66	56.0
1918-19	7973.39	227.12	232.58	41.2
1919-20	9997.92	216.80	217.27	55.3
1920-21	8306.60	218.14	219.88	45.4
1921-22	8653.52	189.77	190.12	54.7
1922-23	7241.43	159.76	158.23	55.0
1923-24	6507.28	170.14	163.95	47.7
1924-25	7679.76	187.89	187.97	49.1
1925-26	7683.83	192.49	194.01	47.6
1926-27	7391.10	188.42	187.79	47.3
1927-28	7095.56	188.60	187.42	45.5
1928-29	7627.01	188.66	192.56	47.6
1929-30	6065.77	147.19	144.64	50.4
1930-31	4345.54	105.22	103.01	50.7
1931-32	4393.68	102.93	104.56	50.5
1932-33	3926.62	97.05	97.91	48.2
1933-34	3903.29	95.26	95.74	49.0
1934-35	4207.48	103.31	103.40	48.9
1935-36	4149.81	107.31	107.49	46.4

Table I - Continued

(1)	(2)	(3)	(4)	(5)
1936-37	4718.71	110.11	112.30	50.5
1937-38	4223.78	104.26	105.97	47.9
1938-39	4331.60	112.08	113.67	45.8
1939-40	4874.15	120.58	122.03	48.0
1940-41	5139.67	136.18	132.55	46.6
1941-42	7191.25	189.79	191.63	45.1
1942-43	15762.84	387.75	385.03	49.2
1943-44	14085.28	346.14	349.03	48.5
1944-45	13116.19	327.27	328.39	48.0
1945-46	11857.57	323.50	332.18	42.9
1946-47	12277.05	331.60	342.33	43.1
1947-48	17195.39	447.24	458.21	45.1
1948-49	18408.60	482.20	499.40	44.3
1949-50	19175.68	480.82	500.98	46.0
1950-51	21918.16	608.47	622.72	42.3
1951-52	21685.33	601.66	610.33	42.7
1952-53	21592.31	548.88	552.12	47.0
1953-54	22328.98	452.10	456.37	58.8
1954-55	18198.36	385.63	379.70	57.6
1955-56	24187.93	504.02	515.40	56.4
1956-57	28115.45	555.44	565.04	59.8
1957-58	25822.95	567.75	571.65	54.3

TABLE II

Index numbers of physical output, constant value and deflated current value of seven principal food-grains in India from 1900 to 1958

Year	Index number of physical output Base 1900-01=100	Index number of output at constant 1925-29 prices Base 1900-01=100	Index number of current value of output deflated by fixed weight index number of prices, Base 1900-01=100
(1)	(2)	(3)	(4)
1900-01	100.00	100.00	100.00
1901-02	93.62	92.91	93.35
1902-03	106.79	107.63	107.57
1903-04	102.06	102.35	101.14
1904-05	100.82	100.73	101.63
1905-06	98.56	98.51	99.82
1906-07	102.26	102.25	102.08
1907-08	79.83	77.53	76.95
1908-09	96.71	96.13	94.98
1909-10	111.52	112.65	112.14
1910-11	108.44	109.51	109.00
1911-12	105.55	103.91	104.06
1912-13	104.53	102.77	103.09
1913-14	90.95	91.38	92.78
1914-15	101.85	99.65	101.11
1915-16	116.25	114.52	114.94
1916-17	119.55	119.14	121.69
1917-18	115.23	115.41	118.15
1918-19	84.77	82.91	84.82
1919-20	113.79	108.02	114.05
1920-21	93.42	91.30	94.16
1921-22	112.55	110.57	112.76
1922-23	113.17	111.88	112.07
1923-24	98.15	91.22	94.58
1924-25	101.03	99.80	101.06
1925-26	97.94	97.07	98.71
1926-27	97.32	96.15	97.01
1927-28	93.62	92.27	93.03
1928-29	97.94	96.90	99.98
1929-30	103.70	102.69	101.90
1930-31	104.32	103.18	102.13
1931-32	103.91	103.44	105.56

Table II - Continued

(1)	(2)	(3)	(4)
1932-33	99.18	98.07	100.05
1933-34	100.82	98.61	101.34
1934-35	100.62	99.70	100.72
1935-36	95.47	93.98	95.62
1936-37	103.91	103.41	105.96
1937-38	98.56	98.43	100.17
1938-39	94.24	93.77	95.57
1939-40	98.76	99.46	99.95
1940-41	95.88	94.96	93.32
1941-42	92.80	92.15	93.69
1942-43	101.23	99.87	100.54
1943-44	99.79	99.23	100.62
1944-45	98.76	97.72	99.10
1945-46	88.27	86.60	90.63
1946-47	88.68	88.81	91.54
1947-48	92.87	92.71	95.08
1948-49	91.15	91.68	94.41
1949-50	94.65	95.28	98.62
1950-51	87.04	87.01	89.07
1951-52	87.86	87.83	89.12
1952-53	96.17	96.30	97.28
1953-54	120.99	120.47	122.13
1954-55	118.52	116.52	116.69
1955-56	116.05	116.06	118.67
1956-57	123.04	122.72	125.17
1957-58	111.73	111.78	112.46