ECONOMICS
of
A MULTIPLE-PURPOSE RIVER DAM

Report of an Inquiry
into
The Economic Benefits of the Hirakud Dam

by
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ERRATA

Chapter I

Page 6, line 2, in place of 61.65 read: 61.15.

Page 11, after line 14, read: beyond 1960. Consequently, the project was staged over a period

Chapter II

Page 18, in place of line 34, read: possible by the cheap power available, there will be more employment,

Chapter III

Page 38, para 2, line 3, in place of Table No. 3.18, read: Table No. 3.8.

Page 38, para 2, line 8, in place of Table No. 3.13, read: Table No. 3.6.

Page 40, Table No. 3.8, in place of the 1st fig. in col. 1, and 1st fig. in col.-heading, read: less than 1.

Page 41, line 2, in place of 1605, read: 1424.

Page 41, line 5, in place of 4903, read: 5078.

Chapter IV

In Table Nos. 4.10(A), 4.10(B), 4.11(A), and 4.11(B), read: Less than 1 in place of 1 in the 2nd col. heading.

In Table No. 4.11(A), and 4.11(B), in the 1st col. heading, read: Owned in place of Cultivated.

In Table No. 4.13, read the total of the 3rd col. as 260, in place of 280.

In Table No. 4.15, item 8, read: 119 in place of 199, and 1 in place of .1.

Chapter V

Read: Economic Conditions In The Delta Zone, in place of the folio title-Economics In The Delta Zone.

Chapter VII

The areas in Table Nos. 7.5(A), 7.5(B), and 7.6(A) are in acres.

Page 182, 1st line after the tabular matter, read: Rs. 349 in place of Rs. 340.

Page 205, in the last footnote, read: p. 496 in place of 946.

Appendix II

Page 259, Table No. S.10, Col. 2, item 5, in place of 18, read: 11.

Page 286, line 7, read: 29 per cent. in place of 20 per cent.

Page 286, last para, 1st line, in place of Rs. 412, read: Rs. 124.

Appendix III

Page 323, Table No. P.12, Col. 7, last item, read: 1.

In the headings of Table Nos. S.4, S.5, S.6, C.4, C.5, C.6, and P.4 on page 294, in place of—of their cultivated holdings—read: of their holdings.

FOREWORD

This publication contains the report of a survey undertaken by the Institute at the instance of the Government of Orissa. The survey was directed towards assessing, as comprehensively as possible, benefits that are likely to accrue to the State from the construction of the dam and related works on the Mahanadi at Hirakud. The report gives, in the first instance, a description of economic conditions in the two regions, the Sambalpur Zone and the Delta Zone, which are expected to receive benefits from the Hirakud Dam and attempts estimation of total income of the area affected by Hirakud irrigation. There follow projections of future crop patterns and estimates of agricultural production after irrigation; these are compared with corresponding data for the period before irrigation. Attention is next paid to possible extent of flood control and benefits accruing from effective flood control and to generation of hydroelectric power and economic developments that may follow upon its availability. Finally, certain calculations of overall benefits and costs of the project are made on the basis of concepts and practices evolved in the U.S. and an estimate is presented of prospects of financial returns.

The first part of the report is of interest because of the presentation of details of the economic situation relating to large and important regions of the country and the discussion of problems involved in the planning and conduct of an economic survey in regions with somewhat limited administrative and revenue data. The second part holds interest on account of the attempts at projections and estimations in many directions that had to be made. I desire to discuss in this Foreword the question of the proper direction and use of such work and this may be best attempted by comparing it with an earlier investigation of the Institute in this field.

The earlier investigation on the subject of benefits of irrigation undertaken by the Institute, tackled the problem of assessing benefits that were seen to accrue after a system of canals had been completed and been in operation for some years. That investigation arose out of a resolution passed by the Central Board of Irrigation and was initiated by the Government of Bombay. The report of the investigation was submitted to Government in 1942 and was published by the Institute in 1947. It came under general notice when irrigation projects began to be discussed actively and undertaken on a large scale after Independence. In a number of essential respects, the problems faced by the present investigation were different from those faced in the earlier one. In both cases, the objective was to assess the difference between two situations. In the earlier investigation an existing situation which incorporated within itself effects of the operation, for over 20 years, of a system of irrigation was compared with a hypothetical situation which might have existed in the tract, other things

being equal, in the absence of the system of irrigation. In the present investigation, the appropriate comparison is between the situation that might come to exist some years after the completion of irrigation and the situation that might be conceived to exist in the region, in the absence of the irrigation project. In the earlier investigation the objective was to assess benefits which might be taken to be accruing currently because of some effort in the past. In the present investigation the objective is to assess benefits which might accrue in the future because of construction of the irrigation system currently undertaken.

It would appear that the former project was not only easier to carry out but that the comparisons involved in it had a firmer base. In the first instance, at least one of the two situations compared, belonged to the concrete present. In constructing the hypothetical picture also, there was little element of pure projection because a concrete existing situation was, for the most part, assumed as the basis of the hypothetical picture. The underlying assumption made, in this instance, was that the existing situation in some nearby tracts which did not enjoy irrigation facilities provided adequate data for portraying the hypothetical situation of the tract at present under irrigation, if it also had not benefited from the system of irrigation. The earlier investigation, therefore, posed problems chiefly of choice of regions or locations for comparison and of designing and conduct of surveys, analysis of their results and of total estimations on the basis of those results. These problems were undoubtedly difficult and were posed in a field in which little work had been previously attempted. Even so these were essentially matters of application or adjustment of accepted methodology, of evolving suitable hypotheses and of methods of analysis in the particular situations. In the project, of which this publication forms the report, the comparison, in the first instance, is less sure; the assumption that the existing situation can be projected unchanged into the future is itself open to question. At the same time, there is no basis for judging the direction in which and the extent to which changes might occur in the existing situation even in the absence of irrigation. The projection of future conditions with irrigation is beset with even greater difficulties. An attempt was made in this project to find out answers to problems of projection by resort to a sort of analogy to the method adopted in the earlier investigation. This was of finding comparable areas in which likely future changes in the irrigated areas could be studied as actualities in the present. However, the problem of finding areas for comparison in this sense was bound to prove difficult. Because of the configuration of land surface and the dependence, in the main, on gravity flow for supply of water from canals it is possible to find, not too distant from most irrigated areas, locations not too dissimilar in other aspects. The projection regarding a future irrigated stage can, however, be based on actual conditions only in an area with an existing plentiful supply of water available all the year round such as can only be obtained from fairly large works. While

it is possible in most areas to find some locations where tank or well irrigation is available, such areas are not only limited in extent but also seldom enjoy ample twelve-month irrigation facilities. The result is that development in them cannot yield sufficiently reliable evidence regarding possible effects of massive irrigation and such vital matters as the post-irrigation cropping patterns and even measure of costs and yields of crops in relation to such areas have to be accepted with great caution in framing the picture of the irrigated future. If present conditions do not supply sufficient data for projections even of agricultural conditions they could obviously give little guidance in relation to development of trade, transport, industry, etc. As a result, a very large number of assumptions in a variety of contexts have to be made before building up an integrated picture of the future economy of the irrigated tract for making calculations of future benefits.

Utility of effort based on such data and such assumptions must be judged in relation to the use to which the results may be put. In this context also, a comparison with the use of results of the earlier investigation may have significance. An investigation of the results of past irrigation projects serves the purpose, mainly, of indicating the total actual benefits from the work of irrigation and the varying manner in which they are currently derived and throwing light on such matters as methods and adequacy of use, of potentialities remaining to be exploited and of possible variations in systems of management of production, distribution, taxation, etc. Further, an adequate number of surveys relating to assessment of performance of older projects may give valuable indications as to situations in which irrigation works have a small or large beneficent effect on the economy, the problems they create and the difficulties they solve. On the basis of results of such surveys, one may even go on to prepare broad indicators or yardsticks relating to possible total effects of given types of projected works in the future.

In the undertaking and construction of a new work of irrigation, two stages may be assumed. Firstly, the stage at which on the basis of a set of broad criteria, the fundamental decision regarding undertaking the project or not undertaking it is arrived at. The decision to undertake a project in an area or a region is determined to a large extent on broad considerations of policy of investment, regional development, etc. The exploitation of irrigation opportunities in different regions may be justified on widely different grounds and it is unlikely that a very detailed projection, such as attempted in this publication, can have relevance to the stage of making the initial decision regarding undertaking the project. It is, in fact, doubtful how far such detailed projections could be attempted without the scheme for the project having been worked out in full technical detail to a point to which this is never carried till after it has been decided to undertake the project. Therefore, elaborate economic investigations are

likely to be undertaken only after considerable progress has been made in relation to the project at the technical level.

The second of the two stages referred to above concerns the programme of activities to be initiated and undertaken either during construction of the project or soon after completion of its construction, for ensuring an early, sound and full use of the possibilities of economic development opened by the construction of the irrigation system. A projection of the economic picture of the future in detail can have great value in this context. Such projection could bring to light forcefully the major problems, technical and socio-economic, that might arise in attempting economic development of the area in the future and could form the basis of a concrete programme of multi-sided action. However, such a view of the use of the projection brings into prominence a very important factor of which the authorities of the Institute were aware even before the undertaking of this survey and importance of which has been greatly emphasized by experience obtained during its conduct. This is that the quality of such economic projections is dependent to an uncomfortably high degree on the adequacy and quality of varied technical data supplied by others to the economist, about the validity and reliability of which he has little knowledge or competence to judge. In making the projections, assumptions have to be made relating to, for example, the extent of water resources available, the area they will command, the uses to which they could be put, the crop patterns which are feasible, the varieties that could be exploited or developed, the organization of land holdings, and the tenancy and other structures, the credit, trading and processing systems that might be established, the pace and direction of the development of socio-economic overheads, etc. All these involve important decisions of government policy, activities and orientations of institutions and systems, and full knowledge of actual or projected work in fields of engineering, agronomy, public health, etc. Moreover, when those who supply information relating to other fields are themselves not involved in the business of making the projections or using the results of projections, the extent and quality of the information supplied are bound to suffer. An important instance of the helplessness of the economist in such contexts is afforded by the reflections contained (pages 164 to 166) in this publication on flood control. The projection and the calculations are made on the basis that flood control will be complete. It is clear from their remarks that the authors, on the basis of evidence of other experts, felt doubtful about the validity of this assumption but could, at the same time, do nothing about modifying it. The economist, working by himself, feels handicapped not only in relation to data obtained from other types of experts but is also unable to proceed surely in the socio-economic field because of lack of sufficient guidance on matters of policy of government and its programme of action. He may, indeed, raise issues and make suggestions about advance action, informally and confidentially, during the course of his work. However, unless some government agency is directly

involved in the work, it is highly unlikely that such communications will receive much attention.

What I want, in effect, to emphasize is that work such as that undertaken by the Institute in relation to this project is neither of great academic importance nor of much practical use. As a result, especially of the experience of this survey, I am convinced that the only way of dealing with problems of future operation and estimation is to set up teams of experts to evolve concrete programmes of development. As soon as any large work of irrigation goes under construction, joint teams of engineers, agronomists, economists and other experts should be put into the field to prepare expeditiously, integrated and properly phased programmes of all-sided development of the area under command to be achieved within the least possible time. This will enable experts in each department to locate problems they have still to tackle before development can be fully achieved, for administrators to become aware of institutional and other arrangements they have to provide and for ministers and politicians to be aware of provisions for funds and legislative and regulatory enactments which have to be looked into before development begins or is completed. In such a concrete programme, the economist will have a valuable role to play, because he will be subjecting all alternatives in the programme to his processes of analysis and measurement and would be suggesting optimum arrangements and combinations from his point of view. The work will require the exercise of his technique at the highest level but it will be carried out with some assurance that the work would bear concrete fruit.

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Poona 4.
September 23, 1960.

D. R. GADGIL

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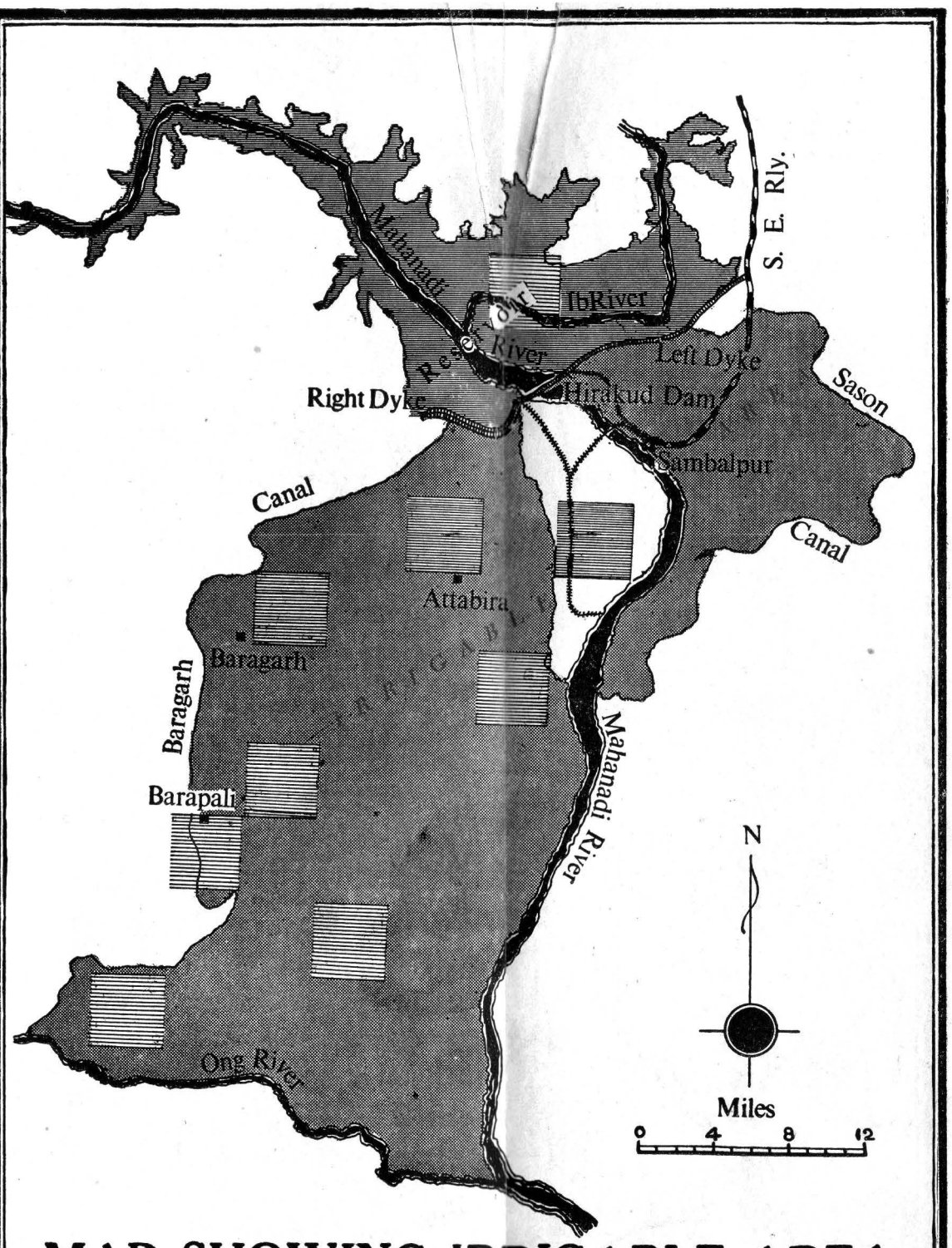
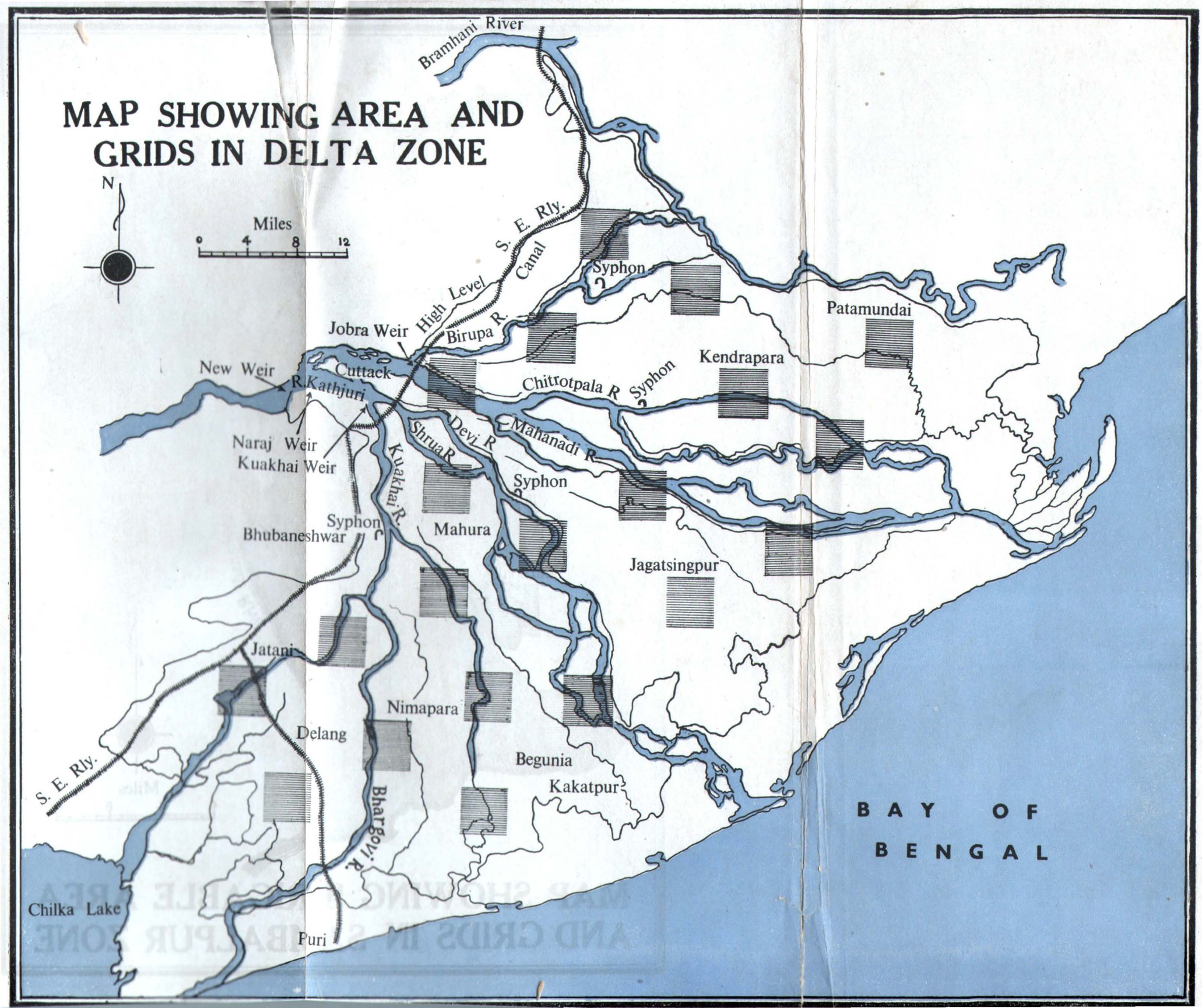


MAP SHOWING IRRIGABLE AREA AND GRIDS IN SAMBALPUR ZONE


MAP SHOWING AREA AND GRIDS IN DELTA ZONE
N
Miles
0 4 8 12
Bramhani River
S. E. Rly.
High Level Canal
Syphon
Patamundai
Jobra Weir
Birupa R.
Kendrapara
New Weir
Cuttack
Kathjuri R.
Chitrotpala R
Syphon
Naraj Weir
Kuakhai Weir
Shrua R.
Devi R.
Mahanadi R.
Kuakhai R.
Syphon
Bhubaneshwar
Mahura
Jagatsingpur
Jatani
Nimapara
Delang
Begunia
Kakatpur
S. E. Rly.
Bhargavi R.
BAY OF BENGAL
Chilka Lake
Puri

Chapter I

A BRIEF HISTORY OF THE HIRAKUD DAM PROJECT

THE three coastal districts of Orissa, Puri, Cuttack and Balasore, have been scourged by flood and drought for centuries. Though this is a medium rainfall area with an average annual precipitation of 60 inches, yet untimely cessation of the south-west monsoon has caused widespread famines in these three districts. On the other hand, the rivers of this delta region have been rivers of sorrow for its teeming millions. Heavy rainfalls due to cloudbursts and cyclones in the upland catchment areas of the Mahanadi, the Brahmani, the Baitarani, as also the Budhabalang and Subarnarekha (the last two in the Balasore district) have caused devastating floods in the coastal plains.

Systematic efforts at controlling this dual problem of flood and drought began almost a century ago with the plans of Sir Arthur Cotton for canal irrigation in the Mahanadi delta, which is possibly the worst flooded area due to the innumerable branches of the Mahanadi creating a network of channels. This canal system which was almost complete by 1865, has, however, not been a success; it proved of little use in preventing the great Orissa famine of 1866.

Floods have remained a recurring feature of the delta. Attempts at finding suitable methods of controlling the floods were being made for many years. In 1927, a Committee of Senior Engineers appointed by the Government of India went into the question and made several recommendations which, however, were not given effect to due to financial difficulties.[1]

Following the devastating floods of 1937, Sir M. Visvesvaraya was requested by the Government of Orissa to advise them on the flood control problem. Sir M. Visvesvaraya who stressed the great need for detailed scientific surveys and continuous observations of the rivers and the delta, visualised flood control by the construction of water reservoirs. He stressed the multi-purpose nature of such reservoirs; "if a reservoir is constructed it may prove useful in several other ways as well—for extending irrigation, generating electric power, etc. Once floods come under effective control, the whole area may be transformed into a prosperous region."[2] In any

[1] The Committee considered among other proposals, the construction of flood control reservoirs "in which all water which cannot be passed to the sea without flooding should be stored, the water being released again as soon as the rivers fall below flooding point", only to dismiss the whole suggestion as impracticable. *Report of the Orissa Flood Committee*, 1928, Superintendent, Government Printing, Bihar and Orissa, Patna, 1929, p. 10; paras 23 and 24.

[2] Visvesvaraya, Sir M., *The Flood Problem in Orissa, A Preliminary Note*, 1937, p. 91; para 22.

case he wished that the matter be fully investigated. "Unless the Committee (1928) have based their conclusions on dependable data – which, however, are not revealed in their report – it seems necessary to investigate this question more fully."[3] He was quite aware of the great difficulties for executing such schemes at the time, but felt that "it is desirable to make some preliminary investigations to see how the question stands at present, and whether there is any prospect of its being taken up later when the Province is able to finance such undertakings"[4] and "if this remedy is definitely ruled out, the investigations conducted and the reasons for abandoning the proposals should be clearly placed on record."[5]

As a result of the recommendations of Sir M. Visvesvaraya, a Flood Advisory Committee was set up in 1939, which studied the problem continuously for four years and gave its final report in 1942. This Committee was of the opinion that the question of storage reservoirs should be taken up for investigation only after other cheaper methods had been tried and their results were known.[6]

It was not until 1945 that attention was again directed to the flood problem of the Mahanadi delta. That year in the month of May, Mr. A. N. Khosla, the Chaiman of the C.W.I.N.C., visited Orissa and after discussions with the authorities, thought reservoir dams on the Mahanadi to be the best solution to the problem. In November 1945, accordingly, in a conference of the representatives of the Central Government, Orissa, Madhya Pradesh and the Feudatory States, a decision was taken for the "immediate investigation of the Mahanadi for multi-purpose development." And in March 1946, the foundation stone of the Hirakud Dam was laid.[7]

The swiftness of the decision to construct such a large multi-purpose dam at enormous cost, was surprising. Indeed, just four months intervened, between the date on which the decision to undertake all "necessary surveys and investigations" was taken and the date on which the foundation stone of the first of the three proposed dams on the Mahanadi – the Hirakud Dam – was laid. Of course the actual construction began in the middle of 1948, which meant an interval of two and a half years between the time of taking the decision about investigations and the actual start of works in the field, and a second foundation-laying ceremony took place in April, 1948. But test works had progressed at the site in the meanwhile, whereas most "detailed investigations" which were to be undertaken were either not begun or not completed.[8]

[3] *Ibid.*, p. 5. [4] *Ibid.*, p. 9. [5] *Ibid.*, p. 6.

[6] *Interim Report of the Orissa Flood Advisory Committee*, 1938-39, pp. 6-7.

[7] *Mahanadi Valley Development, Hirakud Dam Project, June, 1947*, Government of India, C.W.I.N.C., 1947, p. 10.

[8] The Chief Engineer of Hirakud in 1953 remarked regarding the 1947 estimates that "these proposals apparently were based on very insufficient data and field investigation. They therefore underwent extensive modifications and changes." *Hirakud Dam Project : Revised estimates of Cost and Revenue for Stage* 1; Orissa Government Press, Cuttack, Nov., 1953, p. 1.

The first official document with regard to the Hirakud project is the report entitled "The Mahanadi Valley Development, Hirakud Dam Project, June 1947"(hereafter referred to as the Khosla Report), containing the original schemes and estimates relating to the project. The Hirakud Dam was conceived as a part, only the first stage, in the unified basin-wide plan for the Mahanadi Valley. Two other dams on the Mahanadi were contemplated — one at Tikarpara and the other at Naraj — for damming the Mahanadi. Each of these dam projects in the unified basin-wide plan was, however, conceived as independent of the other and could be so undertaken. Certain advantages of the proposed Hirakud Dam gave it first priority in execution.

Of the Hirakud Dam Project the report said, "It is from the Hirakud Dam only that irrigation can be provided to the areas in Sambalpur District. From this dam alone, it would be possible to afford a substantial and adequate measure of flood protection to the delta at relatively small cost and at a fairly early date. Power can be developed to the extent of 350,000 kW so that industrial and agricultural development can be planned and proceeded with almost at once. The regulated releases of water from the Hirakud reservoir will permit appreciable improvement in the navigability of Mahanadi."[9] Such was the four-fold objective of the project.

The dam which was to be an earth-cum-concrete and masonary dam was to be constructed at Hirakud, eight miles from Sambalpur town. It was to have a height of R.L. 625.0 feet at which the reservoir was expected to submerge an area of 135,000 acres of which nearly 70,000 acres were cultivated land.[10] The main objective behind the storage reservoir was flood control and the report expected that by controlling the flood water of the Mahanadi at Hirakud (which covered two-thirds of the catchment area of the river) and regulating the discharge of water in order to "keep the flood level at Naraj below the absolute safe limit of 89.00 in the years of normal highest flood and below the limiting gauge of 90.00 in the years of abnormal highest flood,"[11] any material damage due to floods will be prevented. The dam which was thus to "solve to a large extent the flood problem of the delta" was expected to benefit the delta in two ways: "Firstly, it will save damage to lands and property which on a rough valuation has been reckoned at Rs. 12 lakhs per year; secondly, it will make lands fit for irrigation and cultivation which at present cannot be so used because of the periodic flooding."[12]

The second objective of the Hirakud project was irrigation. The Khosla Report put the gross commanded area in the districts of Sambalpur and Bolangir (then Patna and Sonepur States) at 13,13,000 acres. The culturable commanded area (the irrigable area) was estimated at 8,75,210 acres. The *kharif* intensity of cropping was assumed to be 100 per cent and *rabi*

[9] Khosla Report, p. 12.
[10] *Ibid.*, p. 39.
[11] *Ibid.*, p. 49.
[12] *Ibid.*, p. 49.

intensity 25 per cent, giving the gross irrigable area of 1,094,953 acres or 1.1 million acres roughly.[13]

To irrigate this vast area, six main canals were designed, three gravity flow irrigation canals and three lift irrigation canals. There were to be two flow canals and one lift canal on the right side of the river and one lift and one flow canal on the left. The remaining lift canal was to irrigate offshore areas on the upper side of the reservoir.[14]

So much for irrigation around the dam. In the delta region, it was noted, prospects of irrigation were even better due to the steady flow of an increased volume of water during the dry season in the Mahanadi as a result of the dam. The Report stated that, "No credit, however, has been taken in the project for the improvement and extension of irrigation in the delta likely to be brought about by the construction of the Hirakud Dam, as it has not so far been possible to adequately investigate the irrigation situation in that area."[15] Hence, the Report called for an urgent and thorough enquiry into that problem.

The returns on irrigation investment were calculated on the basis of water rates then prevailing in the delta. In lieu of a betterment levy, it was proposed to have a flat rate increase in land revenue in Sambalpur of two rupees per acre. The receipts from the proposed leasing of the land that was to be available every year in the dry season on the shores of the reservoir as water receded was also taken into account. All these taken together, however, were not expected to meet the interest at three per cent on capital at charge and the operating expenses of the canal system.[16]

The only paying part of the scheme, according to the Khosla Report, appeared to be hydel power generation, which not merely compensated for all losses incurred in other directions but also brought in a net profit. The total capacity of the generators to be installed was put at 3,50,000 kW and it was proposed to generate power at two places, at the main dam and then taking water through a channel up to the Subsidiary Dam at Chiplima some 17 miles downstream and creating a head there for further generation of power. The firm power available from both these dams was put at 3,00,000 kW. The main dam site was to have an installed capacity of 1,50,000 kW and the Subsidiary Dam of 2,00,000 kW. For dry years provision of steam generators was proposed to meet shortages to the tune of 50,000 kW of firm power.[17]

The consumption of power was discussed in general terms, and although possibilities of heavy industries developing nearby were considered, plans for transmission lines laid stress on consumption centres like Jamshedpur, Kharagpur (near Calcutta) and such other important stations outside Orissa. The annual gross revenue from electrical power was estimated at

[13] *Ibid.*, p. 51.
[14] *Ibid.*, p. 51; also p. 18.
[15] *Ibid.*, p. 52.
[16] *Ibid.*, p. 57.
[17] *Ibid.*, p. 59.

Rs. 252 lakhs and deducting the working expenses, the net revenue came to Rs. 172.19 lakhs.[18]

Navigation was not a major objective of the Project but the belief was expressed that, "after the construction of the Dam, there will be great improvement in the regime of the river as the regulated releases of water from the reservoir to the river downstream of the dam will range between 8,800 and 14,000 cusecs during the dry season. With a certain amount of blasting of the jutting rocks in the river bed and other conservancy measures, the navigability of the river can be very materially improved thus making it possible for 600 to 800 ton tows to ply from the sea to Dalab (the Subsidiary Dam) and thence via the Power-cum-Navigation Canal through a series of locks to the reservoir and on to the Central Provinces. There were possibilities of developing inland ports at Cuttack, Dasapur, Sopurothpur, Kantilo, Nuapara, Sania, Tikarpara, Kaintragarh, Baudh, Banusuni, Sonepur and Binka and a major deep sea port at Chandbali or Dhamra. The full development of these facilities was, however, to be possible only after the construction of one of the two lower dams at Tikerpara or Naraj.

"The Mahanadi, as a navigable waterway, will open great possibilities for the cheap transport of agricultural and industrial produce of the valley for local distribution and export abroad."[19]

Thus, the navigation channel was conceived of in three stages: One, between Dalab and the main reservoir where it was to be through the power-cum-navigation channel fitted with locks; two, between Dalab and Dholpur, a distance of 84 miles on river bed which would require blasting of jutting rocks, and lastly, some dredging of the sandy reach to keep the channel navigable to Cuttack. It was also stated that "with the construction of the Tikerpara and Naraj Dams, the necessity for dredging and blasting will mainly disappear depending of course on the reservoir levels at Tikerpara."[20]

All these four features of the Hirakud Project were estimated to cost Rs. 47.81 crores which were proposed to be allocated as follows:

Flood Control	6.11 crores
Irrigation	11.12 crores
Power	29.58 crores
Navigation	1.00 crore
TOTAL	47.81 crores

[18] *Ibid.*, p. 92.

[19] *Ibid.*, pp. viii-ix.

[20] Naturally no estimates of costs were made for all these excepting the construction of the navigation locks at the dam, and no returns calculated. Neither the dredging nor the blasting operations, however, were considered uneconomical or technically difficult, as would appear from a note appended to the report which estimates the cost of the required blasting operation that will enable 600 to 800 ton tows to proceed along the channel, at roughly Rs. 1.50 crores and the dredging cost at one lakh rupees. *Ibid.*, pp. 69-70 and p. 300.

The project when fully operative was expected annually to yield a "net profit" of Rs. 61.65 lakhs from the 19th year onwards.

It may be mentioned here that all these — estimates of areas to be irrigated, of power to be generated, of crops to be grown, etc. — were made without sufficient surveys and investigations, as has been frequently mentioned in the Report itself. The areas to be commanded by the irrigation canals, and those proposed to be irrigated were "worked out from the rough alignments on the topo sheets."[21]

In June, 1948, a Committee of foreign and Indian experts submitted a report on the Hirakud Dam Project. This was essentially a technical report and except for a few technical suggestions, the Committee broadly approved of the estimates, except those of cost, which, for obvious reasons, they did not wish to discuss. Even their suggestions to limit the lift irrigation area, in the first instance, to only about one-third of the total was inspired by technical considerations rather than by those of economic feasibility or profitability.

In January, 1951, a French mission of engineers, on the invitation of the Government of India visited Orissa to examine the possibilities of navigation on the Mahanadi and the development of a seaport at its mouth. The mission travelled in country boats from Sambalpur to Cuttack down the Mahanadi and examined all materials collected. They had extensive discussions with the concerned officers before coming to their conclusions. They dealt with five distinct points :

(1) Navigation in the Power-cum-Navigation Canal and the Hirakud Reservoir,
(2) the upstream rocky reach of the Mahanadi.
(3) the downstream sandy reach,
(4) the anicuts and canals, and
(5) the seaport, which was treated as distinct from these.

As for the first, apart from the technical changes suggested in the navigation canal and locks, attention was drawn to the changing water level of the reservoir which would mean a horizontal shifting of the banks. This will mean "not negligible" expenditure for factories that would like to transport their goods and raw materials by boat, in trying to build piled fenderings and having tip wagons moving along railways to carry their goods.[22]

It was the river bed from Dalab (Subsidiary Dam site) to Cuttack that presented the greatest difficulties. The mission dismissed the idea of blast-

[21] *Report of the Advisory Committee on the Hirakud Dam Project*, June 1948, Government of India, C.W.I.N.C., p. 11.

[22] *Report of the French Mission on Mahanadi River*, February, 1951, Government of India, C.W.I.N.C., pp. 30-1.

ing the jutting rocks along the 92 miles of the upper reach (which was all that was considered necessary in the Khosla Report and which was roughly estimated to cost about one and a half crores of rupees only) with the following words :

"We do not believe that the regulation may be done by blasting off the rocks ('unrocking') from this reach of the river, which characteristics have been given in Chapter V.

"To prepare a channel 250 feet wide, would mean that considerable volumes of 'unrocking' would have to be carried out under the water. According to Shri Kartar Singh, the volumes would amount to :

— for a 4 ft. depth :	23,53,65,850 cu. ft.
— for a 6 ft. depth :	45,01,49,497 cu. ft.
— for a 9 ft. depth :	77,92,27,336 cu. ft.

"Now, there is no equipment at the present moment well adapted to carry out works of the kind, so that the execution is always very costly.

"We believe that, if we consider the price (which we gathered at Hirakud) of Rs. 250 per 1,000 cu. ft. of rocky spoil in the open air, one may consider a price of Rs. 800 per 1000 cu. ft., which would lead approximately to the following expenditure :

— for 4 ft. :	19 crores of Rupees
— for 6 ft. :	36 crores of Rupees
— for 9 ft. :	64 crores of Rupees

"Furthermore, one must keep from believing that after the works in question are carried out, one would actually have during the low water period a channel with a utilizable depth of 4 ft., 6 ft. or of 9 ft. In fact the present low water level is ruled by the presence of rocks which would have been taken away and their disappearance would result in a subsidence of the water level, changing from one spot to the other and of which it is difficult to judge the importance. New works would, therefore, be necessary and the final amount of expenditure could largely exceed the figure already considerable given hereabove."[23]

The little blasting that was suggested in this report was merely to facilitate the movememnt of the country boats then plying in these waters.

The construction of the Tikerpara Dam (and later of the Naraj Dam) which was expected to facilitate navigation on the Mahanadi was brushed aside by the Report after giving interesting reasons and concluding that, "Far from being a favourable circumstance, the building of the Tikerpara Dam complicates, therefore, the achievement of the navigable waterway which interests us."[24]

23 *Ibid.*, p. 46.

24 *Ibid.*, p. 59.

With the greater discharge in the dry season after the completion of the Dam, the French mission thought of two alternative methods of making the rocky upper reach of Mahanadi navigable : (1) digging of a lateral canal, (2) canalization of the river through the construction of weirs and locks. Whereas the former involved digging of a parallel canal to the Mahanadi all along the rocky course of the river the latter involved construction of as many as seven weirs.[25]

The same methods, in addition to the method of "river training" which appeared to lead to "important expenses"[26] if undertaken, were suggested for the sandy reach. In this sandy reach also they recommended the construction of four weirs with locks.

But for all these they suggested elaborate experiments with different methods and types of boats, etc. The costs naturally had not been calculated.[27]

The revised Report of the Hirakud Dam Project of January, 1952, showed considerable changes, modifications, etc. in the original scheme. Firstly, the total cost of the project went up from Rs. 47.81 crores to Rs. 89.09 crores, an increase of nearly 80 per cent. This was not merely due to rise in prices and wages but due to many changes in the plan. Estimates changed as the results of detailed investigations became available.

In the plans of irrigation, alterations and additions were made. Instead of six canals as proposed in the Khosla Report, there were to be only three main canals with a gross commanded area of 6,43,142 acres (which was more than a 50 per cent reduction from the 1947 estimates on the basis of which the construction of the Dam began), and a culturable commanded area of 5,42,000 acres. Of these three, there was a flow and a lift canal on the right side and only a flow canal on the left. The flow canal on the right was so designed as to make the canal for the power channel redundant, while keeping the culturable commanded area intact. The 70-mile-long lift canal, however, was given up "after detailed investigations" and instead a 20-mile-long lift canal was to be taken out from the main Bargarh canal that served a gross commanded area of 1,08,000 acres or a culturable commanded area of 91,000 acres. From 2,90,000 acres in the 1947 estimates to a mere 91,000 acres was certainly a big drop.[28]

The two lift canals at the left side (including the offshore canal) were given up without any mention even, in the Report of January, 1952. As for the proposed left side flow canal in the 1947 plans it is worth quoting the Revised Report (January 1952) at some length :

[25] *Ibid.*, p. 72a. [26] *Ibid.*, p. 71.

[27] For all these points, see Chapter VII and Chapter VIII of the Report which is a very interesting document in itself.

[28] *Report : Hirakud Dam Project (Revised) : Vol. I, General Report and Financial Statements*, Government of India, C.W. and P.C., Hirakud, January 1952, pp. 64-73.

"The 1947 project estimates provided for a flow canal 50 miles long on the left side of the Mahanadi river commanding a gross area of 1,92,000 acres. On actual alignment in the field, it was found that the length of the canal worked out to about 80 miles passing through a very difficult country which involved crossing of a large number of Nallahs and skirting round the toe of hills and an idle run of about 16-mile length between hills and Mahanadi river. The cost of this canal worked out to Rs. 5.72 crores which gave a cost of Rs. 399 per acre of culturable area.

"As irrigation at such a heavy cost did not appear to be justified, it was decided to reduce the length of the canal in order to decrease the cost by avoiding alignment through a difficult tract, which would reduce the number of cross drainages and eliminate the idle length of 16 miles. The length of the canal has thus been reduced to 17.7 miles."[29]

This, "truncated canal system" was estimated to command a gross area of 83,142 acres and a culturable area of 71,129 acres.

Thus, whereas the 1947 estimates showed a gross commanded area of 1.3 million acres, a culturable commanded area of 8.7 lakh acres and irrigated area of 1.1 million acres, the revised estimates of 1952 put them at 6,43,000 acres, 5,42,000 acres and 7,91,000 acres respectively. The discrepancy in the rates of reduction in these three categories arose not merely due to changing design of canals but also due to increased intensity of cropping anticipated. The 1947 estimates had put 100 per cent *kharif* intensity and 25 per cent *rabi* intensity for all the land to be irrigated by the flow or lift canals. The Report on Revised Estimates put the *rabi* intensities at 48 per cent for the flow and 35 per cent for the lift areas.[30]

The Khosla Report always gave overall and total estimates. In regard to distribution of crops in the *Kharif* season, there was not much difference between the 1947 Khosla Report and the Report on Revised Estimates of January 1952, both putting it as follows :

Kharif	
Rice	70 per cent.
Sugarcane	10 per cent.
Other *kharif*	20 per cent.

The difference is that the Khosla Report made a special mention of cotton whereas the Report on the Revised Estimate did not do so. As for *rabi*, however, the crop distribution varied substantially. The Khosla Report mentioned wheat, cotton, and other *rabi* crops. In the Report on the Revised Estimates, for the flow areas, the largest acreage was anticipated under *rabi* paddy (33 per cent), wheat (10 per cent) and other *rabi* crops

[29] *Ibid.*, pp. 69-70.

[30] *Ibid.*, p. 73; and Khosla Report, p. 51.

(5 per cent); in the lift areas wheat was estimated to be most important (25 per cent), with other *rabi* crops (10 per cent) following.[31] The reasons for the new percentages fixed or changes made were not mentioned in the Report except noting that the Central Rice Research Institute at Cuttack did not see any difficulty in raising two rice crops in the same field.[32]

A new estimate was introduced in the Report on the Revised Estimates for the first time, that for delta irrigation. The estimates were based on admittedly inadequate data. They were for the old irrigated areas in Cuttack and the new areas in Puri that were to be protected from flood. The Orissa canals were to become perennial and the culturable commanded area of these canals was estimated at 3,99,700 acres. In addition to these the three Doabs in Puri district were to be irrigated with new canals. The total culturable commanded area here was estimated at 3,68,000 acres. The intensities of cropping were calculated at 100 per cent *kharif* and 48 per cent *rabi*, with *rabi* paddy occupying the position of importance.[33] Thus the net irrigation potential of Hirakud, according to the Report on the Revised Estimates, stood at 13,10,000 acres of culturable commanded area and 19,28,000 acres of total irrigated area.

The following water rates were proposed for the flow irrigation areas :

Sugarcane	Rs. 13/- per acre.
Paddy	Rs. 8/8 per acre.
Wheat	Rs. 6/- per acre.
Other *kharif* and *rabi* crops	Rs. 5/- per acre.

For the lift irrigated areas still higher rates were proposed.[34]

In regard to the power aspect the size of generating sets was proposed to be changed. The total installed capacity at the main and subsidiary dams was reduced from 3,50,000 kW to 2,68,000 kW (or 2,00,000 kW firm power). Out of this, only 1,23,000 kW of installed capacity or 85,000 kW of firm power was to be generated in the first instance from the main dam. The rest of the installations were proposed to be staged.[35]

Apart from these changes, there were many technical changes in the design of the dam and dykes. The raising of the dam level from R.L. 625 feet to R.L. 630 feet meant the submerging of a larger land area of which about 30,000 acres were cultivated. Now the total cultivated area to be submerged by the waters impounded by the dam stood at a little over one lakh acres as against 70,000 in the Khosla Report.

The financial prospects of the project naturally changed with all this. There was no allocation of costs to flood control and the total cost was divided in the proportion of 71:29 between irrigation and power. The

[31] *Ibid.*, p. 64.
[32] *Ibid.*, p. 63.
[33] *Ibid.*, pp. 74-9.
[34] *Ibid.*, pp. 110-12.
[35] *Ibid.*, p. 86.

rate of interest on the loan was calculated at 3.75 per cent instead of three per cent as in the Khosla Report. The project, due to increased cost and staging over long periods, was expected to pay its way only from the 25th year onwards.

Such were the Revised Estimates submitted by the Chief Engineer, Hirakud Project, in January, 1952. In the same month, the Government of India appointed a three-man Advisory Committee (hereafter referred to as the Mazumdar Committee) to review the estimates. It submitted its report in March, 1952. This Committee examined the estimates and consequently the new cost estimate of Rs. 92.08 crores emerged. The main change suggested was in staging the programme of work, the first stage up to 1960 consisting of irrigation, flood control and development of an installed capacity of 123,000 kW at the power house at the main dam, putting off the subsidiary dam and power house development to a period of 20 years. The Mazumdar Committee generally approved the estimates of irrigation, dam design, canal layout, etc. It suggested changes in water rates which were far in excess of what the Report on Revised Estimates had proposed.[36] It also suggested different intensities for *rabi* and *kharif* crops,[37] and while raising the rate of betterment levy, suggested dropping of the proposal to increase the land revenue.[38] It made a number of technical suggestions about the alignment of the new delta canals and the river courses.[39] While approving the general plan of irrigation, they "considered the cost per acre of culturable commanded area in Delta areas as much less than the cost of providing lift irrigation in Sambalpur District" and therefore suggested that "the latter may be replaced by flow irrigation in the Delta area, provided sufficient irrigable areas were available in the Delta."[40]

Revised estimates were again prepared on this basis in November, 1952, for the first stage only, exclusive of the delta irrigation scheme. The final estimates were, however, prepared and accepted in November, 1953.[41] The major change in estimate, apart from new transmission lines, etc. was the proposal to drop the "lift irrigation which was proposed on either side of the river"[42] at Sambalpur. This reduced the culturable commanded area in Sambalpur to 4.48 lakh acres. The Report put the cost for Stage I at Rs. 70.78 crores.

The detailed investigations into delta irrigation that were continuing in the meanwhile were completed in October, 1953 and a report was submitted. It considered the various technical details of the new canal

[36] *Report of the Advisory Committee on Hirakud Dam Project*, March, 1952, Government of India, C.W. and P.C., p. 18.

[37] *Ibid.*, pp. 7-8.

[38] *Ibid.*, p. 20.

[39] *Ibid.*, pp. 5-7.

[40] *Ibid.*, p. 7.

[41] *Hirakud Dam Project : Revised Estimates of Cost and Revenue for Stage I*, Government of Orissa, River Valley Development Department, November, 1953.

[42] *Ibid.*, p. 1.

alignments in the delta and devised a scheme, which was expected to cost Rs. 14.82 crores.[43] It included measures for flood control in the delta including completion of embankments on both sides of the delta rivers and closing of all the escapes that flooded the surrounding areas. The estimates of areas to be irrigated also went up as a result of these detailed surveys. Not only were the areas under existing delta irrigation to be converted into perennially irrigated areas, but new areas were to be brought under irrigation in Cuttack District. In Puri, flood control and irrigation measures were planned to be executed simultaneously. Apart from perennial flow irrigation, a small patch of about 27,570 acres was planned to be put under perennial lift irrigation. About 59,000 acres at the tail end of the new canals were estimated to be non-perennially irrigated.

The gross commanded area of the new and old irrigated regions in the Mahanadi delta was estimated at 13,81,701 acres and the culturable commanded area at 10,77,157 acres.[44] The intensities of cropping in the old and new irrigated areas were also differently estimated from that of the Mazumdar Committee Report. The *rabi* intensity was put at 67 per cent; the *kharif* intensity was put at 110 per cent, due to expectations about suitable rotations of crops starting with jute.[45] Whereas the Mazumdar Committee gave the greatest importance to the *rabi* (or *dalua*) paddy, this report opined that the really important crops were the legume variety (pulses and so on) which were expected to cover 40 per cent of the irrigated area in the *rabi* season.[46]

What about the financial estimates of the Revised Estimates of Stage I and the Delta Irrigation Scheme ? In so far as irrigation was concerned the Committee appointed by the Hirakud Control Board to enquire into the direct benefits of irrigation in the Sambalpur and delta regions (usually referred to as the Sivaraman Committee) said in 1953 "that the water rates prevailing in the coastal areas of Orissa at present are much too low compared to the existing rates elsewhere but the rates recommended by the Advisory Committee in 1952 are too high for conditions in Orissa."[47] The Report continued : "A policy of moderation in the fixing of irrigation dues promises the best results in the long run though the immediate financial results may not be as hopeful as expected."[48] It accordingly suggested the adoption of the rates proposed in the Report on the Revised Estimates of the Hirakud Dam Project of January, 1952,

[43] *Report on the Investigation for the Extension of Irrigation in the Mahanadi Delta*, October, 1953, Ministry of Irrigation and Power, New Delhi, p. 74.

[44] *Ibid.*, p. 62. [45] *Ibid.*, pp. 51-3.

[46] *Ibid.*, p. 52.

[47] *Report on the Direct Benefits from Irrigation of the Hirakud Dam Project (Sambalpur Zone)*, Government of India, Ministry of Irrigation and Power; Orissa Govt. Press, Cuttack, 1953, p. 16.

[48] *Ibid.*, p. 16.

with a few modifications. Similar measures were proposed for the canal areas in the Delta region. It also suggested a betterment levy but at a reduced rate.

The new proposal made by the Committee was the imposition of an annual levy in those areas of the delta which were to be protected from flood as a result of the Hirakud Dam. So long the expenditure allocated to flood control had been considered only as a protective measure and was thus not "remunerative" in the usual sense. The Sivaraman Committee on the other hand proposed to raise an annual revenue of Rs. 16 lakhs by this levy.[49]

The second stage of the Hirakud Project, as suggested by the Report on Revised Estimates of January 1952, and approved by the Mazumdar Committee, was to be taken up after 1960. The revised estimate for it stood at Rs. 8.21 crores in 1954.[50] The Mazumdar Committee had recommended the installation of generating sets of 72,000 kW at the Subsidiary Dam. The revised programme of 1954 put the total firm power at the two power houses at 1,27,000 kW. But since there were technical difficulties about continuous generation of 54,000 kW at Chiplima, a new generator of 37,500 kW was proposed to be installed at the Main Power House in the second stage. Consequently, the cost went up to Rs. 8.26 crores. With increased installations, the cost of the second stage was finalised at Rs. 14.32 crores. The total estimate of the Hirakud Project, including the second stage, came to Rs. 100.02 crores.

The following extract from the Annual Report of the Ministry of Irrigation and Power, Government of India, 1957-8, gives the latest position regarding the Hirakud Project :

> "The Hirakud multi-purpose project (Stage I) has been completed and was inaugurated by the Prime Minister in January 1957. Up to the end of December 1957, facilities for the irrigation of over 1 lakh of acres were made available. The construction of the canal distribution system in the Sambalpur area (including the execution of water courses) has been accelerated in order to ensure that it is completed by 1959-60, *i.e.* a year ahead of the scheduled programme.
>
> "In the Main Power House, three units with a capacity of 85,500 kW have been commissioned. Installation of the fourth unit of 37,500 kW is nearing completion. The transmission grid is being extended and is at present supplying to the Cement Factory of Rajgangpur, the Steel Works at Rourkela, the Ferro-Manganese Plant at Joda, and the Paper

[49] *Report on the Benefits Due to Complete Flood Protection by the Hirakud Dam Project (Delta Zone — Cuttack and Puri Areas)*; Government of India, Ministry of Irrigation and Power; Orissa Government Press, Cuttack, 1954, p. 3.

[50] M. S. Thirumale Iyengar : *Second Stage Power Development at Chiplima;* Superintendent, Orissa Government Press, Cuttack, 1954, p. 12.

Mills at Brijrajnagar. In addition, power is being supplied to Sambalpur, Sundergarh, and other towns.

"Against an estimated cost of Rs. 70.78 crores for Stage I of the project, an expenditure of Rs. 54.67 crores has been incurred up to the end of November, 1957.

"The Mahanadi Delta Irrigation Scheme, estimated to cost Rs. 14.92 crores, is being executed by the Government of Orissa as an adjunct to Stage I.

"The works on the Hirakud Subsidiary Dam Power House Project at Chiplima (Stage II), estimated to cost Rs. 14.32 crores have been progressing according to schedule."[51]

[51] Annual Report of the Ministry of Irrigation and Power, Government of India, 1957-8, regarding Hirakud Project, March, 1958, p. 17.

Chapter II

ORIGIN AND PLAN OF INQUIRY

THE inquiry on which the present report is based originated in a letter from Mr. Kunwar Sain, Member (Designs) Central Water and Power Commission, Government of India, New Delhi, dated 15th August, 1952, to Prof. D. R. Gadgil, inquiring whether the Institute can prepare a scheme for the evaluation of the costs and benefits of the Hirakud Dam Project and whether the Institute will be willing to undertake such an inquiry. Prof. Gadgil replied by expressing his willingness to co-operate in such an undertaking. As a result of a further exchange of letters, a note on the proposed inquiry was prepared at the Institute and sent to Mr. Sain. This note is fully reproduced below:

Note Prepared by the Gokhale Institute

The nature of economic benefits flowing from a multi-purpose project, like the Hirakud, is far-flung, complex and often elusive to measurement. This has been realized for a long time by students of the problem and considerable thought and ingenuity have been devoted in recent years to the problem of measuring them. As a result, certain agreed procedures have been evolved, at least in regard to certain aspects of such measurements. However, the nature of the problem varies considerably from project to project. It is best, therefore, to consider the problem under reference by visualizing the effects the project may produce at various stages, to realize their complexity and range in order to be able to plan the necessary inquiries in the best manner possible.

Economic benefits arising out of a capital work are usually classified into primary, secondary, etc. The classification rests mainly on the chronological sequence in which the benefits arise and the closeness of their connection with the investment whose effects are being studied. In each of these classes again the benefits can be divided into two classes, direct and indirect. When, for instance, an irrigation dam is completed, it makes water available for irrigation of the area under command. Irrigation results in higher agricultural production than before in that region and this is the direct primary benefit. The increased production results in increased incomes, which are partly saved and partly spent, thus giving rise to increased demand for both producers' and consumers' goods and services. Economic activity increases resulting in more employment, trade, etc. and this is the direct primary benefit. When some of the agricultural produce begins to get processed in the area, as for instance, oilseeds into oil and

cake by oil mills, it gives rise to further employment, trade, income, etc. These are the direct secondary benefits. Indirect secondary benefits arise when the increased incomes arising from oil are spent on goods and services giving rise to further economic activity. When the oil produced in the oil mills begins to be used for soap-making in new soap mills in the area, there is a further rise in employment, income, etc. These are the direct tertiary benefits. When the increased incomes arising from them are spent, they increase economic activity further giving rise to indirect tertiary benefits. This chain can go on *ad infinitum*. But at every remove the benefits become more diffuse and less specific as other factors besides the originating ones come growingly into the picture. In the measurement and evaluation of these benefits, therefore, it has been recognized that the primary benefits lend themselves to easy measurement and that the measurement of secondary, tertiary, etc. benefits becomes progressively more difficult. Direct benefits in these categories again are easier to measure than indirect ones. These limitations must be borne in mind when planning an enquiry for estimating benefits.

Before proceeding further it needs to be stressed that we are interested in measuring the net economic benefits arising from the project and the costs involved at every stage have to be set off against the total benefits. As can be seen from what follows, at every stage there arise certain benefits and they are accompanied by certain costs. In fact, costs and benefits go hand in hand and both have to be measured at every stage with equal care and diligence.

The first stage of a multi-purpose project, like the Hirakud Dam, begins when construction is started and ends when it is completed. It is not potentially productive till it is complete. The very process of construction, representing as it does the expenditure of a vast sum of money in a particular area, does increase employment, incomes, etc. during that period. But these benefits are temporary and are co-extensive only with the period of construction. As such they do not form part of the more permanent or long range benefits flowing from that project.

The benefits we are here concerned with begin to arise after the multi-purpose dam is completed. All the benefits, however, do not appear immediately. They come slowly first and steadily accumulate till the stage of maturity is reached. Benefits of a major irrigation system may, for instance, take at least 25 years to attain their peak. The primary benefits come first and the secondary, tertiary, etc. follow later. In estimating the benefits, therefore, it would be appropriate to make at least two independent estimates, one for the short period and another for the long period. Even after a dam is completed it requires a certain time for the tract affected to adapt itself to new conditions. The farmers have to adopt new methods of farming, new crops, etc. and to make the necessary investment. It is the same with new users of electricity. Roughly speaking, most of the

primary benefits would begin to flow fairly fully at the end of five years after completion of the project. The benefits flowing at the end of five years after completion might be termed the short-term benefits and estimated accordingly. In the period that follows, primary benefits will attain their peak and secondary, tertiary, etc. benefits will also progressively appear. The system as a whole might be expected to reach its stage of maturity at the end of 25 years after completion. The long-term estimate of benefits will cover the benefits arising at this point of time.

Once a multi-purpose project is completed it yields several "products" or produces many effects. These can be best visualized by classifying them under the different purposes for which the dam is constructed. These purposes may be: (1) Irrigation. (2) Generation of power. (3) Flood control and (4) Navigation. Let us proceed to examine what costs and benefits are associated with each of these.

The dam affects the primary production in the area firstly through its effects on the total land surface and its use. It affects the total cultivated area in various ways. It increases it by making possible the reclaiming of certain lands that were not cultivated before because of lack of water; by making possible year-round cultivation of lands that were liable to inundation by floods every year; and by preventing loss of land due to erosion. On the other hand, it reduces it by flooding some area under the lake created by the dam, by waterlogging, by preventing inundation of land whose cultivation depends upon it. Secondly, the dam makes it possible to utilize the available land for a longer period or more intensively, leading to higher yields of existing crops, introduction of new crops, double cropping of land, etc. by making water available for irrigation over the area commanded by its canals. The primary direct benefit from irrigation would thus be: (1) increased agricultural production; and (2) the saving in famine relief and cognate expenditures to Government. In regard to (1), it should be noted, however, that its extent will depend, besides irrigation, upon other things, such as the availability of technical knowledge and capital to farmers, appropriate system of land tenure, etc. Against gains from irrigation, moreover, costs incurred by the public authority in maintaining and operating the dam for irrigation purposes and expenses incurred by it in settling new lands, building roads and other public works there, etc. and the costs of investments necessary for irrigated farming by peasants will have to be set off.

Besides agriculture, the dam will also affect favourably or adversely forests and their produce, grassland, fish and wild life, and the balancing of both sides in these respects will also have to be done to estimate the benefits from them. The total increase in primary production in the area will also be affected by the good or bad effects produced by the dam on the level of subsoil water and its effects on well irrigation. Losses or gains of scenic and historical value because of the construction of the dam will have

also to be similarly balanced. Any other losses because, for example, of a possible development of malaria in the irrigated area will have to be set off against the total benefits.

As remarked earlier, the extent of increase in agricultural production after irrigation will depend to a very significant extent on State policy in connection with land rights, land holdings, agricultural extension activity, public works programme, agricultural credit and marketing structure, etc. These will have to be carefully designed and planned beforehand. It is necessary to think ahead and with the aid of experts in the field to explore what would be the best crops and their combination and rotation that would give the highest increase in agricultural production. What types of land holdings will be the most beneficial ? How and in what manner can the farmers be taught the efficient method of irrigated agriculture ? What would be the most productive unit of cultivation ? How would the credit machinery and processing activities be best organized ? These and many other questions will have to be asked, answered and suitable plans made to translate these into practice. Plans and policies in regard to land revenue, water rates, betterment charges, etc. also will have to be formulated. This type of investigation is best exemplified by the Columbia Basin Joint Investigations. This is stressed here because the absence of planning in these matters would make a great deal of difference to the process of adjustment, of the costs involved in it, and the direction and pace of development of the tract. Quick adjustment with minimum cost can be planned; if not, the adjustment would be by trial and error. It will involve higher costs, require more time and may even take wrong directions. This will, of course, cut into the total benefits.

Electrical energy made available over the region might be used for different purposes such as lighting, or motive power for industries or for agriculture. The benefit from the use of electrical energy will depend upon how its use is planned by the authorities. The part of it that will be made available to consumers for lighting, etc. purposes will save so much kerosene or other fuel. The part that will be used by agriculture and industry may well produce further effects. In so far as new industries are made may well produce further effects. In so far as new industries are made higher incomes, etc. In this regard the plans made by Government for utilizing the power made available will be of crucial significance.

On the side of costs which have to be set off against these we will have to note : (*i*) expenses for maintenance and continuous operation of hydel plants; (*ii*) investment in transmission equipment; (*iii*) investment that will have to be made by users of electricity for wiring, etc. and (*iv*) losses suffered by those formerly dealing in the substituted fuels, etc.

The control of annual floods would in the first instance lead to the saving of expenditure on flood relief and will also prevent losses due to floods. It might also lead to the reclamation of lands for year-round cul-

tivation which was not possible before because of floods.

A channel for navigation all the year round for a length of more than one hundred miles from the mouth of the Mahanadi will mean facilities for cheap transport of men and materials. The benefits can be estimated by the saving that can be effected in the cost of transportation on the new channel as against the old alternative means and channels of communication. But more important than this will be the effects produced on the trade and industry of the region and its neighbouring tracts because of the availability of cheap transport. For this purpose, it would be necessary to know what area the channel will serve, what kinds of goods will or can be transported and what will be the costs of transportation on the channel, and how and whether this will facilitate or further any connected economic activity. What the Government expects to do in this regard by way of planning will be of utmost importance. Costs will, of course, be incurred in investing in the new river boats that will carry the goods. The expenses of maintaining them and keeping them in continuous operation also will have to be deducted from the total benefits.

Certain other incidental benefits may be also noted: (1) increased and steady supply of water downstream to villages and towns on the banks for use; (2) more effective uses of Orissa canals in the delta because of the control of the flow of water in the river; (3) reclamation of salt lands on the sea coast.

Broadly speaking, we can roughly assume that in the short period (five years after completion) chiefly the primary benefits will be manifested and even these will not reach their peak.

In the long period (twenty-five years after completion) the primary benefits will attain their peak. The secondary, tertiary and further benefits will be also flowing in and rising towards their own highest levels. A description of the expected developments at this stage in connection with the different purposes of the project might make this clearer. (1) Irrigation will have proceeded to the highest pitch possible and the adjustments of peasants, crops, etc. will have fully taken place. As a result, agricultural production in the area will attain the maximum. Besides this primary effect, secondary and other effects will have followed through the development of processing, industries. etc. For example, if as a result of irrigation, sugarcane becomes a permanent crop of the region, it is likely that activities connected with the further processing of it will develop. It might give rise to gur and sugar manufacture, which will create additional employment and income. A sugar mill might proceed to process further its own wastes, such as molasses and bagasse by starting the manufacture of power alcohol and paper respectively which will again increase employment and income; or if irrigation leads to an increase in the production of oilseeds this might lead to the establishment of oil mills and the oil

available might be used by new soap factories in the region. (2) Electrical power will be used by new industries which might be attracted to the region because of the availability of cheap power. This might lead to the development of new mineral and other resources. So also it might rehabilitate and develop further the existing handicrafts in the region. An increased use of electrical appliances is also possible and might lead to the establishment of industries making these. (3) Availability of the navigation channel will increase the traffic on the river, and give a fillip to trade in general. Increased use of boats on the river might lead to development of a small ship building industry.

It needs to be emphasized here as in regard to the primary benefits, that how fast and cumulatively they will flow and the highest level they will reach will be governed to a very significant extent on how well the plans for them are prepared now and executed later. Lack of planning will involve lower levels of total benefits, greater costs, undesirable and harmful developments, etc.

From the detailed discussion so far, the broad contours of a plan for measuring the economic benefits of multi-purpose projects under construction can be discerned. Basically, of course, we will have to take stock of the economic conditions at the time of construction with which comparisons can be made of the economic conditions after the completion of the project. The present conditions can be gauged by carrying out a survey of the area affected by the project. Conditions after completion have to be projected on the basis of available data, contemplated policies, etc. As has been indicated above, two pictures of economic conditions after completion, one after five years and one after 25 years, will have to be built up to see the problem in the short and long term perspective.

An enquiry bearing on all these can be planned and completed in three stages as detailed below :

Stage I : To build up a short-term and a long-term picture of the economic conditions in the area in the future on the basis of existing and available data, estimates and policy forecasts made in collaboration with experts from other fields.

For this purpose a wealth of data will be necessary, which, we assume, would be available at the project office. It would be useful to indicate in some detail what are the required data so that deficiencies if any can be made good by the proper authorities. A major estimate, among others, in respect of primary benefits would be that of the future agricultural production in the region. For this purpose the following information would be necessary: (1) Total land surface available for utilization after the completion of the project; (2) the topography, geology and soils of the area; (3) hydrology of the region which includes precipitation, evaporation, surface water, ground water, quality of water; (4) sedimentation.

These are mainly physical data which have a bearing on agriculture. Besides these we will have to know: (5) the pattern of land use, i.e. land under forest, grass and under cultivation including new and reclaimed land either from floods and/or sea, of the latter the area that will be irrigated; (6) rotations and combinations of crops. Apart from this, agricultural production will be influenced significantly by the future land policy that will determine: (7) the conditions of land holding; (8) the size of cultivating units, tenancy laws, etc. So also will have to be known the future policy in regard to: (9) land revenue, water cess, betterment charges, agricultural credit policy, roads, village and town sites and other public works for agricultural and industrial development.

In respect of the power aspect, we will have to know : (1) the total power that will be available, the area it will serve, rate at which consumption is expected to increase, the policy of charging rates for various types and at various periods. How much will be consumed in agriculture and transport? (2) How much of it will be reserved for the industrial activity? (3) The total consumption of fuels at present in the area which will be served with power later on; (4) mineral development planned or possible; (5) industrial development planned or possible; (6) investments that would be necessary for all these.

In respect of flood control, it is necessary to know: (1) damage to crops, etc. every year that will not occur after completion of the dam; (2) lands that will now become cultivable for the whole year because they are not affected by floods; (3) the amount of water flow that will be maintained downstream and which can be used by towns and villages on the banks; (4) effects on the operation of the Orissa canals further downstream.

Information will be necessary on : (1) the navigation channel and the estimates about its potentialities. The points or centres that can and will be served by the channel; (2) the present volume of traffic along comparable and alternative routes. Effect on transport of possible agriculture and industrial development in the region. The possibility of transport requirements originating in other regions being satisfied or being attracted by the navigation channel.

The foregoing has been made fairly detailed. Yet some additional information may become necessary as the inquiry proceeds. This is noted here only to indicate that the above by no means exhausts the necessary information. It will be clear that the information required, as indicated so far, can be supplied partly by engineers and partly by agronomists attached to the project. Some of the estimates, etc. required will have to be worked out jointly by both of them in collaboration with economists. With the data thus furnished, the economist, in consultation with the expert engineer and the agronomist, can proceed to build as far as possible a complete picture of physical and other conditions in the region in the short and the long periods.

Stage II : The carrying out of a comprehensive socio-economic survey of the area affected by the project. This will have to cover agriculture, industries, trade, transport, occupations, incomes, etc. in the area. It will furnish the basic data for making comparisons with the future. Another set of surveys will at the same time have to be carried out of already developed areas in or outside the area affected, but with mostly similar conditions, for providing the data necessary for calculating future incomes, etc. in the region arising from particular aspects of development. Most of the surveys will have to be carried out with the help of local enumerators or field men, who will have knowledge of the local people and of the region and who will be familiar with the local conditions.

The surveys as a whole will be planned by the Institute, the local workers will be trained by it but we will have to depend on the local administration for supply of suitable local investigators.

Stage III : In this final stage, the data made available in the first two stages will be integrated for estimating the economic benefits of the project. The data from the socio-economic surveys and other statistical data will be comprehensively tabulated. The whole information will be thoroughly digested and an analytical report will be prepared and submitted.

It is difficult to give final and detailed estimates regarding requirements of staff and finance at this stage. Certain tentative figures may, however, be indicated. The whole project will have to be put in charge of one economist from the staff of the Institute, helped by a research assistant and a statistical assistant. This unit, together with the necessary clerical help, will function for the whole period from the beginning to the completion of the project. At the first stage, this nuclear staff will work in collaboration with experts from other fields provided by the Project authorities. In the second stage, the nuclear staff will plan and generally supervise investigational work for which, however, separate field staff would be necessary. The extent of this will depend on the number of centres, locations or types of investigations conducted both in and outside the region affected. It may be assumed that the total of all these could be covered by about fifteen field investigators. To these will have to be added a number of field supervisors and a general control of field operations. In the third stage, the main cost will be that of processing and tabulating all information and statistical data collected as a result of work at both the first and second stages.

The analysis of these data and the actual writing of the report will be done by the nuclear staff set up at the beginning. On the basis of the above, rough estimates of costs may be made. In making these estimates it has been assumed that the time taken from the beginning of the work to the final submission of the report will be not less than two years and

should not exceed two years and a half. The broad financial estimates for the total work may be indicated as below:

1.	Cost of nuclear staff for the whole of the project period	Rs. 40,000
2.	Field Investigations (2nd Stage)	Rs. 60,000
3.	Processing of information and tabulation of data (3rd Stage)	Rs. 50,000
		Rs. 150,000

This note was considered by the Government of India. It was decided that while it was in favour of the inquiry being undertaken and was also in favour of entrusting it to the Gokhale Institute of Politics and Economics, this could be done only if the Government of Orissa undertook the financial responsibility and itself entrusted the work to the Gokhale Institute of Politics and Economics. This the Government of Orissa decided to do by a resolution in the Finance Department on 2nd January 1954 and the Gokhale Institute undertook the inquiry.[1] The terms of reference laid down by the Government of Orissa for the proposed inquiry were as under :

1. To conduct an inquiry into the economic benefits resulting from the Hirakud Dam and for this purpose :
   (*a*) to carry out a comprehensive socio-economic survey of the area affected by the dam to collect benchmark data for comparisons with the future;
   (*b*) to carry out surveys of already developed areas inside and outside the area affected by the dam for providing the data necessary for calculating future incomes in the affected region from particular aspects of development;
   (*c*) to gather and scrutinize the available published and unpublished information with the Government concerning the Hirakud Project and the area affected by it, and
   (*d*) to analyse the data thus collected and present a report on the economic benefits of the Hirakud Dam both in the short and the long period.
2. To conduct such inquiry and collect such information within the Hirakud Project area as may be required for the economic survey of the whole State.

The Institute authorities decided to put Mr. N. V. Sovani in charge of the inquiry. He was assisted by Mr. Nilakantha Rath of the research staff

[1] The original letters exchanged, the resolution of the Orissa Government, etc. are reproduced in full in Appendix I to this report.

of the Institute. Both of them visited Cuttack and Sambalpur in February, 1954. The Institute set up an office of its own at Cuttack and a sub-office at Sambalpur. Mr. Nilkantha Rath was deputed to Orissa to take charge of investigations there on behalf of the Institute. Two field controllers were recruited to assist him in this work. One was posted at Sambalpur and the other at Cuttack. Supervisors and investigators to serve under each of the two were subsequently recruited from each locality. The sampling design was worked out at the Institute. The questionnaires that were to be used were also finalised at the Institute. They were subsequently translated into Oriya and printed at Cuttack.

The first stage of the inquiry referred to in the original scheme was dropped as it was thought that it was better to proceed at once to the second stage of the inquiry in the field. The inquiry went into the field in June, 1954. Because of the difficulty of communications in Orissa during the rains, the inquiry began with the surveys of the urban centres of Sambalpur, Puri and Cuttack.

We now set down for convenience of reference, the number of inquiries that we actually carried out, their scope, coverage, etc. and the way they have been presented in the following pages.

For convenience we divide the inquiries into two broad classes, rural and urban, and deal with each of them separately.

Rural

For the purposes of the benchmark survey, the commanded areas in the two localities of Sambalpur and the delta were marked off on a Survey of India one inch one square mile map and a stratified random area sample was drawn. The sample unit was a grid of 10 square miles of area. Nine such grids were chosen in the Sambalpur zone and 20 in the delta area of Cuttack and Puri.

We carried out in each of these grids a complete census of households. The census questionnaire gathered information regarding the main and subsidiary industry of the household, the land owned, cultivated, rented out or in, etc. of the household, the occupations in which each of the working members of the household was engaged, the number of earners who were outside the region, etc. This census was completed in three months (October 1954 to December 1954) and for that purpose were employed a total of 20 enumerators, seven supervisors, one for a batch of three enumerators. Two field controllers, one for each region, supervised, checked and tallied the questionnaires filled in.

A total of 10,091 schedules in Sambalpur and 33,583 in the delta area of Cuttack and Puri were filled in. From this, a preliminary sort was carried out by separating the households which were mainly engaged in agriculture or cultivation, from the rest. The census schedules of the cultivator

families in each grid were then arranged in a descending order according to the land size of the cultivating unit of each family and two middle families from each of the deciles were chosen for constituting the intensive sample. In each grid, there were thus 20 families of farmers constituting the sample. The intensive sample in the Sambalpur zone thus consisted of 180 families and that in Cuttack and Puri as a whole of 400 families. A farm business survey of these cultivator families was carried out. We in all filled in 580 farm business account books.[2] A short account based on these data is presented in the main body of the report for each area but the detailed report is presented in Appendix II.

Besides the cultivator families, there were families whose reported main occupation was agricultural labour. A random sample of 10 families from this group in each of the grids was selected for intensive inquiry. In the Sambalpur zone, the sample consisted of 90 families and that in Cuttack and Puri of 200 families. The intensive inquiry gathered data about the employment and earnings of the heads of these families.

For the sampling of households engaged in non-farm occupations a different procedure was followed. It was decided that the sample size, for this purpose, per grid should be 15 families, consisting of seven families engaged in industry, five in trade and three in services and professions. The total sample size for an area (consisting of several grids) was determined by multiplying this by the number of grids in it. The families reporting non-farm occupations in an area were pooled together and a stratified random sample, in the proportions indicated for the area as a whole, was drawn according to the strength of each industry or trade or profession in that area.

The units thus selected were covered by an intensive inquiry. In regard to the industries, information regarding production, raw materials used, labour employed, capital invested, value added, etc. was sought. Both retail and wholesale trade was covered and information regarding turnover, investment, inventories, customers, etc. was gathered. In the case of professions and services, the information gathered related to the net earnings from them and a few details about the activity.

The information regarding industries was supplemented by gathering information about industrial units outside the sample also. These non-sample units were covered by the same questionnaire in order to get more information about certain centres in the areas where a particular industry was concentrated or to get more information about certain aspects which were not, we thought, adequately covered by the sample. Some of the data gathered in regard to industries has been presented in the form of notes on each of the important industries. In most cases, industries of large size

[2] The data regarding farm business in the Sambalpur zone pertains to the year 1955-6 instead of 1954-5 as in Cuttack and Puri. For further explanation see pp. 40-41.

as well as those having some special features have been dealt thus. For others, information is presented in the consolidated Tables in Appendix III.

In regard to trade, services and professions, the data gathered have been presented in consolidated Tables in Appendix III. It was not considered desirable to present the data regarding trade in the form of notes as in regard to industries, partly because of the rather uniform character of information and partly because of the various shortcomings of the data themselves.

The trade Tables sum up the employment position, the total turnover, the costs and the net income position in the different groups. They help to indicate the size of operation of the units in these sectors of the economy. Most trading establishments in the rural areas were very small, judged both from the point of view of total turnover and employment. A few grocers' shops were rather large, with much bigger turnovers and profits than those of others.

The traders were requested to supply us their own best estimate of their net annual income. For most types of trading establishments, this turned out to be between 15 to 25 per cent of the total turnover. With the very small trading units in rural areas this was not unexpected. The comparatively big grocers, on the other hand, reported only a small income, sometimes as low as three to five per cent of their total turnover. Though the proportion of their income to turnover may not be as large as in the case of the petty traders, it appeared too low. Obviously there was underreporting of net incomes in their case, the precise extent of which, however, could not be determined.

There were a few other deficiencies in the data presented to which attention may be drawn. In some cases, the number of employees has been reported but not the amount of wages paid. In some other cases, total turnover figures were not reported. In most such instances, the unwillingness of the respondent to part with the information was responsible for these gaps. We have made no efforts to fill them by making plausible estimates. The cases of non-reporting have, however, been noted in the relevant places in the Tables.

As regards services and professions, the information gathered was limited in nature. It mostly related to the net incomes derived by persons or households pursuing these occupations and these were ascertained with as much care as possible.

Apart from these questionnaires filled in for the families in the intensive sample for agricultural and non-agricultural sectors, a family questionnaire was separately filled in for each of the families in the intensive sample. This questionnaire sought information about the earners and non-earners in the family, the occupations and earnings of the former, other income received by the family as a whole, etc. These questionnaires were simultaneously filled in with the other intensive survey questionnaires.

The 1955 floods afforded us an opportunity to gather information directly about the damage resulting from them. For this purpose, 275 villages in the flood-affected area were visited and information was gathered. Besides this in six pockets of the flood-affected area, two in Cuttack district and four in Puri district, we selected a random sample of a total of 90 farmers for whom farm business schedules were filled in.

For helping us in building up a picture of the future conditions of agriculture after the completion of the dam, we carried out special surveys of particular crops which were grown under irrigated conditions at that time, but only in spots. Certain areas where there was a marked concentration were selected and there a certain number of farmers was surveyed by means of farm business schedules. These special surveys covered sugarcane, jute, potato, tobacco, etc. The following statement gives the number of questionnaires filled in in each case.

Sambalpur	47 farms for special cash crops,	
	18 farms in a minor irrigation area.	
Delta	Jute	: 10 farmers
	Potato	: 20 farmers (10 Puri 10 Cuttack)
	Sugarcane	: 16 farmers (Puri)
	Tobacco	: 7 farmers (Cuttack)

We also gathered information regarding the traffic in the navigation canals in Cuttack district as also the river transport on the Mahanadi. Information regarding the incoming and outgoing traffic on 15 railway stations in the area was also copied out from railway records. Similarly, the octroi records of the Sambalpur Municipality were copied out.

With a view to having some idea of the state of persons and families who had been displaced from the land flooded by the Hirakud reservoir and who had been rehabilitated in other parts, we filled in 350 schedules one each for a rehabilitated family.

Urban

In the area affected by the Hirakud irrigation, there were only two small urban centres : Bargarh in Sambalpur and Kendrapada in Cuttack. We carried out a complete census of resident families in these centres in July-September, 1955. The total families enumerated in Bargarh were 2,293, those in Kendrapada were 2,815. Family questionnaires seeking information about earners, employment, occupation, earnings, education, etc. were filled in for all these families. A random sample of 12½ per cent of these questionnaires was tabulated and the Tables presented in the text are based on these sample tabulations.

Though Cuttack, Puri and Sambalpur towns were strictly outside the area affected by the Hirakud irrigation, we decided to carry out a survey of them so as to have some concrete idea about the structure of urban centres in or near the region as also about the trade and industry carried on in them. A socio-economic survey of Cuttack town was being simultaneously conducted by the Utkal University. We, therefore, decided not to duplicate that work and confined our survey to Puri and Sambalpur. As the Utkal University's survey of Cuttack was not going to gather information about trade and industry in the town, we decided to do that bit regarding Cuttack ourselves.

In Puri and Sambalpur, a 10 per cent stratified random sample of resident families was selected from the National Register of citizens and the sample families were covered by the family questionnaire, the same as used in Bargarh and Kendrapada. The surveys in the two towns were carried out in August and September, 1954. In the Cuttack survey also a similar sample was selected and questionnaire used was also the same. The Utkal University carried out the survey in Cuttack in the first half of 1955.

The family sample in the three towns when broadly analysed according to occupation of heads and earners supplied us the necessary sample for industries and trade. The trading and industrial units owned and managed by heads or earners in sample families were covered by a detailed questionnaire. Both retail and wholesale trade units were covered through a detailed questionnaire which sought information about the goods traded in, the stocks, trade channels, turnover, labour employed, transport charges, commission, etc. In regard to the industrial units, the questionnaire gathered information about the kind of goods made, the life of the unit, labour employed, capital structure, production, sales, raw materials, taxes paid, etc. The following statement gives the number of questionnaires filled in, in respect of each of these in the three towns :

Schedules	*Sambalpur*	*Puri*	*Cuttack*
Family Questionnaire	537	1,155	1,867
Industry	85	96	360
Retail trade	106	260	280
Wholesale trade	18	27	77
Transport	..	..	10

A full report on the data gathered in these towns is presented in Appendix IV.

The field investigations for the survey were started in August 1954 and were completed in June 1956. The tabulation of data was started in March, 1956, and was completed by the end of 1957. The writing of the Report

began in July 1957 and took a full year to complete. The report was submitted to the Orissa Government in September 1958.

The total expenditure on the Hirakud Benefits Inquiry to date has amounted to nearly Rs. 1,60,000. This does not include cost of publication of this report which is still to be incurred.

We may end this introductory chapter by outlining the scheme of presentation of the report that follows. In Chapter I, we present a brief history of the evolution of the Hirakud Project to serve as background material. Chapter II describes the origin, scope and scheme of the inquiry. In Chapters III to V, we present the data gathered in extensive and intensive field inquiries area-wise, i.e. for Sambalpur, Cuttack and Puri respectively. These are the benchmark data. An attempt is made in Chapter VI to present a comprehensive view of the economic structure and conditions in the area by calculating the regional national income. In Chapter VII, we discuss and calculate the economic benefits to be expected from irrigation, flood control and hydro-electricity separately. The last chapter discusses the benefits as a whole together with the financial returns and certain other related matters. It ends with some concluding observations.

In the Appendices we have presented additional and supporting data that had a bearing on the report in general but which would have unnecessarily cluttered it up if they had been included in the main body of the report.

Chapter III

ECONOMIC CONDITIONS IN THE SAMBALPUR ZONE IN 1954-5

1. Population Characteristics

The total population of the villages in nine sample grids as enumerated in our survey was 41,448 persons in 10,092 households or families. The total population of the same villages in these grids at the time of the 1951 Census was 44,500 as computed from the District Census Handbook of Sambalpur (1951). Thus the population of these villages at the time of our survey was reported to be less by about 3,000 compared to the Census figure for 1951. This difference, which may be real or spurious, between the two figures was also met with in the case of Cuttack and Puri. This led us to investigate the matter still further. We found that while in Sambalpur all the villages in our sample grids were to be found in the 1951 District Census Handbook of Sambalpur, in the Cuttack and Puri areas 10 and 17 villages respectively that were enumerated in our sample grids were not to be found in the District Census Handbooks (1951) of those districts. These missing villages were old revenue villages and their absence in the District Census Handbooks (1951) of Cuttack and Puri badly shook our confidence in the 1951 Census figures. Fortunately we have not had to use population figures on many occasions in this report. Where they were necessary we have used our figures and not those of the census.

Caste composition : Table No. 3.1 gives the distribution of sample families according to community. Sixty-eight per cent of the total sample families were of Caste Hindus; Scheduled Castes accounted for 19 per cent and Scheduled Tribes (Adivasi) for about 11 per cent. Though the Adivasi population of Sambalpur and Bolangir districts was large, it inhabited mostly the upland and jungle areas. The plains, which constituted the commanded area, had comparatively less of Adivasis. Among the Caste Hindus, 30 per cent were Kultas (the cultivator caste), 10 per cent Gaud (milkman), a little more than seven per cent Keuta (fisherman), and slightly more than six per cent weavers and Brahmins each.

Adults formed about 69 per cent of the total resident population surveyed. Of the total adult population, earners formed 71 per cent, i.e. among adults there were 2.3 earners for each non-earner. Roughly two-thirds of these earners were males and the remaining one-third females. This proportion of female earners to total, however, was not uniform for all the

TABLE No. 3.1

Distribution of sample families according to community in the Sambalpur Zone

S.No.	Name of caste	No. of families		S.No.	Name of caste	No. of families	
		No.	Per cent			No.	Per cent
	Caste Hindus				*Scheduled Castes*		
1	Brahmin	452	4.5	21	Ganda	351	3.5
2	Karan or Kayastha	26	0.3	22	Ghashi	88	0.9
3	Kshatriya	34	0.3	23	Dhoba	173	1.7
4	Kulta	2041	20.2	24	Chamar	120	1.2
5	Odia	104	1.0	25	Turi	39	0.4
6	Meher	444	4.4	26	"Harijan"	1027	10.2
7	Niyari	39	0.4	27	Others	137	1.4
8	Bania	80	0.8		Total	1935	19.1
9	Kansari	210	2.1	28	Scheduled Tribes	1095	10.9
10	Kumbhar	146	1.5				
11	Badhei	23	0.2				
12	Kamar	10	0.1		*Other Religions*		
13	Teli	179	1.8	29	Muslims	14	0.1
14	Gaud	1306	12.9	30	Christians	45	0.4
15	Barika	74	0.7	31	Others	6	0.1
16	Keuta	512	5.1				
17	Mali	140	1.4		Total	65	0.6
18	Vaishnab & Jogi	39	0.4				
19	Sundhi	82	0.8	32	Unspecified	166	1.7
20	Others	889	8.8				
	TOTAL	6830	67.7		GRAND TOTAL	10091	100.0

major communities (Table No. 3.2). It was low among Caste Hindus, only 31 per cent, whereas it was nearer 40 per cent among Scheduled Castes and Scheduled Tribes.

Occupational distribution of earners : Table No. 3.3 gives the distribution of earners by occupations. The occupations are grouped in 18 classes. The scheme of occupational classification is the Indian Statistical Institute's classification scheme. These occupational categories can be broadly grouped industry-wise and have been so grouped for purpose of analyses and comparison. However, the primary characteristic of classification, it should be remembered, is occupation not industry.

TABLE No. 3.2

The distribution of earners in the sample in the Sambalpur Zone according to sex and community

Main Caste	Earners		Total
	Male	Female	
Caste Hindus	9436 (69.0)	4232 (31.0)	13668 (100.0)
Scheduled Castes	2458 (60.9)	1578 (39.1)	4036 (100.0)
Scheduled Tribes	1333 (60.4)	875 (39.6)	2208 (100.0)
Other Religions	77 (59.7)	52 (40.3)	129 (100.0)
Unspecified	195 (61.5)	122 (38.5)	317 (100.0)
TOTAL	13499 (66.3)	6859 (33.7)	20358 (100.0)

Table No. 3.4 also gives the distribution of families of different caste groups in the sample according to their main occupations. Only a few comments are necessary. Nearly 78 per cent of the families were in agriculture and the rest in non-agricultural occupations. A little more than 10 per cent were in manufacturing. The more prominent industries in the group judged by the size of employment in them, were silk spinning, weaving and making of leather goods. Among services containing 3.3 per cent of the households, the prominent groups were those of domestic and administrative services. Among trades who formed 6.8 per cent, the majority was in retail trade.

The contrasts between the Caste Hindus and Scheduled Castes and Scheduled Tribes were obvious and bold. In the categories together comprising households with agriculture, as their main occupation, while two-thirds of the Caste Hindu families were owner or tenant cultivators similar proportions among the Scheduled Castes and Scheduled Tribes were 30 and 36 per cent respectively. On the other hand, while only 13 per cent of the Caste Hindu households worked as agricultural labourers, these proportions among the Scheduled Castes and Scheduled Tribes were 42 per cent and 57 per cent respectively. The proportion of pure rentiers was insignificant in all the three. The contrasts in the three categories comprising households engaged in manufacture were also significant. Among the Caste Hindus, about 12 per cent of the sample families were

TABLE NO. 3.3

Distribution of earners in the sample of the Sambalpur Zone according to their main occupation

Main Occupation	Earners					
	Male		Female		Total	
Cultivation	7497	(55.7)	2773	(40.3)	10270	(50.4)
Livestock, forestry, fishing, hunting, etc.	132	(1.0)	38	(0.6)	170	(0.8)
Labour	3080	(22.7)	2192	(32.0)	5272	(25.9)
Rentiers	2	—	—	—	2	—
Traders	214	(1.6)	86	(1.3)	300	(1.5)
Superior executive and technical services	102	(0.8)	12	(0.2)	114	(0.6)
Subordinate administrative services	118	(0.9)	28	(0.4)	146	(0.7)
Huskers and pounders	108	(0.8)	358	(5.2)	466	(2.3)
Other food and oil processing	98	(0.7)	123	(1.8)	221	(1.1)
Textile- and leather-product making	1267	(9.4)	879	(12.7)	2146	(10.5)
Woodwork and construction	123	(0.9)	86	(1.3)	209	(1.0)
Metal, gen. engineering and related occupations	475	(3.5)	65	(0.9)	540	(2.7)
Transport and communications	18	(0.1)	—	—	18	(0.1)
Miscellaneous production	105	(0.8)	82	(1.2)	187	(0.9)
Domestic services	150	(1.1)	127	(1.9)	277	(1.4)
Health services	6	—	6	(0.1)	12	(0.1)
Other service occupations	4	—	4	(0.1)	8	—
Total	13499	(100.0)	6859	(100.0)	20358	(100.0)

found in this group. This proportion was as high as 20 per cent among Scheduled Castes and as low as four per cent among Scheduled Tribes.

Table No. 3.5 gives the distribution of sample families according to their main and subsidiary occupations. Only about one-third of the families had some subsidiary occupations. Of the 3,287 families in this category about a quarter practised cultivation as a subsidiary occupation, 37 per cent worked as agricultural labourers, so that about 62 per cent were accounted for by work in agriculture. Among those who practised cultivation as a subsidiary occupation, about 45 per cent were agricultural labourers and 30 per cent were in manufacturing. Of those who worked as agricultural labourers as a subsidiary occupation, nearly 80 per cent were cultivators. This only shows that while many cultivators work as labourers also, many labourers also cultivate their own or leased-in land.

TABLE NO. 3.4

Distribution of families in different caste groups according to their main occupations (figures in brackets show percentages) in the Sambalpur Zone sample

Main occupation	*Main castes*					
	Caste Hindus		*Scheduled Castes*		*Scheduled Tribes*	
Cultivation	4458	(65.3)	554	(28.6)	391	(35.6)
Livestock, forestry, fishing, hunting, etc.	41	(0.6)	44	(2.3)	1	(0.1)
Labour	901	(13.2)	817	(42.1)	632	(57.7)
Rentiers	11	(0.2)	2	(0.1)	1	(0.1)
Traders	114	(1.7)	25	(1.3)	8	(0.7)
Superior executive and technical services	71	(1.0)	6	(0.3)	—	—
Subordinate administrative service	75	(1.1)	21	(1.1)	5	(0.5)
Huskers and pounders	151	(2.2)	1	(0.1)	4	(0.4)
Other food and oil processing	64	(0.9)	—	—	2	(0.2)
Textile- and leather-product making	493	(7.2)	327	(16.9)	37	(3.4)
Woodwork and construction	38	(0.6)	56	(2.9)	7	(0.6)
Metal, gen. engineering and related occupations	278	(4.1)	1	(0.1)	2	(0.2)
Transport and communications	8	(0.1)	3	(0.2)	2	(0.2)
Miscellaneous production	59	(0.9)	8	(0.4)	—	—
Domestic services	51	(0.7)	68	(3.5)	3	(0.3)
Health services	7	(0.1)	—	—	—	—
Other service occupations	3	—	2	(0.1)	—	—
Not given	7	(0.1)	—	—	—	—
Total	6830	(100.0)	1935	(100.0)	1095	(100.0)

TABLE No. 3.4—(Contd.)

Distribution of families in different caste groups according to their main occupations (figures in brackets show percentages) in the Sambalpur Zone sample

Main occupation	Main castes					
	Other Religions		Unspecified		Total	
Cultivation	36	(55.4)	164	(38.6)	5503	(54.5)
Livestock, forestry, fishing, hunting, etc.	—	—	3	(1.8)	89	(0.9)
Labour	4	(6.2)	45	(27.1)	2399	(23.8)
Rentiers	—	—	—	—	14	(0.1)
Traders	5	(7.7)	26	(15.7)	178	(1.8)
Superior executive and technical services	3	(4.6)	1	(0.6)	81	(0.8)
Subordinate administrative service	9	(13.9)	2	(1.2)	112	(1.1)
Huskers and pounders	—	—	3	—	156	(1.5)
Other food and oil processing	3	(4.6)	4	(2.4)	73	(0.7)
Textile- and leather-product making	—	—	3	(1.8)	860	(8.5)
Woodwork and construction	3	(4.6)	4	(2.4)	108	(1.1)
Metal, gen. engineering and related occupations	1	(1.5)	7	(4.2)	289	(2.9)
Transport and communications	—	—	—	—	13	(0.1)
Miscellaneous production	—	—	3	(1.8)	70	(0.7)
Domestic services	—	—	4	(2.4)	126	(1.2)
Health services	1	(1.5)	—	—	8	(0.1)
Other service occupations	—	—	—	—	5	(0.1)
Not given	—	—	—	—	7	(0.1)
Total	65	(100.0)	166	(100.0)	10091	(100.0)

TABLE No. 3.5

Distribution of families in the sample of the Sambalpur Zone by their main and subsidiary occupations

Main occupation	Subsidiary occupations							
	1	2	3	4	5	6	7	8
1. Cultivation	—	32	1056	1	74	65	24	136
2. Livestock, forestry fishing, hunting, etc	10	—	19	—	—	—	—	2
3. Labour	384	12	—	26	9	9	9	29
4. Rentiers	—	—	7	—	1	2	—	—
5. Traders	32	—	9	7	—	—	2	2
6. Superior executive and technical services	13	—	2	3	—	—	1	—
7. Subordinate administrative service	7	—	4	1	—	—	—	1
8. Huskers and pounders	37	8	38	3	—	—	—	—
9. Other food and oil processing	25	—	1	4	—	—	—	1
10. Textile- and leather-product making	180	—	68	16	—	—	—	—
11. Woodwork and construction	10	—	11	3	—	—	—	—
12. Metal, gen. engineering and related occupations	55	—	3	31	1	—	—	2
13. Transport and communications	4	—	2	—	—	—	—	—
14. Miscellaneous production	28	—	6	2	3	—	2	—
15. Domestic services	38	—	13	6	—	—	—	—
16. Health services	1	—	—	1	—	—	—	—
17. Other service occupations	2	—	1	—	—	—	—	—
18. Not given	3	—	—	1	—	—	—	—
Total	829	52	1240	105	83	76	38	173
Percentage of the total	8.3	0.5	12.3	1.0	0.9	0.8	0.4	1.7

TABLE No. 3.5–(*Contd.*)

Distribution of families in the sample of the Sambalpur Zone by their main and subsidiary occupations

No.	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*Total*
1	104	225	59	71	10	77	77	1	15	3476	5503
2	—	—	1	—	—	—	—	—	—	57	89
3	—	4	5	3	1	2	7	—	5	1894	2399
4	—	—	—	1	—	—	—	—	—	3	14
5	—	—	—	—	1	—	—	—	—	125	178
6	1	1	—	2	—	—	1	—	—	57	81
7	—	1	—	—	—	—	—	—	—	98	112
8	—	—	—	3	—	—	—	—	—	67	156
9	—	—	—	—	—	—	—	—	—	42	73
10	—	—	—	2	1	—	—	—	—	593	860
11	—	—	—	—	—	—	—	—	2	82	108
12	1	—	—	2	—	—	—	—	—	194	289
13	—	—	—	—	—	—	—	—	—	7	13
14	—	—	—	—	—	—	—	—	—	29	70
15	—	—	—	—	—	—	—	—	—	69	126
16	—	—	—	—	—	—	—	—	—	6	8
17	—	—	—	—	—	—	—	—	—	2	5
18	—	—	—	—	—	—	—	—	—	3	7
Total	106	231	65	84	13	79	85	1	22	6804	10091
Percentage of the total	1.0	2.3	0.6	0.8	0.1	0.8	0.8	—	0.2	67.5	(100.0)

NOTE : The serial nos. for subsidiary occupations indicate the same occupations as those for the main.

If we consider the proportion of families with subsidiary occupations in the different main occupation groups, the highest percentage is met with among rentiers. About 80 per cent of them had subsidiary occupations. The next highest percentages were among huskers and pounders and those engaged in miscellaneous production. The lowest proportion was met with among the subordinate administrative services (about 12 per cent). Next lowest were the agricultural labourer families, only 21 per cent of whom had some subsidiary occupations.

2. *Land-holding*

Perhaps the most important structural aspect of agriculture in a region is the way land is held and operated. Of the total families in the sample 3,589 or 36 per cent neither owned nor cultivated land (Table No. 3.18). The families owning some land numbered 6,211 or 61.55 per cent of the total families in the sample and the average size of owned land-holding came to about 5.1 acres. Even this low average figure does not bring out fully certain important aspects in the distribution of the ownership of land. Table No. 3.19 indicates that more than two-thirds (68.4 per cent) of the reported landowners among the sample families

TABLE No. 3.6

Distribution of sample families in the Sambalpur Zone according to the size of owned land-holdings and the total land owned by them

Size of owned holding	*Holdings*		*Total owned land*	
	No.	*Per cent to the total*	*Area in (acres)*	*Per cent to the total*
Less than 1.00 acre	359	5.8	179.5	0.6
1.00 to 1.99 acres	1206	19.4	1809.0	5.6
2.00 to 2.99 „	1223	19.7	3057.5	9.5
3.00 to 3.99 „	836	13.5	2926.0	9.1
4.00 to 4.99 „	624	10.0	2808.0	8.8
5.00 to 5.99 „	459	7.4	2524.5	7.9
6.00 to 7.99 „	551	8.9	3784.5	11.8
8.00 to 9.99 „	276	4.4	2440.0	7.6
10.00 to 14.99 „	375	6.0	4478.5	14.0
15.00 to 19.99 „	116	1.9	1936.0	6.0
20.00 acres & above	186	3.0	6111.0	19.1
Total	6211	100.0	32054.5	100.0

reported less than five acres of owned land each, and owned in all about one-third of the total land area. On the other hand, a little less than 11 per cent (10.89) of landowners owned 10 acres or more land each, but they owned 39 per cent of the total land. Indeed we find that the one per cent biggest landowners owned nearly 10 per cent of the total area, whereas one-fourth of the total landowners with the smallest land-holding owned only about six per cent of the total area.

As pointed out above, all landowners, however, did not cultivate land on their own, nor were all those who cultivated some land necessarily owners. The cultivators – meaning here, those who cultivated any land, however small in area, on their own – who numbered 6,350, constituted 62.93 per cent of the total number of families and reported an average cultivated holding of about 5.1 acres, which is practically the same as that of owned holdings (Table No. 3.7). As in the case of owned land-holdings here too we find that over two-thirds of cultivators had cultivated holdings of less than five acres and cultivated only about one-third of the total cultivated area. On the other hand, 10.6 per cent of the cultivators with cultivated holdings of 10 acres or more cultivated in all 37.3 per cent of the total cultivated area. Indeed whereas one per cent of the

TABLE NO. 3.7

Distribution of sample families in the Sambalpur Zone according to the size of cultivated land-holdings and the total land cultivated by them

Size of cultivated holding	*Holdings*		*Total cultivated land*	
	No.	*Per cent to the total*	*Area in (acres)*	*Per cent to the total*
Less than 1.00 acre	353	5.6	176.5	0.5
1.00 to 1.99 acres	1110	17.5	1665.0	5.1
2.00 to 2.99 „	1243	19.6	3107.5	9.5
3.00 to 3.99 „	927	14.6	3244.5	9.9
4.00 to 4.99 „	702	11.1	3159.0	9.6
5.00 to 5.99 „	484	7.6	2662.0	8.1
6.00 to 7.99 „	577	9.1	3981.5	12.1
8.00 to 9.99 „	282	4.4	2502.0	7.6
10.00 to 14.99 „	377	5.9	4499.5	13.7
15.00 to 19.99 „	111	1.7	1869.5	5.7
20.00 acres & above	184	2.9	5969.0	18.2
Total	6350	100.0	32836.0	100.0

biggest cultivators cutivated over 11 per cent of the total cultivated area, 25 per cent small cultivators cultivated hardly seven per cent of the total cultivated area.

The figures relating to owned and cultivated land-holdings are very similar. The small differences noticed are of two sorts. Firstly, the total number of cultivators is a little larger than the total number of owners of land. And the degree of concentration is a shade less in case of cultivated holdings than in case of owned holdings. The reasons are two (Table No. 3.8). In the first place, whereas only 152 families owning land did not cultivate any (pure rentiers) as many as 291 families who owned no land cultivated some (pure tenants). Secondly, as a result of the process of leasing-in-and-out of land there has

TABLE No. 3.8

Distribution of sample families in the Sambalpur Zone with different sizes of owned land-holdings according to the size of their cultivated land-holdings

Cultivated land (in acres) / *Owned land (in acres)*	*1*	*1-*	*2-*	*3-*	*4-*	*5-*	*6-*	*8-*	*10-*	*15-*	*20 & above*	*Total*	*Nil*	*Grand total*
1	280	27	12	5	9	3	—	—	—	—	—	336	23	359
1—	30	941	84	68	27	8	6	2	4	—	—	1170	36	1206
2—	4	47	1004	53	38	16	16	2	6	—	2	1188	35	1223
3—	3	10	31	706	33	22	14	2	2	—	—	823	13	836
4—	1	3	15	34	508	17	16	12	2	1	1	610	14	624
5—	—	1	11	11	28	367	26	4	3	1	—	452	7	459
6—	—	2	3	7	16	25	460	20	8	1	1	543	8	551
8—	—	1	—	1	7	5	20	220	15	1	—	270	6	276
10—	—	3	2	1	2	5	9	19	321	6	—	368	7	375
15—	—	—	1	—	—	—	2	—	9	97	6	115	1	116
20 & above	—	—	—	—	—	—	—	1	5	4	174	184	2	186
Total	318	1035	1163	886	668	468	569	282	375	111	184	6059	152	6211
Nil	35	75	80	41	34	16	8	—	2	—	—	291	3589	3880
Grand total	353	1110	1243	927	702	484	577	282	377	111	184	6350	3741	10091

been a slight redistribution of cultivated land in favour of the smaller cultivators. Indeed we find that about one-fourth (1605) of those who owned or cultivated some land, either leased out or leased in some or all of the land they owned or cultivated. Thus, the remaining three-fourths of the families (4,903) cultivated their owned land entirely. The number might be more if there were any families that both lease in and lease out land, though the number of such cases was not likely to be large. Of the remaining families, 532 reported that they leased out some or all land and they constituted about 8.6 per cent of the total number of land-owning households in the sample. As many as 303 or 57 per cent of the total number of families who leased out some land owned less than five acres of land. But it is also noticed that a slightly higher proportion of households in the larger-size groups leased out land, than in the lower-size groups. The same, however, cannot be said with regard to those who leased in some land. There were 1,073 such households and they formed 16.8 per cent of the total number of cultivating households; 291 of them (or about 27 per cent) were pure tenants who owned no land. About 68 per cent (732) of these households were reported to be cultivating less than five acres of land. But unlike families leasing out land, we find in the middle-size groups a larger proportion of cultivators reporting leasing in of land.

3. *Farm Business*

In order to obtain benchmark data relating to agriculture in the Hirakud commanded area, a detailed survey of sample farms in the selected grids in the Sambalpur zone was carried out in the year 1954-5. All families who reported some cultivated land in these grids were arranged in the descending order of the size of their cultivating holdings. The schedules were then divided into twenty equal lots and the middle two schedules from each lot were selected. Thus, in each grid 20 cultivators were selected for a survey of their farm businesses on a stratified random sample basis. On the whole, 180 cultivators were selected for the purpose in the Sambalpur Zone.

The year 1954-5, however, turned out to be a year of drought. The crop yield in parts of the proposed commanded area was considerably below normal. The subsequent agricultural year, 1955-6, however, showed signs of normaley and therefore, it was decided to cover the same sample families for their farm business accounts for the second year in succession. One of the nine grids surveyed in the previous year could not be resurveyed. Of the 160 sample cultivators in the remaining eight grids, six cultivators had either ceased to cultivate or were not available for interview. Therefore, data for only 154 farms were collected during the re-survey in 1955-6. The following discussions relate to these families only. All calculations in

terms of value in the following have been adjusted to the 1954-5 prices in order to make them comparable with similar information relating to the delta. A more detailed report on the farm business in the area is presented in Appendix II. Here only a brief outline has been given with detailed comments on and data regarding the receipts and expenses of sample farms.

The average size of the cultivated holding in the sample was 5.2 acres. Fifty-eight per cent of the cultivators had holdings of less than five acres. Cultivators with less than five acres of cultivated lands accounted for 38 per cent of the total families and cultivated only 27 per cent of the total cultivated land. On the other hand, about 12 per cent of the cultivators with more than 10 acres of land each cultivated in all over 34 per cent of the total cultivated land.

The average size of the cultivator family was about five. The biggest cultivators had larger families than the smaller cultivators.

In the year under report, nine per cent of the total cultivated land was fallow. Slightly more than half of this was so because of a reported want of seed with the farmers. A further 12 per cent was fallow because it was uncultivable. Ninety-two per cent of the gross cropped area was under paddy. Pulses accounted for a little less than four per cent. The area cropped more than once was less than one per cent of the gross cropped area. Pulses and grams were both *kharif* and *rabi* crops. A little over seven per cent of the gross cropped area was reported to be irrigated. Irrigation was purely seasonal and protective.

Over 92 per cent of the total assets of the sample farm families were accounted for by land owned by them; live-stock accounted for 6.6 per cent and farm implements accounted for 1.25 per cent of the total assets. The average value of the live-stock per family was reported to be Rs. 246. The average value of the farm implements came to Rs. 48. Of the total number of sample families, 144 possessed bullocks. The cultivated area per pair of bullock increased as the size of the cultivated holding increased. Excluding calves, on an average, there was only one cow per family. There were no buffaloes. Hardly any milk yield was reported. Farmyard manure was the only live-stock product reported. There were 2.4 bullocks reported per family. Most of the bullocks were purchased.

There were no improved farm implements in this region. Wooden ploughs were used and they needed to be changed every two or three years. The total value of purchases of implements came to about nine per cent of the total value of the existing implements.

The per family investment in physical assets of the farm during the year amounted to Rs. 20.7. About 30 per cent of this investment went into the purchase of land, 29 per cent into the purchase of live-stock, 20 per cent in the purchase of farm implements and nearly 16 per cent was devoted to making permanent improvements to land.

Only six per cent of the total value of crops and fodder was realized in the market. This indicated the extent of the total production that was marketed.

Farm receipts : Table No. 3.9 presents the total receipts of the farms surveyed. The biggest item of receipts was receipts from crops grown on the farm. It accounted for over 80 per cent of the total receipts of the farmers. The next important receipt was wages. When farmers were not engaged on their own farms they sought employment on others' farms. This might be considered as a farm receipt. It accounted for nearly 10 per cent of the total receipts. Receipts from live-stock accounts for only five per cent of the total. The only item of live-stock produce reported was farm-yard manure. The inclusion of this on the receipt side was mainly for accounting purposes since this had been included among expenses too. Thus, if we exclude live-stock receipts, crops (including fodder) and wages were the only two items of farm receipts.

Examining the relative importance of these sources of receipts among different groups of cultivators, we find that the biggest group of farmers cultivating 10 acres or more reported no wage earnings. Being well off with larger holdings they did not do wage work. As holdings grew smaller the share of wages in the total receipts became larger. Indeed, the smallest cultivators had half of their receipts from wages only.

Analysing the crop receipts a little further we find that paddy accounted for most of the receipts. Pulses, groundnut and other crops contributed only small proportions of the total crop receipts.

Most of the receipts were in kind. Crops produced on the farm were mostly retained for home consumption or were paid out in kind to labourers and others. Only about six per cent of the total estimated value of crops was received in cash through sale of crops and fodder. There was no sale of live-stock produce reported. It was only in case of wages that cash receipts exceeded those in kind. Only about 25 per cent of the total wages were reported as received in kind; the remainder was received in cash. Only three per cent of the total farm receipts were in cash, the rest being in kind.

Farm expenses : Table No. 3.10 presents the total reported expenses of the sample farms on different items. The three important items of expenditure reported were wages, materials, and feed and fodder charges. Nearly 36 per cent of the total expenses were on seed and manure, 29 per cent on feed and fodder for farm animals, and 28 per cent were payments to casual and permanent farm servants and village servants. Rent paid to landlords and other miscellaneous expenses, including land revenue and cess, accounted for 2.5 per cent each. Repairs to farm property and implements were minor expenses accounting for less than one per cent of the total expenses.

TABLE NO. 3.9

Receipts from farm business of sample farms during 1955-6 in the Sambalpur Zone classified by size (at 1954-5 prices)

Group Size (acres)	Number of farms	Crop receipts			Livestock produce			Other receipts		
		Sold Rs.	Unsold Rs.	Total Rs.	Sold Rs.	Unsold Rs.	Total Rs.	Sold Rs.	Unsold Rs.	Total Rs.
1 Less than 1.00	12	90.00 (7.30%)	1142.50	1232.50 (100%)	—	176.75	176.75 (100%)	—	115.00	115.00 (100%)
2 1.00 to 1.99	27	94.00 (1.75%)	5286.37	5380.37 (100%)	—	605.62	605.62 (100%)	12.00 (1.74%)	677.75	689.75 (100%)
3 2.00 to 2.99	18	216.00 (3.30%)	6335.00	6551.00 (100%)	—	430.87	430.87 (100%)	—	262.00	262.00 (100%)
4 3.00 to 3.99	22	250.50 (3.22%)	7537.75	7788.25 (100%)	—	598.37	598.37 (100%)	—	349.50	349.50 (100%)
5 4.00 to 4.99	11	89.00 (1.97%)	4418.87	4507.87 (100%)	—	326.87	326.87 (100%)	—	232.00	232.00 (100%)
6 5.00 to 6.99	28	1296.00 (7.62%)	15701.34	16997.34 (100%)	—	1137.25	1137.25 (100%)	—	834.00	834.00 (100%)
7 7.00 to 9.99	18	694.56 (5.82%)	11233.09	11927.65 (100%)	—	702.87	702.87 (100%)	—	718.75	718.75 (100%)
8 10.00 and above	18	2636.60 (10.40%)	22720.50	25356.50 (100%)	—	1322.44	1322.44 (100%)	—	558.75	558.75 (100%)
Total	154	5366.06 (6.73%)	74375.42	79741.48 (100%)	—	5301.04	5301.04 (100%)	12.00 (0.32%)	3747.75	3759.75 (100%)

TABLE No. 3.9—(Contd.)

Receipts from farm business of sample farms during 1955-6 *in the Sambalpur Zone classified by size (at* 1954-5 *prices)*

Group	Total			Wage receipts			Grand total		
	Sold Rs.	*Unsold* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.
1	90.00 (5.90%)	1434.25	1524.25 (100%)	1241.50 (89.09%)	152.00	1393.50 (100%)	1331.50 (45.63%)	1586.25	2917.75 (100%)
2	106.00 (1.59%)	6569.74	6675.74 (100%)	1723.00 (65.94%)	890.00	2613.00 (100%)	1829.00 (19.69%)	7459.74	9288.75 (100%)
3	216.00 (2.98%)	7027.87	7243.87 (100%)	1372.50 (82.06%)	300.00	1672.50 (100%)	1588.50 (17.82%)	7327.87	8916.37 (100%)
4	250.50 (2.87%)	8485.62	8736.12 (100%)	1141.75 (72.83%)	426.00	1567.75 (100%)	1392.25 (13.51%)	8911.62	10303.87 (100%)
5	89.00 (1.76%)	4977.74	5066.74 (100%)	435.50 (42.76%)	583.00	1018.50 (100%)	524.50 (8.62%)	5560.74	6085.24 (100%)
6	1296.00 (6.83%)	17672.59	18968.59 (100%)	2388.25 (91.92%)	210.00	2598.25 (100%)	3684.25 (17.08%)	17882.59	21566.84 (100%)
7	694.56 (5.20%)	12654.71	13349.27 (100%)	1439.25 (75.30%)	472.00	1911.25 (100%)	2133.81 (13.98%)	13126.71	15260.52 (100%)
8	2636.00 (9.68%)	24601.69	27237.69 (100%)	— —	— —	— —	2636.00 (9.68%)	24601.69	27237.69 (100%)
Total	5378.06 (6.06%)	83424.21	88802.27 (100%)	9741.75 (76.26%)	3033.00	12774.75 (100%)	15119.81 (14.89%)	86457.21	101577.02 (100%)

TABLE No. 3.10

Farm expenses on sample farms in the Sambalpur Zone in 1955-6 classified by size (at 1954-5 prices)

Group	Size (acres)	Number of farms	Wages to casual farm labourers			Payment to permanent farm servants			Materials used		
			Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	/Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.
1	Less than 1.00	12	95.25 (100%)	—	95.25 (100%)	—	—	—	— —	162.94	162.94 (100%)
2	1.00 to 1 99	27	4.25 (12.32%)	30.25	34.50 (100%)	—	—	—	12.75 (1.51%)	833.12	845.87 (100%)
3	2.00 to 2.99	18	129.81 (94.88%)	7.00	136.81 (100%)	—	—	—	25.00 (2.99%)	811.87	836.87 (100%)
4	3.00 to 3.99	22	180.12 (57.20%)	134.75	314.87 (100%)	—	236.00	236.00 (100%)	93.75 (6.40%)	1371.19	1464.94 (100%)
5	4.00 to 4.99	11	59.75 (36.43%)	104.25	164.00 (100%)	—	224.00	224.00 (100%)	23.25 (2.68%)	844.56	867.81 (100%)
6	5.00 to 6.99	28	235.81 (40.39%)	348.00	583.81 (100%)	—	1773.00	1773.00 (100%)	159.75 (5.92%)	2538.25	2698.00 (100%)
7	7.00 to 9.99	18	357.25 (45.10%)	434.94	792.19 (100%)	—	833.00	833.00 (100%)	127.44 (5.48%)	2199.44	2326.88 (100%)
8	10.00 and above	18	757.50 (52.29%)	691.12	1448.62 (100%)	12.00 (0.28%)	4321.81	4333.81 (100%)	276.25 (5.91%)	4397.81	4674.06 (100%)
	Total	154	1819.74 (50.97%)	1750.31	3570.05 (100%)	12.00 (0.16%)	7387.81	7399.81 (100%)	718.19 (5.18%)	13159.18	13877.37 (100%)

TABLE No. 3.10—(Contd.)

Farm expenses on sample farms in the Sambalpur Zone in 1955-6 classified by size (at 1954-5 prices)

Group	Size (acres)	Feed and fodder charges			Repair charges of implements			Payments to village servants			Current improvement expenses on land		
		Cash	Kind value	Total	Cash	Kind value	Total	Cash	Kind value	Total	Cash	Kind value	Total
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Less than 1.00	87.62 (32.20%)	184.50	212.12 (100%)	5.12 (100%)	—	5.12 (100%)	—	—	—	4.00 (19.05%)	17.00	21.00 (100%)
2	1.00 to 1.99	223.87 (18.92%)	959.37	1183.24 (100%)	20.25 (100%)	—	20.25 (100%)	—	—	—	15.94 (69.49%)	7.00	22.94 (100%)
3	2.00 to 2.99	86.00 (13.05%)	573.00	659.00 (100%)	15.75 (100%)	—	15.75 (100%)	—	0.19	0.19 (100%)	10.00 (25.00%)	30.00	40.00 (100%)
4	3.00 to 3.99	173.62 (16.95%)	850.50	1024.12 (100%)	25.75 (100%)	—	25.75 (100%)	—	—	—	23.00 (53.49%)	20.00	43.00 (100%)
5	4.00 to 4.99	72.50 (17.46%)	342.75	415.25 (100%)	19.37 (100%)	—	19.37 (100%)	—	4.00	4.00 (100%)	— —	7.00	7.00 (100%)
6	5.00 to 6.99	502.62 (20.98%)	1893.19	2395.81 (100%)	85.06 (100%)	—	85.06 (100%)	—	—	—	— —	53.06	53.06 (100%)
7	7.00 to 9.99	575.87 (28.75%)	1427.00	2002.87 (100%)	45.81 (100%)	—	45.81 (100%)	—	—	—	23.75 (25.28%)	70.19	93.94 (100%)
8	10.00 and above	719.44 (35.77%)	1291.75	2011.19 (100%)	106.56 (100%)	—	106.56 (100%)	—	4.62	4.62 (100%)	53.00 (96.36%)	2.00	55.00 (100%)
	Total	2441.54 (24.50%)	7522.06	9963.60 (100%)	323.67 (100%)	—	323.67 (100%)	—	8.81	8.81 (100%)	129.69 (38.61%)	206.25	335.94 (100%)

TABLE No. 3.10–(Contd.)

Farm expenses on sample farms in the Sambalpur Zone in 1955-6 classified by size (at 1954-5 prices)

Group	Other current expenses			Payments to landlord			Total		
	Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.
1	21.75 (100%)	—	21.75 (100%)	— —	—	—	213.74 (36.97%)	364.44	578.18 (100%)
2	48.56 (44.02%)	61.75	110.31 (100%)	10.00 (71.43%)	4.00	14.00 (100%)	335.62 (15.04%)	1,895.49	2,231.11 (100%)
3	37.87 (45.15%)	46.00	83.87 (100%)	— —	112.00	112.00 (100%)	304.43 (16.15%)	1,580.06	1,884.49 (100%)
4	64.44 (88.96%)	8.00	72.44 (100%)	— —	128.00	128.00 (100%)	560.68 (16.94%)	2,748.44	3,309 12 (100%)
5	50.12 (100%)	—	50.12 (100%)	— —	40.00	40.00 (100%)	224.99 (12.56%)	1,566.56	1,791.55 (100%)
6	203.19 (72.78%)	76.00	279.19 (100%)	— —	261.50	261.50 (100%)	1,186.43 (14.59%)	6,943.00	8,129.43 (100%)
7	153.81 (73.31%)	56.00	209.81 (100%)	— —	41.50	41.50 (100%)	1,283.93 (20.23%)	5,062.07	6,346.00 (100%)
8	183.00 (89.27%)	22.00	205.00 (100%)	— —	392.00	392.00 (100%)	2,107.75 (15.93%)	11,123.11	13,230.86 (100%)
Total	762.74 (73.87%)	269.75	1,032.49 (100%)	10.00 (1.01%)	979.00	989.00 (100%)	6,217.57 (16.58%)	31,283.17	37,500.74 (100%)

The wages, which formed 28 per cent of the total expenses, consisted of wages to casual labourers (nine per cent) and to permanent farm servants (over 19 per cent). The expenses under this head formed a smaller proportion of the total expenses of the small cultivators than of the larger ones. The trend was opposite of this in case of feed and fodder expenses where the proportion of this expense to the total went on declining as the size of holding went on increasing. Thus, whereas with the smallest cultivators it accounted for half the total expenses, it was only about one-sixth of the total in the case of the biggest farmers.

Most of the total expense was incurred in kind, only about six per cent being cash expense incurred in paying wages, or taxes, etc. or purchasing materials. Taking total cash expenses, the highest proportion of it was devoted to purchasing feed and fodder (39 per cent). Twenty-nine per cent was spent in paying wages to casual farm servants, 12 per cent in paying land revenue and incurring other cash expenses, another seven per cent in repairs to implements and farm property (which again were mostly wage payments).

Considering individual items of current farm expenses, we find some were normally cash expenses, like payment of land revenue, whereas some, like customary payments to village servants, were in kind. Most expenses, however, were incurred both in cash and kind. In the Sambalpur zone, payment of rent and payments to annual farm servants were normally made in kind, very little cash coming into the picture. On the other hand, payment of wages to artisans, which was what mostly constituted the item "repair expenses of farm implements," was always made in cash. Nearly one-fifth of the total expenses on feed and fodder had to be made for purchasing them. With seed and manure the proportion of purchases to total expenses was much smaller.

Unlike annual farm servants, casual labourers were paid as often in cash as in kind. A detailed examination of the data revealed that this was applicable even to harvest labour in the region, though paddy was practically the only crop grown. Of course, in the context of total wages and salaries paid to farm labour, the cash expenses were rather small; they formed about 12 per cent of the total. Though it was not known how much of money might have been spent by farmers in purchasing grain to pay labourers, it did not appear that this could have been substantial.

The picture of farm expenses in this region can be summed up in the following manner. Most items of farm expenditure like seed, manure, feed and fodder were produced on the farm. Even the bulk of wage payment was in kind, thus in a sense was produced in the farm itself. Current cash expenses were confined mostly to payment of land revenue, interest on loans, purchase of feed and fodder and other sundry expenses. These amounted to less than Rs. 35 per farm which was rather a small amount in comparison to total expenses.

4. *Agricultural Labour*

The sample of agricultural labour in the Sambalpur zone comprised 89 cases of which 53 were of casual workers and the rest of attached ones. Information regarding them is presented separately below.

Casual: In Table No. 3.11, the information regarding the work days of the agricultural labourers in the sample have been summarized. A more detailed table is presented in Appendix II. Work available to the sample labourers, during 12 months, was 10,295 man-days. Of these, 60 per cent were in agriculture and the rest in non-agricultural pursuits. Of the total employment (man-days) in agriculture, most was available in the village. Less than one per cent was available outside the village. Three-fourths of the non-agricultural work available was found in the village and the rest outside it.

TABLE NO. 3.11

The employment and earnings of casual agricultural labourers in the Sambalpur Sample

Serial No.	*Nature of work*	*No. of labourers*		*Total*			
				(1)	(2)	(3)	(4)
				Value in Rupees			
1	In agriculture both in	45	T	5,382	2,451	1,520	3,971
	and outside the village		A	119.6	54.5	33.8	88.3
2	In non-agriculture both in	40	T	4,913	175	4,579	4,754
	and outside the village		A	122.8	4.4	114.5	118.9
3	Total work done	53	T	10,295	2,626	6,099	8,725
			A	194.2	49.5	115.1	164.6

T = Total
A = Average per labourer
(1) No. of days worked
(2) Value of payments in kind
(3) Cash wages
(4) Total

The availability of work in agricultural and non-agricultural lines was of a mutually fitting type. Agricultural employment or work, nearly 75 per cent of it, was concentrated during the six-month period from June to December and 66 per cent of the non-agricultural work in the period from January to May. This seasonality was common to all villages.

Table No. 3.12 presents the classification of workers in the sample according to the number of days they got work and the range of their total earnings in the period. In rural employment analysis if a labourer gets

employment on 300 days in the year, he can be considered as "fully employed". (This is by allowing him a weekly holiday and some other holidays out of the 365 days in the year.) Judging on this criterion about 17 per cent of the workers were "fully employed" and a further 11 per cent were "nearly fully employed."

The wage rates per day varied less widely in this area than in Cuttack or Puri.[1] This is reflected in the fact that there was a greater correspondence here between total earnings and total days employed than in Puri or Cuttack. Non-agricultural (average) wage rates were higher generally than agricultural wage rates.

Attached : Sambalpur had a larger proportion of annual farm servants than Cuttack and Puri. The information presented in Table No. 3.13 pertains to the total days worked by them and their earnings.[2]

[1] *Report of the Agricultural Labour Enquiry* (1951), Vol. III, 1954, p. 71.

[2] Some additional information about the attached farm servants is adduced from the *Report of the Agricultural Labour Enquiry*, Vol. III, 1954, p. 75.

"In Northern Zone the Kothias in the Bolangir-Patna district were usually paid at the following rates. Both adolescents and adult males were employed at the same rate :

6 *Khaais* or 90 seers of paddy	Rs. 12 per year.
Meals	Rs. 84 per year.
Cloth	Rs. 7 per year.
For extra work in threshing (from 7 p.m. to 3 a.m.) at the rate of 3¾ seers of paddy per day.	Rs. 10-2-0 (for 20 days per year)
Total	Rs. 113-2-0

Adult males were also employed as Halias. An advance of Rs. 20 to Rs. 30 was given free of interest at the beginning of the year and was adjusted towards wages. The wage rate was as follows :

	Annual Income
Wage: nine maunds of paddy	Rs. 58- 8-0
One maund five seers of paddy per month	87-12-0
Cloth	8- 0-0
Extra for threshing (two maunds and 24 seers of paddy)	17- 1-0
Total	Rs. 171- 5-0

Similar wage rates were prevalent in the Kalahandi and Sambalpur districts, but the total annual remuneration came to about Rs. 163 and Rs. 133 respectively. Children were employed usually as graziers and were allowed six maunds of paddy worth Rs. 39 a year."

TABLE No. 3.12

Casual agricultural labourers in the Sambalpur Zone Sample classified according to the total number of days on which they were employed during 1954-5 and the range of their total earnings during the period

	No. of days employed during the year	*No. of samples*	*Range of total earnings (in Rs.)*
1	300 days and above	9	131 to 540
2	270 days to 299 days	6	135 to 423
3	240 days to 269 days	5	101 to 231
4	210 days to 239 days	8	110 to 270
5	180 days to 209 days	1	180
6	150 days to 179 days	4	56 to 150
7	120 days to 149 days	5	55 to 114
8	90 days to 119 days	3	28 to 107
9	Below 90 days	12	8 to 86
		53	

TABLE No. 3.13

The employment and wage earnings of 36 attached agricultural labourers (farm servants) in the Sambalpur Zone sample

Total receipts		
Cash		Rs. 800.00
Kind		Rs. 7,712.00
	Total	Rs. 8,512.00

5. *Rural Industry*

A detailed Table regarding the industrial units included in the sample for intensive inquiry of industries has been presented in Appendix III. The following notes deal with the more prominent industries in the Sambalpur zone.

Weavers : The families in the nine grids surveyed in the Sambalpur zone reporting weaving as one of their occupations, either main or subsidiary, were separated into a group. From this group, families reporting some cultivation of land as also those who reported any other occupation than weaving as their main occupation were excluded. The remaining 603 families of non-cultivating weavers reporting weaving as their main occupation constituted the universe from which samples were drawn for an intensive study of handloom weaving industry in the area. For purposes of investigation, these families were divided into two groups. The village Barpali, which is one of the biggest centres of handloom weaving in the district, happened to be one of the villages surveyed by us and it was decided to study the industry in this centre separately. The 252 weaver families of this village, therefore, were taken out to constitute a separate universe from which a 25 per cent stratified random sample was drawn for intensive enquiry. The remaining 351 weaver families scattered over the remaining centres and villages of the nine grids surveyed formed the other group from which a 10 per cent stratified random sample of families was selected for intensive enquiry. In the discussion that follows the two samples are dealt with separately.

Unlike some other village industries which are fairly well distributed over the countryside, weaving is to a considerable extent localized. Villages like Barpali, Remunda, Tora and Sonepur are traditional centres of handloom weaving. Though the surveyed grids contained some smaller handloom weaving centres, Barpali alone accounted for nearly a third of the total number of weaver families in all the nine grids.

In the Sambalpur zone, there were three main castes of weavers — Bhulia, Kustha and Ganda. The Gandas belonged to the scheduled castes. Their techniques were rather crude and the products coarse. The Bhulia, a caste Hindu, was a skilled weaver and the production of superior quality cotton fabric was confined to this caste. Both the Ganda and the Bhulia, however, worked only in cotton yarn. Sambalpur had also a traditional reputation for its tussar-silk products and the Kusthas specialized in this. Once upon a time, tussar-silk cocoons used to be reared in this area. This was no longer the case. Today cocoons had to be imported from Chaibasa in Singhbhum district of Bihar or from Raipur in Madhya Pradesh. The consequent difficulties were forcing the Kustha to weave cotton fabrics in order to make a living.

Unlike in many other parts of India where under the pressure of competition from the mills, the industry was concentrated in *karkhanas* (factory yards) in urban centres, in Sambalpur the pure cottage industry pattern still existed. Most of the weavers had their looms in their homes and also marketed their own product. The attempt at starting a factory or *karkhana* was made at two places. The Sambalpuri Bastralay, which was now a co-operative society, started one factory at Tora near Bargarh

and another in Bolangir town in Bolangir district. The latter factory was virtually closed; the former was the society's factory with most of its weavers as members.

Of the 35 weaver families (outside Bargarh) covered during the survey, 25 had one loom each, nine had two looms each and only one family had four looms. Only one of the families reported some employees.

All labour engaged in weaving could be considered to be more or less skilled, in the sense that it would involve some training and practice before any of the operations could be tackled by freshers. In the survey, however, all such persons who were not engaged in the task of actual weaving were classified as unskilled. Thus most of the female and child labour has been classified as unskilled. Out of the 109 persons reported as employed in weaving, 54 were adult males, 47 adult females and eight were children. Of these, 49 males were reported as skilled but only one female and three children were so classified, the rest being unskilled. Two of these 109 persons were employees of a Harijan family and both were females.

The value of total original capital investment in machines and tools of these weavers was reported to be over Rs. 2,000, giving a per loom capital cost of about Rs. 47 and per family capital investment of about Rs. 63. A pit loom with a throwshuttle cost about Rs. 10 and a flyshuttle loom about Rs. 15. The looms were very long lasting; the other tools varied in durability from one to ten years.

The present value of these tools and implements, however, was much less. The average annual expense on replacement and maintenance come to about Rs. 8 per loom unit. This might be considered to be the rate of depreciation per unit of production.

Besides tools and implements, there were no other fixed capital investments reported. The weaving-shed was usually a part of the weaver's own house and no separate estimates could be made for it.

The current expenses of the weavers, besides the cost of maintaining the tools and implements, consisted of yarn, dyes, certain chemicals and starch. Since most of the producers purchased their raw materials and sold their produce in or near their villages, there was very little expense on marketing and transport. Payment of octroi duties amounted to only Rs. 2 per year per family.

Almost the entire actual expenditure was, therefore, incurred on the purchase of raw materials like yarn, dyes, etc. On an average, the cost of raw material, formed a little over 63 per cent of the total annual value of production. The corresponding percentage for other expenses amounted to not more than two. Thus the producer (weaver) got about one-third of the value of total production as remuneration and profit, etc.

These weavers produced sarees and other fabrics of medium and lower count yarn, the fabrics of higher count yarn and complicated designs being

confined to a few centres only. The superior quality goods were mostly made to order and had a very limited market, mostly outside the district. Out of the 35 weavers surveyed, six were excluded from the sample due to unreliable reports on costs and returns. Table No. 3.14 presents information regarding the volume and value of various types of cloth produced during the year preceding our survey by the remaining 29 families.

TABLE NO. 3.14

Volume and value of types of cloth produced by 29 weaver families in the Sambalpur Zone sample

Amount of yarn	*Pieces*	*Value in Rs.*
Saree:		
16's × 20's	696	3,216
20's	2,056	11,528
20's × 30's	384	1,920
20's × 40's	288	1,584
Unspecified	368	2,622
Sakatapara	64	736
Dhoti:		
20's	5,020	10,035
Unspecified	6	36
Lungi:		
20's	1,584	2,496
Unspecified	12	48
Gamcha:		
20's	1,788	3,111
Unspecified	780	1,572
Pachhura:		
„	20	160
Grand total		39,064

The dominance of coarse variety of textiles in the total production is obvious from the Table. None of the sample weavers reported production of cloth woven of yarn above 40's. The value of such superior quality product would be undoubtedly high compared to its volume. But this Table, along with the one for Barpali, goes to show the importance of the local market for the handloom weaving industry of Sambalpur. Sarees accounted for more than half the value of total production but dhoties were reported to be produced in far larger number. In Barpali, on the other hand, mostly sarees were produced. Indeed Barpali (and a few such centres) specialized

in the production of sarees and tussar-cloth whereas production of dhoties was scattered over the whole district. Dhoties of 16's to 20's yarn were produced in large number and their prices varied from Rs. 4 to Rs. 6 a pair. Sarees were also of 16's to 20's yarn mostly and prices varied according to length, breadth, quality and design, from Rs. 5 to Rs. 18 a pair. The women in rural Sambalpur wore rather short and coarse coloured sarees with designs at both ends. In the district, on the whole, mill-made cloth had been able to make little headway so far.

Table No. 3.15 gives the distribution of the 29 weaving families with one or more looms according to their net income. Nine out of the 29 families had two or more looms (only one had four looms). Of the total number of families 10 had an income of less than Rs. 400 a year, 11 between Rs. 400 and Rs. 500 and the remaining eight had more than Rs. 500 net annual income. Of the nine families with two or more looms six had a net annual income of more than Rs. 500 but only two of the 20 families with one loom each had an income of more than Rs. 500. The average net annual income per family was Rs. 492.

TABLE No. 3.15

Distribution of weaver families in the Sambalpur Zone according to the numbers of looms owned by them and their net incomes

Net annual income of families	*Families with*		*Total*
	1 loom	*2 or more looms*	
Less than Rs. 100/-	—	—	—
Rs. 100/- to „ Rs. 200/-	3	2	5
Rs. 200/- to „ Rs. 300/-	3	—	3
Rs. 300/- to „ Rs. 400/-	2	—	2
Rs. 400/- to „ Rs. 500/-	10	1	11
Rs. 500/- to „ Rs. 750/-	2	1	3
Rs. 750/- to „ Rs. 1,000/-	—	3	3
Rs. 1,000 and above	—	2*	2
Total	20	9	29

* Including one family with four looms.

Barpali : Of the 63 families surveyed, 42 had flyshuttle looms and 21 had throwshuttle looms. There were in all 74 looms, 49 with flyshuttle and 25 with throwshuttle. Ten families were engaged in weaving "tussar" (silk) mainly, and they had 11 looms with throwshuttle and one with flyshuttle. Table No. 3.16 gives the average value of fixed capital at purchase and at present value, the annual cost of maintenance, the average

value of raw materials consumed and the goods produced during the year separately for tussar weavers and cotton weavers (with fly and throwshuttle separately).

TABLE No. 3.16

Cost of production, investment, production, etc. of the sample weaver families in Barpali in the Sambalpur Zone

	Per household	*Tussar*	*Total throw-shuttle*	*Flyshuttle cotton*	*Grand total*
1.	Original value of present capital	75.3	61.7	67.4	65.5
2.	Present value of present capital	45.1	37.0	38.0	37.6
3.	Investment in fixed capital during the year	1.2	1.4	2.3	2.0
4.	Maintenance expenditure of fixed capital during the year	7.0	9.4	8.6	8.9
5.	Value of annual raw material consumption	953.1	758.0	606.2	652.5
6.	Value of products during the year	1,467.2	1,177.0	994.0	1,050.0
Per loom					
7.	Original value of fixed capital	62.8	50.0	58.9	55.7
8.	Present value of fixed capital	37.6	30.0	33.2	32.0
9.	Investment in fixed capital during the year	1.0	1.1	2.0	1.8
10.	Maintenance expenditure of fixed capital during the year	5.9	7.6	7.5	7.56
11.	Value of raw materials consumed during the year	847.2	650.0	528.8	566.2
12.	Value of total products during the year	1,304.2	1,009.0	865.0	911.0

The average original value of the existing capital equipment came to about Rs. 66 per family (or Rs. 56 per loom unit). The respective figures for a flyshuttle loom unit were a little higher, Rs. 67 and Rs. 59. The throw-shuttle loom figures were a little lower than this, but not in the case of the tussar weavers.

The total reported expenses on purchase of tools and implements were rather low and repair charges were high compared to the sample of weavers outside Barpali. Treating the two items together as the total depreciation charge, the expenses came to about Rs. 11 per family or Rs. 7 or 8 per loom.

The 63 households with 74 looms reported 192 workers. Of these 98 were adult males, 92 adult females and 2 children. One hundred and two were reported as skilled and 90 unskilled. Eighty-eight women and two men were reported as unskilled workers.

The cost of raw materials formed about 62 per cent of the value of the total production which was about the same as in the case of the other sample. Of course, this varied with the quality of yarn and cloth produced.

Out of the 63 households surveyed, nine were mainly wage-earners in the sense that they used to obtain yarn from traders and supply them the cloth woven and get only the wages for weaving. Excluding these, there were 54 families who were producing and selling the produce on their own. The average annual net income per family was reported to be about Rs. 402 which was about a hundred rupees less than that for the other group of sample families. The small group of tussar weavers, numbering seven, had an average net income of about Rs. 485 but the cotton weavers had averages of Rs. 346 and Rs. 401 for weavers with throwshuttle and flyshuttle looms respectively.

Table No. 3.17 gives the net annual income of weavers weaving cotton and tussar on throwshuttle and flyshuttle looms separately.

TABLE No. 3.17

Net annual income of sample weaver families in Barpali in the Sambalpur Zone classified by the number and type of looms worked and the raw materials used

Annual net income of household	*Cotton*						*Tussar*			*All*
	Flyshuttle			*Throwshuttle*						
	One loom	*More than one loom*	*Total*	*One loom*	*More than one loom*	*Total*	*One loom only*	*One loom*	*More than one loom*	*Total*
Less than Rs. 100	—	—	—	—	—	—	—	—	—	—
Rs. 100 to less than Rs. 200	4	—	4	3	—	3	—	7	—	7
Rs. 200 „ Rs. 300	8	—	8	—	—	—	—	8	—	8
Rs. 300 „ Rs. 400	13	1	14	5	—	5	2	20	1	21
Rs. 400 „ Rs. 500	4	—	4	—	—	—	2	6	—	6
Rs. 500 „ Rs. 750	2	3	5	1	1	2	3	6	4	10
Rs. 750 „ Rs. 1,000	—	1	1	—	—	—	—	—	1	1
Rs. 1,000 and above	—	1	1	—	—	—	—	—	1	1
Total	31	6	37	9	1	10	7	47	7	54

About 34 per cent of the cotton weavers had a net annual income of less than Rs. 300 each, about 40 per cent had an income between Rs. 300 and Rs. 400 each, and the remaining 25 per cent of over Rs. 400 each.

Those with more than one working loom had in general a higher average income.[3] In the sample it seemed that the production per loom increased as the number of looms in the household increased.

The volume and value of production of 54 weavers during the year is presented in Table No. 3.18. Both in terms of number and value, sarees

TABLE No. 3.18

Production of textile piecegoods by sample weavers in Barpali in the Sambalpur Zone

Description of piecegoods produced	*Counts of yarn used*	*No. of pieces produced*	*Value of production (in Rs.)*
	Cotton — Flyshuttle		
1. *Saree*	16	7,432	17,286.00
	20	160	480.00
	16 × 20	288	720.00
	16 × 20 × 30	128	680.00
	16 × 20 × 40	192	924.00
	20 × 40	672	4,836.00
	40	328	2,464.00
	Total	9,200	27,390.00
2. *Dhoti*	16	768	864.00
	20	2,764	7,074.00
	Total	3,532	7,938.00
3. *Gamchha (Karia)*	16	240	600.00
	20	1,344	2,352.00
	Total	1,584	2,952.00
4. *Lungi*	20	48	144.00
	Value of total production Rs. 38,424.00		
	Cotton — Throwshuttle		
1. *Saree*	16	416	1,356.00
	20	1,264	4,488.00
	16 × 20	274	1,096.00
	20 × 26	160	720.00
	20 × 40	240	1,680.00
	40	134	1,340.00
	Total	2,488	10,680.00
	Value of total production	Rs. 10,680,00	

[3] The inclusion of wage earners who apparently were engaged in production of sarees made of higher count yarn would possibly have made some difference to the average and to the distribution of income.

TABLE No. 3.18—((*Contd.*)

Production of textile piecegoods by sample weavers in Barpali in the Sambalpur Zone

Description of piecegoods produced	*No. of pieces produced*	*Value of production (in Rs.)*
Total Cotton Goods Produced		
1. *Saree*	11,688	38,070.00 (77.5%)
2. *Dhoti*	3,532	7,938.00 (16.2%)
3 *Gamchha (Karia)*	1,584	2,952.00 (6.0%)
4. *Lungi*	48	144.00 (0.3%)
Total	16,852	49,104.00 (100%)
Tussar — Throwshuttle (Total production)		
1. *Saree*	183	4,284.00
2. *Chadar*	72	1,008.00
3. *Jatha*	48	1,572.00
4. *Pachhuda*	48	576.00
5. *Thana*	15	270.00
Total	366	7,710.00
Value of grand total of production		
Cotton		Rs. 49,104.00 (86.4%)
Tussar		Rs. 7,710.00 (13.6%)
Total		Rs. 56,814.00 (100%)

dominated the field. Out of a total of Rs. 49,000 worth of cotton piecegoods produced, sarees accounted for nearly Rs. 38,000 or about 77 per cent of the value of total production. Tussar cloth accounted for about 12 per cent of the value of total production reported.

Goldsmiths: In the nine grids in the Sambalpur zone covered by the household census only 100 families reported gold and silver smithy as their main occupation. This constituted about one per cent of the total number of families in the grids. Out of these 100, nine families were selected at random for intensive study. It, however, turned out that none of them sold products of their own making, but merely did wage work. They were artisans in the sense in which a mason was an artisan. The customers mostly gave silver or gold bullion to these goldsmiths and they prepared the particular type of ornament required and got their wages. In most cases, this wage included the cost of charcoal and chemicals neces-

sary in this sort of work. But in some cases it was reported that the customers provided these things also. In a few cases, some local trader placed orders with the goldsmiths and paid wages for the work done, the bullion being supplied by the trader concerned. It was not possible to obtain information about the quantity of work done during the year except, again, in a few instances. It was mostly making of silver ornaments that was reported, gold coming seldom into the picture. For ordinary silver ornaments, the making charge was as low as four annas a tola, though this varied with the type of ornament. On an average a goldsmith received about twelve annas to a rupee a day as his remuneration and the annual income of a family from this source varied between Rs. 150 to Rs. 350.

The value of implements was very small – about Rs. 10 to Rs. 15 per family and the long life of many of these made depreciation a negligible item. On an average repair charges came to about a rupee a year per family.

Puffed rice-making : About 112 families reported making of puffed rice (*mudhi*) as their main occupation. Making *mudhi* and beaten rice was a traditional occupation of the Keuta community in Orissa. This was, however, a full-time occupation of only a few such families. Mostly female members of the families were engaged in the business though males in Keuta families also participated in it. Apart from Keutas, single women, widows and others quite often did this work to earn a living.

Obviously, this required no fixed capital. An earthen pot and a broom-like stick to fry were all that was necessary and these were not of any great durability. Besides rice (or preferably paddy of a particular type from which rice suitable for puffed rice could be made) salt and fuel were needed. Depending upon the quality and the processing of rice, a pot of rice would make four to six similar pot fuls of puffed rice. While rice was sold for six annas a seer, puffed rice was sold for 10 annas a seer (assuming one pot ful to give five potfuls of puffed rice). Fuel and salt worth an anna or so were required for these, giving a net income of about three annas per seer of puffed rice, or about 4½ annas per rupee worth of produce.

Bamboo basket-making : Out of a total of 57 families reporting making of bamboo baskets, etc. as their main occupation six were chosen for intensive enquiry. In each of these families, two persons, one male and one female, were reported to be working in this business. Both were skilled in the art of weaving baskets. The capital equipment for the business consisted of an axe only and the value per family came to about Rs. 2. Purchases were less frequent than repairs which cost on an average an equal amount, i.e. Rs. 2.

This work was done by persons belonging either to the Scheduled Castes or to Scheduled Tribes. All the six families in the sample belonged to Sahara, Bedhara or Turi castes.

Bamboo was the only raw material used though some dye was purchased occasionally to colour the baskets. Of the six families in the sample, five reported that they purchased the bamboo required by them at the rate of four to five pieces of bamboo a rupee. Only in one case did the person report that he procured bamboo at the rate of one anna per bamboo from the Government Reserve Forest near his village and had to pay an annual licence fee of Rs. 3 for the purpose.

They manufactured household and agricultural requirements, like baskets, etc. and also a country-style umbrella. Umbrellas cost a rupee each and the price of other goods varied from one-half to five annas. The total value of produce was reported to be more than Rs. 1,230 and the cost of bamboo, etc., amounted to about Rs. 660, giving an average annual net income of Rs. 100 or so per family. Most families besides this, did some repair work for various households and were paid for it in cash as well as in kind. They went to the house of the person concerned and did the repair work and were supplied food for the day by the employer.

6. *Rural Trade and Professions*

The data gathered in the intensive inquiry of trading establishments pertains to turnover, expenses, etc. and is given in an elaborate table in Appendix III.

7. *The Urban Sector : Bargarh*

Population : The population of Bargarh had increased, according to the 1951 Census from 4,689 in 1911 to 9,197 in 1951, *i.e.* it has slightly less than doubled in 40 years. The growth was uninterrupted throughout the period and the largest growth was recorded during the decade 1921-31, when the population increased by 1,881 persons. During the following decade the rate and magnitude of increase were successively smaller. From the data gathered in our inquiry we estimated the total population in 1954-5 at 9,244. This would indicate that the town was growing only very slowly after 1951.

Table No. 3.19 gives the distribution of the sample population by age, sex, earners and non-earners. There were 892 females for 1,000 males in the sample population. The sex ratio of the population of the town as revealed at successive censuses was as follows:

Number of females per 1,000 *males in* :

1911	1921	1931	1941	1951
880	855	955	910	945

The proportion of females increased rather suddenly and sharply during 1921-31, showing that the sudden increase of population during this decade

was mainly among females; it then dropped and again rose in 1951. No consistent trend in the sex ratio is observable.

TABLE No. 3.19

Distribution of the sample population of Bargarh into earners and non-earners by age and sex

Description of population	*Earners*		*Non-Earners*		*Total*	*Per cent to the total*
Male Adult	324	(91.3)*	31	(8.7)	355 (100)	30.8
Male Non-adult	1	(0.4)	253	(99.6)	254 (100)	22.0
Total Males	325	(53.4)	284	(46.6)	609 (100)	52.8
Female Adult	134	(36.3)	235	(63.7)	369 (100)	32.0
Female Non-adult	—	(—)	175	(100)	175 (100)	15.2
Total Females	134	(24.6)	410	(75.4)	544 (100)	47.2
Total Persons	459	(39.8)	694	(60.2)	1153 (100)	100.0

* Figures in brackets are percentages of total.

The total adult population constituted 64 per cent of the total population. Sixty-three per cent of the total adults were earners. Only one non-adult earner was recorded in the sample. Of the adult males, 91 per cent were earners. Among males, there were 1.12 earners to every non-earner. Only 36 per cent of the adult females were earners. Among females, there were 3.2 non-earners to every earner.

In Table No. 3.20, the sample families have been classified according to the main and sub-occupation of their heads. Nearly one-third of the heads of families were found in the inadequately described class of activities. Nearly 22 per cent were engaged in agriculture. Between 11 and 12 per cent were in manufacturing, the most prominent among which was weaving. One-eighth of the heads were engaged in trade and commerce and the overwhelming majority of them was in retail trade. An equal number of heads of families were in services, a considerable proportion of whom were in government service. Transport, storage and communications engaged 4.5 per cent. Sixty-four heads of families reported subsidiary occupations besides their main ones. In 20 of these cases the information available was inadequate to precisely classify them. About 38 per cent were in agriculture and 15 per cent in retail trade. About 14 per cent were in services.

We shall now present data regarding the distribution of all the earners in the sample according to industry and occupation. This is shown in

TABLE NO. 3.20

Distribution of sample families in Bargarh according to the main and subsidiary occupations of their heads

Name of the industry	*Families with this as*	
	Main occupation	*Subsidiary occupation*
Agriculture, livestock, forestry, fishing and hunting	62	23
Manufacturing	33	2
Construction	6	—
Electricity, gas, water and sanitary services	3	—
Distributive services (trade and commerce)	36	10
Transport, storage and communication	13	—
Services	36	9
Activities not adequately described	94	20
Not stated	1	220
Total	284	284

Table No. 3.21. Again, 34.4 per cent were in the inadequately described category. There were 21.6 per cent in agriculture, nearly 13 per cent in manufacturing and 12.7 per cent in trade and commerce. The distribution pattern was broadly the same as that of the heads of families described above. Considered from the point of view of occupational classification, about 65 per cent were in subordinate technical occupations, 14 per cent were in ministerial occupations and 12.6 per cent in commercial occupations.

Table No. 3.22 gives the total earnings from the main occupations of earners in the sample classified by industry. The Table also gives 1st, 2nd and 3rd quartile earnings for each of the important industries. The earnings are uniformly those earned during the year previous to the survey.

In agriculture, the median earnings were Rs. 175. The third quartile earnings were seven times the first quartile earnings. In manufacturing, the median earnings were around Rs. 266, significantly higher than in agriculture. The 3rd quartile earnings were a little less than seven times the first quartile earnings. In trade and commerce, the median earnings were slightly lower than in industry but the 1st and 3rd quartile earnings higher than in industry. In transport, storage, etc. the 1st quartile earnings were nearly four times the 1st quartile earnings in agriculture and slightly less than twice the 1st quartile earnings in trade and commerce. The median earnings in the category were Rs. 412 but the third quartile

TABLE NO. 3.21

Distribution of earners in the sample families in Bargarh by industry and main occupation

Main industry	Main occupations									
	Managerial, administrative and executive Occupations (non-technical)	Professional technical and related occupations (superior)	Subordinate administrative and executive occupations	Ministerial occupations	Sales and related occupations (subordinate)	Subordinate technical occupations	Service occupations	Not stated	Total	Percent to the total
Agriculture, livestock, forestry, fishing and hunting	—	—	1	—	—	98	—	—	99	21.6
Manufacturing	—	—	—	—	—	60	—	—	60	13.1
Construction	—	—	—	—	—	9	—	—	9	2.0
Electricity, gas, water & sanitary services	—	—	6	—	—	—	—	—	6	1.3
Distributive services (trade & commerce)	—	—	—	—	58	—	—	—	58	12.7
Transport, storage & communications	—	—	1	—	—	19	—	—	20	4.3
Services	2	10	8	6	—	—	16	—	42	9.1
Activities not adequately described	—	—	48	—	—	110	—	—	158	34.4
Not stated	—	—	—	—	—	—	—	7	7	1.5
Total	2	10	64	6	58	296	16	7	459	100.0

earnings were only 1.8 times of it. The category of services recorded the highest earnings in all the industrial categories. The median income was Rs. 566. The middle 50 per cent earnings ranged between Rs. 334 and Rs. 1,187. The distribution of earnings in the imperfectly described category was very similar to that in agriculture.

The above deals with the earnings of earners from their main occupation. We must now consider the distribution of family income which includes the earnings of earners in it from their main and subsidiary occupations, if any, together with other incomes received by individuals in the

TABLE NO. 3.22

Distribution of earners in the sample families in Bargarh by industry and annual income from main occupation

	Name of industry of earners	Income (in Rs.) 1 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 500
1.	Agriculture, livestock, forestry, fishing and hunting	33	15	6	9	6	1	11
2.	Manufacturing	15	8	3	—	6	6	3
3.	Construction	—	—	1	3	—	3	1
4.	Elecricity, gas, water, and sanitary services	1	—	—	2	—	2	1
5.	Distributive services (trade & commerce)	9	15	3	—	1	3	5
6.	Transport, storage and communications	1	2	2	1	1	1	1
7.	Services	5	3	—	—	1	8	2
8.	Activities not adequately described	48	31	15	7	4	16	11
	Total	112	74	30	22	19	40	35

	Income (in Rs.) 501 to 750	751 to 1,000	1001 to 2,000	Above 2,000	1st Quartile income (Rs.)	Median income (Rs.)	3rd Quartile income (Rs.)
1.	7	7	—	1	54.54	175.00	388.64
2.	2	2	1	7	87.50	266.67	559.38
3.	—	1	—	—			
4.	—	—	—	—			
5.	4	3	8	3	105.00	250.00	666.67
6.	1	5	2	—	206.25	412.50	762.50
7.	3	4	11	5	334.38	566.67	1,187.50
8.	6	7	10	3	61.72	175.00	367.19
Total	23	29	32	19	73.33	220.31	459.37

family or by the family as a whole such as, remittances, rents, etc. The family incomes of sample families classified by industry during the year previous to the survey are given in Table No. 3.23.

The median income was about Rs. 425. The ratio of 1st and 2nd quartile (median) income was 1:1.43 while that of 2nd quartile (median) to the 3rd quartile income was 1:1.89. The *per capita* income in Bargarh was Rs. 329.

TABLE NO. 3.23

Distribution of sample families in Bargarh by industry and their total annual income

Industry of the head of the family	*Family income (Rs.)*							*Family income (Rs.)*					
	1 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 500	501 to 750	751 to 1,000	1,001 to 2,000	Above 2000	Not stated	Total
Agriculture, livestock, forestry, fishing and hunting	2	4	4	7	4	1	10	12	10	5	2	1	62
Manufacturing	3	1	2	2	1	5	6	2	3	3	3	2	33
Construction	—	—	—	—	—	2	1	1	1	1	—	—	6
Electricity, gas, water and sanitary services	—	—	—	—	—	—	—	2	1	—	—	—	3
Distributive services (trade and commerce)	1	4	2	—	1	4	4	4	2	7	4	3	36
Transport, storage and communications	—	—	—	—	—	1	3	1	4	2	—	2	13
Services	1	1	—	—	1	5	3	5	3	10	7	—	36
Activities not adequately described	5	7	12	5	7	14	16	5	7	9	7	—	94
Not stated	—	—	—	—	—	—	—	—	—	—	—	1	1
Total	12	17	20	14	14	32	43	32	31	37	23	9	284

Chapter IV

ECONOMIC CONDITIONS IN THE DELTA ZONE (CUTTACK AND PURI) IN 1954-5

1. Population Characteristics

In the delta zone, the census of households covered 20 sample grids covering an area of 200 square miles. Of these, 13 were in Cuttack and seven in Puri. The population of these grids as enumerated in the census of households was 105,304 in Cuttack and 48,310 in Puri. If we compare with this the population of the villages in these grids as recorded by the Census of 1951, we find that the population as enumerated by us was smaller by 4.75 per cent in Cuttack but larger by about 14 per cent in Puri. This comparison is, however, invalid because as remarked already the District Census Handbooks (1951) of Cuttack and Puri Districts do not give the population of 10 villages in Cuttack and 17 in Puri district that were in our grids though they were old revenue villages. Table No. 4.1 gives a list of these villages with their population as enumerated in our census of households together with their Revenue Thana number. We have, used our figures of population throughout in what follows.

Caste composition : Table No. 4.2 (A and B) gives the distribution of the sample families by caste. The caste composition of the population in the Mahanadi delta was slightly different from that in the uplands. The Caste Hindus in Puri and Cuttack accounted for 72 and 74 per cent of the total sample families respectively. The Scheduled Castes formed a little more than one-fifth (21 per cent) of the total sample families in Cuttack and one-fourth (25 per cent) of the total families in Puri. There were hardly any Scheduled Tribes in the delta region. Mohammedans accounted for four per cent of the families in Cuttack.

The similarity in the broad caste composition of the sample families in Cuttack and Puri is, however, not maintained when we look at the detailed caste composition of the population. We will here take note of the very noticeable features only. The Khandayats and Chasas taken together formed the most dominant caste group in the popultaion; in Puri, they were about 29 per cent and, in Cuttack, over 37 per cent. In Puri, the Chasas and Khandayats were in equal proportion; in Cuttack, the Chasas were only five per cent whereas the Khandayats were over 32 per cent. The difference may be explained partly by the tendency on the part of Chasas, who were slightly inferior to the Khandayats in caste hierarchy, to report themselves as Khandayats. The greater urban contact of the

TABLE NO. 4.1

List of revenue villages in the sample grids in Cuttack and Puri which were not to be found in the 1951 *District Census Handbooks of those districts, and their population as enumerated in our census of households* (1954)

S. No.	Name of the village	Name of the Police Station	Revenue Thana No. of the village	Population according to our census of households
	Dist. Cuttack			
1	Puran	Salepur	359	749
2	Utrola	„	368	404
3	Odasing	„	372	990
4	Pana Sudha	Badachana	1,228	1,017
5	Surati Pur (Nankar)	Kendrapara	288	127
6	Rahama	Tirtol	172	132
7	Bambarada	„	430	173
8	Dalbar	Cuttack Sadar	319	309
9	Mandar Pur	Jagatsingpur	308	5
10	Titinga	„	456	540
	Dist. Puri			
1	Pamsara	Pipili	44	300
2	Bhailo	„	49	249
3	Kahnu Pur	Satyabadi	97	115
4	Jipur	„	98	278
5	Solahal	„	99	406
6	San Solahal	„	113	32
7	Aragad	Delanga	5	410
8	Bodanga Deuli	Balipatna	17	14
9	Denua	Nimapara	32	1,531
10	Kasi Pur	„	56	115
11	Kalia Pada	„	60	217
12	Kasia Sasan	„	68	277
13	Tara Boi Sasan	„	70	346
14	Berunha Sasan	„	106	221
15	Kolahana	„	107	553
16	Bhilideuli	„	163	562
17	Chhitikana	„	164	627

TABLE NO. 4.2 (A)

Distribution of sample families in Cuttack according to caste

S.No.	Name of caste	No. of families		S.No.	Name of caste	No. of families	
		No.	Per cent			No.	Per cent
	Caste Hindus				*Scheduled Castes*		
1	Brahmin	1,610	7.0	24	Dhoba	539	2.3
2	Karan, Kayastha	772	3.3	25	Bauri	1,584	6.9
3	Khandayat, Kshatriya	7,413	32.1	26	Kandara	1,141	4.9
4	Chasa	1,253	5.4	27	Pana	896	3.9
5	Bania	294	1.3	28	Hadi	75	0.3
6	Gudia	763	3.3	29	Dama	80	0.4
7	Tanti	399	1.7	30	Chamar	196	0.8
8	Badhei	302	1.3	31	Sial	58	0.2
9	Kamar	153	0.7	32	Gokha	85	0.4
10	Kansari	81	0.4	33	Kela	16	0.1
11	Kumbhar	246	1.1	34	"Harijan"	164	0.7
12	Teli	527	2.3	35	Others	22	0.1
13	Gaud	1,484	6.4		Total	4,856	21.0
14	Keuta	686	3.0		*Scheduled Tribes*		
15	Barika	446	1.9	36	Savara	41	0.2
16	Vaishya	17	0.1	37	Others	3	0.0
17	Sundhi, Gola	89	0.4		Total	44	0.2
18	Patra	62	0.3		*Other Religions*		
19	Vaishnab and Jogi	137	0.6	38	Muslims	963	4.2
20	Jyotish	149	0.6	39	Others	32	0.1
21	Mali	48	0.2		Total	995	4.3
22	Rajput	81	0.3				
23	Others	166	0.7	40	Unspecified	17	0.1
	Total	17,178	74.4		GRAND TOTAL	23,090	100.0

TABLE No. 4.2 (B)

Distribution of sample families in Puri according to caste

S.No.	Name of caste	No. of families		S.No.	Name of caste	No. of families	
		No.	Per cent			No.	Per cent
	Caste Hindus				*Scheduled Castes*		
1	Brahmin	1,421	13.5	23	Dhoba	196	1.9
2	Karan	298	2.8	24	Bauri	1,806	17.2
3	Kandayat, Kshatriya	1,537	14.7	25	Kandara	300	2.9
4	Chasa	1,501	14.3	26	Pana	103	1.0
5	Bania	190	1.8	27	Daura	46	0.4
6	Gudia	261	2.5	28	Chamar	14	0.1
7	Tanti	196	1.9	29	Sial	71	0.7
8	Badhei	104	1.0	30	Kela	21	0.2
9	Kamar	86	0.8	31	"Harijan"	17	0.2
10	Kansari	17	0.2	32	Others	43	0.4
11	Kumbhar	126	1.2		Total	2,617	25.0
12	Teli	381	3.6				
13	Gaud	422	4.0				
14	Keut	246	2.3				
15	Barik	238	2.3				
16	Vaishya	77	0.7		*Other Religions*		
17	Sundhi, Gola	65	0.6	33	Muslims	256	2.4
18	Patra	30	0.3	34	Others	4	0.1
19	Vaishnab and Jogi	127	1.2		Total	260	2.5
20	Jyotish	54	0.9				
21	Mali	117	1.1				
22	Others	102	1.0	35	Unspecified	20	0.2
	Total	7,596	72.3		GRAND TOTAL	10,493	100.0

Cuttack villages may account for this. Similarly among Scheduled Castes, the Bauris were not only the single largest caste in Puri but were of overwhelming preponderance as compared to Cuttack. In Cuttack, they shared their importance in size with Kandaras and Panas.

Earners and non-earners : Adults formed 68 per cent of the total population in the Delta (Puri 69 per cent; Cuttack 68 per cent) and over 56 per cent of the adults reported themselves as earners (56 per cent in Cuttack and 57 per cent in Puri). Of the total earners, nearly 78 per cent in the case of Cuttack and 80 per cent in the case of Puri were males and the rest females. Whereas 91 per cent of the adult males were reported as earners, only about 23 per cent of the adult females were so reported.

Turning to the caste composition of the earners (Table No. 4.3) we find that Scheduled Castes accounted for a higher percentage of earners than their proportion in the total number of families. Over 34 per cent of the earners in Puri and 29 per cent in Cuttack belonged to the Scheduled Castes. The reason lies in the fact that most of the female earners in these districts belonged to the Scheduled Castes. The Scheduled Caste female earners formed 67.5 per cent of the total female earners in Puri district and 55.3 per cent of the total in Cuttack district.

TABLE No. 4.3

Distribution of earners in the sample in Cuttack and Puri according to caste

Main Caste	*Male*	*Female*	*Total*
	CUTTACK		
Caste Hindus	23,290	3,806	27,096
Scheduled Castes	6,985	4,878	11,863
Scheduled Tribes	66	31	97
Other Religions	1,019	101	1,120
Unspecified	14	5	19
Total	31,374	8,821	40,195
	PURI		
Caste Hindus	11,031	1,223	12,254
Scheduled Castes	4,040	2,613	6,653
Other Religions	381	26	407
Unspecified	30	8	38
Total	15,482	3,870	19,352

Table No. 4.4 (A and B) gives the distribution of families in the sample by occupation and by non-resident earners. Nearly five per cent of the families in Puri and seven per cent in Cuttack had no resident earners. A further tabulation of the data showed that in most of these cases the heads of the families were non-resident earners. In as many as 2,118 families in Cuttack and 516 families in Puri, the heads were non-resident earners.

Occupational distribution of earners : Table No. 4.5 (A and B) gives the distribution of resident adult earners in the sample families according to their occupations. Looking at the distribution in broad perspective, we find that 82 per cent of the earners were engaged in agriculture in different capacities: 48 per cent were cultivators of owned land, 30 per cent agricultural labourers, two per cent cultivators of rented land and 1.6 per cent rent receivers.[1]

About 12 per cent of the earners were engaged in production other than agriculture, including dairying, fishing, etc. which may be considered as primary industries. If these latter are excluded, the earners engaged in secondary industry constituted about 10 per cent of the total earners. About 40 per cent of them were engaged in husking and pounding rice, about 17 per cent were in woodwork and construction, 12 per cent in textile and leather manufacturing and 10 per cent in metal work. About 90 per cent of those engaged in husking and pounding paddy were females.

Services engaged about six per cent of the adult earners. This category included a variety of occupations but the large groups among them were those of barbers and washermen, priests and astrologers and, to a smaller extent, teachers. Among the barbers, there were more women than men. In Oriya society, the barber was an important functionary in marriages and related social ceremonies and, besides the toilet of ladies, women barbers earned a good bit by performing other services on such occasions.

Trade engaged only 1.6 per cent of the total earners while transport claimed only one-tenth of one per cent.

Family occupation : In Table No. 4.6 (A and B) is presented the distribution of sample families according to their reported main occupations. The distribution of families by occupation was very similar to the one described earlier for adult earners. Nearly 80 per cent of the families were engaged in agricuture, eight per cent in industry (including dairying, fishing, etc.), four per cent in services and professions and 1.6 per cent in

[1] The enumeration by occupation in our survey was by the occupation which was considered to be the main one by the earner himself. In the categories noted just above, this rule has been followed. An agricultural labourer may own some land but he may be mainly relying on agricultural labour as the source of his livelihood and may be here classified as such. The only point to be noted is that the distinction between main and subsidiary occupations is based on the reporting done by the respondent himself.

TABLE NO. 4.4(A)

Distribution of sample families in Cuttack by their main occupation and the number of their non-resident earners

Main occupation	Families with number of non-resident earners				
	1	2	3 and more	Total families	Total No. of families surveyed
Cultivation	1,724	307	64	2,095	12,092
Livestock, forestry, fishing, hunting, etc.	19	4	2	25	249
Labour	228	22	3	253	5,660
Rentiers	198	21	1	220	860
Traders	17	4	1	22	374
Superior executive and technical service	23	4	1	28	357
Subordinate administrative service	10	—	—	10	91
Huskers and pounders	24	3	—	27	647
Other food and oil processing	3	—	—	3	100
Textile- and leather-product making	10	3	—	13	189
Woodwork and construction	9	3	—	12	267
Metal, gen. engineering and related occupations	6	1	—	7	233
Transport and communications	1	—	—	1	32
Misc. production	4	—	—	4	137
Domestic services	29	3	—	32	435
Health services	—	—	—	—	—
Other service occupations	3	—	—	3	220
Not given	971	103	23	1,103	1,147
Total	3,279	431	95	3,805	23,060

TABLE NO. 4.4(B)

Distribution of sample families in Puri by their main occupation and according to the number of their non-resident earners

Main occupation	*Families with number of non-resident earners*				
	1	2	3 *and more*	*Total families*	*Total No. of families surveyed*
Cultivation	481	61	27	569	5,009
Livestock, forestry, fishing, hunting, etc.	1	1	—	2	148
Labour	50	3	—	53	2,524
Rentiers	55	8	2	65	259
Traders	14	7	1	22	277
Superior executive and technical service	16	5	3	24	278
Subordinate administrative service	5	1	—	6	95
Huskers and pounders	9	1	—	10	400
Other food and oil processing	9	1	—	10	113
Textile- and leather-product making	12	2	—	14	177
Woodwork and construction	1	—	—	1	190
Metal, gen. engineering and related occupations	5	1	1	7	206
Transport and communications	2	1	—	3	20
Misc. production	—	—	—	—	62
Domestic services	23	1	—	24	286
Health services	—	—	—	—	2
Other service occupations	3	—	—	3	100
Not given	257	49	10	316	347
Total	943	142	44	1,129	10,493

TABLE NO. 4.5(A)

Distribution of earners in sample families in Cuttack according to their main occupation

Main occupation	Earners					
	Males		Females		Total	
Cultivation	18,853	60.2	661	7.5	19,514	48.6
Livestock, forestry, fishing, hunting, etc.	440	1.4	578	6.6	1,018	2.5
Labour	7,999	25.5	3,885	44.1	11,884	29.7
Rentiers	327	1.0	324	3.7	651	1.6
Traders	586	1.9	49	0.6	635	1.6
Superior executive and technical service	550	1.8	29	0.3	579	1.4
Subordinate adminstrative service	133	0.4	4	—	137	0.3
Huskers and pounders	185	0.6	1,374	15.7	1,559	3.9
Other food and oil processing	137	0.4	101	1.1	238	0.6
Textile- and leather-product making	267	0.8	228	2.6	495	1.2
Woodwork and construction	395	1.3	286	3.2	681	1.7
Metal, gen. engineering and related occupations	411	1.3	1	—	412	1.0
Transport and communications	56	0.2	2	—	58	0.1
Miscellaneous production	227	0.7	198	2.2	425	1.1
Domestic services	672	2.1	1,018	11.5	1,690	4.2
Health services	—	—	—	—	—	—
Other service occupations	125	0.4	81	0.9	206	0.5
Not given	11	—	2	—	13	—
Total	31,374	(100.0)	8,821	(100.0)	40,195	(100.0)

TABLE NO. 4.5(B)

Distribution of earners in the sample families in Puri according to their main occupation

Main occupation	Earners					
	Males		Females		Total	
Cultivation	8,421	54.4	371	9.6	8,792	45.4
Livestock, forestry, fishing, hunting, etc.	236	1.5	69	1.8	305	1.6
Labour	3,917	25.3	1,581	40.8	5,498	28.4
Rentiers	121	0.8	130	3.4	251	1.3
Traders	415	2.7	26	0.7	441	2.3
Superior executive and technical service	382	2.5	11	0.3	393	2.0
Subordinate administrative service	141	0.9	3	0.1	144	0.7
Huskers and pounders	168	1.1	569	14.6	737	3.8
Other food and oil processing	171	1.1	46	1.2	217	1.1
Textile- and leather-product making	229	1.5	486	12.5	715	3.7
Woodwork and construction	281	1.8	202	5.2	483	2.5
Metal, gen. engineering and related occupations	356	2.3	2	0.1	358	1.9
Transport and communications	37	0.2	—	—	37	0.2
Miscellaneous production	103	0.7	28	0.7	131	0.7
Domestic services	408	2.6	310	8.0	718	3.7
Health services	4	—	2	0.1	6	—
Other service occupations	77	0.5	30	0.8	107	0.6
Not given	14	0.1	4	0.1	18	0.1
Total	15,481	(100.0)	3,870	(100.0)	19,351	(100.0)

trade and commerce. Nearly one per cent of the families in the sample did not report any occupation and another four per cent reported only subsidiary occupations and no main occupation. These families had their main bread winners or earners outside the region and received remittances from them. As we were interested in the occupational pattern in the region, we did not consider the occupation of the non-resident main earners as the main occupation of the family even if so reported by the family. We only tabulated the subsidiary occupation of the family which we, for our purpose, could have treated as the main occupation of the family. If we had not disregarded the occupation of the non-resident earner, we would have had the occupation of such families classified as work in the jute mills, without, of course, any connection with the occupational pattern of the region which did not have a single jute mill.

Table No. 4.6 (A and B) also gives the distribution of families of different communities by their main occupation. The occupational distribution of the Caste Hindus came close to that of the sample and this was natural because Caste Hindu families constituted nearly 70 per cent of the total in the sample. An examination of the occupational distribution of families of the Scheduled Castes and other religions and their comparison with that of the Caste Hindus brings out certain interesting and significant points. While 61 per cent of the families of the Caste Hindus cultivated their own or rented land, only 36 per cent of the families belonging to "other religions" did so. Their percentage among Scheduled Caste families was only 23. In contrast, agricultural labour was the main occupation of only about 14 per cent of the Caste Hindu families. The proportion of such families among the Scheduled Castes and other religions was 80 per cent and 25 per cent respectively. That the bulk of the Scheduled Caste families depended on agricultural labour showed that they occupied the lowest position in the agriculture of the region.

Table No. 4.7 (A and B) presents the distribution of sample families according to their main and subsidiary occupations. Only 48 per cent of the families had any subsidiary occupations besides the main one. Nearly 70 per cent of the families, which had subsidiary occupations, were engaged in agriculture as their subsidiary occupation. Nearly 60 per cent of the families cultivating their own land and having subsidiary occupations worked as agricultural labourers. On the other hand, three-fourths of the families of agricultural labour reporting subsidiary occupations cultivated their own land as a subsidiary occupation. This brings out the fact that whether a family gives cultivation or agricultural labour as its main occupation mainly depends upon what it regards as its main occupation. Otherwise, cultivators of owned or tenanted lands worked as agricultural labourers and agricultural labourers cultivated, owned and rented lands.

TABLE NO. 4.6(A)

Distribution of families in the sample in Cuttack by caste and by their main occupation

Main occupation	Main castes					Total
	Caste Hindus	Scheduled Castes	Scheduled Tribes	Other Religions	Unspecified	
Cultivation	10,534	1,189	6	359	4	12,092
Livestock, forestry, fishing, hunting, etc.	196	37	—	13	3	249
Labour	2,362	3,005	37	253	3	5,660
Rentiers	788	9	1	59	3	860
Traders	292	16	—	66	—	374
Superior executive and technical service	343	9	—	5	—	357
Subordinate administrative service	32	54	—	5	—	91
Huskers and pounders	596	22	—	28	1	647
Other food and oil processing	76	—	—	24	—	100
Textile- and leather-product making	167	15	—	7	—	189
Woodwork and construction	163	104	—	—	—	267
Metal, gen. engineering and related occupations	230	—	—	3	—	233
Transport and communications	30	—	—	2	—	32
Misc. production	133	4	—	—	—	137
Domestic services	169	265	—	1	—	435
Health services	—	—	—	—	—	—
Other service occupations	170	28	—	22	—	220
Not given	897	99	—	148	3	1,147
Total	17,178	4,856	44	995	17	23,090

TABLE No. 4.6(B)

Distribution of families in the sample in Puri by caste and by their main occupation

Main occupation	Main castes				Total
	Caste Hindus	Scheduled Castes	Other Religions	Unspecified	
Cultivation	4,280	623	95	11	5,009
Livestock, forestry, fishing, hunting, etc.	118	29	1	—	148
Labour	909	1,561	52	2	2,524
Rentiers	258	—	—	1	259
Traders	206	4	67	—	277
Superior executive and technical service	264	9	4	1	278
Subordinate administrative service	45	48	2	—	95
Huskers and pounders	383	6	10	1	400
Other food and oil processing	112	—	—	1	113
Textile- and leather-product making	141	28	8	—	177
Woodwork and construction	62	127	—	1	190
Metal, gen. engineering and related occupations	205	1	—	—	20[illegible]
Transport and communications	16	2	2	—	2[illegible]
Miscellaneous production	62	—	—	—	6[illegible]
Domestic services	139	145	—	2	2[illegible]
Health services	2	—	—	—	[illegible]
Other service occupations	76	20	4	—	1[illegible]
Not given	318	14	15	—	3[illegible]
Total	7,596	2,617	260	20	10,4[illegible]

TABLE No. 4.7(A)

Distribution of families in the sample in Cuttack according to their main and subsidiary occupations

Main occupation	Subsidiary occupation*									
	1	2	3	4	5	6	7	8	9	10
1. Cultivation	—	363	3,196	2	452	341	75	240	92	51
2. Livestock, forestry, fishing, hunting, etc.	70	3	60	15	3	—	—	20	—	—
3. Labour	2,091	84	—	83	22	8	19	153	5	17
4. Rentiers	—	2	25	—	11	12	—	3	2	1
5. Traders	144	1	29	51	—	2	—	4	1	—
6. Superior executive and technical service	89	—	10	89	2	8	—	2	—	1
7. Subordinate administrative service	25	—	15	13	—	—	—	—	—	—
8. Huskers and pounders	58	10	64	77	4	—	—	—	—	1
9. Other food and oil processing	25	—	12	14	—	—	—	3	—	—
10. Textile- and leather-product making	83	1	31	6	—	—	1	2	—	—
11. Woodwork and construction	117	—	37	14	1	5	—	2	—	—
12. Metal, gen. engineering and related occupations	64	—	13	57	—	—	—	—	—	—
13. Transport and communications	6	—	1	10	—	—	—	—	—	—
14. Miscellaneous production	54	4	37	3	—	—	—	1	—	—
15. Domestic services	206	—	77	29	2	—	—	1	—	—
16. Health services	—	—	—	—	—	—	—	—	—	—
17. Other service occupations	17	—	1	27	—	6	—	1	—	1
18. Not given	302	5	60	452	3	6	1	14	—	1
Total	3,351	473	3,668	942	500	388	96	446	100	73
Percentage of total	14.5	2.0	15.9	4.1	2.2	1.7	0.4	1.9	0.4	0.3

* The serial numbers for subsidiary occupations indicate the same occupations as those for the main.

TABLE NO. 4.7(A)–(*Contd.*)

Distribution of families in the sample in Cuttack according to their main and subsidiary occupations

Main occupation	Subsidiary occupation*								Total	Percentage of total
	11	12	13	14	15	16	17	18		
1. Cultivation	112	92	70	49	307	1	17	6,632	12,092	52.4
2. Livestock, forestry, fishing, hunting, etc.	—	—	—	—	1	—	—	77	249	1.1
3 Labour	67	4	—	9	95	—	9	2,994	5,660	24.5
4. Rentiers	—	1	—	—	1	—	10	792	860	3.7
5. Traders	1	1	1	—	1	—	1	137	374	1.6
6. Superior executive and technical service	—	—	—	—	—	—	2	154	357	1.5
7. Subordinate administrative service	—	—	—	—	—	—	—	38	91	0.4
8. Huskers and pounders	1	—	1	—	2	—	3	426	647	2.8
9. Other food and oil processing	—	—	—	—	—	—	—	46	100	0.4
10. Textile- and leather-product making	1	—	—	—	—	—	—	64	189	0.8
11. Woodwork and construction	—	—	—	—	—	—	1	90	267	1.2
12. Metal, gen. engineering and related occupations	—	—	—	—	—	—	—	99	233	1.0
13. Transport and communications	—	—	—	—	—	—	—	15	32	0.1
14. Miscellaneous production	—	—	—	—	—	—	—	38	137	0.6
15. Domestic services	—	—	—	—	—	—	—	120	435	1.9
16. Health services	—	—	—	—	—	—	—	—	—	—
17. Other service occupations	—	—	—	—	—	—	—	167	220	1.0
18. Not given	4	—	—	—	5	—	—	294	1,147	5.0
Total	186	98	72	58	412	1	43	12,183	23,090	(100.0)
Percentage of total	0.8	0.4	0.3	0.3	1.8	—	0.2	52.8	(100.0)	

* The serial numbers for subsidiary occupations indicate the same occupations as those for the main.

TABLE NO. 4.7(B)

Distribution of families in the sample in Puri according to their main and subsidiary occupations

Other occupation	Subsidiary occupation*									
	1	2	3	4	5	6	7	8	9	10
1. Cultivation	—	103	1,807	—	207	194	77	73	41	19
2. Livestock, forestry, fishing, hunting, etc.	55	3	12	2	1	—	—	2	—	—
3. Labour	1,229	9	—	18	2	6	1	19	2	99
4. Rentiers	—	—	4	—	3	1	—	7	—	—
5. Traders	83	—	16	40	—	4	1	13	1	2
6. Superior executive and technical service	133	—	11	41	1	—	—	—	—	—
7. Subordinate administrative service	44	—	9	7	—	—	—	—	—	—
8. Huskers and pounders	77	9	20	53	5	—	—	—	—	3
9. Other food and oil processing	55	—	13	11	2	—	—	—	—	—
10. Textile- and leather-product making	42	1	35	5	1	—	—	1	—	—
11. Woodwork and construction	65	1	52	4	1	19	—	—	—	2
12. Metal, gen. engineering and related occupations	69	—	4	30	1	—	—	—	—	—
13. Transport and communications	10	—	3	1	—	—	—	—	—	—
14. Miscellaneous production	49	1	5	—	—	—	—	—	—	—
15. Domestic services	177	—	40	9	2	—	—	—	—	—
16. Health services	—	—	—	—	—	—	—	—	—	—
17. Other service occupations	9	1	8	10	1	—	—	—	—	—
18. Not given	40	—	6	175	3	1	1	2	—	1
Total	2,137	128	2,045	406	230	225	80	117	44	126
Percentage of total	20.5	1.2	19.6	3.4	2.2	2.1	0.8	1.1	0.4	1.2

* The serial numbers for subsidiary occupations indicate the same occupations as those for the main.

TABLE No. 4.7(B)–(*Contd.*)

Distribution of families in the sample in Puri according to their main and subsidiary occupations

Other occupation	Subsidiary occupation*									Percentage of total
	11	12	13	14	15	16	17	18	Total	
1. Cultivation	43	35	36	24	103	—	9	2,238	5,009	47.6
2. Livestock, forestry, fishing, hunting, etc.	22	—	1	—	—	—	1	49	148	1.4
3. Labour	11	1	4	1	5	1	15	1,101	2,524	24.1
4. Rentiers	—	2	—	—	1	—	1	240	259	2.5
5. Traders	—	—	1	1	1	—	1	113	277	2.6
6. Superior executive and technical service	3	—	—	—	—	—	6	83	278	2.7
7. Subordinate administrative service	—	—	—	—	1	—	—	34	95	0.9
8. Huskers and pounders	—	—	1	—	—	—	1	231	400	3.8
9. Other food and oil processing	—	—	—	—	—	—	—	32	113	1.1
10. Textile- and leather-product making	—	—	—	—	—	—	1	91	177	1.7
11. Woodwork and construction	—	—	—	—	—	—	—	46	190	1.8
12. Metal, gen. engineering and related occupations	—	—	—	—	—	—	—	102	206	2.0
13. Transport and communications	1	—	—	—	—	—	—	5	20	0.2
14. Miscellaneous production	—	—	—	1	—	—	—	6	62	0.6
15. Domestic services	—	—	—	—	—	—	—	58	286	2.7
16. Health services	—	—	—	—	—	—	—	2	2	—
17. Other service occupations	—	—	—	—	1	—	—	70	100	1.0
18. Not given	—	1	1	—	1	—	—	115	347	3.3
Total	80	39	44	27	113	1	35	4,616	10,493	100.0
Percentage of total	0.8	0.4	0.4	0.3	1.1	—	0.3	44.2	100.0	

* The serial numbers for subsidiary occupations indicate the same occupations as those for the main.

2. *Land-holding (Cuttack and Puri)*

We now proceed to indicate how land was held and operated in the delta zone. The occupational distribution of families shows that more than two-thirds of the total number of families (67 per cent in Cuttack and 68 per cent in Puri) had cultivation as either their main or subsidiary occupation. If we take into account families who cultivated some land but did not report cultivation as either their main or subsidiary occupation, we find that over 70 per cent of the families in the sample cultivated some land. This was a higher proportion than that in the Sambalpur zone and emphasized the importance of land-holding and agriculture in the delta zone.

Land is both widely held and cultivated in the delta (Table No. 4.8 A and B). In Cuttack, 73 per cent and in Puri 65 per cent of the sample families owned some land. The average size of owned land-holding came to 2.8 acres in Cuttack and 3.47 acres in Puri. But most of the families owned less than this average. Nearly 30 per cent of the landowners in both the districts reported holdings of less than one acre each. Another 25 per cent of the families owned less than two acres each. Thus, in the delta, we find nearly 55 per cent of landowners with less than two acres of owned land and about 70 per cent of landowners with less than three acres of owned land. The total land owned by these families, was, however, small. The 30 per cent of families with less than one acre of land each owned in all about five per cent of the total land. And 70 per cent of the landowners with less than three acres each owned only one-third of the total land. Or to put the same thing differently, only 30 per cent or less than one-third of the total number of landowners with more than three acres each owned two-thirds of the total land. Or to show the extent of concentration of landowning, we might point out that in Cuttack the one per cent biggest landowners owned nine per cent of the total land and in Puri one per cent owned nearly 13 per cent of the total land.

This picture of small holdings and considerable concentration in land-holdings does not change when one considers cultivated land (Table Nos. 4.9 A and B). And over 70 per cent of the families in both the districts cultivated some land and the average size of the cultivated holding was 3.2 acres in Cuttack and 3.6 in Puri. And over 60 per cent of the families had cultivated holdings of less than three acres, and cultivated in all about one-fourth (25 per cent in Puri and 28 per cent in Cuttack) of the total cultivated land. About 17 per cent of the cultivators in Puri and 20 per cent in Cuttack cultivated less than one acre each and had in all only two to three per cent of the total land under cultivation. Looking at the other end of the scale, we find that in Cuttack the 10 per cent biggest cultivators cultivated about one third of the total cultivated area, and in Puri the area cultivated by the biggest 10 per cent was about 38 per cent of the total.

TABLE NO. 4.8(A)

Distribution of sample families in Cuttack according to the size of owned land-holding and the total land owned by them

Size of owned holding in acres	*Holdings*		*Total owned land*	
	Number	*Per cent to the total*	*Area in acres*	*Per cent to the total*
Less than 1.00	5,243	30.0	2,621.5	5.4
1.00 to 1.99	4,418	25.3	6,627.0	13.6
2.00 to 2.99	2,697	15.5	6,742.5	13.8
3.00 to 3.99	1,728	9.9	6,048.0	12.4
4.00 to 4.99	977	5.6	4,396.5	9.0
5.00 to 5.99	731	4.2	4,020.5	8.2
6.00 to 7.99	677	3.9	4,677.5	9.6
8.00 to 9.99	305	1.7	2,692.5	5.5
10.00 to 14.99	368	2.1	4,306.0	8.8
15.00 to 19.99	174	1.0	2,901.0	5.9
20.00 and above	137	0.8	3,836.5	7.8
Total	17,455	100.0	48,869.5	100.0

TABLE NO. 4.8(B)

Distribution of sample families in Puri according to the size of owned land-holding and the total land owned by them

Size of owned holding in acres	*Holdings*		*Total owned land*	
	Number	*Per cent to the total*	*Area in acres*	*Per cent to the total*
Less than 1.00	2,021	29.5	1,010.5	4.3
1.00 to 1.99	1,720	25.1	2,580.0	10.9
2.00 to 2.99	968	14.2	2,420.0	10.3
3.00 to 3.99	635	9.3	2,222.5	9.4
4.00 to 4.99	396	5.8	1,782.0	7.5
5.00 to 5.99	250	3.7	1,375.0	5.8
6.00 to 7.99	248	3.6	1,717.0	7.3
8.00 to 9.99	144	2.1	1,251.0	5.3
10.00 to 14.99	232	3.4	2,676.0	11.3
15.00 to 19.99	86	1.3	1,466.0	6.2
20.00 and above	139	2.0	5,119.5	21.7
Total	6,839	100.0	23,619.5	100.0

TABLE NO. 4.9(A)

Distribution of sample families in Cuttack according to the size of cultivated land-holding and the total land cultivated by them

Size of cultivated holding in acres	*Holdings*		*Total cultivated land*	
	Number	*Per cent to the total*	*Area in acres*	*Per cent to the total*
Less than 1.00	3,283	20.2	1,641.5	3.1
1.00 to 1.99	3,807	23.4	5,710.5	10.9
2.00 to 2.99	2,975	18.3	7,437.5	14.2
3.00 to 3.99	2,081	12.8	7,283.5	13.9
4.00 to 4.99	1,313	8.1	5,908.5	11.3
5.00 to 5.99	910	5.6	5,005.0	9.6
6.00 to 7.99	827	5.1	5,709.5	10.9
8.00 to 9.99	397	2.4	3,513.5	6.7
10.00 to 14.99	390	2.4	4,589.0	8.8
15.00 to 19.99	175	1.1	2,955.5	5.6
20.00 and above	101	0.6	2,615.5	5.0
Total	16,259	100.0	52,369.5	100.0

TABLE NO. 4.9(B)

Distribution of sample families in Puri according to the size of cultivated land-holding and the total land cultivated by them

Size of cultivated holding in acres	*Holdings*		*Total cultivated land*	
	Number	*Per cent to the total*	*Area in acres*	*Per cent to the total*
Less than 1.00	1,279	17.3	639.5	2.4
1.00 to 1.99	1,845	25.0	2,767.5	10.4
2.00 to 2.99	1,354	18.3	3,385.0	12.2
3.00 to 3.99	927	12.6	3,244.5	12.7
4.00 to 4.99	571	7.7	2,569.5	9.7
5.00 to 5.99	394	5.3	2,167.0	8.1
6.00 to 7.99	377	5.1	2,602.5	9.9
8.00 to 9.99	194	2.6	1,704.0	6.4
10.00 to 14.99	252	3.4	2,962.0	11.1
15.00 to 19.99	85	1.2	1,417.5	5.3
20.00 and above	108	1.5	3,133.0	11.8
Total	7,386	100.0	26,592.0	100.0

Though the two pictures thus presented are very similar in the main, there are slight differences between the two. Firstly in Cuttack the cultivators were somewhat smaller in number than the owners whereas it was the opposite in Puri. In Cuttack, owners were about 73 per cent of the total number of families and the cultivators only 70 per cent. On the other hand, in Puri the cultivators were 70 per cent but the owners were 65 per cent of the total.

The process of leasing-in and leasing-out of land was far more extensive in the delta than in inland Orissa, Table Nos. 4.10 (A and B) and 4.11 (A and B). In Cuttack, of the families owning or cultivating some land, only 48 per cent cultivated as much land as they owned. The remaining were either leasing in or leasing out part or whole of the land at their disposal. In Puri this proportion was far more. No more than 30 per cent of the total families cultivated as much land as they owned. All the remaining 70 per cent were involved in owner-tenant relations. The extent of tenancy, it appears, was far greater in the delta than in Sambalpur, and in the delta zone itself it was more so in Puri than in Cuttack. In Cuttack, of the total landowners or cultivators who were involved in owner-tenant relationship, only 2,651, or about one-fourth, leased out some land and the remaining families leased in some land assuming that the number of families both leasing in and out land was negligible. Of those leasing out, however, we find that as many as 2,161, or about 82 per cent, were pure rentiers, that is they leased out all their land. And most of these had very little land to lease out, near about 80 per cent of them owning less than two acres each. A large proportion of the small landowners leased out whole or part of their land. As against this, there were fewer pure tenants, that is, those who leased in all the land they cultivated in Cuttack; but the number of families leasing in some land was very large. The total number of families leasing in some land was 6,838, or nearly three times the total number leasing out any land. But the pure tenants among these were only 965, or about 14 per cent of the total. And again these belonged mostly to the small-size groups. The fact that the number of pure rentiers in Cuttack was nearly two-and-a-half times the number of pure tenants, explains the smaller number of owners than cultivators in this district. And the fact of the larger number of pure rentiers and that, too, from the very smallest-size land-owning classes, was partly explained by the large migration from this district to outside places for work.

In Puri, we found that nearly 70 per cent of those owning or cultivating land, either leased in or leased out land. About 20 per cent of these leased out some land and the remaining 80 per cent leased in some land. Those leasing out some land formed over 16 per cent of the total landowners; and over 82 per cent of these families had leased out all their land. Most of these rentier families had very little land to lease out; over 50 per cent of the families leasing-out land, owned less than two acres.

Cultivated land. (in acres)	*Land leased in (in acres)*										*Total*	*Nil*	*Total*
	1	1-	2-	3-	4-	5-	6-	8-	10-	15-			
Less than 1	620		1	1							620	2,663	3,283
1—	903	807	1								1,710	2,097	380
2—	472	625	475	1							1,572	1,403	2,975
3—	228	359	265	206							1,058	1,023	2,081
4—	103	234	159	102							690	623	1,313
5—	56	110	101	59	34	44					404	506	910
6—	49	96	92	57	35	36	23				378	449	827
8—	13	36	28	33	24	15	21	4			174	223	397
10—	8	27	30	18	13	16	15	6	4		137	253	390
15—	3	5	9	4	6	4	9	3	5	2	50	125	175
20 and above		1	5	4	6	3	2	3	5		29	72	101
Total	2,455	2,300	1,154	483	210	118	70	16	14	2	6,822	9,437	16,259
Nil												6,831	6,831
Total	2,455	2,300	1,154	483	210	118	70	16	14	2	6,822	16,268	23,090

TABLE No. 4.10(B)

Distribution of cultivated holdings of sample families in Puri by size and according to the size of land leased in

Cultivated land (in acres)	*Land leased in (in acres)*													
	1	1-	2-	3-	4-	5-	6-	8-	10-	15-	*20 and above*	*Total*	*Nil*	*Total*
Less than 1	658											658	621	1,279
1—	402	839										1,241	604	1,845
2—	198	332	426									956	398	1,354
3—	80	187	169	195								631	296	927
4—	38	88	96	53	81							356	215	571
5—	19	51	55	40	37	41						243	151	394
6—	7	43	37	40	19	24	41					211	166	377
8—	5	22	15	15	7	6	14	7				91	103	194
10—	9	9	16	15	8	10	8	5	11			91	161	252
15—		4	3	3	5	2	1	2	2	4		26	59	85
20 and above	3	1	2	2	2	4			1	3	2	20	88	108
Total	1,419	1,576	819	363	159	87	64	14	14	7	2	4,324	2,662	7,386
Nil	8	2	1		1	1						13	3,094	3,107
Total	1,427	1,578	820	363	160	88	64	14	14	7	2	4,337	5,756	10,493

Cultivated land (in acres)	*Land leased out (in acres)*													
	1	1-	2-	3-	4-	5-	6-	8-	10-	15-	20 *and above*	*Total*	*Nil*	*Total*
Less than 1	749											749	4,494	5,243
1—	35	661										696	3,722	4,418
2—	19	36	345									400	2,297	2,697
3—	10	21	16	164								211	1,517	1,728
4—	9	13	8	5	85							120	857	977
5—	3	11	10	3	1	57						85	646	731
6—	8	16	29	12	3	2	37					107	570	677
8—	4	11	8	6	3	4	2	16				54	251	305
10—	4	4	18	12	8	10	9	5	24			94	274	368
15—		7	3	5	4	9	7	6	4	6		51	123	174
20 and above	1	3	7	8	3	8	5	2	13	8	19	77	60	137
Total	842	783	444	215	107	90	60	29	41	14	19	2,644	14,811	17,455
Nil													5,635	5,635
Total	842	783	444	215	107	90	60	29	41	14	19	2,644	20,446	23,090

TABLE NO. 4.11(B)

Distribution of owned land-holdings of sample families in Puri by size and according to size of land leased out

Cultivated land (in acres)	Land leased out (in acres)													
	1	1-	2-	3-	4-	5-	6-	8-	10-	15-	20 and above	Total	Nil	Total
Less than 1	288											288	1,733	2,021
1—	10	217										227	1,493	1,720
2—		15	136									151	817	968
3—	3	5	8	88								104	531	635
4—		3	2	4	44							53	343	396
5—	4	2	5	4	2	20						37	213	250
6—	1	3	8	5	5	2	17					41	207	248
8—		6	6	2	2	2	1	10				29	115	144
10—		7	16	6	6	8	4	7	14			68	164	232
15—		2	5	9	4	4	3	4	3	4		38	48	86
20 and above		1	4	3	10	10	3	7	16	10	27	91	48	139
Total	306	261	190	121	73	46	28	28	33	14	27	1,127	5,712	6,839
Nil	3		1		1	1						6	3,648	3,654
Total	309	261	191	121	74	47	28	28	33	14	27	1,133	9,360	10,493

Whether one considers pure rentiers among all rentiers or rentiers among landowners, it is again clear that the proportion of rentier families was largest among the small landowners.

Considering tenants, we find that in Puri nearly 60 per cent of the cultivating families had leased in some land and pure tenants were as many as 20 per cent of the total cultivators, or about 34 per cent of all tenants. Most of these tenants were small cultivators.

The data thus reveal the seriousness of the tenancy problem in the delta and its peculiarities. Whereas the tenants were many times more than the rentiers, most of the rentiers belonged to the small-owner class. The total land leased in was again far in excess of the total land reportedly leased out. In addition to the peculiar problem, particularly in Cuttack, where economic pressure has created a class of petty-rentiers, who migrate for work to urban metropolitan centres, two other features can be noted. Firstly, apparently a large number of owners of the land in villages could not be covered in the survey because they stayed outside the area, possibly mostly in urban centres. And, secondly, the extent of urbanization being severely limited, it followed that there was a considerable concentration of land in the hands of a few town-dwellers and institutions like temples and Maths (as in Puri). Tenancy in these coastal areas assumed a peculiar form. The tenants were far larger in number and were mostly small cultivators. On the other hand, the comparatively small group of rentiers consisted of two classes, the small landowners who rented out and migrated for work, and the larger owners (individuals and institutions) who were mainly town-dwellers and consisted of both the middle class and the rich. They were possibly smaller in number among rentiers but controlled the larger portion of the area leased-out.

3. *Farm Business in the Delta Zone*

The Delta covers parts of Cuttack and Puri districts. The Delta Irrigation Project Report of 1953 divided the total estimated culturable commanded area into three different parts: (*a*) the perennial flow irrigated area; (*b*) the lift-irrigation area and (*c*) the non-perennial area. Later on it was decided to "postpone" (apparently indefinitely) the lift-irrigation part of the scheme both in the Sambalpur and the Delta zones. The Delta Report was rather cautious about the non-perennial area. It took this area into account in estimating the culturable commanded area, etc., but in making financial forecasts of the project this area was left out of account.[2] We have followed the Report and excluded this area from our survey region.

[2] *Report on the Investigations for Extension of Irrigation in the Mahanadi Delta, Hirakud Dam Project,* Ministry of Irrigation and Power, Government of India, New Delhi, October 1953, para 7, pp. 68-73.

Therefore, the area surveyed by us or the area which we sampled is slightly smaller than the culturable commanded area as given in the Delta Report. As in the Sambalpur zone, from the 20 sample grids of the Delta zone 400 sample cultivators were selected by the same method of sampling, 20 from each grid. Thirteen of these grids were in the Cuttack district and seven in Puri. We present here the data for these two districts of the Delta zone separately.

Though the agricultural year, 1954-5, was a year of drought for the whole of the State, it was of lesser intensity in the Mahanadi Delta area than in the Sambalpur zone. Besides, during the subsequent year, 1955-6, unprecedented floods visited the Delta. It damaged the crops in large non-irrigated areas in Puri and Cuttack districts (in the proposed irrigation tract). What is more, for the first time since their construction, the flood protection embankments in the irrigated areas in Cuttack district gave way before the flood waters, damaging villages and cultivated land over a wide area. In view of these considerations it was decided to use the data for the year 1954-5 in regard to the Delta grids as the benchmark data.

Farm business (Cuttack): The average size of the cultivated holding was reported to be 2.83 acres only. One-fifth of the sample cultivators had less than one acre each. A quarter had one to two acres each, and another 22 per cent had between two and three acres each. Cultivators with more than 10 acres each, were less than three per cent of the total and cultivated 13 per cent of the total cultivated area. The smallest 20 per cent cultivated only four per cent of the total cultivated land.

The average family size was 5.3. Larger holdings and larger families went together. The smaller cultivators treated cultivation as only a part-time occupation.

About 40 per cent of the gross cropped area in the sample was canal irrigated. As the irrigation was in the *kharif* season it was mainly used for paddy. Only 25 per cent of this gross irrigated area was irrigated in the *rabi* season. Three per cent of the total cultivated land was reported to be fallow.

Sixty-nine per cent of the gross cropped area was under paddy. Pulses came next occupying nearly 27 per cent. Only 2.37 per cent of the area was under jute.

The average value of the farm assets per family was reported to be Rs. 1,577. Nearly 89 per cent of this was accounted for by owned land, 10 per cent by livestock and the rest by farm implements. The average value of farm implements was a little over Rs. 22 per family. The value of implements per family increased as the size of the holdings increased, until it reached the group of those having 10 and more acres each.

Out of a total of 260 families surveyed, 211 had bullocks. Most of the families without bullocks were in the smallest-size groups where also most

farms had no bullocks or only one per farm. Most of the bullocks were purchased. Owning of milch cattle was larger among larger cultivators. The farm implements used were of the traditional type. The bullock cart was the only expensive farm equipment and that too was not found everywhere. In most of the grids, none of the sample families had bullock carts. The average value of the farm implements per family came to about Rs. 22. Annual replacement charges per family amounted to one-third of this.

The two important products of livestock were milk and milk products and cattle droppings. The cattle droppings accounted for half of the total livestock products and the other half was accounted for by milk and milk products. Little was derived from the sale of eggs, hides and skins. A little over one-third of the milk produced and over half of the total milk products made were sold. The average investment in the total physical assets per family was very small. A little over 50 per cent of the total was in land, the remaining being in livestock and implements.

Farm receipts : Table 4.12 gives farm receipts of sample farms in Cuttack during 1954-5. Farm receipts were analysed under four different heads: receipts from land, from livestock, from trees and kitchen garden and from labour outside the farm. In the 13 grids of Cuttack district, receipts in the form of crop and fodder accounted for 70 per cent of the total, from livestock about nine per cent, about two per cent from kitchen garden, etc. and the remaining 20 per cent or so from wages. The receipts from land formed a smaller percentage of the total receipts of smaller cultivators than of the large ones. On the other hand, receipts from wages formed nearly 60 per cent of the receipts of the smallest cultivators, 31 per cent of the second smallest group and less than 10 per cent for the medium cultivators. They did not at all figure in the case of the group of biggest cultivators who naturally had no need and/or time to work on wages.

Most of the receipts were in kind. Only about 18 per cent were received in cash through wages, sale of produce, etc. Of these total cash receipts as much as 78 per cent were from wages, sale of produce amounting to only a fifth of the total. Wages were received mostly in cash, only about 25 per cent being received in the form of grain or other produce of the farm.

The most important farm produce was paddy, pulses, and jute.

Current farm expenses : Table 4.13 presents data about total expenses on current farm operations on sample farms in Cuttack under different heads. Of the total expenses, wages, including wage payments to casual and animal farm labour and to customary village servants, and feed and fodder expenses of livestock, accounted for a third each. The remaining one-third of the total was divided between expenses on materials like seed and manure, rent payment to landlords and other expenses like payment of land revenue, interest, etc.

TABLE No. 4.12

Receipts from farm business of sample farms (classified by size) in Cuttack during 1954-5

Groups	Size (Acres)	No. of Farms	Crop receipts			Livestock produce			Produce from trees, orchards kitchen gardens etc.		
			Sold Rs.	Unsold Rs.	Total Rs.	Sold Rs.	Unsold Rs.	Total Rs.	Sold Rs.	Unsold Rs.	Total Rs.
1	Less than 1.00	55	551.06 (12.41%)	3,888.51	4,439.57 (100%)	41.25 (6.36%)	607.75	649.00 (100%)	63.00 (25.91%)	180.12	243.12 (100%)
2	1.00 to 1.99	66	1,097.94 (8.34%)	12,062.33	13,160.27 (100%)	797.63 (35.45%)	1,452.37	2,250.00 (100%)	— —	335.00	335.00 (100%)
3	2.00 to 2.99	58	2,208.12 (12.65%)	15,242.66	17,450.78 (100%)	185.00 (11.96%)	1,361.62	1,546.62 (100%)	254.00 (31.59%)	550.00	804.00 (100%)
4	3.00 to 3.99	27	1,261.25 (11.40%)	9,799.44	11,060.69 (100%)	114.00 (9.31%)	1,110.87	1,224.87 (100%)	83.75 (29.00%)	205.00	288.75 (100%)
5	4.00 to 499	19	1,426.94 (14.16%)	8,649.21	10,076.15 (100%)	75.13 (7.18%)	971.56	1,046.69 (100%)	26.00 (12.32%)	185.00	211.00 (100%)
6	5.00 to 6.99	17	1,165.50 (10.39%)	10,051.39	11,216.89 (100%)	514.37 (28.23%)	1,308.00	1,822.37 (100%)	77.00 (36.32%)	135.00	212.00 (100%)
7	7.00 to 9.99	11	1,523.50 (14.92%)	8,686.72	10,210.22 (100%)	85.37 (11.01%)	689.75	775.12 (100%)	2.00 (4.08%)	47.00	49.00 (100%)
8	10.00 and above	7	2,274.12 (27.32%)	6,050.79	8,324.91 (100%)	360.00 (26.78%)	984.37	1,344.37 (100%)	— —	35.00	35.00 (100%)
	Total	260	11,508.43 (13.39%)	74,431.05	85,939.48 (100%)	2,172.75 (20.38%)	8,486.29	10,659.04 (100%)	505.75 (23.22%)	1,672.12	2,177.87 (100%)

Sold—cash value. Unsold—kind value.

TABLE NO. 4.12—(*Contd.*)

Receipts from farm business of sample farms (classified by size) in Cuttack during 1954-5

Group	*Other receipts*			*Total*			*Wages receipts*			*Grand Total*		
	Sold Rs.	*Unsold Rs.*	*Total Rs.*	*Sold Rs.*	*Unsold .Rs.*	*Total Rs.*	*Cash Rs.*	*Kind value Rs.*	*Total Rs.*	*Cash Rs.*	*Kind value Rs.*	*Total* Rs.
1	—	430.12	430.12 (100%)	655.31 (11.37%)	5,105.50	5,761.81 (100%)	5,466.37 (71.35%)	2,195.50	7,661.87 (100%)	6,121.68 (45.60%)	7,302.00	13,423.68 (100%)
2	—	546.87	546.87 (100%)	1,895.57 (11.63%)	14,396.57	16,292.14 (100%)	5,114.37 (73.60%)	1,834.19	6,948.56 (100%)	7,009.94 (30.16%)	16,230.76	23,240.70 (100%)
3	—	626.75	626.75 (100%)	2,647.12 (12.96%)	17,781.03	20,428.15 (100%)	4,658.69 (77.80%)	1,329.00	5,987.69 (100%)	7,305.81 (27.66%)	19,110.03	26,415.84 (100%)
4	—	282.25	282.25 (100%)	1,459.00 (11.35%)	11,397.56	12,856.56 (100%)	953.00 (80.94%)	224.44	1,177.44 (100%)	2,412.00 (17.19%)	11,622.00	14,034.00 (100%)
5	—	262.00	262.00 (100%)	1,528.07 (13.18%)	10,067.77	11,595.84 (100%)	583.50 (93.36%)	41.50	625.00 (100%)	2,111.57 (20.89%)	10,109.27	12,220.84 (100%)
6	—	322.69	322.69 (100%)	1,756.87 (12.94%)	11,817.08	13,573.95 (100%)	698.50 (83.70%)	136.00	834.50 (100%)	2,455.37 (17.04%)	11,953.08	14,408.45 (100%)
7	—	174.62	174.62 (100%)	1,610.87 (14.37%)	9,598.09	11,208.96 (100%)	219.00 (100%)	—	219.00 (100%)	1,829.87 (16.01%)	9,598.09	11,427.96 (100%)
8	—	157.00	157.00 (100%)	2,634.12 (26.71%)	7,227.16	98,612.28 (100%)	—	—	—	2,634.12 (26.71%)	7,227.16	9,861.28 (100%)
Total	—	2,802.30	14,186.93 (100%)	87,391.76 (13.97%)	101,578.69	17,693.43 (100%)	17,693.43 (75.44%)	5,760.63	23,454.06 (100%)	31,880.36 (25.50%)	93,152.39	125,032.75 (100%)

Sold—cash value. Unsold—kind value.

TABLE NO. 4.13

Current farm expenses of sample farms (classified by their size) in Cuttack during 1954-5

Groups	Size (acres)	No. of farms	Wages to casual farm labourers			Payments to permanent farm servants			Materials used		
			Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.
1	Less than 1.00	55	611.87 (82.40%)	130.69	742.56 (100%)	—	—	—	58.62 (10.62%)	493.25	551.87 (100%)
2	1.00 to 1.99	66	1,366.19 (77.04%)	407.06	1,773.25 (100%)	—	—	—	199.00 (12.04%)	1,453.56	1,652.56 (100%)
3	2.00 to 2.99	58	1,785.37 (64.94%)	963.75	2,749.12 (100%)	24.00 (53.33%)	21.00	45.00 (100%)	297.19 (14.91%)	1,695.50	1,992.69 (100%)
4	3.00 to 3.99	27	1,299.50 (65.54%)	683.31	1,982.81 (100%)	150.00 (37.22%)	253.00	403.00 (100%)	73.37 (6.41%)	1,071.44	1,144.81 (100%)
5	4.00 to 4.99	19	1,815.12 (71.47%)	724.50	2,539.62 (100%)	280.00 (37.79%)	461.00	741.00 (100%)	79.00 (8.02%)	906.62	985.62 (100%)
6	5.00 to 6.99	17	1,502.25 (58.40%)	1,070.31	2,572.56 (100%)	570.00 (30.31%)	1,310.44	1,880.44 (100%)	11.25 (0.98%)	1,142.31	1,153.56 (100%)
7	7.00 to 9.99	11	1,550.62 (63.04%)	909.19	2,459.81 (100%)	260.00 (36.26%)	457.00	717.00 (100%)	107.75 (9.96%)	974.19	1,081.94 (100%)
8	10.00 and above	7	1,203.62 (66.81%)	597.87	1,801.49 (100%)	530.00 (40.11%)	791.25	1,321.25 (100%)	— —	772.12	772.12 (100%)
	Total	280	11,134.54 (66.99%)	5,486.68	16,621.22 (100%)	1,814.00 (35.56%)	3,293.69	5,107.69 (100%)	826.18 (8.85%)	8,508.99	9,335.17 (100%)

TABLE NO. 4.13–(*Contd.*)

Current farm expenses of sample farms (classified by their size) in Cuttack during 1954-5

Groups	Size (acres)	*Feed and fodder charges*			*Repair charges of implements*			*Payments to village servants*			*Current improvement expenses on land*		
		Cash Rs.	*Kind value* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.
1	Less than 1.00	358.12 (22.10%)	1,262.69	1,620.81 (100%)	14.00 (100%)	—	14.00 (100%)	11.00 (26.54%)	30.44	41.44 (100%)	16.37 (100%)	—	16.37 (100%)
2	1.00 to 1.99	718.75 (22.32%)	2,502.00	3.220.75 (100%)	20.06 (100%)	—	20.06 (100%)	14.87 (10.44%)	127.62	142.49 (100%)	52.75 (100%)	—	52.75 (100%)
3	2.00 to 2.99	873.56 (23.89%)	2,783.69	3,657.25 (100%)	14.75 (100%)	—	14.75 (100%)	4.00 (1.83%)	215.12	219.12 (100%)	98.94 (100%)	—	98.94 (100%)
4	3.00 to 3.99	475.44 (23.68%)	1,532.37	2,007.81 (100%)	1.00 (100%)	—	1.00 (100%)	— —	114.44	114.44 (100%)	61.00 (100%)	—	61.00 (100%)
5	4.00 to 4.99	459.75 (24.45%)	1,420.94	1,880.69 (100%)	6.94 (100%)	—	6.94 (100%)	— —	100.56	100.56 (100%)	55.75 (96.54%)	2.00	57.75 (100%)
6	5.00 to 6.99	514.94 (25.16%)	1,531.44	2,046.38 (100%)	6.37 (100%)	—	6.37 (100%)	— —	91.62	91.62 (100%)	65.50 (100%)	—	65.50 (100%)
7	7.00 to 9.99	333.37 (15.76%)	1,782.00	2,115.37 (100%)	0.94 (100%)	—	0.94 (100%)	— —	80.25	80.25 (100%)	53.00 (92.98%)	4.00	57.00 (100%)
8	10.00 and above	222.37 (17.92%)	1,018.75	1,241.12 (100%)	—	—	— —	— —	62.37	62.37 (100%)	15.00 (100%)	—	15.00 (100%)
	Total	3,95630 (22.24%)	13,833.88	17,790.18 (100%)	64.06 (100%)	—	64.06 (100%)	29.87 (3.50%)	822.42	852.29 (100%)	418.31 (98.59%)	6.00	424.31 (100%)

TABLE NO. 4.13–(*Contd.*)

Current farm expenses of sample farms (classified by their size) in Cuttack during 1954-5

Groups	Size (acres)	Other current expenses			Payments to landlord			Total		
		Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.	Cash Rs.	Kind value Rs.	Total Rs.
1	Less than 1.00	371.06 (98.93%)	4.00	375.06 (100%)	— —	215.12	215.12 (100%)	1,441.04 (40.28%)	2,136.19	3,577.23 (100%)
2	1.00 to 1.99	1,031.56 (97.50%)	26.44	1,058.00 (100%)	7.50 (0.51%)	1,449.37	1,456.87 (100%)	3,410.68 (36.37%)	5,966.05	9,376.73 (100%)
3	2.00 to 2.99	937.87 (90.50%)	98.44	1,036.31 (100%)	— —	2,195.44	2,195.44 (100%)	4,035.68 (33.61%)	7,972.94	12,008.62 (100%)
4	3.00 to 3.99	275.56 (94.19%)	17.00	292.56 (100%)	4.00 (0.30%)	1,347.44	1,351.44 (100%)	2,339.87 (31.80%)	5,019.00	7,358.87 (100%)
5	4.00 to 4.99	424.44 (93.17%)	31.12	455.56 (100%)	10.00 (1.32%)	746.37	756.37 (100%)	3,131.00 (41.61%)	4,393.11	7,524.11 (100%)
6	5.00 to 6.99	727.87 (94.79%)	40.00	767.87 (100%)	2.00 (0.15%)	1,315.44	1,317.44 (100%)	3,400.18 (34.34%)	6,501.56	9,901.74 (100%)
7	7.00 to 9.99	238.25 (97.84%)	5.25	243.50 (100%)	— —	714.31	714.31 (100%)	2,543.93 (34.05%)	4,926.19	7,470.12 (100%)
8	10.00 and above	602.56 (100%)	—	602.56 (100%)	— —	327.87	327.87 (100%)	2,573.55 (41.89%)	3,570.23	6,143.78 (100%)
	Total	4,609.17 (95.40%)	222.25	4,831.42 (100%)	23.50 (0.28%)	8,311.36	8,334.86 (100%)	22,875.93 (36.10%)	40,485.27	63,361.20 (100%)

Expenses on labour engaged on farm increased as the size of the farm increased, the last but one group of large farmers reporting nearly half of its total expenses to be on this account. However, unlike the Sambalpur zone, payments to annual farm servants accounted for less than 25 per cent of the total wage payments.

Except for the very small cultivators, expenses on seed and manure formed roughly a steady proportion of between eight and 12 per cent of the total expenses. Rent payments formed a higher proportion of the total expenses only in those groups where a large proportion of the cultivated land was leased in.

The discussion above relates to total expenses. But nearly two-thirds of this was in kind—produce of the farm used or paid out as expenses. Most of the cash expense was on account of wage payments—payments to casual labour and to annual farm servants. These two accounted for nearly 57 per cent of the total cash expenses. One-fifth of the total was due to miscellaneous expenses, mainly land revenue and interest payments. Over 17 per cent of the total was due to purchase of feed and fodder.

Examining individual items of expenditure separately we find that expenses like payment of land revenue, rent for hire of instruments, wages of artisans repairing implements, etc. were made entirely in cash. With regard to all other expenses, payments were reported both in cash and kind. In regard to wages, about one-third of the total payment was in kind, the rest in cash. In this also there was no difference between casual and attached labour. Only about eight to nine per cent of the seed and manure used on the farm was purchased and most of it was manure. Nearly a fourth of the total expenses on feed and fodder for livestock was in cash. Almost the entire rent payment to landlords was in the form of the produce, cash rent being of little significance. Customary payments to village servants was in kind but here too the smaller cultivators reported cash payments to a certain extent. Almost the entire miscellaneous expense group was in cash, since all land revenue and most interest payments were or had to be in cash.

4. Agricultural Labour in Cuttack

The total sample of agricultural labourers in the Cuttack area consisted of 130 persons. Of these, 108 were casual labourers and the remaining permanent or annual or attached farm servants. The two are treated separately below. Additional details regarding their employment, etc. are given in Appendix II.

Casual: To the total of 108 cases in the sample an employment of 24,277 man-days was recorded for the whole period of 12 months, i.e. on an average a labourer could have got employment for 225 days during the year (Table No. 4.14). The average is by itself of very little significance

TABLE NO. 4.14

The employment and wage earnings of agricultural labourers in Cuttack district in 1954-5

S. No.	Name of work	Number of labourers		Number of days worked	Value of payment in kind Rs.	Cash wages Rs.	Total Rs.	Bulk receipts during year: In kind Rs.	Bulk receipts during year: In cash Rs.	Bulk receipts during year: Total Rs.	Grand total income Rs.
Casual Labour											
1.	In agriculture both in and outside the village	105	T	21,534	5,117	13,905	19,022	—	—	—	19,022
			A	205.0	48.7	132.5	181.2	—	—	—	181.2
2.	In non-agriculture in and outside the village	73	T	2,743	119	2,642	2,761	—	—	—	2,761
			A	37.6	1.6	36.2	37.8	—	—	—	37.8
3.	Total work done	108	T	24,277	5,236	16,547	21,783	—	—	—	21,783
			A	224.8	48.5	153.2	201.07	—	—	—	201.07
Farm servants											
1.	In agriculture both in and outside the village	22	T	6,673	2,776	846	3,622	930	—	930	4,552
			A	303.3	126.2	38.4	164.6	42.3	—	42.3	206.9
2.	In non-agriculture both in and outside the village	10	T	266.0	94	66	160	—	—	—	160
			A	26.6	9.4	6.6	16.0	—	—	—	16.0
3.	Total work done	22	T		2,870	912	3,782	930	—	930	4,712
			A		130.5	41.4	171.9	42.3	—	42.3	214.2

A = Average T = Total

except as showing the total volume of wage work of all descriptions available to these labourers in this region, in a period of 12 months. Further details about the employment available to individual labourers in the sample is discussed below.

Of the total employment available to these labourers, 88 per cent was in agriculture and the rest in non-agricultural pursuits. A detailed breakdown given in Appendix II showed that of the total work in agriculture, 91 per cent was in the village of the labourers and the remaining outside it. Of the non-agricultural work, 75 per cent was in the village and the remaining outside it. On the whole, most of the employment was in agriculture and in the village.

An examination of the employment data in the different periods of two months into which the year was divided showed that the availability of agricultural and non-agricultural employment was rather properly dovetailed. The slack period in agriculture corresponded with the busy one in non-agricultural work. In agriculture, the peak load of work was in June and July (23 per cent of the total man-days) and the load was lower than the peak but quite heavy in August-September and December-January, each accounting for 20-18 per cent of the total man-days of employment. The remaining three periods of two months each accounted for the remaining 40 per cent of the total man-days of employment. In non-agricultural work, on the other hand, the peak load of work was in February-March and less heavy but substantial in April-May. The load also increased in a small way in October-November. The seasonal fluctuations in agricultural and non-agricultural employments were common to all villages, i.e. the fluctuations in these were the same with regard to work available inside and outside the village.

Table 4.15 gives the classification of sample labourers according to the total number of days on which they were employed and the range of their total earnings in each class. Judging on the criterion discussed earlier (p. 51) about 12 per cent of the total labourers in the sample were fully employed. About 15 per cent were nearly fully employed (90 to 100 per cent of the days). About 12 per cent could not secure employment (on the assumption that they were seeking it) for less than half the period. This continuum can be cut at any point to decide where the boundary between full employment and underemployment lies.

What was more significant, however, was the range of earnings. The total range in earnings was wide in all classes showing the wide range of daily wage rates possibly for different types of work.[3] This was reflected in the total earnings of the two top groups where the average earning in the fully employed group was lower than that in the "nearly fully em-

[3] *The Report of the Agricultural Labour Enquiry*, Vol. III, East India, p. 71, reports that the range of earnings for men labourers in the coastal zone was from less than 10 as. to 34 as. per day.

TABLE NO. 4.15

Casual agricultural labourers in the Cuttack sample classified according to the total number of days on which they were employed during 1954-5 and the range of their total earnings during the period

Number of days employed during the year	*Number of samples*	*Range of total earnings (in Rupees)*
1. 300 days and above	13	200 to 336
2. 270 to 299 days	16	202 to 359
3. 240 to 269 „	16	189 to 287
4. 210 to 239 „	27	111 to 279
5. 180 to 209 „	16	91 to 218
6. 150 to 179 „	7	51 to 195
7. 120 to 149 „	7	42 to 150
8. 90 to 199 „	1	98 —
9. Below 90 days	5	33 to 63
	108	

ployed" group. The level of total earnings was thus not proportionately connected with the total employment secured by a labourer. Wage rates were higher in non-agricultural work than in agriculture. They were higher in busy seasons than in slack seasons in both agriculture and other employment.

Annual farm servants : There were 22 cases of these in our sample and the information regarding them is presented in Table 4.14. The Table needs no elaborate comments. As attached servants, they mostly worked in agriculture and in the village. Obviously they could not work in non-agricultural lines nor outside the village. The perquisites were naturally important in their case. There is no point in analysing the seasonal pattern of employment because they were salary earners all the time employed during the period of contract.[4]

[4] Some further facts about attached servants might be quoted from the *Report of the Agricultural Labour Enquiry* (1951). "In Coastal zone attached workers were of two types known as Kothias or Halias and Chakirias. The latter received an annual wage of about Rs. 30 to Rs. 60, which was paid in cash in three to four instalments. In addition, the following perquisites were allowed during a year to the Chakirias.

A bed-sheet worth	Rs. 3.8.0
A pair of dhotis worth	Rs. 6.0.0
A napkin worth	Rs. 3.0.0
3 or 4 meals a day*	Rs. 270.0.0 (approx.)

* (consisting of rice; the value of the meals was annas 12 per day).

[*Contd. on p.* 105]

5. *Rural Industry (Cuttack)*

Weavers : In the 13 grids surveyed in Cuttack district, 82 families reported weaving as their main occupation. Seven of these families were selected as a part of the general sample of industries for survey. As an additional sample, 17 extra families were also selected for an intensive study of the handloom weaving industry in the district. The following discussion covers all the 24 families of weavers surveyed.

All but two of the families had just one loom each; two families had two looms each. The 24 families reported 66 workers in all, two of whom were very temporary employees with a family. Twenty-nine of the workers were adult males, all skilled; of the 31 female workers, 17 were reported as skilled and 14 unskilled. There were only four children reported to be engaged in this industry.

The average original value of present capital equipment per family came to about Rs. 78 and the estimated present value to about Rs. 56. These values were a little higher than those reported for either Puri or Sambalpur. The average value of new additions to the weaver's equipment amounted to about Rs. 10.5 and the annual repair and maintenance expense to about Rs. 15 to 16.

The average value of sale (production) during the year was reported to be about Rs. 1,000. Out of this, nearly 67 per cent accounted for yarn, starch and dye. Inclusive of other costs, the total expenses came to about 69 per cent of the total sales (value of production). The average net income per family (or household) came to about Rs. 326. As the following Table will show most of the families (about 45 per cent of them) had an income of between Rs. 300 to less than Rs. 400 per annum and only three of the 24 families reported an income of more than Rs. 540 per annum.

[*Contd. from p.* 104]

The Kothias or Halias were allowed a piece of land free of rent locally known as Heta. The employer bore the entire cost of cultivation, except in Puri district, where the cost was borne by the worker, the employer paying the land revenue. In such cases, Kothias got four meals a day, but were not permitted to work elsewhere during the entire period of contract. Interest-free loans of Rs. 20 to Rs. 50 were also granted to these workers. The Kothias were allowed a daily wage of one gouni or four seers of paddy worth annas 12. In some villages, the daily wage was only 2 seers of paddy worth annas 6. The Kothia was engaged on piece wages during the harvesting season and was entitled to one-fifth share in the produce harvested by him, earning Rs. 1.8.0 per day for nearly 3 to 4 weeks at this rate. Workers usually preferred employment as Chakirias, as they were allowed free meals in addition to other perquisites and a yearly wage of about Rs. 50. Children were engaged as graziers and were paid at the rate of Rs. 8 a year for each head of cattle." *Agricultural Labour Enquiry, Report on the Intensive Survey of Agricultural Labour Employment, Underemployment, Wages and Levels of Living*, Vol. III, East India, Government of India, Ministry of Labour, New Delhi, 1955, p. 74.

Net annual income of family in Rs.	*Families with one loom*	*Families with two or more looms*	*Total*
Less than 100	4	–	4
– 200	2	–	2
– 300	2	–	2
– 400	10	1	11
– 500	2	–	2
– 750	2	–	2
– 1000	–	–	–
Above 1000	–	1	1
Total	22	2	24

Other industries : Information about other rural industries in Cuttack is presented in Appendix III, in a consolidated Table.

6. *Rural Trade, Transport and Professions (Cuttack)*

Information regarding trade and transport is presented in a consolidated Table in Appendix III.

7. *The Urban Sector in Cuttack – Kendrapada*

Population : The population of Kendrapada had declined from 15,245 in 1901, to 12,253 in 1951. The decrease had been continuous from 1901 to 1941, the largest decrease occurring in the decade 1921-31. During 1941-51 there was a slight increase. According to our estimate, the population was 12,851 at the time of our survey. The number of females per 1,000 males was 1,028 in the sample population.

The total adult population constituted 61 per cent of the total population (Table No. 4.16). Of the adult males 88 per cent were earners. The proportion of earners among the adult females was 10 per cent only. Only one non-adult earner was reported. The ratio of total earners to non-earners was 1:2.62.

Industry and occupation : In Table No. 4.17, the sample families are classified by the industry (main and subsidiary) in which their heads were engaged. Nearly 20 per cent fell in the category of imperfectly described occupations. Twenty per cent of the sample families were in agriculture

TABLE NO. 4.16

Distribution of the sample population of Kendrapada by age, sex, earners and non-earners

Description of population	*Earners*		*Non-earners*		*Total*		*Per cent to total*
Male adult	403	(88.8)*	51	(11.2)	454	(100)	28.2
Male non-adult	1	(0.3)	338	(99.7)	339	(100)	21.1
Total males	404	(50.9)	389	(49.1)	793	(100)	49.3
Female adult	52	(9.9)	475	(90.1)	527	(100)	32.8
Female non-adult	—	—	287	(100.0)	287	(100)	17.9
Total females	52	(6.4)	762	(93.6)	814	(100)	50.7
Total persons	456	(28.4)	1,151	(71.6)	1,607	(100)	100.0

* Figures in brackets indicate percentages of total.

TABLE NO. 4.17

Distribution of sample families in Kendrapada according to the main and subsidiary industries in which their heads were engaged

Name of the industry	*Families with this as:*	
	main industry	*subsidiary industry*
Agriculture, livestock, forestry, fishing, hunting	72	47
Manufacturing	76	5
Construction	4	—
Electricity, gas, water and sanitary services	1	—
Distributive services (trade and commerce)	44	7
Transport, storage and communications	13	2
Services	62	10
Activities not adequately described	70	15
Not stated or none	10	266
Total	352	352

and 21 per cent were engaged in manufacturing; services accounted for 17.5 per cent and trade and commerce for 12.5 per cent. The large number of families in the insufficiently described category indicated a rather undifferentiated structure of employment and work in Kendrapada. Eighty-six families reported subsidiary occupations, 46 in agriculture, six in manufacturing, 10 in services, etc.

Table No. 4.18 gives the distribution of earners in the sample by industry and occupation. The insufficiently described category claimed 18 per cent of the total earners. About 26 per cent of the earners in the sample were in manufacturing, nearly 17 per cent in services and about 13 per cent in trade and commerce. Agriculture and primary industry engaged 18 per cent. In regard to occupations, it was found that 60 per cent of the total earners belonged to the subordinate technical occupations, about 13 per cent to sales and related occupations, and nine per cent each to professional, technical and related occupations and ministerial occupations.

Table No. 4.19 gives the distribution of earners according to their earnings from their main occupations during the year preceding the inquiry. The 1st, 2nd and 3rd quartile earnings in the different industrial groups are also given in the Table. The median earnings in agriculture and manufacturing were about the same, Rs. 235 and Rs. 231 respectively. Both the first and third quartile earnings in agriculture were, however, significantly higher than in manufacturing. Transport, storage and communications had the highest earning levels in the sample, its median income being considerably greater than the third quartile income of services. The median earnings in services were Rs. 337. The 1st quartile earnings in services were about the same as in agriculture but the 3rd quartile earnings were Rs. 517.61. In trade and commerce, there was small difference between the median and the 3rd quartile earnings though the median was more than twice the 1st quartile earnings.

Table No. 4.20 gives the distribution of families according to their total income during the previous year. The median income was Rs. 361. The range of the middle 50 per cent of incomes was from Rs. 214 to Rs. 568. The per capita income in Kendrapada was Rs. 126.

TABLE NO. 4.18

Distribution of earners in sample families in Kendrapada according to industry and main occupation

	Name of main occupation									
	Managerial, administrative and executive occupations (non-technical)	*Professional technical and related occupations (Superior)*	*Subordinate administrative and executive occupations*	*Ministerial occupations*	*Sales and related occupations (subordinate)*	*Subordinate technical occupations*	*Service occupations*	*Not stated*	*Total*	*Per cent to the total*
Agriculture, livestock, forestry, fishing & hunting	—	—	—	—	—	84	—	—	84	18.4
Manufacturing	1	2	—	—	—	117	—	—	120	26.3
Construction	—	—	—	—	—	4	—	—	4	0.9
Electricity, gas, water & sanitary services	—	—	1	—	—	—	—	—	1	0.2
Distributive services (trade & commerce)	—	1	—	—	57	—	—	—	58	12.7
Transport, storage and communications	—	—	4	—	—	12	—	—	16	3.5
Services	1	39	11	4	—	—	21	—	76	16.7
Activities not adequately described	—	—	25	—	—	58	—	—	83	18.2
Not stated	—	—	—	—	—	—	—	14	14	3.1
Total	2	42	41	4	57	275	21	14	456	100.0

TABLE NO. 4.19

Distribution of earners in sample families in Kendrapada classified by the industry, according to their annual income from their main occupation

Name of industry of earners	Family income (in Rs.)											1st Quartile Income (Rs.)	Median Income (Rs.)	3rd Quartile Income (Rs.)
	1 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 500	501 to 750	751 to 1,000	1,001 to 2,000	Above 2,000			
Agriculture, live-stock, forestry, fishing & hunting	11	17	10	13	—	4	8	5	8	4	1	129.41	234.62	428.91
Manufacturing	32	16	12	11	6	22	7	7	3	4	—	71.59	231.25	357.50
Construction	—	—	—	—	1	1	1	—	1	—	—			
Electricity, gas, water & sanitary service	—	1	—	—	—	—	—	—	—	—	—			
Distributive services, (trade and commerce)	11	7	2	7	1	15	4	6	3	2	—	125.00	328.33	384.38
Transport, storage & communications	—	2	—	2	—	1	—	3	5	3	—	300.00	625.00	825.00
Services	12	13	2	8	1	6	10	11	1	7	4	126.92	337.50	517.61
Activities not adequately described	9	10	20	14	6	9	7	4	1	3	—	179.38	233.93	343.06
Total	75	66	46	55	15	58	37	36	22	23	5	123.16	250.00	396.35

NOTE : "Earners" who did not report any earning and who did not report any occupation have been excluded for this Table.

TABLE NO. 4.20

Distribution of sample families in Kendrapada classified by the industry of their heads, according to the total annual family income

Industry of the head of the family	*Family income (in Rs.)*												*Total*
	1 to 100	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 500	501 to 750	751 to 1,000	1001 to 2,000	*Above 2,000*	*Not stated*	
Agriculture, live-stock, forestry, fishing & hunting	2	11	7	11	3	5	6	11	7	7	2	—	72
Manufacturing	9	4	4	8	2	13	12	10	4	9	—	—	75
Construction	—	—	—	—	1	—	1	1	1	—	—	—	4
Electricity, gas, water & sanitary services	—	—	1	—	—	—	—	—	—	—	—	—	1
Distributive services (trade & commerce)	7	2	1	3	1	8	3	9	5	4	1	—	44
Transport, storage & communications	—	—	—	—	—	1	—	4	4	3	1	—	13
Services	4	14	1	2	1	6	6	13	4	6	5	—	62
Activities not adequately described	7	5	10	10	6	11	9	6	2	2	1	—	69
Not stated	—	1	1	—	—	—	—	—	—	—	—	10	12
Total	29	37	25	34	14	44	37	54	27	31	10	10	352

Chapter V

ECONOMIC CONDITIONS IN THE DELTA ZONE (PURI) IN 1954-5

1. Farm Business (Puri)[1]

THE average size of the cultivated holdings was 3.68 acres. Two-thirds of the cultivators had less than four acres of land each. Cultivators having less than four acres each cultivated only about one-third of the total cultivated land. Cultivators with more than 10 acres of cultivated land each cultivated over one-fifth of the total land. In Puri, joint cultivation was practised to a considerable extent. For a particular plot of land a number of cultivators came together and put in the labour and incurred expenses and shared the produce in the same proportions.

The average size of the farm family was reported to be 5.5. Generally, the size of the family increased with the increase in the size of the farm. Two per cent of the net cultivated area was reported to be fallow. Sixty-five per cent of the gross cropped area was reported to be under paddy and 29 per cent more was occupied by pulses. The area under orchard crops like coconut, betel leaves, etc. accounted for a little less than one per cent of the gross cropped area. About thirty-one per cent of the gross cropped area was cropped more than once. The second crop was almost invariably pulses. The total irrigated area constituted about 2.16 per cent of the gross cropped area. All of this was lift irrigation.

The average value of the assets per farm was reported to be about Rs. 1,276. Eighty per cent of this was owned land, about ten per cent livestock and the remaining farm implements, etc. The bigger cultivators had more bullocks and cows per farm. Cultivators with less than four acres each had less than a pair of bullocks on an average. Most of the bullocks were purchased.

The average value of farm implements per farm was Rs. 43.5 and the annual purchases of these per farm were reported to be about Rs. 6.

Farmyard manure and dung-cakes accounted for three-fourths of the total value of the live-stock product, the rest being accounted for by milk products. Forty per cent of the total milk and milk products was sold. Only about ten per cent of the total live-stock product was marketed. Nearly a half of the total investment was in the purchase of land, one-fifth in improvements to land, about 32 per cent of the remaining investment was on implements and the rest in live-stock.

[1] As in the case of Sambalpur and Cuttack, a detailed report on the farm business survey in the Puri sample grids is contained in Appendix II.

Farm receipts : Over 73 per cent of the total farm receipts according to Table No. 5.1, were from land, in the form of crop and fodder receipts and receipts from trees, orchards and kitchen gardens. Live-stock receipts amounted to about nine per cent of the total and the remaining eighteen per cent were from wages. Considering cultivators in different size groups we find that receipts from live-stock were more or less of the order of this average. The wages, on the other hand, constituted as large as 65 per cent of the total farm receipts in the case of the smallest cultivators and less than three per cent in case of the largest.

Only about 10 per cent of the total value of the receipts from crops and fodder, live-stock produce and produce of trees and orchards, etc. was from sales. The rest was consumed at home or used on the farm. About nine per cent of the total value of crop and fodder was for sale. The larger portion of wages received by the farmer was, however, in cash. The wages in kind formed only about 38 per cent of the total wages received.

Paddy was the most dominant crop. Pulses came next. The other crops were of minor importance. A larger proportion of the other crops was sold whereas the sales of paddy were proportionately less.

Farm expenses : Table 5.2 gives the total expenses on current farm operations under different heads. The wages paid to casual and annual farm servants and to village servants accounted for one-third of the total expenses. Nearly 32 per cent of the total expenses were on feed and fodder. Expenses on account of seed, manure and other materials formed about 17 per cent of the total expenses. Due to greater prevalence of tenancy in this district, payment of rent formed 14 per cent of the total expenses.

The smaller cultivators — those with less than five acres of cultivated land — incurred a smaller proportion of their total expenditure on payment to labourers than the bigger ones. On the other hand, feed-and-fodder expenses formed a larger part of the small cultivators' total expenses than that of the larger ones.

Out of the total expenses on current farm operations, only about 33 per cent were incurred in cash. All other expenses were in kind. Excepting a stray case here and there, all payments to landlords and to village servants were in kind, in the form of farm produce. Payment of land revenue and repair charges of implements (payment to artisans) were invariably in cash. Payment of wages in cash, which formed nearly 54 per cent of the total cash expenses, formed about 54 per cent of the total wage payments also. Of course, cash payments to casual labour were nearly two-thirds of the total payments, whereas cash payments to permanent farm servants formed only about half the total payment to them. Cash expenses on feed and fodder which formed about 25 per cent of the total expenses under this head, also formed one-fourth of the total cash expenses of the farmers. Land revenue and interest payments formed about 12 per cent of the total cash expenses.

TABLE NO. 5.1

Receipts from farm business of sample farms (arranged by size) in Puri during 1954-5

Groups	Size (acres)	No. of farms	Crop receipts			Livestock produce			Produce from trees, orchards, kitchen garden etc.		
			Sold Rs.	Unsold Rs.	Total Rs.	Sold Rs.	Unsold Rs.	Total Rs.	Sold Rs.	Unsold Rs.	Total Rs.
1	Less than 1.00	26	29.37 (1.79%)	1,615.94	1,645.31 (100%)	24.00 (5.83%)	388.00	412.00 (100%)	— —	20.00	20.00 (100%)
2	1.00 to 1.99	28	354.00 (8.06%)	4,038.28	4,392.28 (100%)	245.75 (24.98%)	737.87	983.62 (100%)	— —	37.00	37.00 (100%)
3	2.00 to 2.99	23	220.00 (4.53%)	4,640.12	4,860.12 (100%)	91.87 (13.50%)	588.81	680.68 (100%)	191.56 (63.52%)	110.00	301.56 (100%)
4	3.00 to 3.99	16	122.00 (2.59%)	4,593.04	4,715.04 (100%)	86.25 (11.81%)	644.12	730.37 (100%)	— —	99.94	99.94 (100%)
5	4.00 to 4.99	14	543.75 (10.07%)	4,854.39	5,398.14 (100%)	— —	474.50	474.50 (100%)	— —	30.00	30.00 (100%)
6	5.00 to 6.99	13	679.87 (11.42%)	5,272.75	5,952.62 (100%)	9.00 (1.41%)	630.37	639.37 (100%)	— —	76.69	76.69 (100%)
7	7.00 to 9.99	12	1,572.50 (15.42%)	8,625.00	10,197.50 (100%)	— —	850.00	850.00 (100%)	43.00 (22.66%)	146.75	189.75 (100%)
8	10.00 and above	8	782.00 (7.68%)	9,395.85	10,177.85 (100%)	173.69 (16.33%)	890.12	1,063.81 (100%)	192.00 (46.06%)	224.87	416.87 (100%)
	Total	140	4,303.49 (9.09%)	43,035.37	47,338.86 (100%)	630.56 (10.81%)	5,203.79	5,834.35 (100%)	426.56 (36.40%)	745.25	1,171.81 (100%)

Sold—cash value. Unsold—kind value.

TABLE No. 5.1—(contd.)

Receipts from farm business of sample farms (arranged by size) in Puri during 1954-5

No.	*Other receipts*			*Total*			*Wages receipts*			*Grand total*		
	Sold Rs.	*Unsold* Rs.	*Total* Rs.	*Sold* Rs.	*Unsold* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* Rs.	*Total* Rs.
1.	—	221.62	221.62 (100%)	53.37 (2.32%)	2,245.56	2,298.93 (100%)	2,234.50 (59.05%)	1,549.81	3,784.31 (100%)	2,287.87 (37.61%)	3,795.37	6,083.24 (100%)
2.	—	202.50	202.50 (100%)	599.75 (10.68%)	5,015.65	5,615.40 (100%)	1,368.19 (59.65%)	925.44	2,293.63 (100%)	1,967.94 (24.88%)	5,941.09	7,909.03 (100%)
3.	—	141.87	141.87 (100%)	503.43 (8.41%)	5,480.80	5,984.23 (100%)	1,083.75 (61.04%)	691.81	1,775.56 (100%)	1,587.18 (20.45%)	6,172.61	7,759.79 (100%)
4.	—	143.75	143.75 (100%)	208.25 (3.66%)	5,480.85	5,689.10 (100%)	816.25 (59.95%)	545.37	1,361.62 (100%)	1,024.50 (14.53%)	6,026.22	7,050.72 (100%)
5.	—	105.62	105.62 (100%)	543.75 (9.05%)	5,464.51	6,008.26 (100%)	558.37 (58.10%)	402.62	960.99 (100%)	1,102.12 (15.81%)	5,867.13	6,969.25 (100%)
6.	—	90.62	90.62 (100%)	688.87 (10.19%)	6,070.43	6,759.30 (100%)	455.50 (56.82%)	346.19	801.69 (100%)	1,144.37 (15.14%)	6,416.62	7,560.99 (100%)
7.	—	86.25	86.25 (100%)	1,615.50 (14.27%)	9,708.00	11,323.50 (100%)	354.75 (85.53%)	60.00	414.75 (100%)	1,970.25 (16.78%)	9,768.00	11,738.25 (100%)
8.	—	103.12	103.12 (100%)	1,147.69 (9.78%)	10,613.96	11,761.65 (100%)	330.00 (100%)	—	330.00 (100%)	1,477.69 (12.22%)	10,613.96	12,091.65 (100%)
Total	—	1,095.35	1,095.35 (100%)	5,360.61 (9.67%)	50,079.76	55,440.37 (100%)	7,201.31 (61.43%)	4,521.24	11,722.55 (100%)	12,561.92 (18.70%)	54,601.00	67,162.92 (100%)

Sold—cash value. Unsold—kind value.

TABLE NO. 5.2

Current farm expenses on sample farms (arranged by size) in Puri in 1954-5

Groups	Size (acres)	No. of farms	Wages to casual farm labourers			Payments to permanent farm servants			Materials used		
			Cash Rs.	Kind value in Rs.	Total Rs.	Cash Rs.	Kind value in Rs.	Total Rs.	Cash Rs.	Kind value in Rs.	Total Rs.
1	Less than 1.00	26	150.75 (95.64%)	6.87	157.62 (100%)	— —	—	— —	30.37 (11.28%)	238.87	269.24 (100%)
2	1.00 to 1.99	28	623.69 (83.39%)	124.19	747.88 (100%)	— —	—	— —	136.31 (18.40%)	604.69	741.00 (100%)
3	2.00 to 2.99	23	842.37 (87.32%)	122.31	964.68 (100%)	— —	125.62	125.62 (100%)	104.87 (12.28%)	749.37	854.24 (100%)
4	3.00 to 3.99	16	945.75 (75.70%)	303.62	1,249.37 (100%)	— —	—	— —	38.81 (5.20%)	708.00	746.81 (100%)
5	4.00 to 4.99	14	280.44 (57.20%)	209.81	490.25 (100%)	20.00 (9.71%)	186.00	206.00 (100%)	272.19 (27.28%)	725.50	997.69 (100%)
6	5.00 to 6.99	13	575.19 (50.53%)	563.12	1,138.31 (100%)	330.00 (41.99%)	455.87	785.87 (100%)	32.19 (4.20%)	734.37	766.56 (100%)
7	7.00 to 9.99	12	1,359.19 (72.30%)	520.81	1,880.00 (100%)	507.00 (32.50%)	1,053.00	1,560.00 (100%)	229.75 (19.63%)	940.87	1,170.62 (100%)
8	10.00 and above	8	1,103.25 (50.02%)	1,102.19	2,205.44 (100%)	742.00 (36.91%)	1,268.25	2,010.25 (100%)	315.94 (22.09%)	1,114.12	1,430.06 (100%)
	Total	140	5,880.63 (66.57%)	2,952.92	8,833.55 (100%)	1,599.00 (34.11)%	3,088.74	4,687.74 (100%)	1,160.43 (16.63%)	5,815.79	6,976.22 (100%)

TABLE No. 5.2–(contd.)

Current farm expenses on sample farms (arranged by size) in Puri in 1954-5

Groups	*Feed fodder charges*			*Repair charges of implements*			*Payments to village servants*			*Current improvement expenses on land*		
	Cash Rs.	*Kind value* in Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* in Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* in Rs.	*Total* Rs.	*Cash* Rs.	*Kind value* in Rs.	*Total* Rs.
1	352.94 (42.03%)	486.87	839.81 (100%)	17.94 (100%)	—	17.94 (100%)	3.00 (23.18%)	9.94	12.94 (100%)	16.25 (100%)	—	16.25 (100%)
2	473.06 (40.14%)	705.37	1,178.43 (100%)	12.19 (100%)	—	12.19 (100%)	— —	33.69	33.69 (100%)	— —	—	—
3	317.12 (28.20%)	807.31	1,124.43 (100%)	40.62 (100%)	—	40.62 (100%)	— —	49.37	49.37 (100%)	23.00 (100%)	—	23.00 (100%)
4	513.31 (40.12%)	766.00	1,279.31 (100%)	37.19 (100%)	—	37.19 (100%)	4.00 (7.79%)	47.37	51.37 (100%)	— —	—	—
5	285.12 (27.42%)	754.69	1,039.81 (100%)	33.25 (100%)	—	33.25 (100%)	— —	39.25	39.25 (100%)	9.00 (100%)	—	9.00 (100%)
6	457.12 (30.83%)	1,025.37	1,482.49 (100%)	19.56 (100%)	—	19.56 (100%)	— —	48.69	48.69 (100%)	24.50 (100%)	—	24.50 (100%)
7	488.37 (27.99%)	1,256.44	1,744.81 (100%)	34.69 (100%)	—	34.69 (100%)	— —	60.75	60.75 (100%)	11.00 (100%)	—	11.00 (100%)
8	445.62 (22.31%)	1,551.62	1,997.24 (100%)	45.87 (100%)	—	45.87 (100%)	— —	39.75	39.75 (100%)	12.25 (100%)	—	12.25 (100%)
Total	3,332.66 (31.19%)	7,353.67	10,686.33 (100%)	241.31 (100%)	—	241.31 (100%)	7.00 (2.08%)	328.81	335.81 (100%)	96.00 (100%)	—	96.00 (100%)

TABLE No. 5.2–(contd.)

Current farm expenses on sample farms (arranged by size) in Puri in 1954-5

Groups	Size (acres)	Other current expenses			Payments to landlord			Total		
		Cash Rs.	Kind value in Rs.	Total Rs.	Cash Rs.	Kind value in Rs.	Total Rs.	Cash Rs.	Kind value in Rs.	Total Rs.
1	Less than 1.00	132.25 (93.67%)	8.94	141.19 (100%)	— —	222.00	222.00 (100%)	703.50 (41.95%)	973.49	1,676.99 (100%)
2	1.00 to 1.99	178.44 (80.76%)	42.50	220.94 (100%)	— —	301.56	301.56 (100%)	1,423.69 (44.00%)	1,812.00	3,235.69 (100%)
3	2.00 to 2.99	416.19 (99.67%)	1.37	417.56 (100%)	4.00 (0.43%)	917.56	921.56 (100%)	1,748.17 (38.67%)	2,772.91	4,521.08 (100%)
4	3.00 to 3.99	67.44 (67.48%)	32.50	99.94 (100%)	— —	721.19	721.19 (100%)	1,606.50 (38.39%)	2,578.68	4,185.18 (100%)
5	4.00 to 4.99	57.75 (86.84%)	8.75	66.50 (100%)	— —	1,141.94	1,141.94 (100%)	957.75 (23.80%)	3,065.94	4,023.69 (100%)
6	5.00 to 6.99	79.94 (73.55%)	28.75	108.69 (100%)	—	757.37	757.37 (100%)	1,518.50 (29.59%)	3,613.54	5,132.04 (100%)
7	7.00 to 9.99	332.75 (93.40%)	23.50	356.25 (100%)	— —	1,026.19	1,026.19 (100%)	2,962.75 (37.77%)	4,881.56	7,844.31 (100%)
8	10.00 and above	164.19 (94.23%)	10.06	174.25 (100%)	— —	854.81	854.81 (100%)	2,829.12 (32.26%)	5,940.80	8,769.92 (100%)
	Total	1,428.95 (90.14%)	156.37	1,585.32 (100%)	4.00 (0.07%)	5,942.62	5,946.62 (100%)	13,749.98 (34.91%)	25,638.92	39,388.90 (100%)

Thus we find that most items of farm expenditure were in kind, coming out of the produce of the farm. Payment to labour, some purchase of feed and fodder for the live-stock, and payment of land revenue and interest were the major items for which the farmers had to pay cash.

2. *Agricultural Labour (Puri)*

The sample consisted of 70 cases. Of these five were annual and 65 casual labourers. Additional information is presented in Appendix II. We deal here with casual labour only.

Casual : The total man-days of work reported during the year in the sample were 16,115 i.e. the average work available per man was 248 days (Table 5.3).

TABLE No. 5.3

The employment and wage earnings of sample agricultural casual labourers in Puri in 1954-5

Serial No.	*Nature of work*	*No. of labourers*		Total				*Total receipts during the year*			*Grand total income (in Rs.)*
				1	2	3	4	*In kind*	*In cash*	*Total*	
1	In agriculture both in and outside the village	62	T	11,731	3,615	4,332	7,947	80	—	80	8,027
			A	189.2	58.3	69.9	128.2	1.3	—	1.3	129.5
2	In non-agriculture both in & outside the village	61	T	4,384	219	3,024	3,243	—	—	—	3,243
			A	71.9	3.6	49.6	53.2	—	—	—	53.2
3	Total work done	65	T	16,115	3,834	7,356	11,190	80	—	80	11,270
			A	247.9	59.0	113.2	172.2	1.2	—	1.2	173.4

T = Total; A = Average; 1 = No. of days worked; 2 = Nature of payments in kind; 3 = Cash wages; 4 = Total.

Of the total available employment, 73 per cent was in agricultural and the rest in non-agricultural pursuits. As compared to Cuttack, the proportion of non-agricultural employment in the total was substantial. Of the total agricultural work available, 86 per cent was in the village, but in non-agricultural work only 66 per cent was available there and the rest outside the village.

Considering the broad seasonality of available agricultural and non-agricultural work, we find that they alternated well. Of the total available work in agricuture, eight per cent was in February-March and 14 per cent

in April-May. The rest of the work was almost equally divided (about 17 to 18 per cent each) in the remaining four periods of two months each. On the other hand, 53 per cent of the total available work in non-agricultural lines was done during February-May, corresponding to the slack season in agriculture. As in Cuttack, in Puri also the seasonality of work in agricultural and non-agricultural lines was similar both inside and outside the village. That is, the seasonality did not vary from village to village.

Table 5.4 gives the classification of the casual labourers in the sample according to the total number of days on which they were employed and the range of the total earnings in each class. About 14 per cent of the labourers could be described as "fully employed" and 23 per cent more as "nearly fully employed" (90 per cent to 100 per cent days employed) as per criterion discussed earlier. Only three per cent were unemployed for more than half the period. As compared to Cuttack, the degree of underemployment was markedly less in Puri.

TABLE No. 5.4

Casual agricultural labourers in the Puri sample classified according to the total number of days on which they were employed during 1954-5 *and the range of their total earnings during the period.*

	No. of days employed during the year	*No. of samples*	*Range of total earnings (in Rs.)*
1	300 days and above	9	136 to 246
2	270 to 299 days	15	124 to 326
3	240 to 269 „	16	98 to 313
4	210 to 239 „	12	75 to 229
5	180 to 209 „	6	78 to 173
6	150 to 179 „	5	101 to 134
7	120 to 149 „	1	96 — —
8	90 to 119 „	—	— — —
9	Below 90 days	1	50 — —
		65	

The earnings and their ranges in each of these categories showed the wide margin of variation of daily wages. This is again fully reflected in the range of total earnings of the two top classes the "fully employed" and the "nearly fully employed". The average earnings in the latter were found to be higher than those in the former.

Agricultural and non-agricultural wage rates were about the same. Seasonal fluctuations in wage rates were not very marked.

3. *Rural Industry (Puri)*

A consolidated Table containing the data regarding rural industry in Puri is given in Appendix III. The following notes deal with a few important industries.

Goldsmiths : In the seven grids surveyed in Puri district, weaving and goldsmithy were the two noteworthy industries in which non-agricultural families were engaged to any significant extent. The census of households recorded 111 families with goldsmithy as their principal occupation. Seven of these were selected on a random basis for an intensive survey. In view of the large number of goldsmiths and their importance in the industry group, an extra sample of 16 goldsmiths was drawn from one of the biggest concentrations of goldsmiths in our grids, Balanga. In the following discussion, the 23 families of the two samples taken together are treated separately.

Of the seven families, one turned out to be an employee's; he had had no independent establishment. Another in the Balanga sample was not a goldsmith but maker of goldsmith's tools and moulds. These two families were, therefore, excluded from the sample.

The six families in the general sample reported 10 earners in all. Nine of them were skilled adult males and one a skilled child. Three of the families had two skilled adult male workers each, and the other three had one such worker each. Taking non-adult workers into account, four families had two workers each and two had one each.

The implements of goldsmiths consisted of small hammers, scissors, blowpipes, bellows, scales, etc. The average original value of implements per goldsmith came to a little over Rs. 26 and their value on the date of the investigator's visit was estimated at Rs. 19 per family. The average annual repair and maintenance cost of these implements came to about Rs. 4 while new purchases were reported by none of these six families.

Besides bullion, the largest expense in the making of ornaments by the goldsmith was fuel. The average expenses under this head came to about Rs. 23 per annum per family in our sample. The materials like acid, etc. cost a little over Rs. 3 only per family per year.

None of these goldsmiths, however, reported any purchase of bullion and making of ornaments, etc. on their own. All of them only prepared ornaments out of bullion supplied by the customers and charged only the wage (which, of course, included the cost of fuel, etc.) for such work. Thus the industry could be described as only a service industry.

The six families taken together reported making of ornaments out of 3,945 tolas of silver and only 50 tolas of gold. For the making of these ornaments they charged the customers at various rates depending on the value of ornaments and the degree of skill involved in the making of them.

Making charges for silver ornaments varied from four annas to one rupee a tola, and for gold from Rs. 5 to Rs. 15 a tola. The six families had received Rs. 1,970 (Rs. 328 per family) during the year preceding our survey, as making charges of ornaments. Besides, they reported receipt of about Rs. 300 as repair charges (or Rs. 50 per family). Out of the total receipts of Rs. 2,270 (or Rs. 378 per family), expenses on fuel, etc. amounting to Rs. 182 (or about Rs. 32 per family) were met. Thus the families reported a net income of Rs. 2,089 or Rs. 348 per family.

Taking the 22 families of the two samples together, we find that the general picture is not much different. The 22 families reported 39 workers of whom two were skilled children, three unskilled adult male workers, and 34 skilled adult male workers. Eleven of these families had only one adult male worker each, seven had two, and four families had three each. No employees were reported; only one family had an apprentice learning his trade at the establishment.

The average original value of implements came to about Rs. 32 per family and the maintenance and repair charges to about Rs. 6 per family. Only six families reported any new purchases of implements, worth about Rs. 25 in all. The implements lasted long and only needed sharpening from time to time.

All but one reported no purchase of bullion and making of ornaments for sale. Only one goldsmith reported that he had purchased 20 tolas of gold and 300 tolas of silver for making ornaments and selling them during the marriage season. Others merely had received what they called "making charges".

On the whole, the 22 families reported having made ornaments of 14,160 tolas of silver and 158 tolas of gold, during the year previous to our survey. As making charges (including a small amount of sale) they received a little over Rs. 10,000. Besides they received about Rs. 790 as repair charges. Deducting the cost of bullion, fuel, etc. purchased by the goldsmiths themselves, the net income came to a little over Rs. 7,700 for the 22 families or Rs. 350 on an average per family per annum.

The Table on page 123 gives the distribution of families according to the net income and number of male adult earners in the business.

Thirteen out of the 22 families had an income of less than Rs. 300 a year and only eight of the families had more than Rs. 400 per year. None of the families with only one adult male worker had an income of more than Rs. 400 a year; all families with an income of more than Rs. 400 had more than one worker.

Of course, it would be too much to say that the family income depended on the number of adult workers in the family because income depended on demand and, apart from the fact that many of these goldsmiths were in scattered villages with little custom, the skill of the workman determined his income. Those who knew no better than the making of old-fashioned

ornaments had less income. New fashions in ornament-making commanded higher wages and thus made for better earnings.

Net annual income	*Families with number of adult male workers*			
	1	2	3	*Total*
Less than Rs. 100	1	—	—	1
200	6	—	—	6
300	3	3	—	6
400	1	—	—	1
500	—	1	1	2
600	—	—	2	2
700	—	—	1	1
800	—	2	—	2
Up to 1,000	—	1	—	1
Total	11	7	4	22

Bamboo basket, etc. making : In the seven grids surveyed in Puri district, 48 families in all reported making of bamboo baskets, etc. as their main occupation. For intensive study, four of these families were selected. But to get a somewhat better idea about the bamboo basket-making industry an extra sample of six families was selected. The data, therefore, relate to 10 families only. In what follows, the data for the general and the special samples are treated together, unless differences between the two warrant comments.

This industry was confined to families of the Scheduled Castes and Scheduled Tribes (in the highlands of the State also). Persons of the Dama and Pana castes were mostly engaged in this work. Of the 10 families surveyed in Puri district, nine belonged to the Pana caste and one to the Dama caste. The total number of persons engaged in this work in these families was reported to be 25, giving on an average 2.5 workers per family. Both men and women in these families worked. Of the 25 members of the family reported as engaged in this work, 11 were adult males, 12 adult females and only two non-adults. The work required some degree of skill; only one female and one child were reported to be unskilled workers. No employees were reported.

Axe and bodkin were the only implements used by these workers. The average original value of implements with a family was reported to be about Rs. 5 and the present value only Rs. 4. Value of new purchases of any of these implements during the year was reported at a little over Re. 1 per family and maintenance expenditure in sharpening, etc. at about 11 annas only per annum.

Bamboo was the main raw material. Vegetable fibres of a particular type were used as threads for tying. Bamboo cost about 12 annas to a rupee per piece. The average annual purchase of bamboo per family was reported at about Rs. 128, and, inclusive of maintenance and other charges, the total expenses came to about Rs. 130 per family per year.

Products were of various types for domestic and farm use and varied in price from one anna to eight annas or even more.

Cane work : Like making of bamboo baskets, cane basket-making was also a cottage industry in these areas followed by Scheduled Caste families. Out of a total of 45 families in the seven grids reporting the making of cane goods as their main occupation, 14 families were selected for intensive enquiry, three in the general sample and the remaining 11 as extra samples. All the sample families were of the Pana caste.

Taking all together, we find there were 30 earners, of whom 29 were adults and only one non-adult. All but three of these earners were skilled, the three unskilled being females. Indeed, the nature of the work required only skilled workers. There were no employees reported. Of the 29 adult workers, 11 were females and 18 males. This gives a little over two workers on an average per family, mostly a male and a female.

The capital equipment consisted of no more than axes and needles. The average original value of these implements per family was reported at about Rs 6 and the present value at Rs. 4. Annual purchases appeared small; all families did not report more than Rs. 2 worth of purchases of implements. But repair charges which in this case meant sharpening of the axe, cost about Rs 8 in all, giving a per family average of about nine annas a year. For purchasing cane, they required some working capital. The average working capital was reported to be about Rs. 4 per family.

Cane was the only important raw material. The fibre that was used as string was obtained from local shrubs and bushes and cost nothing. Cane was locally obtained and paid for at the rate of Rs. 2.25 for 80 canes of 15 to 18 feet length or Re. 1 for 80 canes of six to seven feet length. The average raw material consumption was reported to be Rs. 72 a year per family. This amounted to 48 per cent of the value of the total production. Taking other expenses like transport and repair charges into account, we find that costs accounted for about half of the value of the total production.

The average value of production per family per year came to about Rs. 160 and the costs to Rs. 70, giving a net income per family per year from making of cane baskets, of Rs. 90 only.

The baskets made were used for measuring grain in the countryside and were a fairly standardized product.

Weavers : In the seven grids surveyed in Puri district, 100 families reported weaving as their main occupation. A sample of 24 families was

selected from among these at random, seven as a part of the general sample for industry in the district, and 17 as extra samples to give a sizable number for studying weaving industry in the area. The two groups of sample families are here treated together.

The 24 weaver families reported 34 looms, 10 of them having two or three looms each. There were 75 workers reported; all of them were family members. Of these 38 were males, 35 females and two children. Thirty-seven out of 38 males were skilled workers whereas 18 out of the 35 females were reported as skilled.

The average original value of the existing tools and implements amounted to about Rs. 53 per family. The present value of the existing equipment was estimated at Rs. 35 only. The average addition to capital equipment during the year was stated to be about Rs. 3.50 per family and the average repair and maintenance expenses Rs. 6.10.

The value of raw materials was reported to be about 69 per cent of the total value of production. Including expenses on repair and maintenance and transport, etc. the total expenses accounted for about 70 per cent of value of total production. This was somewhat more than that for the Sambalpur weavers. The type of production may account for it to a certain extent.

The average value of sale per family (or production) was reported to be Rs. 757 per annum and of expenses to be Rs. 533 giving a net family income of Rs. 224 which was considerably less than that reported for weavers of Sambalpur. The following Table gives the distribution of families according to their net annual income and the number of looms operating in the house.

Net annual income of the household	*Families with* 1 *loom*	2 *or more looms*	*Total*
Rs. 100	3	—	3
200	7	3	10
300	4	3	7
400	—	1	1
500	—	1	1
750	—	2	2
Total	14	10	24

Twenty out of 24 weavers had annual incomes of less than Rs. 300. All the families with only one loom had less than Rs. 300 whereas four out of the 10 families with two or more looms had annual incomes of more than Rs. 300.

The following Table shows the quantity and value of the various types of production reported by the weavers :

	Number	*Value in Rupees*
Saree 20's	502	1,429. 0.0
20 × 26's	726	3,514. 8.0
26 × 30's	75	300. 0.0
30's	70	262. 8.0
30 × 40's	150	610. 0.0
	1523	6,116. 0.0
Gamcha and Pancha		
20's	4187	4,988.10.0
20 × 24 or 26	1210	1,861. 4.0
26 × 30	197	236.10.0
	5,584	7,086. 8.0
Other goods 20's	246	361. 0.0
20 × 26's	195	440. 0.0
	441	801. 0.0
Grand Total	7,548	14,003. 8.0

Nearly one-half of the value of the total production was accounted for by Gamcha, pancha, towel, etc. The low value and the low margin of profit in case of these products, as compared to those in case of sarees, may go to explain the comparative low income of the weavers in this region.

4. *Rural Trade and Transport in Puri.*

Information regarding trade and transport is presented in a consolidated table in Appendix III.

Chapter VI

THE TOTAL INCOME OF THE AREAS AFFECTED BY HIRAKUD IRRIGATION

We have described in the preceding pages the main structural features of the economy of the regions that will receive irrigation waters from the Hirakud Dam, as they were before the dam was completed. The presentation has inevitably been piecemeal and it is necessary to draw all the threads together to form a composite picture to serve as a benchmark to which the future picture, say ten years after the completion of the dam, may be compared for measuring the total benefits of the project. The best way of doing this is to put all the data in the framework of the national income or regional income estimate. This, we now proceed to do.

An important part of the main data from which we have to estimate total income of these areas has been already presented. The rest is to be found in the Appendices II and III. The intensive farm business enquiry of the sample of the cultivators together with that of the agricultural workers furnishes the main data from which the income estimates for the agricultural sector are to be derived.[1] The non-agricultural income estimates can be derived from the intensive enquiry in the randomly selected samples of industries, retail and wholesale trade, professions, etc.

These surveys provided detailed and fairly reliable information about the main business of the family and the earnings in it. But they did not furnish information regarding the earnings of other earners in the family who did not either partly or wholly work in the family business, or about any other incomes received by these families by way of remittances, etc. This was covered by a family questionnaire which was separately filled in for each of the sample families at the time of the intensive inquiry. A part of the data of these family schedules could have been checked against the data furnished by the intensive inquiries mentioned earlier. As it happened, however, the family schedules were filled in simultaneously with the intensive inquiry schedules and the earnings of the family from its main occupation were, in most cases, identical in both the family and the intensive inquiry schedules.

We have thus data regarding incomes received by sample families, including the incomes earned by different earners in them from the pursuit

[1] As remarked already (p. 41) the data regarding the agricultural income in the Sambalpur zone, pertain to the year 1955-6 instead of 1954-5. The year 1954-5 was one of drought in Sambalpur. The agricultural income in Sambalpur, as presented here, is not the actual income in 1954-5, but 1955-6 income adjusted by prices of the preceding year. The actual income for 1954-5 was probably 20 to 30 per cent smaller than that given in the Tables in this chapter.

of various occupations outside the family occupation. The total income for the grids has been blown up for the whole area by multiplying by the appropriate sampling fraction. This is contained in Table 6.1.

The incomes of two groups of families in this Table have not been furnished directly by the intensive inquiries. They have had to be estimated indirectly from the data furnished by them. The two groups were those of families who reported their occupation as "rentiers" and those who did not report any occupation at all.

In regard to the rentier families, no intensive inquiry was carried out and we had no direct information about their income receipts. We had to estimate these from other data. The total land owned and leased out by the rentier families was insignificant in Sambalpur, 1,336 acres in Puri and 3,338 acres in Cuttack. The data of the farm business survey showed that the average rent paid or received by the sample families was Rs. 34 per acre in Puri and Rs. 38 per acre in Cuttack. Assuming that the rentier incomes must have generally accrued at these rates on the lands owned and rented out by them, a close approximation of the incomes of these families would be Rs. 45,000 in Puri and Rs. 1,27,000 in Cuttack in rounded figures.

Many of the families in the group, which did not report any occupation were found to be without a resident earner. The earners in them were working outside the region and the families received remittances from them. As these families were not covered by an intensive inquiry, there was no direct information available regarding their incomes. They had to be estimated from indirect information. It was found that the rentier families (65 in Puri and 220 in Cuttack) also derived incomes from remittances. These also had to be estimated. In Cuttack 1,100 and in Puri 316 families reporting no occupation had one or more non-resident earners. There were no such families in the Sambalpur zone. Data from the intensive family schedules showed that in Cuttack the average annual receipts from non-resident family members amounted to Rs. 185 per year per reporting family. A similar average for Puri was Rs. 103. Assuming that all families who did not report any occupation had earners outside and received remittances at about these rates, the income of such families in Cuttack would come to Rs. 2,04,000 and to Rs. 33,000 in Puri. Calculating in the same way, the remittance income of rentier families in Cuttack and Puri comes to roughly Rs. 41,000 and Rs. 6,700 respectively, in rounded figures.

The total estimate of income of the region as it emerges finally from the calculations noted above, needs to be adjusted in yet another direction. The areas affected by the Hirakud irrigation waters are almost an unbroken mass of rural territory and our grid sample broadly represented this rural population. There are nevertheless two small urban centres, Bargarh in Sambalpur and Kendrapada in Cuttack, within this area. As

TABLE No. 6.1

Total income received in the region from different sources during 1954-5

(in thousands of Rs.)

Occupation	Income from different occupations							
	Cultivation	*Agricultural labour*	*Other labour*	*Industry*	*Trade*	*Profession and services*	*Transport*	*Total*
SAMBALPUR								
1 Cultivation	21,119	3,313	234	6,249	320	1,220	—	32,455
2 Labour	388	3,190	194	923	71	109	12	4,887
3 Industry	140	90	85	4,464	—	16	—	4,795
4 Trade	87	—	—	—	1,062	13	—	1,162
5 Profession	3	22	21	—	—	136	—	182
6 Service	17	86	71	106	48	1,240	40	1,608
7 Transport	—	—	—	—	—	—	2	2
Total	217,54	6,701	605	11,742	1,501	2,734	54	45,091
CUTTACK								
1 Cultivation	21,513	12,852	411	4,428	1,064	4,010	272	44,550
2 Labour	84	8,078	3	553	63	105	—	8,886
3 Industry	8	300	62	1,841	30	14	—	2,255
4 Trade	18	35	27	87	1,065	25	4	1,261
5 Profession	12	152	71	—	20	723	104	1,082
6 Service	50	114	4	49	—	329	143	689
7 Rentiers	—	—	—	—	—	—	—	—
Total	21,685	21,531	578	6,958	2,242	5,206	523	58,723
PURI								
1 Cultivation	8,659	5,755	—	1,129	602	1,436	793	18,374
2 Labour	3	2,379	12	164	2	—	—	2,560
3 Industry	6	16	132	1,245	—	105	—	1,504
4 Trade	—	7	16	28	272	55	—	378
5 Profession	—	17	10	—	1	156	—	184
6 Service	—	13	14	93	29	307	88	544
7 Transport	*	—	—	—	—	*	5	5
8 Rentiers	—	—	—	—	—	—	—	—
Total	8,668	8,187	184	2,659	906	2,059	886	23,549
Grand Total for delta region (Cuttack & Puri)	30,353	29,718	762	9,617	3,148	7,265	1,409	82,272

* Less than Rs. 500.

TABLE No. 6.1 (Contd.)

Total income received in the region from different sources during 1954-5

(in thousands of Rs.)

Occupation	Income from different sources						Adjustment for higher urban income	Grand Total Income
	Income from different occupations	Remittance Receipts	Rent land & houses	Interest & bonus	Others	Total		
SAMBALPUR								
1 Cultivation	32,455	—	162	—	50	32,667		
2 Labour	4,887	19	—	—	2	4,908		
3 Industry	4,795	2	174	16	—	4,987		
4 Trade	1,162	—	172	11	—	1,345		
5 Profession	182	—	—	—	—	182		
6 Service	1,608	—	267	28	—	1,903		
7 Transport	2	—	—	—	—	2		
Total	45,091	21	775	55	52	45,994	1,904	47,898
CUTTACK								
1 Cultivation	44,550	4,333	145	—	532	49,560		
2 Labour	8,886	230	52	—	45	9,213		
3 Industry	2,255	34	245	—	23	2,557		
4 Trade	1,261	8	46	3	2	1,320		
5 Profession	1,082	17	42	—	18	1,159		
6 Service	689	—	28	—	3	720		
7 Rentiers	—	41	127	—	—	168		
8 Families reporting no occupation	—	204	—	—	—	204		
Total	58,723	4,867	685	3	623	64,901	745	65,646
PURI								
1 Cultivation	18,374	651	142	6	109	19,282		
2 Labour	2,560	52	11	—	4	2,627		
3 Industry	1,504	50	115	—	—	1,669		
4 Trade	378	9	93	—	—	480		
5 Profession	184	7	7	—	—	198		
6 Service	544	30	59	—	—	633		
7 Transport	5	—	—	—	—	5		
8 Rentiers	—	7	45	—	—	52		
9 Families reporting no occupation	—	33	—	—	—	33		
Total	23,549	839	472	6	113	24,979		24,979
Grand total for delta region (Cuttack & Puri)	82,272	5,706	1,157	9	736	89,880	745	90,625

a part of the general survey, we also carried out an intensive survey of these two centres, and the data regarding incomes, etc. of the residents of these centres have been presented in Chapters III and IV. The detailed enquiry conducted in these centres showed that not only was the occupational pattern markedly different in them but the level of earnings was also comparatively higher than in the surrounding area. It will, therefore, be appropriate to adjust our previous estimate for the higher income in these two centres.

As we had the data to calculate the total incomes of the two centres, it was possible to add these to the income of the surrounding area. This, however, would have involved double counting. In order to avoid this, we calculated the per capita income of the population of the total area including the towns. Deducting this from the per capita income in the two centres, we calculated the excess of income enjoyed by the residents of these areas. This excess in each case was multiplied by the total population of each of the two centres. This was added to the total income. The calculations detailed above are set out in Table 6.2.

TABLE NO. 6.2

Adjustment for Urban Incomes

Cuttack (Kendrapada) :		
Per capita income of the area	Rs.	68.00
Per capita income in Kendrapada	Rs.	126.00
Excess *per capita* income in Kendrapada	Rs.	58.00
Population of Kendrapada		12,851
Total excess income to be added on account of Kendrapada	Rs.	745,000.00
Grand total income of the Cuttack area	Rs.	65,646,000.00
Sambalpur (Bargarh) :		
Per capita income of the area	Rs.	123
Per capita income in Bargarh	Rs.	329
Excess *per capita* income in Bargarh	Rs.	206
Population of Bargarh		9,244
Total excess income to be added on account of Bargarh	Rs.	1,904,000
Grand total income of the Sambalpur Zone	Rs.	47,899,000

In national income calculations, a distinction is drawn between "income produce" (income originated by the factors of production in a given region) and "income received" (the income accruing to the residents of that region). U.N. studies call the former "net geographical product at factor cost" and the latter "national income at factor cost".

"In general for any region, income received will exceed income produced to the extent that receipts of service and property income by in-region residents who own factors employed outside the region exceed payments to factors employed within the region but owned without."[2]

In the present context, the income we have calculated is income received. If we subtract from it the income derived from remittances we will, broadly speaking, have the income produced in the region.

National income is the income of the factors of production but it is not the income that individuals actually receive because it excludes those payments which are not received by individuals such as social insurance contributions, undistributed profits of corporations, corporate profits, taxes, etc. but includes all non-factor payments such as relief, charities, etc., i.e. payments which individuals receive for reasons other than current services rendered.[3] Both the inclusions and exclusions mentioned above, it may be judged, do not amount to much in the three areas we are considering here and, for all practical purposes, income received as calculated above may be taken as equivalent to the national income of the regions or income paid out to factors of production.

[2] Richard Easterlin, in Regional Income, *Studies in Income and Wealth*, Vol. XXI, By the Conference on Research in Income and Wealth, A Report of the National Bureau of Economic Research, Princeton, 1957, p. 29.

[3] Ruggles, *National Income and Income Analysis*, 1949, New York, p. 74.

Chapter VII

ECONOMIC BENEFITS FROM IRRIGATION, FLOOD CONTROL AND HYDRO-ELECTRICITY

We shall now examine each of the three aspects of the Hirakud project, namely irrigation, hydro-electricity and flood control, and try to indicate the economic benefits that would probably result from each.

Irrigation : The completion of the Hirakud project will make perennial irrigation available to 448,600 acres in the Sambalpur zone and to 990,000 acres[1] in the delta areas of Cuttack and Puri districts according to the Project Reports. In order to estimate the benefits resulting from this, the first step is to estimate how much will the agricultural production increase over the present level because of irrigation. There are quite a number of problems involved in this and we will begin by examining the problems involved in estimating the agricultural production of the area before irrigation.

Agricultural production before irrigation : The first problem is to fix the area for which these calculations are to be made. The Hirakud Project Reports give what they call the culturable commanded area in the Sambalpur and Delta zones. The figures quoted above are taken from these reports. These are arrived at, according to our information, by applying a uniform ratio to the total commanded area which is in its turn read off from the topographical maps.[2]

The actual surveys when conducted may naturally show the actual culturable commanded area to be more or less or equal to these estimates. In the case of the Sambalpur zone, the actual surveys in progress show, as per the latest information available to us, that the actual culturable commanded area there will be in the neighbourhood of 380,000 acres rather than 448,600 acres. In the estimates made by us, where necessary, we have used the former and not the latter figure given by the Project Reports. In the case of the delta area, we have taken the official figures as quoted above for estimation where necessary.

The culturable commanded area is not the area under cultivation or the area cropped. It is simply land that is culturable, i.e. which can be cultivated but which is not necessarily cultivated or cropped) and which will receive irrigation water. The area that is actually cropped or culti-

[1] This excludes the area of 59,000 acres under non-perennial irrigation for reasons mentioned in Chapter IV.

[2] *Report of the Advisory Committee on Hirakud Dam Project* (Chairman—S. C. Majumdar), Central Water and Power Commission, Government of India, March 1952, pp. 4, 7.

vated may be equal to or less than this figure. Ordinarily, the total cultivated area in any year should be available from the agricultural statistics. The agricultural statistics of Sambalpur district and the districts of Cuttack and Puri are far from reliable in this respect. Since the latest settlement in Sambalpur during 1921-5 and that in Cuttack and Puri during 1922-32, there has been no proper assessment and the figures of cultivated area given by revenue officials for later years are very much in the nature of informed estimates based on the old settlement figures. Apart from this, these figures are for the districts as a whole and not for the particular areas in them affected by the Hirakud irrigation waters with which we are here concerned. We have, therefore, felt inclined to put more reliance on our figures. We have made a calculation of our own from the sample data collected by us. According to this estimate the cultivated area in the Sambalpur zone was 325,000 acres in 1954-5. In the Delta area it was 674,000 acres in the same year. For estimating the agricultural production in these areas during the year of the benchmark survey i.e. 1954-5, we have used these estimates of the cultivated areas.

It was next necessary to know the distribution of the cropped area among the various crops. Again there were available the official figures as embodied in the Agricultural Statistics. These were again not usable because of the defects noted above. We, therefore, decided to use the crop distribution data that we had collected in our sample as more reliable for our purpose.

Accordingly, we distributed the total cultivated area as revealed by our sample according to the crop distribution, again as revealed by our sample, for the calculation of the total agricultural production in 1954-5 in the area to be affected by the Hirakud irrigation waters. Needless to say, we used the yield figures of different crops also as revealed by our sample data as also the prices prevailing at that time with which to evaluate the physical quantities into money terms. As explained before, the production data for Sambalpur are for the year 1955-6 but have been converted into money terms at the 1954-5 prices. Our estimate of crop production in the area to be irrigated by the Hirakud waters in 1954-5, i.e. before the Hirakud Dam was completed, is solely based on the data gathered in our survey. This is given in Table No. 7.1 (Parts I and II). The crop production calculations contained in this Table are exclusive of the production of fodder as well as of the other receipts of farmers such as those derived from cattle, grass cutting and selling, etc. The gross crop receipts are not identical with gross receipts from agriculture. The Table also gives the estimates of materials used up in the production of the different crops based on the data of the farm business survey. These represent the cost of production to the economy as distinct from the cost of production to the peasant.

TABLE No. 7.1—(Part I)

The estimated value of crop production in the Sambalpur Zone in 1955-6 *at* 1954-5 *prices* (*Net cultivated area* 325,000 *acres*)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in production (Value in Rs.)	
			Per acre	Total	Per md.	Total	Per acre	Total
1	Paddy	275,015	13.00	3,575,195	8.01	28,637,312	18.73	5,151,031
2	Wheat	455	4.25	1,934	18.22	35,237	27.91	12,699
3	Other cereals	1,495	2.55	3,812	4.48	17,078	3.15	4,709
4	Green gram	2,242	1.14	2,556	16.55	42,302	5.07	11,367
5	Black gram	5,688	1.51	8,589	18.10	155,461	10.45	59,440
6	*Kulthi*	2,145	2.14	4,590	10.90	50,031	2.87	6,156
7	*Chana*	1,105	1.40	1,547	7.60	11,757	3.97	4,387
8	Groundnut	4,940	7.10	35,074	6.56	230,085	15.96	78,842
9	Other oilseeds	813	6.11	4,967	8.50	42,220	8.39	6,821
10	Condiments	98	—	Not reported	—	10,832	30.55	2,994
11	Jute	130	2.18	283	25.19	7,129	27.43	3,566
12	Sugarcane	2,568	32.00	82,176*	12.94	1,063,357	81.27	208,701
13	Potato	65	5.13	333	10.00	3,330	84.23	5,475
14	Vegetables	1,722	—	Not reported	—	301,384	30.55	52,607
15	Orchards etc.	552	—	Details not reported	—	—	—	—
	Total	299,033	—	—	—	30,607,515 or 30,608,000	—	5,608,795 or 5,609,000

* *Gur.*

TABLE No. 7.1–(Part II)

The estimated value of crop production in the Delta Zone in 1954-5 (Net cultivated area 674,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in production (Value in Rs.)	
			Per acre	Total	Per md.	Total	Per acre	Total
1	*Beali* paddy	56,691	10.00	566,910	5.87	3,327,762	12.81	726,212
2	*Sarad* paddy	578,355	13.36	7,726,823	6.24	48,215,376	11.07	6,402,390
3	Wheat	335	3.64	1,219	9.90	12,068	18.50	6,198
4	Other cereals	1,725	3.42	5,900	9.72	57,348	7.06	12,179
5	Green gram	149,129	1.54	229,659	8.79	2,018,703	3.67	547,303
6	Black gram	40,298	2.44	98,327	8.50	835,780	4.57	184,162
7	*Kulthi*	63,710	3.51	223,622	6.30	1,408,819	3.68	234,453
8	*Chana*	7,020	2.52	17,690	6.34	112,155	6.60	46,332
9	Other pulses and grams	293	0.26	76	19.86	1,509	3.90	1,143
10	Oilseeds	2,937	1.56	4,582	10.63	48,707	2.31	6,784
11	Condiments	321	2.41	774	24.52	18,978	33.98	10,908
12	Jute	14,508	8.44	122,448	25.05	3,067,322	8.59	124,624
13	Sugarcane	904	35.72	32,291*	11.92	384,909	61.42	55,524
14	Tobacco	126	—	Not reported	—	25,122	51.44	6,481
15	Potato	2,152	44.49	95,742	8.00	765,936	172.71	371,672
16	Vegetables	779	—	Not reported	—	69,971	39.79	30,996
17	*Betel* leaves	271	—	Not reported	—	355,880	Not reported	—
18	Orchard etc.	5,003	—	Details not reported	—	—	—	—
	Total	924,557	—	—	—	60,726,345 or	—	8,767,361 or
					—	60,726,000	—	8,767,000

*Gur.

Agricultural production after irrigation: For estimating the agricultural production of the area after irrigation, we have to start by fixing the area for which such a calculation should be attempted. The production before the dam as worked out above has been for the area as estimated from our sample data. This area is smaller than the official estimate. The estimate of future production is to be made for comparing it with the present one so as to estimate the net increase in it. For the comparison to be fair, we must see that the estimate of future production is not blown up unwarrantedly. If we base the estimate of future production on the official area figures, which are larger than the area estimates based on our sample, that estimate will unwarrantedly exaggerate the net increase in production. We have, therefore, based our estimates of future production on the estimates of area made from our sample data and have used this estimate for the purposes of comparison and for estimating the net benefits. We have, however, made calculations of the future production based on the official areas also and given them separately for those who may feel interested in them.

We must next specify the time horizon to which the estimates of future production are hitched. In the original memorandum on this survey project[3] we had said that we would try to give two estimates, one short-term and the other long-term. The former would roughly be the estimate of benefits at the end of ten years after the completion of the dam or ten years after the irrigation waters are made available, and the latter of production at the end of 25 years. An irrigation system takes, we said, twenty to twenty-five years to come to full maturity when its benefits are at the maximum level. In the first ten years, the area might try to settle down to irrigated farming with the least cost and adjustment but may not exploit its full potential. We are attempting here the short period estimate. Later on, we indicate some lines of future development but we do not propose to attempt a detailed estimate for the long period mainly because the longer the term for which an estimate is to be made the farther away from the period of reference (for which we have sufficient and firm data regarding yields, costs of production, crop pattern, etc.) we go and this makes the estimation difficult and more unreliable.

The basic assumption of the estimate attempted here is that in the ten years that will elapse after the irrigation waters begin to flow to the fields, the area will just settle down to irrigated agriculture with the least possible change in technique or capital investment or crops or seeds, etc. The peasants will grow more than one crop where they were growing one before but the crops will be such as they know of and the methods will be the same as they at present practise. The costs will be about the same as they incur today in respect of the different crops under present irrigated conditions. We can make allowances for the

[3] Cf. Chapter II.

changes in the source of irrigation, if any, the irrigation water charges and betterment levy, and the initial investment that may be necessary to prepare the land for irrigation, etc. So far as the crops are concerned, we will assume that they will not take to other varieties than those they know today. For example, we will expect that the peasants who take to sugarcane cultivation will first grow the variety that is grown today in Orissa, and will not immediately change over to the other and better varieties known. Perhaps, this is bound to come later on but not in the short period we are considering. We shall also assume that the peasants will be slow in overcoming their prejudices in regard to several things, and during the first ten years not many of these will be eroded or given up. For example, the peasants in Sambalpur have a prejudice against the growing of a second crop on the *Bahal* lands because they expect that this will lead to waterlogging and salinization of this land. Scientifically speaking,[4] there is little ground for this belief and yet the peasants have it. We would think that it would not be removed in the first ten years but will certainly go in the long period. Peasants will apply more manure and get higher yields than at present as they get increasingly familiar with irrigation. Their improved financial position after some years of irrigated agriculture will also enable them to do so. In the first ten years, however, they will not, we assume, depart much from the quantity of manure inputs than they are accustomed to at present. In short, we assume that this is the estimate of production which will result with the minimum necessary change from the current practices.

The next step to be taken for calculating the future agricultural production is to determine the future crop pattern and the future yield of crops under irrigated conditions. We shall examine this in turn.

Before considering the future crop pattern, we must make clear the nature of such an attempt and the way we have gone about it. We cannot make the attempt by losing sight of reality. It would not do to think, as with some experts, that with the present technology any crop can be grown anywhere with water availability. This is no doubt possible under

[4] An analysis of Mahanadi waters carried out during 1951 and 1952 for each month showed that "The total dissolved solids range from 8 to 26 parts per 100 thousand parts of water. Moreover, out of the acidic ions, the bicarbonates are by far the most predominant, sulphates and chlorides being less in comparison and calcium is the main basic ion. The irrigation water containing less than 60 parts dissolved solids per 100 thousand parts of water is normally considered safe for that purpose. Judged on that standard, the Mahanadi river water seems safe for use for irrigation and little salinization of land is expected by the application of that water due to the preponderance of calcium salts. This fact received confirmation from the fact that the use of Mahanadi water for irrigation in the Delta Canal System for the past over 80 years has not caused any marked soil deterioration in the area under command there." R. C. Hoon, *Report on the Preliminary Soil Survey of the Area Commanded by the Hirakud Canal System*, 1954, pp. 16-17.

certain ideal conditions but hardly feasible in the real world with its painful limitations. In practice, we have to take into account the fact that the crop pattern in an area is largely determined by its soil, water and climatic conditions, and that this is reinforced by the customs and modes of the peasants that develop around it. This is at any time given. When a new technical factor is introduced into the situation, the whole *ensemble* of conditions has to adjust itself to it and this is a slow process, as experience everywhere shows. The process can be speeded up by careful planning but even this has its limitations. In arriving at the future crop pattern, we adhere to the assumption made earlier of the minimum necessary change from the present.

We accordingly first describe the prevailing soil conditions and crop patterns which are, of course, governed by the soil, water and the climatic conditions as at present. We then consider the new factor of irrigation. It will be appreciated that circumscribed as this situation might appear, there are still an almost infinite number of crops, combinations of their distributions and their rotations that can be technically feasible and can be suggested. Many of these, it is quite possible, will be as good as any other and there will be hardly any criteria decisive enough to choose between them. The fun of the situation is that any or none of them may be actually realized in practice because what will develop in the field will depend very much on what the peasants will actually do and how they will react to the whole situation. In the circumstances, it is obvious that we can only choose a certain crop pattern which, in our judgement based on the information available to us and within our technical competence, appears to us the best.[5] In the final analysis, the choice will be necessarily arbitrary. It is necessary to bear this in mind for a proper evaluation of the discussion that follows.

Sambalpur — Crop Pattern

The present crop pattern : Sambalpur gets an average annual rainfall of 52 inches. The soils are of four broad types: *Bahal* (bottoms), *Berna*

[5] We must note here that in this task we expected that considerable guidance and information will be available from the Agricultural Experiment Stations of the Government of India, or those of the Government of Orissa. We expected that they would have experimented with crops and crop rotations under irrigated conditions and would have established, before the irrigation waters became available, sufficiently firm crop patterns and rotations which they considered best suited to the region; that these would be recommended to and propagated among the peasants. We were sorry to find that very little had been done in this regard and very little relevant information was available in time for use by the time the waters were made available for irrigation in Sambalpur. The same was the story on the Agricultural Extension front. Very little or next to nothing was done to instruct the Sambalpur peasant in methods of irrigated agriculture. He was left to fend for himself as best as he could when the irrigation waters began to flow in the year 1957.

(dells), *Mal* (Slopes) and *At* (tops). The classification is based mainly on location with respect to the water-shed. "In other words, the cultivated land consists of ridges, slopes, dells and bottoms. The uplands which receive only direct rainfall are known as *At*. The slopes are terraced to catch surface drainage from the uplands and are known as *Mal*. The *Mal* terraces are generally dry and harden quickly. The gently sloping *At* may be terraced into *Mal*. The dells are formed where the slopes meet and these get drainage from the slopes on either side. These dells are known as *Berna*. The *Mal* slopes and the *Berna* dells fall into the bottoms which are known as *Bahal* and the *Bahals* usually end in a nullah."[6]

The fertility of these four classes of land varies inversely with their height. The *Bahal* lands have a deeper soil crust than other lands and have comparatively heavier soil at the top than the other lands.[7] They are the most fertile in the area. The *Berna* lands have relatively shallower topsoil than the other three types,[8] and are the second best lands as regards fertility. *Mal* lands are characterized by thin soils and as water runs off them quickly, they are insecure. The *At* lands have the lightest soils of all and the meagrest water-holding capacity. As a result only shallow rooted crops can be grown on them. According to Dr. Hoon's report, all the soils are capable of growing more than one crop under irrigated conditions.

In the total cultivated area, according to the farm business survey information, *Mal* and *Bahal* lands accounted for about 70 per cent of the cultivated area. A further 12 per cent was *At* land. *Berna* land was 15 per cent. In our sample only seven per cent of the cultivated area was irrigated, mostly from tanks. There was very little double cropping, less than one per cent of the cultivated area being reported as cropped more than once. Nearly 92 per cent of the cropped area was put under paddy. The *At* lands usually were planted to pulses and oilseeds, though paddy was also grown on them in some places.

"In almost all villages plots are prepared out of the *At* or *Mal* lands near the village sites for crops like sugarcane, wheat and gram. Such lands are known as *Barcha* lands and are prepared with great labour. The *Barcha* lands are watered either from tanks or wells and a crop of sugarcane is alternated with wheat, gram, potatoes or vegetables like cabbage, onion, etc. The *Barcha* lands illustrate the use to which the *At* lands can be put to, provided water is made available in plenty and suitable investments are made."[9]

Future crop pattern in the Sambalpur zone: The intensity of irrigation in the Sambalpur zone is 100 per cent for *kharif* and 48 per cent for *rabi*,

[6] Report of the Sivaraman Committee, 1953, p. 3.

[7] Dr. R. C. Hoon, *Report on the Preliminary Soil Survey of the Area Commanded by the Hirakud Dam*, 1954, pp. 16-17.

[8] *Ibid.*

[9] Report of the Sivaraman Committee, 1953, p. 4.

according to the Project Reports. This means that irrigation water will be available to only 48 per cent of the total culturable commanded area during the *rabi* season. The first question to be decided is then which types of land will be irrigated throughout the year and cropped more than once.

For determining the future crop pattern we have the following data with us : (1) crop patterns and rotations recommended by the Committee of Officials in 1952; (2) those recommended, according to soil conditions, by Dr. Hoon; (3) the information collected by us regarding the preference of farmers in Sambalpur regarding the second crop; (4) experience and information available regarding coastal practices or delta irrigation; (5) data regarding the cost and yields of cultivation of different crops in Sambalpur gathered by us; and (6) the same gathered by the Sivaraman Committee.

The best and most fertile lands in Sambalpur are the *Bahal* lands. There are, however, several reasons why it seems unlikely that they will be put under an irrigated second crop. For one thing, according to our information, there is a great prejudice among the Sambalpur cultivators about putting these lands under irrigated second crops partly because they are afraid that as these lands are low lying, they will tend to retain the irrigation water with a consequent tendency to waterlogging. From the farmer's point of view, *Bahal* lands are the most secure and the most fertile and they are his mainstay, his main security or insurance against drought or failure of crop on other lands. He is naturally reluctant to monkey with this land.

Secondly, most of this land usually grows a long maturing variety of paddy. This is relatively heavy-yielding and its quality is also much better than the short-maturing varieties. This is planted in June and harvested in December-January. This is too late for a *rabi* crop except perhaps some catch crop like pulses. If the peasant wants to grow a second crop, he must change over to a shorter maturing variety of paddy which will necessarily be coarser and lower in yield than the long-maturing variety cultivated today. Together with the prejudice noted earlier, and the distinct preference for the long maturing paddy in Sambalpur, it seems most likely that the *Bahal* lands would not be put under an irrigated second crop.

Berna lands, which are located just above the *Bahals*, are next to them the most secure and fertile. There is no prejudice against putting them under an irrigated second crop as in the case of *Bahal* lands. The *Mal* lands are neglected today because water runs off quickly over them and crops on them are not secure. The peasants are ready to experiment with this type of land and already encouraging results have been obtained by individual farmers in growing wheat as a second crop after *kharif* paddy on these lands.[10] *At* lands grow only shallow rooted crops today. But both

[10] R. C. Hoon, *op. cit.*

At and *Mal* lands can be developed, as exemplified by *Barcha* land, if water supply is assured.

The Advisory Committe, in 1952, recommended the following intensities for the right and left side flow canals.

	% of C.C.A.
1. *Kharif*	
Kharif paddy	70
Sugarcane	10[11]
Other *kharif* crops	20
	100
2. *Rabi*	
Rabi Paddy	33
Cash *rabi* wheat, groundnut, potatoes, etc.	8
Light *rabi* crops like *Urid, mung, kulthi*, etc.	7
Total	148

This plan was suggested at an early stage of the project and the data on which it was based were not available in as great a detail as were, for example, available in regard to the delta irrigation scheme. There were some quite strong contra-indications regarding this crop pattern in the information we had gathered, as also in the information that had become available since then. For example, in the crop pattern a very large proportion of the area under the *rabi* crop was proposed to be put under paddy. This appeared to be uneconomic for one thing. The results of crop rotation experiments at the Rice Research Station, Cuttack, showed that two crops of paddy in succession would be profitable only if there is grown a green manure crop in between which is ploughed under. A green manure crop was unknown in the present crop practices in Sambalpur. Without a green-manure crop, a second crop of paddy was not paying. Secondly, the known tendency of the peasants in Sambalpur was to put as much land under paddy in the *kharif* season as possible. Thirdly, the information we had collected from the peasants in the area, after the Hirakud waters became available last year, showed that they were not thinking of a second paddy crop at all but were all thinking of growing wheat after *kharif* rice, a rotation they had successfully tried on a small scale before. It was, therefore, not possible for us to accept the above crop pattern. We thought a modification was called for.

[11] The non-inclusion of sugarcane in the *rabi* does not mean that it will not get water during the *rabi* season. Its requirements for all the year are included in this.

It was necessary in the light of our information to reduce the area proposed to be put under *kharif* crops other than paddy and to put that area under paddy, making the total proportion of the area under *kharif* paddy 90 per cent. The *kharif* crops thus displaced were put down for *rabi* where the area proposed to be put under paddy was vacated and put under pulses and wheat. Pulses, wheat and groundnut were allotted 30 per cent each of the total *rabi* area and the remaining 10 per cent was allotted to potato. From the point of view of water availability, this was feasible because our plan replaced paddy, a very heavy irrigation crop by other lighter irrigation crops such as wheat, or oilseeds, pulses, etc. in the *rabi* season, and shifted the paddy crop to the *kharif* season where, because of 100 per cent intensity and additional supply from rain, the water availability was quite satisfactory.

As will be noticed, we have not thought of varying the acreage under sugarcane. This is so mainly because the sugarcane crop requires perennial irrigation and this depends on the total water supply available to an irrigation project, in the first place, and, in the second place, on the water that may be allotted by the irrigation authorities for sugarcane as such considering their concurrent commitments to other crops in the area and the other technical factors such as the discharge capacity of the canals, the feasibility of frequent waterings, etc. As the Official Committee had put the acreage under sugarcane at 10 per cent of the total cultivable area, we took that as based on a certain decision and view of the irrigation authorities after taking account of all the technical factors involved. Ten per cent also appeared to be a modest and realistic target. It appeared that if a very large proportion of the area is to come under sugarcane, that would necessitate a very radical change of crop patterns and rotations in the area. Even putting 10 per cent of the cultivable area under sugarcane was a tremendous change considering the fact that at the time of the survey a fraction of one per cent of the net cultivated area was under that crop. In Sambalpur *Mal* and *At* lands had to be prepared for the cultivation of this crop and turned into *Barcha* land, as mentioned previously. This will necessarily take time and the extension of area under sugarcane will, we expect, be a slow process even after irrigation.

The final crop pattern after irrigation in the Sambalpur zone, as expected by us is given in a Table on the next page.

Future crop pattern in the delta area : We may begin this by noting the characteristics of the soils of the Mahanadi delta. The following from Dr. Hoon's report on the soil survey of the delta gives a good description :

> "The area occurs as a deep alluvium and comprises a number of 'Doabs'. The soil texture varies from clay loam to clayey with clay content ranging from 30 to 50 per cent. The land at the head of the 'Doab', i.e. near the bifurcation of channels and along the banks of streams is

comparatively high level and lighter in texture with heavier soil in the valley. The latter continues till the sea sand belt is reached. The high-lying, intermediate and low-lying lands are known locally as 'Biali', 'Laghu' and 'Sarad' respectively..... The soils are primarily deficient in nitrogen and, to a slight extent, phosphorus and potassium and call for an enrichment by artificial fertilizers and/or green manuring which can be introduced in the crop rotation."[12]

(*Table showing final crop pattern referred to on page* 143)

		% of C. C.A.
1.	*Kharif*	
	Kharif paddy	90.0
	Sugarcane	10.0
		100
2.	*Rabi*	
	Pulses	14.4
	Wheat	14.4
	Groundnut	14.4
	Potato	4.8
		48.0
	Total	148.0

We may proceed by describing the existing crop pattern in the Cuttack and Puri districts in order to assess the factors that have basically shaped it. In Cuttack, 195,000 acres of the net cultivated area are under canal irrigation, and the crop pattern, in this area, may furnish valuable clues to the shape of things to come when perennial irrigation comes to the delta region through the Hirakud waters.

"The principal crop is rice, three main variations of which are Beali (Autumn rice), *Sarad* (Winter rice) and *Dalua* (Spring rice). The autumn rice is sown broadest in the month of June and is harvested in August or September. The winter rice is sown like the autumn rice in the month of June and harvested from October to January. *Dalua* or spring rice is sown in waterlogged depressions in the cold weather and harvested in March and April. This is a short-term crop."[13] According to the figures given by the Sivaraman Committee, winter rice is by far the most important of the three and accounts for nearly 80 per cent and more of the area

[12] Quoted in the *Report on Investigations for the Extension of Irrigation in the Mahanadi Delta*, Ministry of Irrigation and Power, October 1953, p. 321.

[13] Sivaraman Report on the *Direct Benefits of Irrigation of the Hirakud Dam Project* (Delta Area), Cuttack, 1954, p. 1.

under rice. Area under autumn rice accounted for about 8 to 9 per cent of the area under rice. Both these were *kharif* crops. Area under spring rice is very small, slightly more than one per cent of the total area under *kharif* rice. The other *kharif* crops were oilseeds (til and groundnut) and jute, mainly in Cuttack district (17,000 acres).

The proportion of the net cultivated area double cropped in Cuttack was 27 per cent; it was 23 per cent in Puri. In both the main *rabi* crop was pulses which covered nearly 17 per cent of the net cultivated area in both the districts. Potato was grown in both the districts and the area under it was 14,000 acres in Cuttack and 1,670 acres in Puri. Wheat occupied 3,000 acres in Cuttack and a negligible area in Puri. Sugarcane was cultivated in both the districts and the total area under it amounted to 17,000 acres in the two together.

There are certain features of this crop pattern which need further attention. For example, the soil conditions in the delta are much more uniform than in Sambalpur. The soils are generally alluvial and do not differ much. They are all capable of growing the same crops under similar conditions of water supply. So also most of the area is flat. The soil composition and the surface levels, etc. being generally similar do not affect the crop pattern in any particular direction. The main factor seems to be water supply and manure supply. This will be brought out more clearly if we discuss some of the crops grown and their locations, etc.

Jute cultivation has increased of recent years. The Sivaraman Committee noted that acreage under it had increased from 5,080 acres in all the coastal districts at the time of the last Settlement (1932) to 68,000 acres in Cuttack alone in 1952-3. Jute is a very paying crop, but its cultivation is limited by several factors in Cuttack. The jute crop is followed by a rice crop. Jute is sown in June and harvested in August. The succeeding rice crop is transplanted as soon as jute is harvested. This has to be done almost simultaneously, because if it is not done the late transplanted rice does not get enough moisture in its early stages of growth. For both the harvesting of jute and transplantation of rice to be carried out almost simultaneously, a considerable amount of labour force is necessary. This is more so because the harvesting of the jute crop is not over when the crop is cut. It has to rot and then has to be beaten and the latter is a very labour intensive operation. The very large amount of labour that these operations require is not easily available in the areas where jute is grown, partly because the agricultural population in the area is also busy in these months with their other *kharif* crops (weedings, etc.) and is not willing to work for somebody else in that period. Partly also, the shortage is not really of labour but of working capital to employ it. The jute growers have not the cash required to employ a large number of casual labourers for the job during this period. The other restriction on the expansion of acreage under jute is the lack of clear water pools in the canal

irrigated areas of the delta which are necessary for the further processing of jute after harvesting. The fineness and quality of the jute fibre depends to a very significant degree on the water in which it is rotted. The muddy canal water is not very suitable for this purpose. But perhaps this is a restriction that can be overcome easily with a little planning.

The acreage under potato has also shown an increase in recent years and potato certainly is a paying crop. It is an irrigated crop. The restriction on its growth today besides irrigation is really the demand factor. The potato acreage is today very largely concentrated around the towns of Cuttack and Puri which are their main markets. There is no reason to believe that the acreage will not grow with increased irrigation and increased demand for potato in the urban and rural areas.

Sugarcane is another paying crop. It is to be noted that though sugarcane acreage has increased during recent years it is not confined to Cuttack where canal irrigation is available. In fact, it is not grown in the canal-irrigated areas. Sugarcane is grown along the river banks, where the flood waters reach and leave a residue of silt and where, because of the perennial flow of water in the river, however small, it is possible to give water to sugarcane by lift irrigation. In the Orissa canals, there is no water after December or January nor do the canal irrigated areas receive the natural fertilizer dose in the form of flood silt. The farmers believe that the canal-irrigated soils are not fertile enough for sugarcane. This merely expresses, in another way, the fact that fertilizers will have to be put in for sugarcane cultivation for which they have no money. Even the sugarcane that is grown on river banks is grown in small patches of less than one acre each.

By far the most important *rabi* crop is pulses throughout the delta. The main reason for this preference is that pulses are a necessary ingredient of the diet of the area; they are also suitable as quick catch crops; they do not require much water and are easily nurtured on the water remaining in the soil after the earlier crop is harvested; the pulse crop also restores the fertility of the soil to some extent and serves as a fertilizer and does not need any fertilizers for its own growth.

Crop pattern under irrigation : In contrast with the Sambalpur area, in the delta irrigation zone we have more data for determining the crop pattern under Hirakud irrigation. For one thing, the Orissa canals in Cuttack, now nearly a century old, give at least some patterns of irrigated agriculture in this area, a good basis to build upon. For another thing, somehow there seems to have been much more technical data gathered, processed and examined with regard to the delta irrigation scheme than seems to have been done in regard to the Sambalpur area. *The Report on the Investigations for Extension of Irrigation in the Mahanadi Delta* (Mimeographed), October 1953, contains a wealth of data regarding the irrigation plans in this area,

The proposed scheme of delta irrigation will make available more water to the existing Orissa canals and turn them from seasonal into perennial ones. The discharge capacities of these canals are also being modified. Secondly, new canals will be dug in Puri, where there is no flow irrigation today and Hirakud water will flow through them all the year round.

As Cuttack and Puri districts receive annually an average of 62 inches of rainfall between June and 30th November, it was necessary to take into account the water thus made available and then to chart out how best the Hirakud water could supplement it.

"For this purpose it is necessary to evaluate the annual precipitation much more precisely than is done by the mere figures of inches of rainfall. It is usual to take a certain percentage of the total annual rainfall, varying between 50 and 70 per cent and call it useful rainfall. This is, however, vague, and a better method known as the Madras Method (Madras Engineering Association, P.W.D. Diary 1944, p. 49-50, based on results of experiments on water requirements in Madras State) has been evolved. According to this :

> "It is desirable to ignore during transplantation rainfall of less than ¼" in 24 hours, or exceeding 3" in 24 hours or 5" in any 10 days' period. After transplantation period, all falls less than 1/10th of an inch in 24 hours or exceeding 2" in 24 hours or 3" in any 10 days' period shall be ignored."

Examining the rainfall data for the Mahanadi Delta over the preceding 30 years and more particularly that of five years of low rainfall among them, the useful rainfall calculated according to the above method came to 31.0 inches.[14]

Taking this minimum into account and also considering the discharging capacities of the proposed canals, the total available water, losses during transmissions, etc., the report works out detailed duties for monsoon and non-monsoon months. The total intensity of irrigation in the delta area is 177 per cent. All this was considered at a conference of representatives of Directors of Food and Agriculture, Orissa; Director, Central Rice Research Institute, Cuttack; and the C.W.P.C., and the following decisions regarding intensities and crop rotation were arrived at : (see p. 148).

Taking account of all the information available on this point, the above appears to be a reasonable crop pattern for the delta area. As in the case of Sambalpur, our data throws up no contra-indications. We have, therefore, assumed this crop pattern for the future for our purposes.

[14] M. G. Hiranandani, *Report on the Investigations for Extension of Irrigation in the Mahanadi Delta,* Ministry of Irrigation and Power, Government of India, October 1953. (Mimeographed), Appendix XI, p. 228.

Crop yields : We now go on to indicate what we expect to be the situation in regard to the yields of different crops under irrigation.

Kharif		
Jute	15%	15th April to 31st July followed by *Aman* paddy in 2/3rd jute area. 15th May to 30th November.
Aman Paddy	80%	This includes 10% of the land in which jute will be grown and *Aman* paddy done from 1st August to 30th November. Seedlings of this will be raised in July, transplanted from 1st August to 15th August and matured from 15th August to 30th November.
Beali Paddy	5%	15th May to 30th September; to be followed by potatoes and vegetables.
Sugarcane and garden	10%[13]	Whole year crop
	110%	
Rabi		
Dalua paddy	12%	1st January to 30th April (Seedlings to be raised in December).
Wheat-Cotton		
Groundnut	10%	15th October to 30th April.
Cover crop (legume variety)	40%	(In *Aman* paddy area) December to April.
Vegetables and potatoes	5%	These will be grown in *Beali* paddy area (October to March).
	67%	

Total intensity during the year 177%

As in the case of the crop pattern, here also we have to make the best judgement possible from the available data. In respect of the current yields of crops widely grown in the area today, we had data gathered in our farm business survey. Besides this, we had conducted special surveys in respect of certain crops which were today not very extensively grown

[13] As in Sambalpur, the omission of sugarcane from *Rabi* does not mean that this will not get irrigation water in that season. Its requirements for 12 months have been taken into account.

but which might become important after irrigation, as also crops which were today being grown under irrigated conditions. These data furnished us yields as well as the costs of cultivation to the economy (i.e. materials used up in production) of those crops. Besides our data, we also have made use of data available to us from the Agricultural Experiment Stations at Cuttack and Sambalpur. These data were meagre, as noted before, but, such as they were, we have tried to make maximum use of them. We have also used, in some cases, data from all-India Reports. Even this varied type of information was found insufficient sometimes and we had to use our best judgement in making good the deficiency. It was, therefore, thought necessary that we must make clear in every case the reasoning behind the figures of yield that we have finally arrived at. We have set down, in each case, the data on which we have based ourselves in respect of each crop.

Sambalpur Zone

Paddy : In the Sambalpur zone there is no broad division of paddy into *Beali* and *Sarad* as found in the coastal region. Of course, the short duration paddy grown on *Mal* lands might be considered the equivalent of *Beali* on the coast. But separate yield figures were neither stated nor noted down for these in our survey, since such division was not customary among farmers in Sambalpur. For Sambalpur we consider all paddy together. The average per-acre yield of paddy in the Sambalpur zone during the year 1955-6 came to 13 maunds in our farm business survey.

The Sambalpur zone had practically no irrigated paddy. Though the soil and topographical conditions of this region are to a certain extent different from the delta, for the purpose under consideration, the figures for the delta may be considered nearest to those of Sambalpur. The difference between the yields of irrigated and non-irrigated paddy in the delta was found to be in the neighbourhood of six maunds. In Sambalpur, the best lands are lowlands which have even today good water supply and here irrigation may not register as much increase in yield due to irrigation as in the coastal area. On *Mal* and *At* lands, because of the soil factor, rice yields cannot be expected to be as high as in the coastal area. On an average, it would be safe to assume an increase of five maunds per acre in the yield of paddy in the Sambalpur zone as a result of irrigation.

Sugarcane : The average yield of *gur* per acre of cane was reported to be 32 maunds in the Sambalpur zone. Calculating on the basis of a 10 per cent recovery, we may put the present cane yield at about 11½ to 12 tons per acre. Cane is grown today in small patches and water availability is severely restricted. With gravity flow irrigation and a factory* to pro-

* See p. 161.

cess the cane, there is bound to be some improvement in cultivation practices. Even today, according to informed cultivators, it is not difficult to get 50 maunds of *gur* or 500 maunds of cane per acre. This is also about the yield in some places in the Delta zone where people regularly and systematically cultivate sugarcane. The Agricultural Experiment Station at Sambalpur has recorded yields of sugarcane varying between 500 maunds and 1,500 maunds per acre. Given proper manure and careful husbandry, the average yield may go beyond a thousand maunds. But under present circumstances, it would be proper to expect a yield of about 20 tons per acre or roughly 56 maunds of *gur* per acre.

Wheat : Though the total area under wheat at present in Sambalpur zone is rather low, it has been increasing of late. A special crop survey by us showed that the average yield of wheat per acre in the region was 5.16 maunds. Informed cultivators, however, reported that with three to four waterings and careful cultivation one could get eight to 10 maunds of wheat per acre. Examining yields of wheat in other highland areas in India, we find the average yield of unirrigated wheat varying between three and six maunds per acre and of irrigated wheat between eight and 12 maunds per acre. In view of this, it would be reasonable to assume that with irrigation the average per acre yield of wheat in the Sambalpur zone may be about eight to eight and a half maunds per acre.

Groundnut : Groundnut is grown on the *At* and upper *Mal* lands of Sambalpur. An average per acre yield of a little over seven maunds (seven maunds four seers) was reported in our Farm Business Survey for the year 1955-6. Groundnut can be a *kharif* or a *rabi* crop though in Sambalpur it is always a *kharif* one. It is not an irrigated crop, though it may benefit from an occasional watering and from protective irrigation. In any case, improved soil conditions due to general irrigation farming may have a beneficial effect on it. Experienced farmers of Sambalpur stated that with proper cultivation the heavy-yielding variety may give a yield of anything like 10 to 15 maunds in shell per acre. The straight variety of plant though heavy yielding is more liable to damage by birds whereas the spreading plant is a comparatively low yielder. The Agricultural Experiment Station at Sambalpur has recorded a yield of over 24 maunds per acre; but of course, this is under exceptional conditions that are rarely reproduced by farmers. Taking all this into consideration one might safely expect that the average yield of groundnut may increase by about three maunds per acre over the 1955-6 average after irrigation is introduced, i.e. the per acre yield will be 10 maunds.

Potato : The Sambalpur zone today grows very little potato and we had in our sample only a fraction of an acre reported under potato. In

the delta on the other hand, potato is grown to a considerable extent and the yield is 92 maunds per acre in Cuttack and 87 maunds per acre in Puri district. The Agricultural Experiment Station at Sambalpur reported a yield of 100 maunds of potato per acre. It is an irrigated crop and is heavily manured. In Sambalpur, the *At* and *Mal* lands will be most suitable for growing potato once irrigation water is available. But their soil is comparatively thin and poor. Of course, heavy manuring may, to a great extent, compensate for the deficiencies of the soil. It would not be improper, therefore, to expect an average yield of 80 to 90 maunds of potato per acre in Sambalpur with irrigation.

Pulses : In Sambalpur today, most of the pulses are *kharif* and are grown on the *At* and *Mal* lands which are of poor quality. The yields are quite low: *kulthi*, a little over two maunds per acre; *mung*, a little over one maund per acre; and blackgram (*birhi*) about one and a half maunds per acre. The average per acre yield of all pulses came to about one and a half maunds. With irrigation, there is a possibility of the condition of the *At* and *Mal* lands improving. And people may also start growing pulses on the *Bahal* lands which are the richest. Though the pulses need very little irrigation, they will be assured of water supply in time. All these considerations lead us to believe that with irrigated farming the yield of these crops will double. According to informed cultivators, a good crop of *kulthi* or blackgram (*birhi*) yields about five to six maunds per acre. So also with *mung*. But these pulses are delicate crops and slightly unfavourable weather or pests might completely damage the crop. An average of about three maunds per acre would, therefore, be a fair estimate of future yields in case of pulses.

Delta Zone

Unlike the Sambalpur zone, in the delta quite a few crops were grown under irrigated conditions, at the time of our survey, and they proved the best guide for estimating future yields of crops when perennial irrigation would be introduced in the delta.

Aman or Sarad paddy : In Cuttack district in 1954-5, the average yield of irrigated *Sarad* paddy per acre in our intensive sample survey, was reported to be 17.5 maunds, and of non-irrigated *Sarad* paddy about 11.5 maunds. The average per acre yield in Puri was also the same as non-irrigated *Sarad* paddy in Cuttack. Making allowance for all factors it might be safe and reasonable to assume an average increase per acre of five maunds in the yield of *Sarad* paddy in the non-irrigated areas of the delta once those lands are brought under irrigation.

Beali *paddy* : Most of the short-duration paddy in this region is also low yielding. *Beali* paddy was grown on comparatively high-level land and did not need any irrigation. *Beali* being a low-yielding variety, the tendency of the cultivator was to convert *Beali* land into *Sarad* wherever possible by digging and levelling down the field. With perennial irrigation reaching the *Beali* land, this tendency might be reinforced and quite a lot of *Beali* land may go under *Sarad* paddy. There are, however, two reasons why cultivators may continue to grow a short-duration paddy like *Beali*. In the first place, long-duration or *Sarad* paddy keeps the land occupied till December, by which time it may be late for any other crop except pulses and such other light *rabi* crops. Those who would want to grow potato, vegetables, wheat or even *rabi* cotton (if that is grown at all) would like to have the field free for it much earlier. And besides, the *Beali* land will be more suitable for most of these crops. Hence the cultivator may prefer to grow *Beali* paddy to be followed by any of these crops to growing long-duration paddy on it. Secondly, the smaller and poorer cultivators always find themselves hard up in the rainy season, particularly during three or four months before the harvest of *Sarad* paddy. *Beali* paddy, which is normally harvested by the end of August, i.e. about three to four months before the long-duration *Sarad* paddy, is a great help to such families, as a stopgap arrangement. In such circumstances, despite irrigation facilities, such cultivators may want to grow some *Beali* paddy. The information collected in our intensive sample shows that *Beali* paddy benefits from irrigation. The yield per acre of irrigated land was higher, on the average, by two maunds than on non-irrigated land (the latter being ten maunds per acre). We have, therefore, assumed that the yield of *Beali* paddy under irrigation will increase by two maunds per acre.

Jute : Jute has been grown in the coastal districts of Orissa for a long time. Since the partition of the country in 1947, the area under jute registered a very considerable increase. Plentiful water is one of the prime requirements of jute cultivation. Jute is at present grown in both irrigated and non-irrigated areas in the Mahanadi Delta. Irrigation may improve the cultivation of jute in two respects. The uncertainty of timely rainfall delays sowing operations in non-irrigated areas, and as a result the yields fall. Secondly plenty of clear water is necessary for separating the jute fibre from the stem; inadequate and muddy water affects the quality of the fibre and hence the price. In both these respects, perennial irrigation might be expected to improve the situation.

The cultivators surveyed in the sample grids in the Cuttack district reported an average yield of 8.44 maunds of jute fibre per acre. There was hardly any difference in the yield figures for canal-irrigated and non-irrigated areas. The cultivator's notion is that, properly cultivated, one should get 10 to 15 maunds of jute fibre per acre. A special survey of some

of the non-sample cultivators of jute, in one of the well-known jute-growing tracts in the delta, showed an average per-acre yield of 13.35 maunds. These were rather good cultivators. Considering all such factors, the present average of 8.44 maunds per acre appears a reasonable one. With perennial irrigation (today it is only for nine months in the year) covering practically all the cultivated land in the commanded region, it might be justifiable to expect an increase in the average per-acre yield of jute. Taking the better farmers' performance into account, one might say that under perennial irrigation in the entire commanded area (part of which is uncommanded today) the per-acre yield might rise by about three maunds.

Sugarcane : Sugarcane is one of the main irrigated crops but, curiously enough as noted earlier, in the canal irrigated area of the Mahanadi Delta, there was very little of it grown.[16] Two sample farmers in the irrigated sample grids reported growing of sugarcane, and only 12 cultivators in non-irrigated areas reported very small areas under it. (They reported a yield of nearly 36 maunds of *gur* per acre.) Therefore, a special survey of sugarcane cultivation was carried out in an important sugarcane-growing area in Puri district along the banks of the River Daya near Bhuvaneswar. The average yield per acre of these farmers was reported to be a little over 56 maunds of *gur*. If we consider a recovery rate of 10 per cent, the cane yield comes to about 560 maunds per acre. These farmers grew cane from year to year and were among the best sugarcane cultivators in the area. Unless methods of cultivation, including manurial practices, improve considerably, there is no compelling reason to expect any great change in the per-acre yield of sugarcane over this, though perennial irrigation might help the extension of area under sugarcane. Taking everything into account, it would not be unfair to expect an average yield of about 20 tons or 56 maunds of *gur* per acre under perennial canal irrigation.

Potato : Among cash crops grown in the delta, potato today occupies a place next only to jute. And yet it is grown in specific areas and not widely spread over the whole region. Twenty-two sample cultivators in the 20 sample grids in the delta region reported potato cultivation with a total acreage of 4.02 acres under potato and the reported yield per acre in their case was 44.50 maunds. Special enquiries were conducted in two important potato-growing areas of Cuttack and Puri districts. Not all potato grown was under canal irrigation. All potato-growing in Puri and quite a lot of it in Cuttack was under lift irrigation. The average per-acre yield of potato in these special surveys was reported to be 90.07 maunds in Cuttack and 84.43 maunds in Puri. The weighted average of these was 86.54 maunds.

[16] The data supplied by the canal revenue authorities show that a little less than 200 acres along the High Level canal had been irrigated for cane during the year 1953-4.

As stated above, the potato crop in the delta region today is fully irrigated and well manured. Perennial irrigation may make only a little difference to the average yield, though the acreage under potato may go up considerably. The Agricultural Experiment Station, Cuttack, had recorded a yield of about 100 maunds per acre. It would not be wrong to expect an average yield of 90 maunds per acre under irrigated conditions.

Pulses : The largest portion of the double-cropped area in the delta is today put under pulses and is proposed to be put under pulses. It is, however, very difficult to say what difference irrigation will make to the average output of pulses. The intensive survey of the farmers in the sample grids in the delta showed that there was practically no noticeable difference in the yields of pulses between the irrigated and the non-irrigated areas. Indeed, if anything, the differences were rather unexpected and suggested that possibly irrigation did not make any difference to the yield of these crops. In Cuttack, for example, the yield of green gram in the irrigated areas was reported at 1.39 maunds per acre (in 1954-5) whereas in unirrigated areas it was 1.52 maunds. The same was true of black gram, *kulthi* and *chana*. The findings were not any different when similar data for Puri district were examined. The average figures for the two districts were practically the same. How is this explained ? Pulses, in the first place, did not require much irrigation; indeed, one or two waterings were the highest that were given to a crop like *mung*, whereas *kulthi* was just not irrigated. Besides, untimely rains might damage the crops or result in mere vegetative growth. Soil conditions were important in determining yield; taking all these factors into consideration it appears that there are no compelling reasons to expect any notable increase in the per-acre output of pulses as a result of the introduction of canal irrigation in the delta. The present average yield of all pulses was about 2.2 maunds per acre in our sample and one might put the yield under irrigated conditions at three maunds per acre generally.

Wheat : Very little wheat was grown in the delta and we could not get any good samples for a special survey. In calculating the production of wheat under irrigation we have assumed, in the absence of anything else, the same yield per acre as in Sambalpur, namely 8.5 maunds.

Estimate of total crop production after irrigation : Combining the crop patterns worked out above as well as the yield estimates and the prices prevailing in 1954-5, we can now estimate the crop production after irrigation in the Sambalpur and the Delta zones. These calculations are contained in Table No. 7.2 (Parts I and II). These calculations relate to the cultivated area as estimated from data gathered in our inquiry. Estimate of the crop production under irrigation relating to the official figures of cultivated area are contained in Table No. 7.3 (Parts I and II). In both

TABLE NO. 7.2—(Part I)

Estimated value of crop production and the materials used up in the production after irrigation in the Sambalpur Zone at 1954-5 prices (Net cultivated area 325,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in production (Value in Rs.)	
			Per acre	Total	Per md.	Total	Per acre	Total
1	Paddy	292,500	18.00	5,265,000	8.01	42,172,650	18.73	5,478,525
2	Wheat	46,800	8.50	397,800	18.22	7,247,916	27.91	1,306,188
3	Sugarcane	32,500	56.00	*1,820,000	12.94	23,550,800	81.27	2,641,275
4	Pulses and gram	46,800	3.00	140,400	15.02	2,108,808	7.28	340,704
5	Groundnut	46,800	10.10	472,680	6.56	3,100,781	15.96	746,928
6	Potato	15,600	90.00	1,404,000	10.00	14,040,000	440.09	6,865,404
	Total	481,000	—	—	—	92,220,955	—	17,379,024

* *Gur.*

TABLE No. 7.2—(Part II)

Estimated value of crop production and materials used up in the production after irrigation in the Delta Zone at 1954-5 prices (Net cultivated area 674,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in production (Value in Rs.)	
			Per acre	Total	Per md.	Total	Per acre	Total
1	*Beali* paddy	33,700	12.00	404,400	5.87	2,373,828	12.81	431,697
2	*Sarad* paddy	539,200	16.50	8,896,800	6.24	55,516,032	11.07	5,968,944
3	*Dalua* paddy	80,880	4.38	354,254	6.15	2,178,662	11.67	943,870
4	Jute	101,100	11.44	1,156,584	25.05	28,972,429	8.59	868,449
5	Sugarcane etc.	67,400	56.00	*3,774,400	11.92	44,990,848	251.60	16,957,840
6	Pulses	269,600	3.00	808,800	7.69	6,219,672	3.89	1,048,744
7	Potato	33,700	90.00	3,033,000	8.00	24,264,000	440.09	14,831,033
8	Wheat	22,467	8.50	190,970	9.90	1,890,603	18.50	415,640
9	Cotton	22,467	Details not available		—	—	—	—
10	Groundnut	22,466	Details not available		—	—	—	—
	Total	1,192,980	—	—	—	166,406,074	—	41,466,217

* *Gur.*

TABLE No. 7.3—(Part I)

Estimated value of crop production and materials used up in the production after irrigation in the Sambalpur Zone at 1954-5 prices (Net cultivated area (official): 380,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in production (Value in Rs.)	
			Per acre	Total	Per md.	Total	Per acre	Total
1	Paddy	342,000	18.00	6,156,000	8.01	49,309,560	18.73	6,405,660
2	Wheat	54,720	8.50	465,120	18.22	8,474,486	27.91	1,527,235
3	Sugarcane	38,000	56.00	*2,128,000	12.94	27,536,320	81.27	3,088,260
4	Pulses and gram	54,720	3.00	164,160	15.02	2,465,683	7.28	398,362
5	Groundnut	54,720	10.10	552,672	6.56	3,625,528	15.96	873,331
6	Potato	18,240	90.00	1,641,600	10.00	16,416,000	440.09	8,027,242
	Total	562,400	—	—	—	107,827,577	—	20,320,090

* *Gur.*

TABLE No. 7.3–(Part II)

Estimated value of crop production and of materials used up in the production after irrigation in the Delta Zone at 1954-5 prices (Net cultivated area (official): 990,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in production (Value in Rs.)	
			Per acre	Total	Per md.	Total	Per acre	Total
1	*Beali* paddy	49,500	12.00	594,000	5.87	3,486,780	12.81	634,095
2	*Sarad* paddy	792,000	16.50	13,068,000	6.24	81,544,320	11.07	8,767,440
3	*Dalua* paddy	118,800	4.38	520,344	6.15	3,200,116	11.67	1,386,396
4	Jute	148,500	11.44	1,698,840	25.05	42,555,942	8.59	1,275,615
5	Sugarcane etc.	99,000	56.00	*5,544,000	11.92	66,084,480	251.60	24,908,400
6	Pulses	396,000	3.00	1,188,000	7.69	9,135,720	3.89	1,540,440
7	Potato	49,500	90.00	4,455,000	8.00	35,640,000	440.09	21,784,455
8	Wheat	33,000	8.50	280,500	9.90	2,776,950	18.50	610,500
9	Cotton	33,000	Details not available		—	—	—	—
10	Groundnut	33,000	Details not available		—	—	—	—
	Total	1,752,300	—	—	—	244,424,308	—	60,907,341

* *Gur.*

the Tables are also given costs of production to the economy of different crops which are identical to the materials used up in production. These are based on the data of the farm business surveys and other information available to us.

In estimating the net increase in crop production after irrigation, we have to deduct from it the crop production that is lost because of the loss of cultivated land submerged by the waters of the reservoir created by the Hirakud Dam. For this, we have to estimate the crop production of this area in Sambalpur before the construction of the dam. This is done in Table No. 7.4. The estimate has been made partly from our data and partly from the available official data. As remarked before, the sample grid that was located in this area could not be covered by us because the land had already been vacated by the peasants by the time our survey began. According to the official information, the submerged area contained one lakh acres of cultivated land. The crop pattern in the area was broadly similar to the other areas in Sambalpur district that were to be under the command of the Hirakud canals and that were sampled and surveyed by us. Taking the official figures regarding the cultivated area and the broad crop pattern from our information and applying the yields of different crops as derived from our farm business data, we calculated the total crop production of the area at 1954-5 prices.

Economic benefits flowing from irrigation : The primary direct benefits from irrigation consist of the net increase in agricultural production. In the foregoing pages we have calculated the crop production of the area affected by the Hirakud irrigation waters both before and ten years after the completion of the dam. The money value of production of the area before the completion of the dam came to Rs. 913.34 lakhs. This is, of course, gross. If from the current production of the area the costs of cultivation to the economy by way of the materials used up in that production calculated from the farm business data are subtracted, we get the net production, which roughly comes to Rs. 769.58 lakhs.

For calculating the net future production we have to make more subtractions than those of costs only. The money value of the gross crop production of the future comes to Rs. 2,586.27 lakhs. We have to deduct from this the crop production in the area lost to cultivation under the Hirakud reservoir. Estimating this from our data and the official figures regarding the cultivated area in the submerged region, we can put its money value at Rs. 103.37 lakhs. Deducting this item from the gross crop production of the future, we get roughly Rs. 2,482.90 lakhs. When we deduct the costs to the economy of this production, we get the net crop production, which comes to Rs. 1,913.22 lakhs. Compared to the net crop production before the dam, this represents an increase of about 150 per cent.

TABLE No. 7.4

Estimated value of crop production and of materials used up in production in the area submerged under the Hirakud reservoir in the Sambalpur Zone in 1955-6 at 1954-5 prices

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (mds.)		Value in 1954-5 prices (Rs.)		Cost of materials used up in Production at 1954-5 prices	
			Per acre	Total	Per md.	Total	Per acre	Total (Rs.)
1	Paddy	95,759	13.00	1,244,867	8.01	9,971,385	18.73	1,793,566
2	Wheat	35	4.25	149	18.22	2,715	27.91	977
3	Other cereals	22	2.55	56	4.48	251	3.15	69
4	Pulses and gram	2,087	1.55	3,235	15.02	48,590	7.28	15,193
5	Sugarcane	600	32.00	*19,200	12.94	248,448	81.27	48,762
6	Groundnut	480	7.10	3,408	6.56	22,356	15.96	7,661
7	Other oilseeds	840	6.11	5,132	8.50	43,622	8.39	7,048
8	Condiments (pepper)	112	Not reported		—	12,379	30.55	3,422
9	Tobacco	65	Details not available		—	—	—	—
	Total	100,000	—	—	—	10,337,367	—	1,876,698

* *Gur.*

Indirect primary benefits result from the spending of the increased incomes of farmers resulting from irrigation. We have no data on this and we cannot proceed any further in that regard. The secondary direct benefits are the values added by transporting, processing and distributing of the added farm products produced in the region mainly because of the advent of irrigation plus any value added by other activities stemming from or induced by the project. In the Hirakud case, the only processing that is visualized as a result of the plans of government is one co-operative sugar factory that will be erected in the next few years, at Atabira, near Bargarh in Sambalpur.

The following information about this is available : It is proposed to start a co-operative sugar factory at Atabira, near Bargarh, in the Sambalpur district. In the Bargarh sub-division of Sambalpur district, there were about 5,000 acres under sugarcane and of this nearly 2,000 acres were within an area of 15 miles of Bargarh. Over 60 per cent of this area the varieties of sugarcane grown were Co. 419 and Co. 421. The rest of the area was occupied by the *desi* varieties.

It was proposed to set up a factory with the crushing capacity of 1,000 tons of sugarcane per day of 24 hours with the possibility of expanding it to 1,200 tons. The working season was expected to be of 120 days in the year. The total capital investment in plant and equipment was put at Rs. 7,000,000. The authorized capital was Rs. 3,000,000, half of it being contributed by members of the co-operative and half to be contributed by Government of Orissa. The borrowing limit was fixed at five times the authorized capital. Substantial contribution from the Industrial Finance Corporation was to be sought.

The employment that it was expected to give rise to was as follows : technical—15; non-technical—15, clerical—30; skilled labour—100; semi-skilled—150; unskilled—300. Calculating roughly and assuming a 10 per cent recovery, the factory would be expected to produce 12,000 tons of sugar every year, worth Rs. 1.11 crores at 1954-5 prices.

Judging from the data available regarding value added in comparable sugar factories elsewhere in India, we can estimate that, in this case, it will come to Rs. 22.2 lakhs. This may be considered the net secondary direct benefit resulting from the Hirakud irrigation. The other products may also be processed but we have no information regarding them. So also we have little data to calculate the net value added by transportation and distribution of the added farm produce.

The indirect secondary benefits would result from the spending of the increased incomes to labourers and others on account of this factory and such other activities. We have little data on this and we have to leave it at that.

The data regarding tertiary benefits are almost non-existent and we cannot say anything in the matter.

There would be, besides these, some other good and bad effects in the long run of the Hirakud irrigation system. Irrigation is known to produce waterlogging and damage to soils by salinization, etc. if not properly handled. Partly because of the characteristics of Mahanadi waters and partly also because of the topography in the commanded area in Sambalpur, there is little danger of both these evil effects appearing, at least according to the experts.[17]

Irrigation water increases the level of the subsoil water and this indirectly benefits the area because it increases the water supply to the existing wells and creates a potential for the development of well irrigation in areas not served by the canals or where canal water does not reach. A canal system, besides supplying water to the crops, also makes it available, to a certain extent, to human beings, and alleviates, to that extent, any water scarcity that might have been experienced in the summer months, in those areas, before the construction of the canals.

Irrigation is also known to bring with it malaria. With the improved means of malaria eradication, this can be easily avoided. This, however, involves costs which will have to come out of the increased production resulting from irrigation.

We have noted previously that the flooding of the land under the Hirakud reservoir has resulted in the loss of a certain amount of agricultural production and we have duly made an allowance for the same. The reservoir may, however, prove to be a good breeding place for fish. If the production of fish can be thus increased, both in the reservoir and in the

[17] Mr. Hiranandani observes about the Delta: "The existing areas have been under irrigation for nearly 90 years and if the water table during winter months fluctuates between 7 and 13.0 ft. from ground surface, no danger due to waterlogging need be apprehended due to the introduction of perennial irrigation which is mostly dry except for wet *Rabi* to the extent of 12 per cent of the C.C.A. Similar inference may be drawn in respect of the new areas in Puri district which are subject to about the same amount of rainfall and will have similar intensity of irrigation during *Kharif* and *Rabi*." *op. cit.*, p. 39.

Regarding Sambalpur, Dr. Hoon observes: "..... the difference for the Hirakud area (Sambalpur) between the maximum and minimum levels of subsoil water ranges on the average between 10 and 25 feet, the highest and the lowest figures of that difference are of the order of 39 feet and 8 feet respectively... There should be little danger of waterlogging in the major portion of the Hirakud area (Sambalpur). Even in the low-lying valley land (Bahal), the observation has been that where drainage is effective in that type of land, as it is over a greater part of it, the excessive water after the rainy season gets drained off very quickly leaving the topsoil free. It may be advisable to maintain the natural drainage as clear as possible in those low-lying areas when a perennial supply of irrigation water becomes available." R. C. Hoon and K. N. Talwar, *Behaviour of Subsoil Water Table under a System of Irrigation and Drainage. Subsoil Water Table Conditions in the Hirakud and the Kosi Projects*, International Commission on Irrigation and Drainage, Second Congress, p. 15 Question 4.

canals, that will be an added item in the benefits resulting from the Hirakud Dam.

As the water level of the Hirakud reservoir falls every year in the winter and summer months, the shore lands from which water recedes become available for the cultivation of fodder and other crops of short duration. This production will have to be added on the benefits side.

These items are only mentioned here. We have not attempted to measure or estimate them because we thought that with the very meagre data bearing on these aspects at our disposal it would not be proper to do so. Perhaps in the course of the next few years more data on these points may become available and a fair estimate will be then made.

To round off this catalogue, we may mention the beauty spot created by the Hirakud Dam and the Reservoir. Perhaps it may become an attractive spot to tourists. The benefits resulting from this cannot be estimated, even vaguely, at this stage.

Irrigation Benefits (1954-5 prices)		Lakhs of Rs.
Primary Direct		
1.1	Gross crop production in 1954-5	
	Sambalpur	306.08
	Delta	607.26
	Total	913.34
1.2	Cost of production of 1.1 to the economy : (Value of materials used up in the production).	
	Sambalpur	56.09
	Delta	87.67
	Total	143.76
1.3	Net crop production : (1.1-1.2)	
	Sambalpur	249.99
	Delta	519.59
	Total	769.58
2.1	Gross crop production after irrigation :	
	Sambalpur	922.21
	Delta	1,664.06
	Total	2,586.27
2.2	Gross crop production (in 1954-5) of the area submerged under the Hirakud reservoir in Sambalpur district	103.37
2.3	Gross crop production of the irrigated area after allowing for 2.2	2,482.90

		Lakhs of Rs.
2.4	Cost of production to the economy of 2.1 :	
	Sambalpur	173.79
	Delta	414.66
	Total	588.45
	Of this cost of production to the economy of 2.2	18.77
2.5	Cost of production to the economy of 2.3	569.68
2.6	Net crop production of the irrigated area	1,913.22
2.7	Increase in net crop production attributable to irrigation (2.6-1.3)	1,143.64
Primary Indirect		No data
Secondary Direct		
3.1	Processing of sugarcane in one factory for producing sugar : expected production of sugar at the factory at 1954-5 prices	111.00
3.2	Value added by the factory in 3.1	22.20
Secondary Indirect		No data
Tertiary Direct and Indirect		No data

2. *Flood Control*

The Mahanadi has a total catchment area of 51,000 square miles and the Hirakud Dam will exert control over 32,000 square miles of the catchment area upstream from Sambalpur. Even after the construction of the Hirakud Dam, the remaining catchment area of 19,000 square miles downstream from Sambalpur will remain uncontrolled as before. But the "peak discharge of this uncontrolled area cannot raise the flood level beyond the gauge of 88.5 feet at Naraj. Damage by floods occurs in the delta area only when the flood level goes above 89 feet at Naraj. The maximum reserve required for controlling the severest flood on record has been estimated as 3 million acre feet while the maximum storage available at the (Hirakud) Dam between the dead storage level and the full reservoir level is 4.5 million acre feet. The flood reserve provided by the Hirakud Dam project is, therefore, considered adequate to reduce all floods to gauge of 89" at Naraj and it is, therefore, forecasted, that there will be no floods to cause damage in the lower regions."[18]

[18] *Report on the Benefits Due to Complete Flood Protection by the Hirakud Dam Project* (Delta Zone—Cuttack and Puri Areas), Government of India, Ministry of Irrigation and Power, Cuttack, 1954, p. 1. (Referred to hereafter as Sivaraman Report on Flood Protection Benefits.)

"The Hirakud reservoir extending over an area of 288 square miles with a flood reserve of 4.27 million acre-feet will successfully hold the flood water until the flood peak in the lower catchment passes down to the sea. Records of 39 damaging floods have been examined. Assuming the safe gauge at Naraj to be R.L. 89.00 feet, it has been found that all such floods can be controlled even without the Hirakud reservoir being filled to the maximum level. In years of exceptionally heavy rain storms only, the full capacity of the Hirakud reservoir will be strained. In designing the Hirakud Dam the requirements of flood control have been given special consideration. The reservoir level will be kept at R.L. 590 during the monsoon period and a large number of deep sluices—a unique feature of this dam—has been provided so that with this reservoir level as much as 7 lakh cusecs can be passed down. Thus, throughout the flood season, the reservoir will have the maximum flood reserve capacity of 4.72 million acre-feet available to absorb flood peaks. This has been made possible due to the Mahanadi carrying sufficient supplies during October and November just after the flood season to enable the reservoir being filled to serve irrigation and hydro-power requirements in the dry season."[19]

We are not technical experts in this field and we have to accept the above claims as coming from experts in the field. But we would like to put down two disturbing thoughts that have impressed us in the large literature available regarding Mahanadi floods. One is regarding the contribution of the catchment area of the Mahanadi not controlled by the Hirakud Dam, to the floods in the delta. According to *The Third Interim Report of the Orissa Flood Advisory Committee* (February 1942) the heaviest rainfall in the catchment area is confined to this uncontrolled sector. "The iso-hyetal lines, or lines of equal rainfall from June to September, show that the heaviest rainfall (60 inches) is confined to a small area between Sambalpur and Sonepur. Thereafter, the next heaviest rain is in the north-east part of the catchment. The rainfall causing heavy floods usually occurs in well-marked patches of heavy rain resulting in an average rainfall over the whole catchment of considerably over one inch per day for about three consecutive days, and moderately heavy rain of over three quarters of an inch per day for about five consecutive days, with maximum flood at the head of the delta at Naraj one day later. General average rainfall of 1 inch per day for three days causes a short flood with maximum flood at Naraj on the fifth day."

"An important factor in estimating floods at Cuttack from Sambalpur is the state of the Tel-tributary which has a large catchment and enters the Mahanadi 46 miles downstream of Sambalpur at Sonepur. This river is capable of producing a considerable flood at Cuttack before the flood

[19] Kanwar Sain, "Harnessing the River Mahanadi", Hirakud Dam Project Supplement to *The Times of India*, January 23, 1957.

from the Mahanadi above Sambalpur arrives at the junction of the Tel and Mahanadi rivers."[20]

These observations leave a distinct apprehension behind that perhaps the claim of Hirakud eliminating the floods in the delta completely, may not be one hundred per cent tenable. The uncontrolled portion of the catchment area may be capable of producing floods on its own in the delta.

The second disturbing thought is based again on certain observations made in the same Interim Report of 1942. The operation of the Hirakud Dam, as envisaged at present, is to moderate the floods by holding up water in the reservoir from the upper catchment area until the peak flood water from the uncontrolled portion of the catchment area has flown down to the sea. Obviously, the moderation of flood by the Hirakud Dam will mean that the gauge at Naraj will be kept below or at R.L. 89 feet. The total discharge of the Mahanadi will not be allowed to rise above a certain level by distributing it over a longer time than hitherto by the moderating operations of the Hirakud Dam. This means that the water level of the Mahanadi will be maintained at Naraj at R.L. 89 feet for a longer time than hitherto because of the Hirakud Dam. This is the essence of the flood-moderating operation of the Hirakud. It is precisely here that, it would seem, lurks danger. The Interim Report says: "The embankments in Orissa if exposed to a high flood for a prolonged period, percolate in many places and there is a chance of earth slips and breaches. A flood height of 25 at Bellevue gauge at Cuttack on the Katjuri river or 89 at Naraj for more than three days may be taken as indicating percolation danger."[21]

This refers to the river embankments in the delta of the Mahanadi constructed for flood protection purposes. The danger of percolation will be greater, as explained above, because of the longer duration of the high water level in the river resulting from the moderating operations of the Hirakud Dam. If this proves real, floods will continue to damage the delta areas even after Hirakud. We have been informed in this connection that the technique of the construction of embankments has since improved and they can be made impervious to percolation. We hope that they will be so made. But if they are not made or until they are so made, flood danger through breaches and slips will remain.

Having noted these two disturbing facets, we now proceed by assuming that there would be no floods after the Hirakud Dam begins to operate. In estimating the economic benefits resulting from complete flood control in the Mahanadi Delta, we have first to address ourselves to the question of the estimation of the loss which results from floods in the area.

Floods are erratic and it is difficult to reduce them to a precise system of intensity, frequency, etc. Yet, for our purpose and for several other purposes, indeed, we have to evolve or really read into the available flood

[20] p. 15.
[21] p. 16.

data some sort of a pattern on which we can reasonably base ourselves. The flood-and-water-discharge data regarding the Mahanadi over the last eight decades have been closely scrutinized and analysed and this showed that a "normal flood" averages once in three years; a fairly "heavy flood" once in five years; and an "abnormally heavy flood" once in 12 years. This pattern can be seen to be underlying the Sivaraman Report on Flood Protection Benefits and its recommendations. It is patent that heavier the flood larger the area affected by it. The Sivaraman Report on Flood Protection Benefits estimates that an area of "two lakh acres in Puri district, and 150,000 acres in Cuttack district in the Mahanadi delta", is liable to floods.[22]

This area is divided into three categories mentioned above as follows :

Area in acres

"Normally liable to floods"	Liable to "heavy floods"	Liable to only "abnormally heavy floods"	Total
180,000	90,000	80,000	350,000

In what way do floods affect these areas ? The destructive aspects of floods are well known. They destroy or affect the crops; they destroy houses and cattle; and they render some land unfit for cultivation by erosion and deposit of sand. But, along with these, there are a few compensatory effects that floods produce. They extend the area under the second or *rabi* crop in the year by leaving enough moisture behind them. Secondly, they leave behind silt deposits which presumably increase the fertility of the soil. For arriving at our estimate of the net adverse effects of floods, it is necessary to evaluate all these as far as practicable. This is what we attempt below with the aid of the data gathered by us regarding the 1955 floods.

For getting detailed and meaningful data regarding flood damage, we carried out a farm business survey of 90 farmers in six pockets in the flood-affected area in 1955. Two of these were in Cuttack and four in Puri. These areas were first marked out on the map and the cultivators in them were then completely enumerated and a stratified random sample of 90 cultivators in all was chosen for our survey (1955-6).

The results of this inquiry are set out in Table Nos. 7.5 (A and B), 7.6 (A and B), 7.7 (A and B) and 7.8 (A and B). Table 7.5 (A and B) contains information regarding the distribution of the cultivated area under different crops in the special flood block samples in Cuttack and Puri districts in 1955-6. For comparison, the crop distribution in the general grid sample in 1954-5 derived from the farm business data is also given. The Tables bring

[22] *op. cit.*, p. 2.

out the fact that, in the areas experiencing floods, the area under second crops is larger than those not experiencing floods. Table No. 7.6 (A and B) presents data regarding the adverse effects of floods on area cultivated and harvested. Details of area over which crops were completely destroyed by the floods and over which crops were washed away in our sample blocks are also presented. The Table broadly indicates that the area over which crops were washed away and destroyed in 1955-6 constituted between six and eight per cent of the total sown area in that year in these blocks. Table No. 7.7 (A and B) contains data regarding crop yields per acre in terms of quantity and value in the special flood block samples in Cuttack and Puri districts in 1955-6. It brings out the adverse effect of floods on crop

TABLE No. 7.5(A)

The proportion of net cultivated area under different crops in the general sample grids and special sample flood blocks in Cuttack District

Sr. No.	Name of the crop	Special flood block samples 1955-6			General grid sample
		Block I	Block II	Total average	1954-5 dt. average
1	*Beali* paddy	5.22	37.84	21.77	7.78
2	*Sarad* paddy	67.66	47.78	57.57	85.90
3	Wheat	3.62	—	1.78	0.08
4	*Ragi*	0.41	2.31	1.87	0.29
5	Other cereals	1.05	—	0.52	—
6	TOTAL CEREALS	77.96	87.93	83.01	94.05
7	Green gram	4.36	37.50	21.18	22.50
8	Black gram	4.11	5.57	4.85	6.61
9	*Kulthi*	8.06	36.29	22.38	5.70
10	*Chana*	40.67	0.90	20.49	1.65
11	Other pulses and gram	—	—	—	0.07
12	TOTAL PULSES & GRAM	57.20	80.26	68.90	36.53
13	Oilseeds	5.02	—	2.47	0.02
14	Condiments and spices	4.71	—	2.31	0.04
15	Jute	26.91	2.09	14.32	3.46
16	Sugarcane	0.70	0.28	0.49	0.07
17	Potato	—	2.16	1.09	0.24
18	Vegetables	—	—	—	0.04
19	Tobacco	—	—	—	0.03
20	*Betel* leaves	—	—	—	0.01
21	Orchard and others	—	1.84	0.93	0.44
	TOTAL CROPPED	172.50	174.56	173.52	134.93

TABLE No. 7.5(B)

The proportion of net cultivated area under different crops in the general sample grids and special sample flood blocks in Puri District.

Sr. No.	Name of the crop	Special flood block samples 1955-6					General grid. sample
		Block I	Block II	Block III	Block IV	Total average	1954-5 dt. average
1	*Beali* paddy	5.72	3.92	22.23	1.61	7.03	9.45
2	*Sarad* paddy	91.68	94.88	75.26	88.69	88.55	85.66
3	*Dalua* paddy	—	—	—	0.89	0.27	—
4	*Ragi*	0.44	—	—	1.96	0.72	0.20
5	TOTAL CEREALS	97.84	98.80	97.49	93.15	96 57	95.31
6	Green gram	26.93	29.82	41.09	21.87	28.58	21.51
7	Black gram	—	32.11	5.60	7.89	10.51	4.94
8	*Kulthi*	5.36	14.03	16.68	10.84	10.96	15.63
9	*Chana*	—	—	—	—	—	0.04
10	TOTAL PULSES AND GRAM	32.29	75.96	63.37	40 60	50.05	42.12
11	Oilseeds	—	—	0.84	3.44	1.19	1.12
12	Condiments and spices	—	—	—	—	—	0.06
13	Sugarcane	—	—	0.38	—	0.07	0.24
14	Potato	—	0.13	0.13	—	0.05	0.45
15	Vegetables	—	0.22	—	—	0.05	0.24
16	*Betel* leaves	—	—	0.07	—	0.01	0.09
17	Orchard and others	—	0.13	—	—	0.03	1.24
	Total cropped	130.13	175.24	162.28	137.19	148.02	140.87

yields. Table No. 7.8(A and B) presents the receipts and expenses of sample farmers in special flood blocks in Cuttack and Puri districts. These are derived from the farm business survey of these farmers conducted during 1955-6.

In evaluating flood damage, let us begin from the adverse effects of floods on agricultural production. The Sivaraman Report on Flood Protection Benefits points out or assumes that the total paddy (*kharif*) crop is destroyed by the floods and then proceeds to average out the total loss over the period over which the area concerned is liable to flood (1/3 or 1/5 or 1/12, etc.). The data gathered by us show that the paddy or *kharif* crop was not totally destroyed but adversely affected by the 1955

TABLE NO. 7.6(A)

Area sown, area on which crops were destroyed and washed away and area harvested in special flood sample blocks in Cuttack District

No. of flood blocks	Name of the crop	Total area sown	Area over which crops were washed away	Area over which crops were destroyed	Area harvested	4 as per cent of 3	5 as per cent of 3	6 as per cent of 3
1	2	3	4	5	6	7	8	9
I	*Beali* paddy	2.54	2.54	—	—	100.00	—	—
	Sarad paddy	11.38	2.00	—	9.38	17.57	—	82.43
	Wheat	1.76	—	—	1.76	—	—	100.00
15 farmers	*Ragi*	0.20	—	—	0.20	—	—	100.00
	Green gram	2.12	—	0.82	1.30	—	38.68	61.32
	Black gram	2.00	0.95	0.16	0.89	47.50	8.00	44.50
	Kulthi	3.92	—	0.25	3.67	—	6.38	93.63
	Chana	19.78	2.00	—	17.78	10.11	—	89.89
	Jute	13.09	—	0.18	12.91	—	1.38	98.62
TOTAL (ALL CROPS)		56.79	7.49	1.41	47.89	13.19	2.48	84.33
II	*Beali* paddy	18.22	0.30	—	17.92	1.65	—	98.35
	Sarad paddy	23.94	—	—	23.94	—	—	100.00
15 farmers	*Ragi*	1.16	—	—	1.16	—	—	100.00
	Green gram	18.79	—	—	18.79	—	—	100.00
	Black gram	2.80	—	0.22	2.58	—	7.85	92.15
	Kulthi	18.17	—	1.27	16.90	—	6.99	93.01
	Chana	0.45	—	0.45	—	—	100.00	—
	Jute	1.05	—	—	1.05	—	—	100.00
	Potato	1.08	—	—	1.08	—	—	1.08
TOTAL (ALL CROPS)		85.66	0.30	1.94	83.42	0.35	2.26	97.39
District Total of above 2	*Beali* paddy	20.76	2.84	—	17.92	13.68	—	86.32
	Sarad paddy	35.32	2.00	—	33.32	5.66	—	94.34
	Wheat	1.76	—	—	1.76	—	—	100.00
	Ragi	1.36	—	—	1.36	—	—	100.00
	Green gram	20.91	—	0.82	20.09	—	3.92	96.08
	Black gram	4.80	0.95	0.38	3.47	19.78	7.91	72.31
	Kulthi	22.09	—	1.52	20.57	—	6.88	93.12
30 farmers	*Chana*	20.23	2.00	0.45	17.78	9.89	2.22	87.89
	Jute	14.14	—	0.18	13.96	—	1.27	98.73
	Potato	1.08	—	—	1.08	—	—	100.00
TOTAL (ALL CROPS)		142.45	7.79	3.35	131.31	5.47	2.35	92.18

TABLE No. 7.6(B)

Area sown, area on which crops were destroyed and washed away and area harvested in special flood sample blocks in Puri District

1 No. of flood blocks	2 Name of the crop	3 Total area sown	4 Area over which crops were washed away	5 Area over which crops were destroyed	6 Area harvested	7 4 as per cent of 3	8 5 as per cent of 3	9 6 as per cent of 3
		(Acres)	(Acres)	(Acres)	(Acres)			
I	*Beali* paddy	5.69	0.12	—	5.57	2.11	—	97.89
	Sarad paddy	91.15	3.00	—	88.15	3.29	—	96.71
15 farmers	*Ragi*	0.44	—	—	0.44	—	—	100.00
	Green gram	26.77	—	1.00	25.77	—	3.74	96.26
	Kulthi	5.33	—	—	5.33	—	—	100.00
TOTAL (ALL CROPS)		129.38	3.12	1.00	125.26	2.41	0.77	96.82
II	*Beali* paddy	2.91	—	—	2.91	—	—	100.00
	Sarad paddy	70.41	0.50	—	69.91	0.71	—	99.29
15 farmers	Green gram	22.13	—	0.40	21.73	—	1.81	98.19
	Black gram	23.82	—	—	23.82	—	—	100.00
	Kulthi	10.41	—	—	10.41	—	—	100.00
TOTAL (ALL CROPS)		129.68	0.50	0.40	128.78	0.39	0.31	99.30
III	*Beali* paddy	13.29	1.77	—	11.52	13.32	—	86.68
	Sarad paddy	44.99	—	—	44.99	—	—	100.00
15 farmers	Green gram	24.57	—	—	24.57	—	—	100.00
	Black gram	3.25	—	—	3.35	—	—	100.00
	Kulthi	9.97	—	—	9.97	—	—	100.00
TOTAL (ALL CROPS)		96.17	1.77	—	94.40	1.85	—	98.15
IV	*Beali* paddy	1.62	0.11	—	1.51	6.79	—	93.21
	Sarad paddy	89.38	21.23	—	68.15	23.75	—	76.25
	Dalua paddy	0.90	—	—	0.90	—	—	100.00
15 farmers	*Ragi*	1.98	0.25	—	1.73	12.63	—	87.37
	Green gram	22.04	—	1.01	21.03	—	4.58	95.42
	Black gram	7.96	—	—	7.96	—	—	100.00
	Kulthi	10.92	—	0.15	10.77	—	1.37	98.63
TOTAL (ALL CROPS)		134.80	21.59	1.16	112.05	16.02	0.86	83.12

TABLE No. 7.6(B)—(*Contd.*)

Area sown, area on which crops were destroyed and washed away and area harvested in special flood sample blocks in Puri District

1 No. of flood blocks	2 Name of the crop	3 Total area sown	Area over which crops were washed away	Area over which crops were destroyed	6 Area harvested	7 4 as per cent of 3	8 5 as per cent of 3	9 6 as per cent of 3
		(*Acres*)	(*Acres*)	(*Acres*)	(*Acres*)			
District Total of above 4 60 farmers	*Beali* paddy	23.51	2.00	—	21.51	8.51	—	91.49
	Sarad paddy	295.93	24.73	—	271.20	8.36	—	91.64
	Dalua paddy	0.90	—	—	0.90	—	—	100.00
	Ragi	2.42	0.25	—	2.17	10.33	—	89.67
	Green gram	95.51	—	2.41	93.10	—	2.52	97.48
	Black gram	35.13	—	—	35.13	—	—	100.00
	Kulthi	36.63	—	0.15	36.48	—	0.41	99.59
TOTAL (ALL CROPS)		490.03	26.98	2.56	460.49	5.51	0.52	93.97

floods in the flood-affected areas. Our data also show that the areas produced a second crop in the wake of the floods. The Sivaraman Report on Flood Protection Benefits does not mention this at all.

In order to estimate the loss of crop production in the areas liable to floods, we must calculate not only the crop production in these areas in a flood year such as 1955-6 but the crop production in these areas when free from floods. Data for calculating the crop production of the flood-affected area in 1955-6 have been already presented. For estimating the crop production of the same areas when protected from floods, we have to decide upon the crop pattern that would be appropriate, and appropriate yields per acre of different crops. The crop pattern of the areas liable to floods is different from that of the areas in the delta that are free from floods. In the absence of floods, it can reasonably be assumed that the crop pattern of these areas will be approximately the same as that of the other areas in the delta. However, there is a complication here. A part of the area in the delta is irrigated while the remaining is not. The crop pattern appropriate for the areas liable to floods, in the absence of floods, is the one that prevails in the non-irrigated areas in the delta because mere protection from flood does not bring irrigation to these areas. In view of this we have, for this calculation, assumed that the crop pattern in these areas will be

similar to that prevailing in the non-irrigated areas of the delta. The data for this have been derived from the non-irrigated farms in the farm business survey sample for the delta. Once this basic decision was made, the decision regarding per-acre yields of crops was also made. The per-acre yields for this calculation were to be those found in our sample of non-irrigated farms.

TABLE NO. 7.7(A)

Crop yields, quantity and value per acre of different crops in special flood block samples in Cuttack District

Sr. No.	Name of the crop	Quantity (in maunds per acre)				Value per acre (in Rupees)		
		Special flood block samples			General grid sample	Special flood block samples		
		Block I	Block II 1955-6	Total average	1954-5 Dt. average	Block I	Block II	Total average
1	*Beali* paddy	(washed)	6.53	5.73	11.49	(washed)	50.92	44.69
2	*Sarad* paddy	8.84	9.16	8.98	14.56	100.33	86.36	94.44
3	Wheat	3.80	—	3.80	3.64	59.78	—	59.78
4.	*Ragi*	11.00	7.70	8.18	3.81	80.00	60.74	63.58
5	Green gram	1.24	2.99	2.81	1.39	14.56	36.45	32.75
6	Black gram	0.19	2.14	1.33	2.53	2.63	30.06	18.64
7	*Kulthi*	3.13	3.55	3.48	3.79	31.71	33.22	32.95
8	*Chana*	1.11	(washed)	1.09	2.50	11.25	(washed)	11.00
9	Other pulses grams	—	—	—	0.26	—	—	—
10	Oilseeds	—	—	—	1.56	—	—	—
11	Condiments & spices	—	—	—	2.83	—	—	—
12	Jute	10.31	10.14	10.30	8.44	256.91	253.22	256.64
13	Sugarcane	—	—	—	45.00	—	—	—
14	Potato	—	72.05	72.05	28.88	—	516.28	516.28
15	Vegetables	—	—	—	—	—	—	—
16	Tobacco	—	—	—	—	—	—	—
17	*Betel* leaves	—	—	—	—	—	—	—

Finally, there was the problem of prices. While the data of crop production of the flood-affected area was in 1955-6 prices, the actual year of the flood, that for the calculation of the crop production in the absence of floods was in terms of the 1954-5 prices being derived from the farm business data. To make a valid comparison between the two calculations, it was necessary to adjust for prices. We decided to calculate the crop production of the flood-affected area in 1954-5 prices.

TABLE NO. 7.7(B)

Crop yields, quantity and value per acre of different crops in special flood block samples in Puri District

Sr. No.	Name of the crop	Quantity (in maunds per acre)					
		Special flood block samples					General grid sample
		Block I	Block II (1955-6)	Block III	Block IV	Total average	1954-5 average
1	*Beali* paddy	10.76	6.03	6.57	8.45	7.65	8.11
2	*Sarad* paddy	4.81	8.55	11.57	3.20	6.24	11.38
3	*Dalua* paddy	—	—	—	4.38	4.38	—
4	*Ragi*	17.50	—	—	4.92	7.22	2.49
5	Green gram	1.24	1.96	2.15	0.82	1.54	1.81
6	Black gram	—	2.09	2.78	1.32	1.98	2.24
7	*Kulthi*	2.61	3.01	2.30	1.57	2.33	3.34
8	*Chana*	—	—	—	—	—	3.90
9	Oilseeds	—	—	—	—	—	1.56
10	Condiments & spices	—	—	—	—	—	1.95
11	Sugarcane	—	—	—	—	—	31.27
12	Potato	—	—	—	—	—	58.19
13	Vegetables	—	—	—	—	—	17.07
14	*Betel* leaves	—	—	—	—	—	—

Table No. 7.9 gives the calculation of crop production in the three different types of flood-affected areas in the flood year. Table No. 7.10 gives the crop production for the same areas in a flood-free year. It should be noted that in estimating the crop production in flood years in Table No. 7.9 we have taken the proportion of the double-cropped area the same as in the non-irrigated area of the Delta zone in a flood-free year, though our data presented earlier indicates that this proportion would be larger in a flood year. We have done this because of the fact, also indicated by our data, that in a flood year which is characterized usually by heavy rainfall, the proportion of double-cropped area increases above the normal in all areas including those that are not actually affected by floods. Table No. 7.11 gives the total crop production in a comparative way.

The evidence we have presented above does not signify regarding the effect, good or bad, of silt deposited by the floods. Comparing the yield of the second crop—which should profit from silt deposited in the wake of the flood—in flooded and non-flooded areas, we find no clear indication as to whether the silt deposit has a favourable or an unfavourable effect on them. In the circumstances, we cannot evaluate the effect of silt deposits.

TABLE No. 7.7(B)—(*Contd.*)

Crop yields, quantity and value per acre of different crops in special flood block samples in Puri District

Sr. No.	Name of the crop	Value per acre (in Rupees) Special flood block samples				
		Block I	*Block II*	*Block III*	*Block IV*	*Total average*
1	*Beali* paddy	77.86	43.21	49.59	67.44	56.87
2	*Sarad* paddy	46.39	72.74	103.02	25.23	54.88
3	*Dalua* paddy	—	—	—	28.61	28.61
4	*Ragi*	184.09	—	—	46.96	71.95
5	Green gram	14.26	27.23	24.83	9.73	18.94
6	Black gram	—	28.54	31.12	16.37	26.04
7	*Kulthi*	29.32	31.61	27.39	16.02	25.48
8	*Chana*	—	—	—	—	—
9	Oilseeds	—	—	—	—	—
10	Condiments & spices	—	—	—	—	—
11	Sugarcane	—	—	—	—	—
12	Potato	—	—	—	—	—
13	Vegetables	—	—	—	—	—
14	*Betel* leaves	—	—	—	—	—

If anything, we presume that it would be favourable to fertility of the soil but it is also possible to exaggerate this effect.

We have still to reckon the other adverse effects of floods. As noted earlier, floods render some areas uncultivable by erosion and sand depositing. The following estimates regarding the areas so damaged in some of the older floods in the Cuttack district are available.[23]

1933	.....600 acres	1939	.....622 acres
1937	.....1598 acres	1944	.....320 acres

With reference to the total area liable to floods in Cuttack, 150,000 acres, these damages are very negligible. If one averages it over the years they are still more so. They affect less than one-half of one per cent of the area. Yet in individual terms it is a severe loss. In terms of resource equipment also it is a loss.

[23] Sivaraman Report on Flood Protection Benefits, 1954, p. 2.

TABLE No. 7.8(A)

Expenses and receipts of sample farmers in special flood block samples in Cuttack District in 1955-6

Block Nos.	FARM EXPENSES (*in Rs.*)								
	Paid to casual labour & farm servants	*Material expenses*	*Feed & fodder expenses*	*Repair charge of implements*	*Repair charge of farm property*	*Rent paid*	*Payments to village servants*	*Other expenses*	*Total expenses*
I	833.00	573.12	1,100.31	—	5.00	57.50	75.75	300.62	2,945.30
II	1,419.00	1,043.19	1,149.87	—	24.25	339.50	20.81	38.31	4,034.93
Total	2,252.00	1,616.31	2,250.18	—	29.25	397.00	96.56	338.93	6,980.23

FARM RECEIPTS (*in Rs.*)						
From land	*From livestock*	*Total*	*Wage receipts Rs.*	*Total Rs.*	*Other receipts Rs.*	*Total receipts Rs.*
7,469.19	755.50	8,224.69	243.00	8,467.69	270.00	8,737.69
5,314.00	513.25	5,827.25	301.62	6,128.87	1,288.00	7,416.87
12,783.19	1,268.75	14,051.94	544.62	14,596.56	1,558.00	16,154.56

TABLE NO. 7.8(B)

Farm expenses and receipts of sample farmers in special flood block samples in Puri District in 1955-6

Flood Block No.	FARM EXPENSES (*Value in Rupees*)								
	Paid to casual labour & farm servants	*Material cost*	*Feed & fodder expenses*	*Repair charges of farm property implements*	*Repair charges of farm property*	*Rent paid*	*Payment to village servants*	*Other current expenses*	*Total expenses*
I	2,026.75	858.50	2,100.56	—	—	425.81	73.25	107.44	5,592.31
II	1,627.50	1,175.56	2,227.81	—	130.00	656.19	47.75	172.81	6,037.62
III	2,305.18	859.81	1,468.19	—	—	640.00	85.25	158.94	5,517.37
IV	711.56	1,162.06	1,924.62	2.19	29.75	497.50	24.62	57.37	4,409.67
Total	6,670.99	4,055.93	7,721.18	2.19	159.75	2,219.50	230.87	496.56	21,556.97

	FARM RECEIPTS (*Value in Rs.*)						
	Land	*Livestock*	*Total*	*Wage receipts*	*Total*	*Other receipts*	*Grand total receipts*
	5,290.81	604.87	5,895.68	373.81	6,269.49	724.88	6,994.37
	7,076.00	1,069.25	8,145.25	891.00	9,036.25	818.18	9,854.43
	6,738.75	939.25	7,678.00	3,873.19	11,551.19	7,416.00	18,967.19
	3,081.44	979.19	4,060.63	1,252.12	5,312.75	975.00	6,287.75
	22,187.00	3,592.56	25,779.56	6,390.12	32,169.68	9,934.06	42,103.74

TABLE No. 7.9–(Part I)

Estimated value of crop production in the area liable to floods in the Delta Zone in 1955-6 (when there were heavy floods) at 1954-5 prices, (Area normally liable to floods : 180,000 acres)

S.No.	Name of the crop	Area cropped (acres)	Yield in physical terms (in mds.)		Value in 1955-6 prices (Rs.)		Value in 1954-5 prices (Rs.)	
			Per acre	Total	Per md.	Total	Per md.	Total
1	*Beali paddy*	26,550	6.75	179,213	6.69	1,198,935	5.87	1,051,980
2	*Sarad* paddy	124,560	6.68	832,061	7.52	6,257,099	6.24	5,192,061
3	*Dalua* paddy	306	4.38	1,340	6.15	8,241	5.83	7,866
4	Wheat	738	3.80	2,804	15.73	44,107	9.90	27,760
5	*Ragi* and	1,782	7.56	13,472	8.98	120,979	7.77	—
6	Other cereals	486	5.51	2,678	8.00	21,424	—	125,486
7	Green gram	31,536	1.77	55,819	10.68	596,147	9.59	535,304
8	Black gram	9,144	2.54	23,226	12.26	284,751	8.66	201,137
9	*Kulthi*	23,256	2.76	64,187	9.01	578,325	6.48	415,932
10	*Chana*	9,504	1.09	10,359	8.58	88,880	6.24	64,640
11	Jute	8,370	10.30	86,211	24.92	2,148,378	26.95	2,323,386
12	Sugarcane	666	25.27	16,830*	14.00	235,620	11.92	200,614
13	Oilseeds	5,382	0.85	4,575	16.93	77,455	10.63	48,632
14	Condiments	828	3.97	3,287	10.99	36,124	25.42	83,556
15	Potato	540	72.05	38,907	7.17	278,963	8.37	325,652
16	Vegetables	18	not reported (quantity)		—	19,688	—	—
	Total	243,666	—	—	—	11,995,116	—	10,604,006

* *Gur.*

TABLE No. 7.9–(Part II)

Estimated value of crop production in the area liable to floods in the Delta Zone in 1955-6 *(when there were heavy floods) at* 1954-5 *prices (Area liable to fairly heavy floods :* 90,000 *acres)*

S.No.	Name of the crop	Area cropped (acres)	Yield in physical terms (in mds.)		Value in 1955-6 prices (Rs.)		Value in 1954-5 prices (Rs.)	
			Per acre	Total	Per md.	Total	Per md.	Total
1	*Beali* paddy	13,275	6.75	89,606	6.69	599,464	5.87	525,987
2	*Sarad* paddy	62,280	6.68	416,030	7.52	3,128,546	6.24	2,596,027
3	*Dalua* paddy	153	4.38	670	6.15	4,121	5.87	3,933
4	Wheat	369	3.80	1,402	15.73	22,053	9.90	13,880
5	*Ragi*	891	7.56	6,736	8.98	60,489	7.77	62,743
6	Other cereals	243	5.51	1,339	8.00	10,712	—	—
7	Green gram	15,768	1.77	27,909	10.68	298,068	9.59	267,647
8	Black gram	4,572	2.54	11,613	12.26	142,375	8.66	100,569
9	*Kulthi*	11,628	2.76	32,093	9.01	289,158	6.48	207,963
10	*Chana*	4,752	1.09	5,180	8.58	44,444	6.24	32,323
11	Jute	4,185	10.30	43,106	24.92	1,074,202	26.95	1,161,707
12	Sugarcane	333	25.27	8,415*	14.00	117,810	11.92	100,307
13	Oilseeds	2,691	0.85	2,287	16.93	38,719	10.63	24,311
14	Condiments	414	3.97	1,644	10.99	18,068	25.42	41,790
15	Potato	270	72.05	19,454	7.17	139,485	8.37	162,830
16	Vegetables	9	not reported (quantity)		—	9,844	—	—
	Total	121,833	—	—	—	5,997,558	—	5,302,017

* *Gur.*

TABLE No. 7.9–(Part III)

Estimated value of crop production in the area liable to floods in the Delta Zone in 1955-6 (when there were heavy floods) at 1954-5 prices (Area liable to abnormally heavy floods : 80,000 acres)

S.No.	Name of the crop	Area cropped (acres)	Yield in physical terms (in mds.)		Value in 1955-6 prices (Rs.)		Value in 1954-5 prices (Rs.)	
			Per acre	Total	Per md.	Total	Per md.	Total
1	*Beali* paddy	11,800	6.75	79,650	6.69	532,859	5.87	467,546
2	*Sarad* paddy	55,360	6.68	369,805	7.52	2,780,934	6.24	2,307,583
3	*Dalua* paddy	136	4.38	596	6.15	3,665	5.87	3,499
4	Wheat	328	3.80	1,246	15.73	19,600	9.90	12,335
5	*Ragi*	792	7.56	5,988	8.98	53,772	7.77	55,773
6	Other cereals	216	5.51	1,190	8.00	9,520		
7	Green gram	14,016	1.77	24,808	10.68	264,949	9.59	237,909
8	Black gram	4,064	2.54	10,323	12.26	126,560	8.66	89,397
9	*Kulthi*	10,336	2.76	28,527	9.01	257,028	6.48	184,855
10	*Chana*	4,224	1.09	4,604	8.58	39,502	6.24	28,729
11	Jute	3,720	10.30	38,316	24.92	954,835	26.95	1,032,616
12	Sugarcane	296	25.27	7,480*	14.00	104,720	11.92	89,162
13	Oilseeds	2,392	0.85	2,033	16.93	34,419	10.63	21,611
14	Condiments	368	3.97	1,461	10.99	16,056	25.42	37,139
15	Potato	240	72.05	17,292	7.17	123,984	8.37	144,734
16	Vegetables	8	not reported (quantity)			8,750		
	Total	108,296	—	—	—	5,331,153	—	4,712,888

* *Gur.*

Floods also destroy houses, roads, bridges, etc. and take away cattle and human beings. In Cuttack district, for example, according to information available, "2,438 houses were destroyed by floods of 1933, 816 houses in 1937 and about 400 houses in 1944. Number of houses partially damaged was also heavy in the years 1933, 1937 and 1944."[24]

The above information is not only incomplete but in a form in which it is irreducible to a common denominator. A more comprehensive attempt to estimate this was made by Mr. J. Shaw, Executive Engineer, Floods and Drainage Division, Cuttack, before World War II. This is contained in the Appendix III, Evaluation of Flood Damage, to the *Interim Report of the Orissa Flood Advisory Committee,* 1938-9. As this is a short Appendix, it may be quoted in full :

"*Evaluation of Flood Damage*

Flood damage is considered under four groups :

(1) Crops, houses, live-stock, personal property and land.
(2) Flood embankments and protection works.
(3) Roads and bridges.
(4) Railways.

"No account of remission of taxes or gratuitous relief is included as the original loss is what is required.

"Regarding Group 1, the Collectors' flood reports for the bad flood years of 1933 and 1937 are selected as giving more detailed descriptions and figures of damage.

"Group 2 is arrived at by consideration of the Public Works Department Annual Embankment Reports.

"Group 3 comprises the District Board figures of flood damage expenditure.

"Under Group 4, it is difficult to get detailed figures as flood damage to railways in Orissa is in general small and casual, and it is only catastrophes such as the Baitarani flood of 1927 which are really damaging. The loss is also not directly provincial. Flood damage losses to the Railways are, therefore, omitted from the present estimate. For information it may be noted that repairs and improvement to the Brahmani bridge flanking spurs in 1920 cost Rs. 86,000 and in 1929-31 Rs. 37,000 were spent in protection from scour of the foundation walls. Rs. 5,81,278 were spent in renewing the track after the 1927 flood of the Baitarani and Rs. 1,99,887 in providing extra waterway.

"Methods of classification and evaluation are available in a fuller report.

"Rough valuation of the flood damage losses is as follows, based on the 1937 and 1933 figures with roughly comparative allowance for the other years of bad flood damage in Orissa :

[24] Sivaraman Report on Flood Protection Benefits, 1954, p. 2.

		Rs.	
1937 –	House damage	29,000	
	Crop damage	2,862,000	
	Public Works Dept.	59,000	
	Roads, etc.	13,000	
	Total	2,963,000	say Rs. 29.5 lakhs
1933 –	House damage	105,000	
	Crop damage	5,395,000	
	Public Works Dept.	56,000	
	Roads, etc.	37,000	
	Total	5,593,000	say Rs. 56 lakhs
			say Rs. 85.5 lakhs
1929	.. ..		Rs. 20 lakhs
1927	.. ..		35 „
1926	.. ..		60 „
1925	.. ..		23 „
1920	.. ..		29 „
1919	.. ..		66 „
1911	.. ..		30 „
		Total	348.5 lakhs
			say Rs. 349 lakhs

"Say Rs. 340 lakhs from 1911 to 1938, i.e. a period of 29 years inclusive. The average annual losses from flood damage, therefore, amount to Rs. 12 lakhs.

These figures are only very approximate as the information available is not in sufficient detail and various assumptions had to be made. Also it has not been possible to differentiate the damage under each river and tract."

In the detailed break-down of figures of flood damage in 1933 and 1937 given by Shaw, the damage to crops accounted for 97 to 98 per cent of the total damage. This gives us a relative idea of the flood damage other than the damage to the crops. Making a generous allowance for other damage, if we add five per cent to the crop damage that would adequately cover these other items of damage. The estimate of total damage would then be as follows:

		Value of crop production in Rs.
I.	Area normally liable to floods	
	180,000 acres: in normal year	14,318,000
	in flood year	10,604,000
	Loss due to floods	3,714,000
	Distributed over three years: per year	1,238,000
II.	Area liable to fairly heavy floods 90,000 acres.	
	Normal year	7,159,000
	Flood year	5,302,000
	Loss due to floods.	1,857,000
	To be distributed over five years: per year	371,400
III.	Area liable to abnormally heavy floods 80,000 acres	
	Normal year	6,363,000
	Flood year	4,713,000
	Loss due to floods	1,650,000
	To be distributed over 12 years: per year	137,500
	Annual loss over I	1,238,000
	II	371,400
	III	137,500
		1,746,900
	+ 5% for damages other than to crops	87,340
	Total annual loss due to floods	1,834,240 or 1,834,000

This estimate of annual loss or damage due to floods compares very well with the older estimates of Mr. Shaw quoted earlier. Mr. Shaw estimated the annual damage or loss between 1911 and 1939 at Rs. 1,200,000. Allowing for price changes, etc. our estimate of Rs. 1,800,000 can be considered fairly reasonable.

Benefits

"Control of floods provides benefits in two ways : (1) By preventing the loss of goods or services which would otherwise occur as a result of floods; (2) by making possible increased production of goods and services

TABLE No. 7.10—(Part I)

Estimated value of crop production in the area liable to floods in the Delta Zone after complete flood control at 1954-5 prices

(Area normally liable to floods : 180,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (in mds.) Per acre	Yield in physical terms (in mds.) Total	Value in 1954-5 prices (Rs.) Per md.	Value in 1954-5 prices (Rs.) Total
1	*Beali* paddy	18,018	10.00	180,180	5.87	1,057,657
2	*Sarad* paddy	150,858	11.50	1,734,867	6.24	10,825,570
3	Wheat	90	4.21	379	9.90	3,752
4	Other cereals	504	3.75	1,890	7.77	14,685
5	Green gram	32,688	1.69	55,243	9.59	529,780
6	Black gram	10,980	2.55	27,999	8.66	242,471
7	*Kulthi*	21,978	3.45	75,825	6.48	491,340
8	*Chana*	1,368	2.57	3,516	6.24	21,940
9	Other pulses & grams	18	crop destroyed—per acre data not available			
10	Oilseeds	1,152	1.56	1,797	10.63	19,102
11	Condiments	126	2.38	300	25.42	7,626
12	Jute	2,682	7.75	20,786	26.95	560,183
13	Sugarcane	324	35.72*	11,573*	11.92	137,950
14	Tobacco	36	not reported	—	—	7,178
15	Potato	540	57.84	31,234	8.37	261,429
16	Vegetables	288	not reported	—	—	24,515
17	*Betel* leaves	90	not reported	—	—	112,405
18	Orchards etc.	1,512	details not reported	—	—	—
	Total (135.14% of net area)	243,252	—	—	—	14,317,583

* *Gur.*

TABLE No. 7.10–(Part II)

Estimated value of crop production in the area liable to floods in the Delta Zone after complete flood control at 1954-5 prices

(Area liable to fairly heavy floods : 90,000 acres)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (in mds.) Per acre	Yield in physical terms (in mds.) Total	Value in 1954-5 prices (Rs.) Per md.	Value in 1954-5 prices (Rs.) Total
1	*Beali* paddy	9,009	10.00	90,090	5.87	528,828
2	*Sarad* paddy	75,429	11.50	867,434	6.24	5,412,788
3	Wheat	45	4.21	189	9.90	1,871
4	Other cereals	252	3.75	945	7.77	7,343
5	Green gram	16,344	1.69	27,621	9.59	264,885
6	Black gram	5,490	2.55	14,000	8.66	121,240
7	*Kulthi*	10,989	3.45	37,912	6.48	245,670
8	*Chana*	684	2.57	1,758	6.24	10,970
9	Other pulses & grams	9	crop destroyed,—per acre data not available			
10	Oilseeds	576	1.56	899	10.63	9,556
11	Condiments	63	2.38	150	25.42	3,813
12	Jute	1,341	7.75	10,393	26.95	280,091
13	Sugarcane	162	35.72	5,787*	11.92	68,981
14	Tobacco	18	not reported (quantity)		—	3,589
15	Potato	270	57.84	15,617	8.37	130,714
16	Vegetables	144	not reported (quantity)		—	12,257
17	*Betel* leaves	45	not reported (quantity)		—	56,202
18	Orchards, etc.	756	details not reported	—	—	—
	Total (135.14% of net area)	121,626	—	—	—	7,158,798

* *Gur.*

TABLE No. 7.10—(Part III)

Estimated value of crop production in the area liable to floods in the Delta Zone after complete flood control at 1954-5 prices

(*Area liable to abnormally heavy floods* : 80,000 *acres*)

S. No.	Name of the crop	Area cropped (acres)	Yield in physical terms (in mds.) Per acre	Yield in physical terms (in mds.) Total	Value in 1954-5 prices (Rs.) Per md.	Value in 1954-5 prices (Rs.) Total
1	*Beali* paddy	8,008	10.00	80,080	5.87	470,070
2	*Sarad* paddy	67,048	11.50	771,052	6.24	4,811,364
3	Wheat	40	4.21	168	9.90	1,663
4	Other cereals	224	3.75	840	7.77	6,527
5	Green gram	14,528	1.69	24,552	9.59	235,454
6	Black gram	4,880	2.55	12,444	8.66	107,765
7	*Kulthi*	9,768	3.45	33,700	6.48	218,376
8	*Chana*	608	2.57	1,563	6.24	9,753
9	Other pulses & grams	8	crop destroyed,—per acre data not available			
10	Oilseeds	512	1.56	799	10.63	8,493
11	Condiments	56	2.38	133	25.42	3,381
12	Jute	1,192	7.75	9,238	26.95	248,964
13	Sugarcane	144	35.72	5,144*	11.92	61,316
14	Tobacco	16	not reported (quantity)		—	3,190
15	Potato	240	57.84	13,882	8.37	116,192
16	Vegetables	128	not reported (quantity)		—	10,895
17	*Betel* leaves	40	not reported (quantity)		—	49,958
18	Orchards, etc.	672	details not reported	—	—	—
	Total	108,112	—	—	—	6,363,361

* *Gur.*

through more intensive use of property which would otherwise be under-utilized because of a flood hazard."[25]

In calculating the loss of agricultural production from floods, we have estimated the agricultural production of the three types of flood-liable areas from the data gathered by us in such areas in 1955-6 (adjusted for 1954-5 prices) and deducted this from the normal production of the areas calculated by applying the average non-irrigated yields of different crops. This calculation of the normal is based on the fact that the areas liable to floods have today almost no irrigation. In fact, without complete flood control these areas cannot be provided with irrigation facilities. The loss due to floods thus calculated comes under (1) in the above, and it amounts to about Rs. 18 lakhs annually.

As it happens, the Hirakud project does not only make these areas free from floods but provides them with perennial irrigation. In terms of (2) above, it makes possible a more intensive use of land resulting in increased agricultural production. This increase in production, over and above the normal, can be easily calculated from the data used earlier for calculating future production under irrigated conditions in the delta. We have not made this calculation because it can be disputed whether this increase should be attributed to flood control at all in the context of the Hirakud project. After all, irrigation is not inherent in flood control. It is an additional thing with its own associated costs, etc. It is true that without flood control there could have been no irrigation in these areas. Flood control creates the pre-conditions for irrigation, but by no means brings it about. We have, therefore, felt that this increase should be attributed to irrigation and not to flood control. We have, therefore, in calculating the future production of the delta under irrigation, not excluded these areas nor have we calculated their production at the lower yields of flood-affected years. Full cognizance of the improvement in agricultural production after irrigation in these areas has already been taken in the calculation of benefits resulting from irrigation.

Besides irrigation, there might be other possibilities of using the resources in the area more intensively than before because of flood control. The control of floods makes possible the development of all-weather communications in this area. It removes the continuous sense of insecurity in the area and creates the conditions for more investment in long maturing schemes. These are by their very nature, not amenable to measurement or estimation at this stage so that it is only possible here to mention them.

3. *Hydro-electric Power*

"An important part of the Hirakud Dam Project is the generation of electric power. The ultimate proposals for the development of power in

[25] *Proposed Practices for Economic Analysis of River Basin Projects*, 1950, p. 41.

the Hirakud Project envisage the installation of five generators of 37,000 kW each and two generators of 24,000 kW each in the first power house located at the toe of the main Dam and four units of 24,000 kW in the second power house.

"The second power house will also be a hydro station located at Chiplima, situated about 14 miles downstream of the dam. This will utilize the tailwaters of the first power house led through a channel with a capacity of 13,000 cusecs and also a head of 78 ft. between the level of water in the channel and the river bed."[26]

In the first stage of the project, an installed capacity of 123,000 kW is being constructed mainly in power house No. 1. The completion of the 1st and 2nd stages of the Hirakud Dam Project will give an installed capacity of 232,000 kW and the firm capacity of the system would be about 180,000 kW.

"The reservoir will be filled up to R.L. 630 by 1st of October every year and from this date on the water in the reservoir and the subsequent inflow after meeting the needs of irrigation and evaporation losses aggregating to 3.038 million acre feet for the season will be so utilized that the maximum average daily power will be obtained by the integrated operation of the power houses No. 1 and 2.

TABLE No. 7.11

Estimated value of crop production in the area liable to floods in the delta with and without flood protection at 1954-5 prices

S. No.	Type of flood liability	Net area (acres)	Cropped area (acres)	Yield value according to flood area crop pattern & flood area crop yields at 1954-5 prices (Rs.)	Yield value according to non-irrigated area crop pattern & non-irrigated area crop yields at 1954-5 prices (Rs.)
1	Area normally liable to floods	180,000	243,666	10,604,006	14,317,583
2	Area liable to fairly heavy floods	90,000	121,833	5,302,017	7,158,798
3	Area liable to only abnormally heavy floods	80,000	108,296	4,712,888	6,363,361
	Total	350,000	473,795 (135.37 per cent. of net area)	—	—

[26] N. Dharmarajan, Superintending Engineer, Electrical Circle, Hirakud Dam Project, Hirakud Dam Supplement to *The Times of India*, 15th January, 1957.

"Such an operation will yield about 128,000 kW of power at 100 per cent load factor. At 70 per cent, which is expected to be the average load factor of the system, the firm capacity will be 180,000 kW."[27] Later on the estimate was reduced still further and the maximum demand that can be met by the Hirakud reservoir, was put at 168,000 kW.

The second-stage works were started in 1956 and were expected to be complete in 1960-61.

"The power will be transmitted to major load centres in the State (Orissa) over a network of 132 Kv and 66 Kv transmission lines, the total length of the lines being 320 miles and 94 miles respectively connecting seven main grid sub-stations. From these sub-stations, hundreds of miles of 33 Kv secondary transmission and distribution lines will serve the various towns and villages making power available to large and small industries in Orissa. Some power in bulk may be sold to neighbouring States of Madhya Pradesh and Bihar."[28] Hirakud power will serve or go to the districts of Sambalpur, Bolangir, Sundergarh, Mayurbhanj, Dhekanal, Cuttack and Puri.

In contrast with irrigation from the Hirakud Dam, the electric power generated by it radiates over longer distances and encompasses a larger territory than that covered by irrigation. On the other hand, the use of electric power is not as all-pervading as irrigation water in the irrigated areas because it is delivered at specific points in large bulk and is, as we shall see in the case of Hirakud power, used also in bulk at those points. The evaluation of the economic benefits in the case of electric power throws up, therefore, quite different problems from those encountered in connection with the evaluation of irrigation benefits.

Let us begin by presenting information about the load forecast of the Hirakud hydel power. "The Central Water and Power Commission carried out in 1951-2 a load survey of the area to be served by the Hirakud project from which it was clear that the possibilities of load development were reasonably good. Since then, the load prospects from large industries such as steel and ferro-manganese have increased considerably. The indications are that the system's maximum demand will exceed the firm power output (of 193 M.W.) from both stages of the project, by 1961."[29] Table No. 7.12 gives the load forecast envisaged by the Rath Committee.

Since the Rath Committee reported, the total demand for power in the region has been continuously increasing and, according to the latest information, the total requirements in the region are now estimated at 295,000 kW in 1960-1 as against 210,000 kW estimated by the Rath Com-

[27] *Ibid.*

[28] *Report of the Orissa Power Tariff Committee on Tariffs for the Supply of Power from the Hirakud and Machkund-Hydro-electric Projects* (Chairman, Shri Radhanath Rath) (Mimeographed), 1956, p. 8 (hereinafter referred to as Report of the Rath Committee).

[29] Report of the Rath Committee, 1956, p. 8.

TABLE NO. 7.12

Hirakud Hydro-Electric Scheme detailed load forecast (Source : Report of the Rath Committee)

	Area and particulars of load (kW)	1958-9	1960-1	1961-2
1	Auminium Factory, Hirakud	25,000	55,000	55,000
2	Steel Factory, Rourkela	20,000	50,000	50,000
3	Ferro-Manganese Factory, Joda	18,000	36,000	36,000
4	*Large Industries* :			
	Dalmia Cement Factory, Rajgangpur	6,000	6,000	6,000
	Orient Paper Mills, Brijrajnagar	3,000	3,000	3,000
	Rampur Colliery	1,500	1,500	1,500
	Birmitrapur Mining Area	1,000	1,000	1,000
	Mining area at Barbil	1,000	1,000	1,000
	Cotton Mill and other loads near Rairangpur	1,000	1,000	1,000
	Hirakud-Cuttack-Talcher Section :			
	Talcher Colliery	2,000	2,000	2,000
	Orissa Textile Mills	2,000	2,000	2,000
	Kalinga Tube Mills	2,000	2,000	2,000
	Orissa Cotton Mills	500	500	500
	Rolling Mill	500	500	500
	Paper Mill, etc.	2,000	2,000	2,000
	New loads for mills, etc. to be established with the availability of power	4,000	6,000	6,000
	Bargarh Paper and Sugar Mill	—	—	4,000
	Nuamcendi Mining Load (Bihar)	—	—	5,000
	Madhya Pradesh	—	—	5,000
	Railway electrification Raghharsuan-Dangaposi Sini-Jharsuguda	—	—	16,000
	Medium and small-size industries	4,600	5,600	6,000
	Domestic supply by Department	1,100	1,300	1,800
	Bulk supply to licensees	2,300	2,700	3,200
	Total	97,500	178,500	210,500

NOTE : Though the system's maximum demand is 210,500 kW only 193,000 kW load will be carried by the Hirakud System and the balance will be taken by other projects.

TABLE NO. 7.13

Anticipated Revenue from Sale of Energy

(Based on the Report of the Rath Committee and adjusted for later changes.)

Sr. No.	*Category of Load*	*Average rate per kW /year or per kWh Rs. or annas*	1956-7	1957-8	1958-9	1959-60	1960-1	1961-2
					Laks of Rupees			
1	Aluminium Factory	Rs. 120 per kW year	—	*15.00	30.00	36.00	36.00	36.00
2	Ferro-Manganese Factory, Joda	Rs. 220 per kW year up to 7,500 kW & Rs. 210 for balance	—	*19.27	38.55	38.55	76.35	76.35
3	Steel Factory, Rourkela	Rs. 5 per KVA & 0.45 anna per kWh	3.80	3.80	38.20	95.39	95.39	95.39
4	Large industries	@ .82 anna per unit average	22.44	58.00	59.30	61.70	65.20	80.10
5	Small & medium industries	@ 1.20 annas per unit average	3.94	7.73	9.02	9.80	9.80	11.20
6	Domestic supply	@ 2.5 annas average per unit	1.37	2.74	3.02	3.28	3.55	4.93
7	Bulk supply to licensees	@ 1 anna average per unit	0.96	3.80	4.40	4.80	5.17	6.13
8	Bulk supply to Madhya Pradesh	@ 0.8 anna per unit average	—	—	—	—	—	10.90
		Total revenue	32.51	110.34	182.49	249.52	291.46	321.00

* For six months only.

mittee. As we are solely concerned here with Hirakud power, we are interested in those demands that will be met from it. In the load forecast given by the Rath Committee, there is listed a demand for 16,000 kW for railway electrification. The Rath Committee does not discuss this demand or frame a tariff for it, nor is it taken into account in its financial forecast clearly indicating that this demand will not be met from Hirakud.[30] From the information supplied to us by the Planning Commission, we gather that though the initial demand of 25,000 kW required by the Indian Aluminium Company will be met from Hirakud, the additional block of power of 25,000 or 30,000 kW required by them for expansion cannot be met from the Hirakud Dam.

The remaining consumers of Hirakud power fall broadly into two classes: (1) industries, including irrigation-pumping, and (2) other consumers, including commercial power and lighting, domestic power and lighting, public lighting and bulk supply to distributing licensees.

The most striking thing about the use of Hirakud power is that 80 per cent of it goes to large industries, nearly 70 per cent going in large blocks to three metallurgical industries, steel, aluminium and ferro-manganese. The other striking feature is that even before the Hirakud Dam is producing power to its capacity, the potential effective demand for power in the area served by the dam has exceeded the capacity of the system. On both these points it is necessary to ask whether they are conducive to the generation of the maximum economic benefits from power.

The Rath Committee justifies the sale of power primarily to the three metallurgical industries as follows: "Electricity development in Orissa in the past has been very poor, the *per capita* consumption being less than one kwh. The project must also be viewed in the background of the efforts of the Orissa Government to improve the economic conditions of the under-developed areas by providing the basic amenities. The bulk of the power available from the Hirakud project is necessarily to be utilized in large industrial units such as aluminium, ferro-manganese and steel factories. With an assured income from the sale of a large part of the power generated to large industries, it will be possible to offer reasonable rates to the general public for small industries and domestic uses so that the benefits of the Project would be extended to a large number of people."[31] This would imply that large blocks of power sold to the three metallurgical industries serve as a stabilizing factor for the rate structure of the

[30] This is also underlined by implication in the article of the Superintending Engineer, Mr. N. Dharmarajan. After giving the Table of the prospective loads for Hirakud power amounting to a total of 187,500 kW, he writes: "For further industrial development schemes including electric power, such as railway electrification, etc. immediate planning for further expansion of generating capacity is essential." Hirakud Dam Supplement of *The Times of India*, 15th January, 1957.

[31] *Ibid.*, p. 12.

Hirakud system and enable the fixation of lower rates for the other types of consumers. In the absence of this stabilizing factor, the rates for the other consumers would have had to be fixed higher than what they actually have been.

In examining this claim, it is necessary to find out whether any preferential or promotional tariffs have been given to these three industrial units. The tariffs fixed for the three are as given below :

Tariff Rates

	Recommended by the Rath Committee	Actually contracted rates
1. Indian Aluminium Company	Rs. 135/- kW annually	Rs. 120/- per kW annually for the first ten years commencing on the day on which such contract demand is first available to the Company.
2. Joda Ferro-Manganese Plant.	Rs. 220/- per kW per year for the first 7,500 kW. Rs. 210/- per kW. per year after the first 7,500 kW.	Rs. 19/8/- per kW of M. D. per month for the first 7,500 kW. Rs. 19/- per kW of M. D. per month for the first 7,500 kW.
3. Rourkela Steel Plant	Rs. 5/- per kW per month plus energy charge 0.45 anna per kW.	—

The aluminium unit has been given a specially low rate as compared with the other two. "In arriving at a suitable tariff for the aluminium factory at Hirakud, the Committee took into account the national importance of this industry, the high load factor of over 90 per cent, the long-term effect of such a big block of load (about 50,000 kW) on the power system and its location near to the generating station. It is recognized that for the economic working of this industry, in which the cost of power constitutes an important element, a low rate is absolutely necessary. The Committee has also taken into consideration the prevailing power costs in the two existing aluminium production units in India. Having regard to all these circumstances on the one hand and the likely cost of power generation at Hirakud over a period of years on the other, the Committee recommends the above quoted tariff schedule".[32] The Committee further added : "In

[32] *Ibid.*, p. 14.

order to help the industry in the early years and to hasten its expansion, it is open to the Government of Orissa to offer such concessions or rebate in the power rate as may be justified by the circumstances under which the factory will be established."[33]

The actual contracted rate between the Indian Aluminium Company and the Government of Orissa is Rs. 120/- per kW for the first 10 years. This was, it appears from its report, known to the Rath Committee and in calculating the financial returns this rate was used by it.

Similarly, for the ferro-manganese factory at Joda, the tariffs fixed by the Committee were based on the study of all aspects of the industry: "the steady nature of the load, its high load factor (over 70 per cent), the good scope which the State offers for the development of this industry and the location of the factory at a considerable distance from the power stations". The rates recommended were the same for this and the other factory at Rayagad which was to be served by Muchkund power. As in the case of aluminium, the Committee left it "to the Government of Orissa to offer whatever concessions or rebate in the power rate to the ferro-manganese industry."[34] The contracted rate with the Joda factory, however, seems to be the same as that recommended by the Rath Committee.

In the case of Rourkela Steel factory, there seems to have been no specially low rate offered, or contracted for, from the information available. On a comparison with the rates for other large industries offered by the Committee, the rates contracted for supply to Rourkela are low. But perhaps this lower rate is justified because the Rourkela Steel factory is a big consumer of Hirakud power.

If, as is clear from the above account, concessional rates have been offered to the Indian Aluminium Company for the first ten years, this can only be either at the cost of other consumers who have to pay higher rates or at the cost of the financial solvency of the power aspect of the Hirakud project.

In its financial calculations, as pointed out previously, the Rath Committee has taken into account the concessional contracted rate for sale of power to the aluminium industry rather than the higher one recommended by them. Even with the lower contracted rate, the hydel part of the Hirakud project becomes financially paying from the fifth year onwards. A little arithmetic will show that even if the originally recommended rate of Rs. 135 per kW per year was charged, it would not have made the power part of Hirakud paying earlier than the fifth year of operation. The financial solvency or rather the period over which it can be achieved, is only slightly affected by the concessional rate though with the higher rate the annual surplus after the fifth year would have been greater. This argument, therefore, loses much of its force. In regard to whether these

[33] *Ibid.*, p. 15.
[34] *Ibid.*, p. 16.

low rates are given at the cost of other consumers of power, it is difficult to say definitely in the absence of adequate data.

This, however, would be too narrow a basis for the economic evaluation of the proper use of Hirakud power. We need not stop at the total proceeds from the sale of power but go further and take into account the other accompanying secondary benefits, etc. that might arise from this pattern of use of Hirakud power.[35]

The secondary benefits of this pattern of consumption of power will be reflected in the production from these metallurgical industries, the employment thrown up by them and the possibility of their products making possible the development of other complementary or supplementary industries in the area, so as to further industrialization. The Rourkela steel plant will give rise to a number of secondary industries for manufacturing fertilizers, benzol, etc. Aluminium melting is to be accompanied by wire-making, etc. and it is likely to stimulate the development of bauxite deposits in the Kalahandi district in Orissa not far from Hirakud. The ferro-manganese plant at Joda will start processing manganese mined in the area, which was formerly being exported. The factory will also be able to manufacture carbon monoxide gas as a by-product leading to the manufacturing of chemicals like methanol. These industries can become the nucleus for further development of other associated and ancillary industries in the region leading to further industrial development.

These secondary benefits of the pattern of power-use are important but it must, of course, be remembered that this particular pattern of use has no monopoly of secondary benefits. Any other pattern will have its own secondary benefits and, unless we have comparative data in this regard, there can be no decisive argument on this score.

Apart from this, the establishment of these industries has also to be put in the context of the industrial development of the country as a whole and the place they occupy in the whole spectrum of development plans. Here again there is a very strong case for the location of these industries in the Hirakud area. For one thing, aluminium, steel and ferro-manganese have been given very high priority in the industrial development em-

[35] "It is axiomatic that power like any other consumable commodity has very little value unless a profitable market can be found for it. The margin of profit is a matter for discussion and decision. For a commodity like electrical power which is a tool of production and influences the installation and operation of industries producing essential material, and employing large number of people, the indirect benefits to the community are vast and multifarious. The State as the owner of this commodity may justifiably take cognizance of such indirect benefits and not insist on the profit margin considered necessary to attract private enterprise," *Report of the Advisory Committee on Hirakud Dam Project*, S. C. Mazumdar (Chairman), Central Water and Power Commission, Government of India, Simla, Manager of Publications, March 1952, p. 20.

bodied in the Second Five Year Plan.[36] Secondly, the location of these industries in Orissa or the area served by Hirakud power is based on a sound appraisal of location factors. In regard to the aluminium industry, the Mission of the Indian Aluminium Company Ltd., with the assistance of the Aluminium Laboratories Ltd., Canada, which investigated the possibilities of increasing the production of aluminium ingots in India (1952-3) observed : "The question of power supply was investigated from the point of geographical location, cost, continuity of supply and reserve potential against possible future expansion. Of all the sources studied, that at present under construction at Hirakud on the Mahanadi river appeared to be the most desirable."[37]

In the case of the ferro-manganese plant at Joda also, the location is one of the most favourable for such plants. It is near the sources of raw materials and near the markets for its products, i.e. the steel factories. In addition to these favourable location factors, there is a special reason for using electricity for the manufacture of ferro-manganese in preference to coke which has been used hitherto. As the *Report on the Programmes of Industrial Development 1955-61*, Second Five Year Plan, observed : "the principal producer (of ferro-manganese) in the country has not found it possible to turn out material of even the standard grade. This is partly due to the high iron content of the manganese ore and partly to the high phosphorus content of Indian coal" (p. 23). "The use of the electric furnace for the manufacture of ferro-manganese might reduce to a certain extent the disadvantages of the high phosphorus content of Indian coke since the percentage of coke in the raw materials charged would be reduced as a result of the electrical heating provided, but the other handicap will still remain to be overcome" (p. 24).

With reference to this industry the C. W. P. C. Report quoted earlier observed : "Orissa possesses all the raw material required for production of ferro-manganese except coke, which can be obtained from Bihar. Though reserves of high grade manganese ore deposits in Orissa are limited, the deposits in Madhya Pradesh are not far off. Proximity of mining centres is, no doubt, desirable but by no means essential. It is, however, the availability of electric power that would mainly determine the location of the industry, and the Hirakud site is ideal for the purpose.

"In the production of ferro-manganese cost of electricity forms 10 to 25 per cent of the entire cost of the product. The location of the industry at a place where electrical power is available in abundance at economic rates,

[36] *Report on the Programme of Industrial Development*, 1956-61, II Five-Year Plan, p. 393.

[37] *Report on the Utilization of Power from the Hirakud Dam Project by Central Water Power Commission*, 1953, p. 33.

is, therefore, far more important than its location in the proximity of mining centres."[38]

The location of the steel factory at Rourkela was decided upon quite independently of Hirakud on its own merits. Out of the three sites in the country, Rourkela won, it is well-known, on almost all counts.

We may try to look at the problem from an altogether different angle by considering whether, in the absence of the demand from these three industries, or by a deliberate denial of power to these, it would have been possible to sell all the power generated by the Hirakud project to other consumers at higher rates or even, say, similar rates. In other words, would there have been enough demand for Hirakud power in the absence of these units? The answer, from all available evidence, is that there would not have been. The total load necessary to serve the established users of electricity would not have amounted to more than 10 to 15 per cent of the total capacity of the Hirakud project. In fact, it can be argued that the full development of the Hirakud hydel potential would have been hampered if the load required by these three industrial units had not come up in time.

The Majumdar Committee observed : "Owing to the urgent demand for power, Power House II, (14 miles below the dam – Chiplima) was planned to be commissioned first in 1953 (Total installed capacity 72,000 kW.) . . . But, in December 1951, the Government of India decided that the irrigation part of the project which arose mainly from the main dam should receive more emphasis, and all equipment and finance available should be diverted thereto. The works in progress on the subsidiary dam Power House II and power canal were, therefore, suspended and efforts concentrated on expediting the main dam and canals."[39]

In the later section of the Report on "Financial Anticipations and Economics of the Project", the Committee remarked that according to its calculations based on the anticipated load and at reasonable rates : "The return covers the standard rate of interest viz. 3.75 per cent in the 17th year." In the 19th year when all power is sold, "the return on the sum at charge will be 4.26 per cent".[40] On this background the Committee recommended : "If the load anticipation does not materialize beyond the estimated 100,000 kW in the load survey for 1960, the balance of 23,000 kW will suffice for normal growth for same years. No work need be undertaken on subsidiary dam, power canal and Power House II till major load is in sight."[41]

But the load developed quite rapidly mainly because of the demand developing in the three industrial projects, and where a long period of 19 years was regarded necessary to take up all the power generated at the main dam it came to pass that even before the dam was completed in

[38] *Ibid.*, pp. 35-6.
[39] *Report of the Majumdar Committee*, p. 9.
[40] *op. cit.*, p. 21.
[41] *op. cit.*, p. 21.

December 1956, the anticipated load had exceeded the full hydel capacity of the dam. The Rath Committee remarked: "Owing to the rapid development of the load from certain large industries, these secondary stage works (i.e. Chiplima or Power House II) are being started early in 1956 with a view to commencing the power station by 1960."[42] According to the calculations of the Rath Committee, all the power (including that of the Power House II) will be taken up by 1961-2 and "the Hirakud Project becomes remunerative from the end of the 5th year of operation".[43] This gives rather good support to the case for the allocation of Hirakud power as proposed at present.

Economic Benefits

We can proceed now to problems of the nature and measurement of economic benefits flowing from power.

"Power benefits consist of primary benefits which are the value of the power produced at the project and any improvement in the upstream or downstream power values, which is attributable to the electric power production."

"The primary power benefits of power produced by a project are the value of the power to the users as measured by the amount that they would be willing to pay for such power in the absence of that project."[44]

The value of power sold is the primary benefit because the power produced is, in a very real sense, the product of the project. In an hydroelectric project, electricity is produced by the force of the flow of water. The power is not extracted out of the water. It is produced by the dam. As such the sales proceeds of power are a real measure of the benefit resulting from the power aspect of the project.[45] In the case of Hirakud power, it is in this connexion necessary only to reproduce the table prepared by the Rath Committee regarding the total sales proceeds of Hirakud Power (Table No. 7.13) after making the necessary adjustment for the fact that the Aluminium factory will not be getting more than 25,000 kW from Hirakud.

[42] *Op. cit.*, p. 7. [43] *Op. cit.*, p. 28.

[44] *Proposed Practices for Economic Analysis of River Basin Projects.* Prepared by the Sub-Committee on Benefits and Costs, Report to the F.I.R.B. Committee, Washington, 1950, p. 49.

[45] The U.N. documents in this regard, distinguish between the consumptive and non-consumptive use of waters "the former being those in which the water is wholly or largely used up. A large part of irrigation use is consumptive, but even here part of the water spread over the land may rejoin the stream as drainage. The passage of water through generating turbines is a non-consumptive use in the sense that the physical quantity is undiminished. At the same time the water is 'used' in the sense that it is no longer available at the upstream level." *Integrated River Basin Development,* Report by a Panel of Experts, United Nations, Department of Economic and Social Affairs, New York, 1958, p. 4.

To these benefits are to be added the benefits, if any, accruing to consumers of power because of a lowering of electricity rates, charged in the area directly or indirectly, because of the availability of power from the project under consideration. In considering this aspect of Hirakud power, we can raise the question of the cost of this power.

The view of the Majumdar Committee may be recalled in this connexion. "There is no special advantage in favour of power produced at Hirakud. It is not cheap, nor plentiful...the cost of coal which is the alternative competing source of large power in the load centres is much less than in other parts of the country and sets the upper limit on the charge which can be made. Conditions thus are not too favourable. It is essential for financial success of power development that market for block power should be obtained in the neighbourhood of Hirakud" (p. 20).

Large Industrial Power Rates Comparison with other Power Systems (Current)

Name of power system	*Overall rate in annas per kWh*				*Remarks*
	Maximum demand 100 KVA		*Maximum demand 2,500 KVA*		
	at 50% load factor	*at 70% load factor*	*at 50% load factor*	*at 70% load factor*	
Bhakra-Nangal	0.893	0.754	0.834	0.726	
U. P. Hydel	1.235	1.105	1.235	1.105	
U. P. (Kanpur)	1.184	1.015	1.037	0.909	Coal at Rs. 26/9 per ton
Delhi	0.925	0.925	0.925	0.925	Coal at Rs. 30 per ton
M. Pradesh	1.048	0.989	1.048	0.903	Coal at Rs. 21/12 per ton
Calcutta	0.670	0.630	0.540	0.520	Coal at Rs. 22/4 per ton
Madras Hydro*	0.589	0.526	0.530	0.490	
Tata Hydro	0.784	0.697	0.714	0.667	
Andhra	0.885	0.775	0.836	0.726	
D. V. C.	0.867	0.774	0.842	0.748	Coal at Rs. 15 per ton
Hirakud (proposed)	0.900	0.810	0.866	0.775	

* A surcharge of 30 per cent on the H.T. supply rate is understood to have been introduced in Madras from April, 1956. The overall rates as against Madras will be higher by 30 per cent.

Source : Report of the Rath Committee, p. 19.

The Rath Committee also pointed out that "due to the availability of coal in many parts of Orissa, the alternative cost of the thermal power

generation by individual factories is somewhat low" (p. 12). The Committee also remarked that the capital allocation to power in the Hirakud project was rather heavy (p. 26). The Committee gave the Table of comparative power tariffs for large industry as formulated by them for Hirakud and other power systems. (See page 199).

It would appear from the Table that the power generated by Hirakud is sold to large industries at rates which are higher than those in the adjoining D.V.C. system as well as the Bhakra Nangal system in the Punjab. The rates are lower than those in U.P. In this connection, however, it is necessary to bear in mind the following observations of Mr. Hayath, Member, C.W.P.C. (Power Wing) quoted in the Appendix to the Report of the Rath Committee. "The table of comparative figures given in the Report indicates approximately the level of charges in the various systems and by no means can be considered as accurate within four per cent, as the tariffs depend upon load factors, sizes of loads, etc. The Hirakud load rates on the basis of certain load factors and sizes of loads would be almost equal to the neighbouring rates....Further...the D.V.C. rates mentioned are subject to variation due to the price of coal. Also the rates mentioned are bulk supply rates at 33 Kv. When the energy is purchased in bulk at 33 Kv. by the Bihar Government and supplied to the factories, the rate would be substantially higher due to the addition of cost involved in the distribution system to be provided for the purpose." The Hirakud rates for industries may be, therefore, taken to be on par with comparable rates in the adjoining D.V.C. and generally speaking not higher than other comparable systems.

We may broadly say that in the case of old established industries who change over to Hirakud power there are not likely to be any differential gains or losses : The case of new industries which are Hirakud-based is different. Here the differential cost or alternative cost approach is not validly applicable because, in all probability, these industries would not have been established (except Rourkela Steel factory) or planned if the large power supplies from Hirakud were not available.

If the rates charged for Hirakud power sold for domestic, commercial, etc. use to the existing users are cheaper than the prevailing ones, and if the lower rates are passed on to the actual consumers, the consumers will naturally gain. This gain will have to be added to the primary gain calculated above. From the information we have on this point, we cannot indicate quantitatively the extent of the benefits on this account. We summarize the information regarding the rates of sale of power before and after Hirakud in the area served by Hirakud power. The information relates mostly to towns.

The Chief Engineer, Electricity, Orissa, informed us in a letter dated 1st July 1958: "At present the towns of Cuttack, Puri, Rourkela, Rajgangpur, Sundargarh, Jharsuguda, Bargarh, Sambalpur, Dhenkanal, Talcher,

Angul, Kendrapada, Jagpur and Bhuvaneshwar are being supplied with power from Hirakud Grid. Out of these towns Cuttack, Puri and Sambalpur are being supplied with power by the Cuttack Electricity Company, Puri Electric Supply Company, and Sambalpur Electric Supply Company, respectively, and the rest are being supplied by the State Electricity Department."

In the three towns of Cuttack, Puri and Sambalpur up-to-now the rates had not changed. "The companies have been asked to revise their structures taking into account the hydro-rate of bulk supply. The rates will now be lower with effect from the date of hydro supply."

In the other towns enumerated above the rates have been reduced. The following statement gives the old and the new rates. The statement generally indicates that consumers of power in all these areas will have to pay for electricity lower rates than before because of the switchover to Hirakud power. As remarked already, it is not possible to estimate quantitatively the total benefit resulting from this. (See page 202).

The total sale proceeds of electricity, however, cannot be considered as equivalent to primary benefits because the costs associated with its generation, distribution and sale have to be allowed for. These are the costs of working the power houses and the depreciation and replacement of the transmission and other equipment built up for distributing power to the various users. The Rath Committee has estimated the total annual working expenditure including that on production (operation, maintenance and depreciation), transmission (operation and maintenance and depreciation) and sub-transmission and distribution (operation, maintenance and depreciation) from the fifth year onwards at about Rs. 90 lakhs. This can be treated as costs associated with the generation, distribution and sale of power and deducted accordingly.

We have to take into account certain adverse effects of the switchover to electricity of the new users. For example, if electric lighting is newly adopted by people naturally they will not buy kerosene which served them as an illuminant before. This will adversely affect the suppliers of kerosene in those localities. Such adverse effects, if they can be measured, will have to be deducted from the primary benefits.

Where Hirakud power is substituted for local power by old users, the problem is whether there is any deduction necessary because of the displacement of the old generating equipment now rendered unemployed. In the case of existing loads in Orissa which will be taken over or substituted by Hirakud power, the generating equipment being used now will be rendered unemployed. Some of this equipment, particularly the diesel sets serving the 13 electrified towns in the region served by Hirakud power, are old and their capacity much derated. Derated capacity of the installed electrical plant in the electrified towns aggregated 3,224 kW. The arithmetic

	Rates prior to supply of Hirakud power	*Rates after the Hirakud power supply began*
1. Lights and fans	6 annas less rebate of 1 anna per unit *1	4.5 annas per kWh per month – rebate of 6 pies per unit for payment within 10 days of the presentation of bills
2. Industrial load	2.2 annas less rebate 0.2 annas per unit for supply at H.T. and 2.4 annas less rebate 0.2 annas per unit for supply at L.T. *2	1.75 annas per kWh *4
3. Street lighting	3 annas per unit *3	Lamps up to 40 watts *5 Rs. 30 per year Lamps of 41 to 60 watts. Rs. 42 per year Lamps above 60 watts. Rs. 60 per year M. V. lamps of 80 watts. Rs. 72 per year

*1 In Jharsuguda, Sundergarh and Bargarh the rate was eight annas less rebate 1 anna per unit.

*2 In Jharsuguda and Bargarh rate per unit varying from 1.9 annas to 3 annas per unit less rebate varying from 4 pies to 6 pies per unit depending on the number of units consumed.

*3 In Jharsuguda and Bargarh 3 annas less rebate 6 pies per unit.

*4 Rate for small industries for demands of 3 kW to 20 kW for supply of 400 volts, 3 phase, 50 cycles: subject to a monthly minimum charge of Rs. 4 per B.H.P. of connected load.

*5 The rate includes the charge for maintenance and energy consumption. The charge for initial fitting of lights, etc. is however, payable by the local body or party requiring provision of the lights.

total of the maximum demands on these stations was approximately 2,000 kW.[46]

This derated equipment may not be of much use now. In other cases—the Chaudwar thermal station is a case in point—perhaps the equipment may be available for use in the same area or elsewhere where no hydel power is available today. Privately owned machinery may be sold away for its depreciated value. The value of the equipment rendered unemployed cannot be counted as cost to be deducted from the total benefits. For continuing to use it, it may have to be removed to other areas and this would involve transport and setting up, etc. costs. If these costs are deducted from the present worth of the equipment that might be a measure of

[46] *Report on the Utilization of Power from Hirakud Dam Project*, by C.W.S.P.C., 1953, p. 28.

fixed old capacity made mobile and, therefore, made available elsewhere. But we have not enough data to estimate this. We have neither the data regarding its present worth nor the data about the supplementary costs that will have to be incurred for moving it and setting it up again elsewhere. Besides noting these things, therefore, we can do no more.

We should now turn to the estimation of the secondary benefits, direct and indirect. These stem from the use of electricity for further production of goods.

Information regarding this is available in respect of new industries[47] that will use Hirakud power as well as in respect of the old industrial units which are planning to expand production by using power. The details of investment, etc. in the new industries and those of the expansion of the existing industrial units in the area served by Hirakud power are given in Table 7.14. This information has been mainly taken from the files of the Department of Industries, Orissa. We have tried to fill in certain gaps by making use of indirect evidence. In the footnotes to Table 7.14, the different methods used in arriving at some of the figures in the Table have been indicated. The information was not as precise and as ample as we would have desired. We have tried to make the best use of whatever was available.

The total value of annual production from the new industrial units is expected to be about Rs. 13 crores while the expansion of production of the existing industries is expected to result in production valued at about Rs. 11.80 crores. But the total value of the production of these industries cannot be counted as a net benefit. For that purpose we must know the value added by manufacture in this total. That would measure the net secondary direct benefits from Hirakud power.

From the available data presented in Table 7.14, the estimates of value added by manufacture cannot be made. The basic data, even of other similar industries, are not available in the important cases of aluminium, ferro-manganese, refractories, etc. If notionally we assume that on an average the value added in the new industries will be 10 per cent of gross production and a similar relation will hold for the expanded production in the old industries, the value added in the new industries will be Rs. 130 lakhs and Rs. 118 lakhs in the expanded existing factories, the total value added in the two being Rs. 248 lakhs.

The net primary and secondary direct benefits of hydro-electricity would amount to Rs. 479 lakhs (annually).

[47] We have excluded from the calculation the steel factory at Rourkela, because that is not Hirakud-based. The investment in that plant would have taken place even if Hirakud power would not have been there. In discussing the secondary benefits from power also we have not included the production of the Rourkela steel factory on the credit side.

TABLE NO. 7.14.

Capital investment, employment and gross value of production of new and expanded industrial units that will consume Hirakud power

(A) Existing industrial units and their plans of expansion

Name of the concern	*Location*	*Present value of capital*	*Present employment*	*Present capacity or production*	*Its value*
1. Orissa Cement, Ltd.	Rajgangpur	—	92 + 450 = 542	165,000 tons of cement a year	*1 110 lakhs
2. Orissa Cement, Ltd. (Cast Iron Manufacture)	Rajgangpur	None at present	—	—	—
3. Orient Paper Mills (Paper)	Brajrajnagar	—	257 + 2,528 = 2,785	31,200 36,000 tons per annum	*3 445.3 lakhs (at 32,000 tons per annum)
4. Orient Paper Mills (Chlorine & caustic soda plant)	Brajrajnagar	—	—	—	—
5. Orissa Textile Mills Ltd.	Chaudwar	—	5,000	47,728 spindles and 864 tons	—
6. Orissa Cotton Mills Ltd.	Bhagalpur	—	100	70 thousand to 1 lakh lb. of cotton	—
7. Orient Weaving Mills	Cuttack	11 lakhs	10 + 305 = 315	1,560 bales of yarn required 100 looms 3 lakh yards	—
8. Kalinga Tubes (Cast iron tubes)	Chaudwar	—	300	36,000 tons	*1 462.3 lakhs
Total	—	—	—		

*1 Ex-factory value of cement per ton (Rs. 66.7) (all-India average), *vide* : *Report on the Ninth Census of Indian Manufacturers*, 1954, p. 272 : only portland cement prices are calculated.

*2 Consumer prices, (Rs. 490.3); *Ibid.*, p. 661.

TABLE No. 7.14—(*Contd.*)

Capital investment, employment and gross value of production of new and expanded industrial units that will consume Hirakud power

(A) Existing industrial units and their plans of expansion.

Power-consumed	*Its value*	*Capital cost of expenditure*	*Extra labour*	*Extra production*	*Its value*	*Extra power*	*Its value*
5,500 kW	—	Over 25 lakhs	20 + 165 = 185	2 lakh tons of Portland & 3 lakh 60 thousand tons of slag cement	*1 133.4 lakhs	1,700 kW	
—	—	Not stated	None	72,000 tons annual	*2 353 lakhs	Not stated	
—	—	1 crore 57 laks	36 + 228 = 264	18,000 tons per annum	*3 250 lakhs	3,000 kW	
—	—	40 lakhs + 40 „ = 80	9 + 80 = 89 + 89 = 178	4,320 tons chlorine 6,480 tons caustic soda	*4 24.2 lakhs *5 37.2 lakhs	3,000 kW	
2,000 kW	—	—	—	—	—	—	
2,00 kW	—	—	—	—	—	—	
200 kW	—	—	18 + 810 = 828	9 lakh-yards 200 looms	—	—	
2,000 kW	—	—	450	30,000	*7 385.2 lakhs	3,000 kW	
		2.62 crores			11.83 crores		

*3 *Ibid.*, p. 337. Total of all 'paper' excluding card board, etc. Value of gross receipts is taken (Rs. 1,396.72 per ton).

*4 *Ibid.*, p. 496. Value of commodity produced for sale (Rs. 560.8).

*5 *Ibid.*, p. 946. Value of production per ton taken (Rs. 574).

TABLE No. 7.14–(*Contd.*)

Capital investment, employment and gross value of production of new and expanded industrial units that will consume Hirakud power

(B) New industrial units being established

S.No.	*Name of the concern*	*Location*	*Total capital investment Rs.*	*Total employment*
1.	Aluminium Factory	Hirakud	About 5.23 crores	200
2.	Western Spinning and Weaving Mills	Jharsuguda	30 lakhs (estimated)	2,500
3.	Kalinga Textiles (Kegriwala)	Rajgangpur	11 lakhs (estimated)	7 + 250 = 257
4.	Titagarh Paper Mills	Chaudwar	About 96 lakhs (estimated)	800
5.	Paper Mill at Kesinga	Kesinga	*11 1.5 crores	1,500
6.	Orissa Cement Ltd. (Refractories)	Rajgangpur	About 3 crores (estimated)	300
7.	Belpahar Refractories Plant (Tata)	Belpahar	*13 3.13 crores	50 + 800 = 850
8.	Ferro-Manganese Plant (Tata)	Joda	*13 172.3 lakhs	150
	Total		About 16 crores	6,557
9.	Hindustan Steel	Rourkela	176 crores	

*6 Value estimates not available.

*7 *Ibid.*, p. 675, price Rs. 1,284.1 (most probably imported material price).

*8 *Ibid.*, p. 534. Value of aluminium ingots, not ex-factory, but inclusive of transport, commission, costs, etc. (Rs. 2,951.73).

*9 Estimated on the basis of Kalinga Textiles, Ltd.

TABLE No. 7.14–(*Contd.*)

Capital investment, employment and gross value of production of new and expanded industrial units that will consume Hirakud power

(B) New industrial units being established

S.No. Name of the concern	*Total production*	*Its estimated value (in laks of Rs.)*	*Total power*
1. Aluminium Factory	10 thousand tons of ingots	*8 2 crores 95 lakhs	25,000 kW (50,000 later)
2. Western Spinning and Weaving Mills	Capacity 25,000 spindles 500 looms	*9 About 110 lakhs	200 kW
3. Kalinga Textiles (Kegriwala)	10 thousand spindles (2.56 lakh lb.)	*10 36 lakhs	200 kW
4. Titagarh Paper Mills	8 thousand tons	*3 111 lakhs	6,000 kW
5. Paper Mill at Kesinga	17 thousand tons	236.6 lakhs	4,500 kW (of this 2,250 kW Hirakud supply)
6. Orissa Cement Ltd. (Refractories)	80 thousand tons	*12 100.3 lakhs	1,000 kW
7. Belpahar Refractories Plant (Tata)	67 thousand tons brick 10 thousand tons mortar	*12 96.5 lakhs	1,630 kW
8. Ferro-Manganese Plant (Tata)	30,000/35,000 tons	*14 300 to 340 lakhs	16,000 kW
Total		About Rs. 13 crores	55,000 kW
9. Hindustan Steel	1 million tons of steel		

*10 Company's estimates.
*11 Estimated on the basis of Titagarh plant at Chaudwar.
*12 *Ibid.*, p. 288.
*13 Figure supplied by the Tata Industries, Ltd.
*14 Calculated at 1953-4 import prices.

The industrial production gives rise to factor incomes and when these incomes are expended on different commodities and services, the suppliers of them experience greater demand than before and have to expand their supplies or production. This is the indirect secondary benefit. As can be realized, this is very difficult to measure and we have very little information regarding this.

The tertiary direct and indirect benefits arise from the possibility of the industrial products creating a further potential for the development of other industries. Thus, the ferro-manganese produced at Joda may lead to a further exploitation of the by-products like methanol, etc. The aluminium ingots can further be processed by starting units for manufacturing aluminium products. These would require investment and would give rise to further production. The direct and indirect benefits resulting can be calculated as in the case of the secondary benefits if we have the necessary information. As we have very little of it we cannot do more than note the possibilities here.

The total economic benefits of hydro-electricity at different stages are set out below:

Benefits from Hydro-electric Power

	Lakhs of Rs.
Primary direct:	
1.1. Gross annual revenue from the sale of power (from the 5th year i.e. 1960-1 onwards)	321.00
1.2. Total working expenditure including depreciation (annual)	90.00
1.3. Net annual revenue [1.1 – 1.2]	231.00
1.4. Gain to present consumers of electricity because of cheaper rates of sale of Hirakud power	This is positive but not exactly known
1.5. Net primary benefits (annual)	231.00
Secondary direct:	
2.1. Total (annual) production of new industries based on Hirakud power	1,300.00
2.2. Value added by new industries at 10 per cent of the value of gross production	130.00
2.3. Gross expansion of the production of existing industries switching on Hirakud power	1,180.00
2.4. Value added at 10 per cent of value of gross production	118.00
2.5. Total secondary direct	248.00
Secondary indirect Tertiary, direct and indirect	No data

Chapter VIII

ECONOMIC BENEFITS OF THE HIRAKUD DAM AND RELATED MATTERS

1. Benefits and Costs

We have so far separately discussed the three purposes for which the Hirakud Dam has been constructed and have tried to indicate, on an annual basis, the approximate size of the economic benefits that might result from each of them. All the calculations have been explained in detail at the appropriate places so as to leave no doubt as to the method of calculation and the data that have been used for the purpose. We can now bring them together and look at the benefits as a whole. The net benefits are presented below :

		Lakhs of Rs.
Primary direct:		
Irrigation		1,143.64
Hydel power		231.00
Flood control		18.00
	Total	1,392.64
Secondary direct:		
Irrigation		22.20
Hydel power		248.00
Flood control		—
	Total	270.20

If we compare the primary direct benefits from all the three, those from flood control are quantitatively the smallest. The primary direct benefits from hydel power are the next in order of magnitude and those from irrigation are the largest of all. Even if we take into account the direct primary and secondary benefits from hydel power together, the combined total of the two as calculated above does not exceed the primary direct benefits from irrigation. It is also obvious that the measurement of secondary benefits has been incomplete and that we have not been able to evaluate them as fully as we would have liked. There is no point, therefore, in comparing the two types of benefits and measure their relative magnitudes. In so far as we have been able to calculate them, the relative dimensions of the total benefits resulting from the three are clear from the above statement.

Perhaps the more important question that can be raised in this connection is the economic evaluation of the Hirakud project as a whole by means of the benefit-cost ratio. The current practice in the U.S.A., where this has received considerable attention, is to regard a project as economic if the total benefits produced by it exceed the total costs. In computing this ratio we must specify what costs and benefit should be taken into account. It is also necessary to reduce them to a common comparable basis because as the *Report on the Proposed Practices for Economic Analysis of River Basin Projects* puts it : "The benefits and costs of projects occur in diverse physical forms, at different times, and have effect over varying periods of time.[1] It is now the universal practice to measure the costs and benefits in the monetary unit of some specified purchasing power as also to take into account only the benefits and costs as are measurable in money terms. These are often called tangible as against intangible ones which cannot be so measured. The reduction to a comparable unit of time is usually to an annual basis.[2]

In calculating this ratio as specified above it is necessary to answer three questions. The first is, "What is the purchasing power of the monetary unit in which these calculations should be made?" In other words, what price level should we take as the basis of the calculation? The question has been debated long but no satisfactory solutions have emerged. The *Report of the Sub-Committee on Costs and Benefits* observes : "In order to satisfy the various purposes to be served by the benefits and cost analysis the use of prices reasonably expected to prevail at the time of the benefits and costs accrual is recommended."[3] This is a counsel of perfection. But the main difficulty in carrying it out in practice is how to arrive at these expected price levels. This is not an easy task and no formulæ have been devised to solve this riddle. We have tried to tackle the problem by calculating costs and benefits, as far as possible, in 1951-5 prices. This ensures comparability. It makes available the calculations on a uniform basis so that any desired revaluation of all or some of the individual items is also rendered easy.

As the benefits usually accrue annually in many cases (as in irrigation, hydro-electricity) the reduction of costs to an annual basis really gives rise to two other problems. One is the rate of interest which should be charged

[1] *op. cit.*, p. 15.

[2] *Report to the Committee on Public Works, Evaluation of Federal Water Resources, Development Project*, 82 Congress, House Committee Print, Washington, December 5, 1952. See also *Proposed Practices for Economic Analysis of River Basin Projects.* Prepared by the Sub-Committee on Benefits and Costs, Report to the Federal Inter Agency River Basin Committee, May 1950, Washington.

[3] *op. cit.*, p. 20.

on the initial investment that goes into the project. The usual practice recommended in the U.S.A. is to take the interest rate on long-term government bonds for Federal and public projects and a somewhat higher rate for private investment.[4] In the Hirakud calculations, we have used interest rates that the Hirakud project authorities have themselves used. Thus in regard to the hydel aspect capital at charge has been taken to bear an interest rate of 4.25 per cent per annum following the Report of the Rath Committee. In regard to irrigation, a rate of 3.75 per cent per annum has also been adopted following the Report by the Chief Engineer, Hirakud Dam Project, on *Hirakud Dam Project – Revised Estimates of Costs and Revenue for Stage I.*[5]

The use of the prevailing interest rates in such calculations, however, is said to understate the real or special cost of capital investment. To avoid this Tinbergen has suggested that a rate of 10 per cent or more be used.[6] We have presented below separate calculations of costs based on a 10 per cent rate of interest.

The third problem is with regard to the annual rate of depreciation of capital for the project. The project authorities have worked out an annual depreciation rate. In our calculations we have adopted the same rate of depreciation. The calculations of the benefit-cost ratio are presented in Table 8.1. The allocation of the cost of the project as between irrigation, flood control and power is as arrived at and discussed in the section on Financial Returns on page 217.

The benefit-cost ratios as calculated in Table 8.1 indicate that if only the primary benefits and costs are taken into account both the irrigation and power aspects of the Hirakud project are economic (in the sense that the benefit-cost ratio is more than one) at the rates of interest used by the project authorities. If, 10 per cent interest is used the irrigation aspect of Hirakud appears to be economic. On the other hand, if both primary and secondary benefits and costs associated with them are taken into account both the irrigation and the power aspects of the project are found to be individually economic even with a 10 per cent rate of interest. If the Hirakud project is considered as a whole, i.e. irrigation and power together, it is seen to be economic whether we take into account only primary or total benefits and whether we take 10 per cent or the other lower rates of interest suggested by the project authorities, for our calculations.

As there is no separate allocation of capital for the flood control part of the project we may be justified in adding the benefits resulting from it to those resulting from irrigation. This is, however, a small sum and cannot

[4] Ibid., p. 24.

[5] River Valley Development Department, Government of Orissa, Cuttack, November 1953.

[6] Jan Tinbergen, *The Design of Development*, The Economic Development Institute, IBDR, Johns Hopkins Press, 1958, p. 39.

TABLE NO. 8.1

Benefit-cost ratios of the Hirakud Dam project

Benefits (annual)	*Lakhs of Rs.*	*Costs (annual)*	*Lakhs of Rs.*	*Costs (annual)*	*Lakhs of Rs.*
Irrigation :		1. Interest charges on the total investment of Rs. 5,400 lakhs at 3.75% per annum	200.50	1. Interest charges on the total investment of Rs. 5,400 lakhs at 10% per annum	540.00
Primary direct: Gross value of increased crop production due to irrigation	1,569.56				
		2. Maintenance of canals at Rs. 2 per irrigated acre. (325,000 + 674,000 acres as estimated from our sample)	19.98	2. Maintenance of canals at Rs. 2 per irrigated acre. (325,000 + 674,000 acres as estimated from our sample)	19.98
		3. Working expenses of the dam including depreciation	7.50	3. Working expenses of the dam including depreciation	7.50
		4. Associated cost of increased crop production	425.92	4. Associated cost of increased crop production	425.92
		Total costs	653.90	Total costs	993.40
Benefit-cost ratio		.....	2.4	.....	1.53
Secondary direct: Value of sugar produced in the sugar factory	110.00	Cost of sugar production at 80% of the total gross production	88.00	Cost of sugar production at 80% of the total gross production	88.00
Total Benefits	1,679.56	Total costs	741.90	Total costs	1,081.40
Benefit-cost ratio		.....	2.26	.....	1.70

TABLE NO. 8.1—(Contd.)

Benefit-cost ratios of the Hirakud Dam project

Benefits (annual)	*Lakhs of Rs.*	*Costs (annual)*	*Lakhs of Rs.*	*Costs (annual)*	*Lakhs of Rs.*
Hydro-electric power :					
Primary direct: Gross revenue from the sale of power	321.00	1. Total working expenditure including depreciation	90.00	1. Total working expenditure including depreciation	90.00
		2. Interest on capital (Rs. 4,600 lakhs) investment at 4.25% per annum	197.00	2. Interest on capital (Rs. 4,600 lakhs) investment at 10% per annum	460.00
		Total costs	287.00	Total costs	550.00
Benefit-cost ratio		.....	1.12	.....	0.585
Secondary direct: Gross value of industrial production based on Hirakud power	2,480.00	Cost of industrial production (calculated by deducting the notional 10% value added by manufacture from gross value of production)	2,232.00	Cost of industrial production (calculated by deducting the notional 10% value added by manufacture from gross value of production)	2,232.00
Total benefits	2,801.00	Total costs	2,519.00	Total costs	2,782.00
Benefit-cost ratio		.....	1.11	.....	1.01
Total primary direct benefits of irrigation and power	1,890.56	Costs associated with total primary direct benefits from irrigation and power	940.90	Costs associated with total primary direct benefits from irrigation and power	1,543.40
Total benefits of irrigation and power	4,480.56	Costs associated with total benefits from irrigation and power	3,260.90	Costs associated with total benefits from irrigation and power	3,863.40
Benefit-cost ratio		Primary	2.00		1.22
		Total	1.37		1.15

significantly alter the benefit-cost ratio of the irrigation aspect of the Hirakud project.

As such ratios are not available for other comparable projects in India, it is not possible to say how far relatively productive the Hirakud project is.

2. *Future Income of the Peasantry*

The discussion of benefit-cost ratios and that of the financial returns of the project are no doubt important but perhaps they may leave many people cold. What they would like most of all to know is : To what extent is the income of the peasantry in the area to be irrigated by Hirakud waters going up after irrigation? This is, of course, a crucial question, but it is also a difficult question to answer. We nevertheless make here an attempt to answer it as best as we can with the data at our disposal.

Of course, we cannot estimate the incomes of peasants in individual terms. We can attempt to measure the income of the peasantry as a whole before the dam was complete and after irrigation is developed in the areas concerned.

In Table 7.1 we have estimated the crop production of the areas in 1954-5. To estimate the net crop receipts of the peasantry from this, it is necessary to estimate the costs of this production borne by the peasantry. Similarly, we have to estimate the costs of production to the peasantry of the future crop production after irrigation as worked out in Table 7.2 to estimate the future net crop receipts of the peasantry. We present below the relevant calculations :

An estimate of the increase in the income of the peasantry due to Hirakud irrigation :

1.1	Gross crop production in 1954-5	Lakhs of Rs.
	Sambalpur	306
	Delta	607
	Total	913

1.1 is the same as in Table No. 7.1 and its calculation is explained on p. 137.

1.2	Cultivation costs (including overheads) of 1.1	Lakhs of Rs.
	Sambalpur	135
	Delta	515
	Total	650

1.2 ***Total costs of cultivation including overheads*** : This estimate of costs has been made as comprehensive as possible. We had calculated costs per acre for individual crops. If we had estimated costs on that basis that would have left out overhead costs that include payments to landlords, payments to village servants,

repairs to implements, etc. which often form between 40 to 50 per cent of the total costs of cultivation. We, therefore, calculated the total costs per acre of the net cultivated area in the sample and estimated the total costs for the area. The total costs include crop costs and overheads costs. By and large the costs do not leave out any costs incurred in farm management.

1.3 Net crop receipts of peasantry (1.1–1.2)	Lakhs of Rs.
Sambalpur	171
Delta	92
Total	263

1.3 *Net crop receipts* : This is derived by subtracting the costs in 1.2 from the gross crop production in 1.1. This does not correspond to the net income of cultivators from cultivation as shown in Table 6.1 in Chapter VI on National Income. This is because the gross crop receipts in 1.1 do not include other receipts such as those from livestock, or grass-cutting, etc. The full costs, however, are taken into account in 1.2. The net crop receipts are, therefore, smaller than the net receipts from agriculture.

2.1 Gross crop production after irrigation	Lakhs of Rs.
Sambalpur	922
Delta	1,664
Total	2,586

2.1 *Gross crop production after irrigation* : This is as in Table 7.2.

2.21 Cultivation costs (including overheads) of 2.1 (estimated)	Lakhs of Rs.
Sambalpur	310
Delta	1,070
Total	1,380

2.21 *Total costs of cultivation including overheads* : This is essentially a hypothetical calculation. The costs of crops cultivated under the new crop pattern under irrigation have been worked out partly from our sample and non-sample special crops intensive surveys. The costs of each of the crops under irrigation have been estimated from these data, supplemented in a few cases by information derived from other sources. To these crop costs the overhead costs per acre derived from the farm business data, have been added to make up the total costs. In thus calculating the overhead costs, we have assumed that the overhead costs per cultivated acre will be the same in the future. In the absence of data which could indicate the future rate per acre of these costs we thought it best to make the assumption of no change in this regard. The second assumption underlying the estimate of future overhead cost was that they would vary with the gross cultivated rather than with the net cultivated area. This was based on our expectation that the important components of overhead costs might increase with the increase in the gross cultivated area. For example, payments to landlords, one of the important components of overhead costs, may be expected

with some certainty to vary with gross rather than with net area judging from present practices under which a fixed proportion of the crop produce is given to the landlord. So too the payments to wage labour and farm servants will increase with the increase in the gross cultivated area. Repair charges of implements and farm property might be expected to increase with more intensive use after irrigation. Other items like land revenue may not be expected to increase. Payments to village servants may or may not go up. On the whole, it is fair to assume that overhead costs will increase with the gross area cultivated.

2.22	Water rates and betterment levy payments	Lakhs of Rs.
	Sambalpur	65
	Delta	188
	Total	253

2.22 The basis of calculation is the same as on p. 219.

2.23	Non-recurrent capital costs in Sambalpur for preparing lands for irrigation spread over 10 years (10 per cent of the total)	Lakhs of Rs. 2.30

2.23 *Non-recurrent capital costs in Sambalpur for the preparation of land to receive irrigation* : This estimate is based on the cost data furnished by the Sivaraman Committee's Report on the *Direct Benefits from Irrigation of the Hirakud Dam Project* (Sambalpur Zone). The Sivaraman Committee remarked : "To get the increased yield (under irrigation) from *Mal* and *At* lands, the existing fields need capital expenditure. There are two types of *Mal* viz. *Malsman* and *Maltikra*. *Maltikra* lands like *At* lands are almost left to nature and contain lots of forest growths at places. The soil has not been improved to any appreciable extent by tilth and improvement in order to benefit by irrigation. It is estimated that a sum of Rs. 150 will be required per acre of *At* land and Rs. 100 per acre of *Mal* land, to deepen the fields, remove stones and gravel and to clear patches of jungle growths. Necessary permanent improvements including the cost of construction of water courses would come to about Rs. 30 per acre of *Bahal* land, Rs. 60 per acre of *Berna*, Rs. 120 per acre of *Mal* land and Rs. 170 per acre of At land", p. 9.

We calculated the capital expenditure by taking these rates and applying them to our sample area distributed into types as per our sample data. As this was capital expenditure, we thought that its repayment can be spread over ten years and we have, therefore, taken into account one-tenth of the total for the annual cost calculation. This item would disappear at the end of ten years.

In the delta area no need for incurring such costs was expressed as the lands there were not as undulating as in Sambalpur.

2.3	Net crop production [2.1 – (2.21 + 2.22 + 2.23)]	Lakhs of Rs. 950.70

2.4	Allowance for the loss of crop production due to the submergence of land under the Hirakud reservoir	103.00

2.4 is the same as in Table No. 7.4.

2.5	Net crop receipts of the peasantry	847.70

It is perhaps necessary here to stress once again the limitations of this calculation. It is not the total agricultural income but only income derived from crops. The costs of future crop production are hypothetical in the sense that they have been derived from present data. So also is the estimate of future crop production. It assumes a certain price level, that of 1954-5. Lastly, it is an aggregative estimate. With all these limitations the calculation indicates that the net income of the peasantry in these areas will go up by 325 per cent over that of 1954-5 as a result of Hirakud irrigation.

3. *Financial Returns: Prospects*

The economic benefits of the Hirakud Dam Project as discussed in the foregoing pages do not indicate the financial returns of the scheme. These consist of the total investment in the project that the Government has had to make and the annual returns that the Government will receive, net of the costs of collection, depreciation, interest on capital at charge, etc. through taxes or levies directly or indirectly attributable to the development of irrigation, power and flood control. These we try to indicate below.

Let us begin by noting the total investment and its allocation to various aspects of the project. The total cost of the project is put at Rs. 100.02 crores, including the second stage. The cost of the first stage (not including the scheme for delta irrigation) amounted to Rs. 70.78 crores and it was allocated as 1:1.5:1.5 as between Sambalpur irrigation, delta irrigation (including flood control) and power.[7] Since then the delta irrigation scheme costing Rs. 14.92 crores was added to the project. This cost naturally is solely to be put to delta irrigation. The cost of the second stage was put at Rs. 14.32 crores and as this was solely for the second power house, it has to be put to the power account. The Rath Committee estimated the capital investment in the power aspect to be Rs. 46.52 crores at the end of the second stage, i.e. 1960-1. Allocating the remaining of the total costs between Sambalpur and delta irrigation, we get the following overall allocations :

Cost allocable to delta irrigation	Rs. 31.97 crores
„ Hydel power	Rs. 46.52 „
„ Sambalpur irrigation	Rs. 21.53 „
Total	Rs. 100.02 „

The allocation is rough and has been based on the information available to us. It relates to all the investment in the project and not only to that going into the Hirakud Dam only.

What does the Government get by way of taxation because of these developments? We are concerned here exclusively with such taxes or collections as can be directly attributed to irrigation, power and flood

[7] Report of the Rath Committee, p. 26.

control. In the following, we do not take into account the increased yield of other taxes or even the existing land revenue. We have thus defined Government receipts rather severely for this purpose to see how that works out.

We will begin with irrigation. The two taxes directly arising out of irrigation development are the water rates and the betterment levy. We have not gone into the question of the appropriate levels of these rates and whether the proposed rates conform to them. We have taken the rates as fixed by Government and based our calculations on them. The rates for these as proposed to be levied in Sambalpur and the delta, together with the total collections expected from them are contained in the following statement and, it should be observed, that they are based not on the official estimate of irrigated area but on the areas as estimated from our sample survey and the crop pattern worked out by us.

Water Rate Collections in the Sambalpur Zone

	Crop	Acreage	Water rate per acre	Total water rate collection Rs.
Kharif	Paddy	292,500	Rs. 8	2,340,000
	Sugarcane	32,500	Rs. 16	520,000
Rabi	Wheat	46,800	Rs. 6	280,800
	Groundnut	46,800	Rs. 8	374,400
	Pulses	46,800	Rs. 5	234,000
	Potato	15,600	Rs. 8	124,800
Net cultivated area		325,000 acres	Total	3,874,000

Betterment Levy Collections in the Sambalpur Zone

Type of land and its proportion to the total according to the information of our Farm Business Survey		Acreage	Betterment charges per acre Rs.	Total betterment charges collection Rs.
At	12%	39,000	60	2,340,000
Berna	15%	48,750	75	3,656,250
Bahal	28%	91,000	60	5,460,000
Mal	42%	136,500	100	13,650,000
Barcha	3%	9,750	75	731,250
		325,000		25,837,500

To be recovered over 11 years. Of this, one-tenth in the first two years and the rest in the subsequent nine years : rough yearly collection on an average : Rs. 2,583,750.

Water rate collection (annual)	Rs.	38.74 lakhs
Betterment levy collection „	Rs.	25.84 lakhs
Total	Rs.	64.58 lakhs

Water Rate Collections in the Delta Zone

	Acreage		Rate per acre Rs.	Total water rate collection Rs.
Jute	101,100		20	2,022,000
Paddy (*Aman* and *Beali*)	572,900		8	4,583,200
Sugarcane	67,400		20	1,348,000
Rabi paddy	80,880		7	566,160
Pulses	269,600	337,001	8	2,696,008
Cotton	22,467			
Wheat	22,467			
Groundnut	22,467			
Potato	33,700		20	674,000
Net cultivated area	674,000 acres			
			Total	11,889,368

Betterment levy collections :

		Rate per acres—Rs.	Total betterment levy collection
Perennial (new) area	474,000	125	59,250,000
Existing irrigated area	200,000	50	10,000,000
		Total	69,250,000

To be recovered over 11 years. Of this one-tenth in the first two years and the rest in the subsequent nine years; rough yearly collection on an average : Rs. 6,925,000.

	Lakhs of Rupees
Annual water rate collections	118.89
Annual betterment levy collections	69.25
Total Rs.	188.14

The annual total collection from water rates and betterment levy would amount to Rs. 38.74 lakhs and Rs. 25.84 lakhs respectively, in the Sambalpur zone and to Rs. 118.89 lakhs and Rs. 69.25 lakhs respectively, in the delta zone. We can calculate the working expenses of collection at five per cent of the water rates collection and the interest on capital at charge at 3¾ per cent as suggested by the *Hirakud Dam Project – Revised Estimate of Cost and Revenue for Stage I*, Chief Engineer, Hirakud Dam Project, 1953, p. 51. The calculation is given on p. 221. Taking into account the receipts from the flood protection cess as well as the expenses on account of the working of the dam for irrigation purposes, the net surplus on the irrigation account comes to Rs. 32.73 lakhs.

This annual surplus will accrue only when the total irrigation system begins to function both in the Sambalpur and the delta zones. We may expect this to happen by 1960. If 1960-1 is regarded as the first year of operation of the irrigation system, during the first two years the betterment levy is to be recovered at half the rates, and then at the normal annual rates during the following nine years. In the first two years, therefore, i.e. 1960-61 and 1961-2, the annual yield of the betterment levy will be Rs. 47.50 lakhs and as the expenditure will remain unaltered there will be deficit of about Rs. 15 lakhs per year. As a consequence in the third year, i.e. 1962-3, there would be a surplus of only Rs. 2.73 lakhs after wiping out the deficits of the previous two years. In the following years, a surplus of Rs. 32.73 lakhs will accrue annually as calculated above. At the end of this period i.e. at the end of 1969-70, if the surplus is used to repay the original capital investment of Rs. 5,350 lakhs, a total compounded sum of about Rs. 300.00 lakhs (or Rs. 299.81 lakhs to be exact) will have been paid back and this will make for a saving of about Rs. 11 lakhs of interest charges annually in the period subsequent to 1969-70.

The betterment levy collection will cease after 1969-70 and as a consequence the annual surplus of Rs. 32.73 lakhs will be converted into an annual deficit of Rs. 62.36 lakhs. If the saving in the annual interest charges, as calculated above, is deducted from this, the net annual deficit will amount to Rs. 51.36 lakhs after 1969-70.

In regard to electricity, we have to reproduce with suitable adjustments noted earlier the elaborate table regarding financial returns worked out in the Report of the Rath Committee. (Table No. 8.2). This shows that the net financial return on the power investment would every year amount to Rs. 33 lakhs from the fifth year onwards, i.e. 1961-62 with a smaller surplus of Rs. 4.66 lakhs in 1960-1. For calculating this net, the Rath Committee has calculated interest on capital at charge at the rate of 4¼ per cent per annum.

Assuming that this net surplus from the fourth year, i.e. 1960-1, is used for repayment of the original capital investment, at the end of 1969-70 (the last year of collection of the betterment levy) the repayment compounded

(*In lakhs of Rupees*)

	Receipts *Annual collections from*			*Expenditure*				
	Water rates	*Betterment levy*	*Total*	*Collection charges of water rates at 5% of total collection of water rates*	*Interest on capital at 3.75 per cent per annum*	*Maintenance of canals at Rs. 2 per acre.**	*Total annual expenditure*	*Net receipts*
Sambalpur zone	38.74	25.84	64.58	1.94	80.25	6.50	88.29	-24.11
Delta zone	118.89	69.25	188.14	5.94	120.38	13.48	139.80	+48.34
Total —	157.63	95.09	252.72	7.88	200.63	19.98	228.49	+24.23

	Net receipts for Sambalpur and Delta zones :	+ 24.23 lakhs of Rs.
Add :	Annual receipts from the Flood Tax : †	+ 16.00 lakhs of Rs.
		+ 40.23 lakhs of Rs.
Less :	Working expense of the dam for irrigation purposes ‡ (Including depreciation).	- 7.50 „
	Net annual surplus.	+ 32.73 „

† Sivaraman Report on Benefits of Flood Protection, p. 3.

‡ *Hirakud Dam Project, Revised Estimates of Cost and Revenue for Stage I*, 1953, p. 48 ff.

* 325,000 acres in the Sambalpur zone and 674,000 acres in the Delta zone.

TABLE NO. 8.2.

Anticipated working expenditure and revenue and the forecast of financial results of the hydro-electric aspect of the Hirakud Dam

(Based on the Report of the Rath Committee)

Year of operation	Operation and maintenance and depreciation	Production, operation, maintenance and depreciation	Transmission, operation, maintenance and depreciation	Sub-transmission and distribution, operation, maintenance and depreciation	Total working expenditure (2 to 5)	Gross revenue	Net revenue before providing interest charges
1	2	3	4	5	6	7	8
1956-7	3.20	33.10	22.11	6.10	64.51	32.51	-32.00
1957-8	3.21	41.50	24.90	7.42	77.03	110.34	33.31
1958-9	3.21	47.46	26.22	7.74	84.63	182.49	97.86
1959-60	3.21	50.23	26.22	7.94	87.60	249.52	161.92
1960-1	4.21	50.23	26.22	8.14	88.80	291.46	202.66
1961-2	4.21	50.23	26.22	8.40	89.06	321.00	231.94
1962-3	4.21	50.23	26.22	8.69	89.35	321.00	231.65
1963-4	4.21	50.23	26.22	8.95	89.61	321.00	231.39
1964-5	4.21	50.23	26.22	9.22	89.88	321.00	231.12
1965-6	4.21	50.23	26.22	9.22	89.88	321.00	231.12

The depreciation charges have been assumed as given in page 27 of this report.

Maintenance charges have been taken as follows : (L.S.)

Civil and Dam Electric Works —	@ 1% of capital cost.
Transmission	@ 1.5% of capital.
Sub-Transmission and Distribution	@ 3% of capital cost.

TABLE No. 8.2—(*Contd.*)

Anticipated working expenditure and revenue and the forecast of financial results of the hydro-electric aspect of the Hirakud Dam

(Based on the Report of the Rath Committee)

Year of operation	*Total capital expenditure upto the end of the year*	*Net revenue before provision of interest*	*Interest charges @ 4.25*	*Surplus or deficit for the year*	*Accumulated surplus or deficit*	*Sum at charge*	*Net revenue expressed as a percentage of sum at charge*
	(*Figures represent Rupees in lakhs*)						
1	2	3	4	5	6	7	8
1956-7	3,775.40	-32.00	270.73*	-302.73	-302.73	4,078.13	-(0.76)
1957-8	4,221.89	33.31	179.95	-146.64	-449.37	4,671.26	0.71
1958-9	4,516.02	97.86	192.00	- 94.14	-543.51	5,059.53	1.94
1959-60	4,643.02	161.92	197.00	- 5.08	-578.59	5,221.61	3.08
1960-1	4,647.02	202.66	197.00	4.66	-572.93	5,219.95	3.87
1961-2	4,652.02	231.94	198.00	33.94	-539.99	5,192.01	4.45
1962-3	4,652.02	231.65	198.00	33.65	-506.34	5,158.36	4.47
1963-4	4,652.02	231.39	198.00	33.39	-472.95	5,124.97	4.50
1964-5	4,652.02	231.12	198.00	33.12	-439.83	5,091.85	4.55
1965-6	4,652.02	231.12	198.00	33.12	-406.71	5,058.73	4.56

* Includes accumulated interest during construction.

would amount to a little less than Rs. 4 crores. This would roughly mean an annual saving of Rs. 16 lakhs in the interest charges for the years following. From 1970-1 the annual net surplus on the hydro-electric aspect of the project would amount to Rs. 49 lakhs roughly.

Up to 1969-70, the irrigation and the hydro-electric parts of the Hirakud project show a net surplus. In 1970-71, with the disappearance of the betterment levy collection, the irrigation aspect is expected to be "in the red" to the extent of Rs. 51.36 lakhs annually. But the hydro-electrical part is expected to show a surplus of Rs. 49 lakhs annually from that year. From that year the project as a whole will show an annual deficit of Rs. 2.36 lakhs.

This is a highly tentative calculation. We have not taken any account of the increased receipts of Government indirectly resulting from irrigation, such as the receipts from stamp duties, excises, sales tax, etc. We have also excluded the possibility of increasing land revenue when the betterment levy ceases. The saving in Government expenditure on drought and flood relief will also add to the surplus, but has not been taken into account in the above. The use of hydel power in industry will indirectly enhance the receipts from income taxes, company taxes, excises, etc., but these we have not taken into account. If they are, receipts from irrigation and power will go up and to that extent increase the surplus or reduce the deficit. It is not possible to estimate these precisely at this stage.

4. *The Employment Angle*

What is the employment potential of the irrigation aspect of the project? Irrigation involves a more intensive use of land which naturally requires, besides water, manure, increased labour inputs, etc. From the data of the farm business survey, we were able to calculate the labour inputs, in terms of labour days, family, exchange and hire, for most of the crops grown at present. In a similar way and using the same figures of labour inputs for each of the crops, we could also calculate the labour inputs that would be necessary for the future crop pattern under irrigated conditions. This is shown below :

	(Man days in lakhs)		
	Family and exchange	*Hired employment*	*Total employment*
Sambalpur zone (1954-5)	117.09	25.41	142.5
(future)	366.26	47.74	414.0
Delta zone (1954-5)	305.00	166.00	471.0
(future)	734.00	322.00	1,056.0

This is necessarily a very rough calculation. It assumes that labour inputs for each type of crop are the same under irrigated and non-irrigated conditions. In actuality this may err on either side. Our data showed that labour inputs for a crop were not much different under irrigated and non-irrigated conditions except where there was lift irrigation. As canal irrigation is less labour intensive than well irrigation, for example, this would appear natural. Now it may be that irrigation may induce the adoption of less labour intensive techniques and, therefore, the total labour inputs required may be less than before. On the other hand, irrigation may extend the area under more labour intensive crops than assumed here and demand more labour inputs. The calculation also assumes that the elasticity of supply of family labour will remain the same as at present. If this is not so, the hired labour inputs will vary in the future. Any calculation is necessarily governed by its assumptions and the present one is no exception to this. It has been attempted more by way of indicating the dimensions of the change that may be expected.

Bearing these limitations in mind, we may indicate a few significant features of the picture thus built up. From the point of view of employment, the non-paid-for employment of family and exchange labour is of less significance than the employment of hired labour. The latter involves payment of wages which directly and instantaneously increase incomes. From the calculation it seems that hired employment, in terms of man-days, will increase by 94 per cent in the delta and by 88 per cent in Sambalpur. This increase is much less than that in total employment which is expected to increase by 124 per cent in the delta and by 190 per cent in Sambalpur.

Construction Labour

The construction of a capital work involves investment for buying goods and services that go into it and gives rise to a demand for materials and labour. This generates income and starts a round of spending and saving made familiar by the discussions connected with the investment multiplier. The multiplier concerns itself with the period of construction only and does not look beyond. The income and employment resulting from the functioning of the capital work after its completion do not come within its purview. To use the terms recently made familiar in such discussion, the multiplier deals with the "revolving" rather than the "sedimented" aspects of capital works. Our inquiry was concerned wih the latter. Nevertheless it may be useful to put down the available information regarding the revolving employment connected with the Hirakud project.

The following information is available regarding the labour component of a part of the total costs of the Hirakud project :

Hirakud project (except power)

	Total cost	*Cost of labour*		
		Skilled	*Unskilled*	*Total*
		(in lakhs of Rs.)		
Main earth dam	647.00	67.26	94.42	161.68
Main concrete dam	780.00	104.39	125.07	229.46
Dykes	295.00	32.27	47.61	79.88
Canals	660.70	99.40	314.12	413.52
Buildings and roads	119.00	30.78	21.22	52.00
Total	2,501.70	334.10	602.44	936.54
Other items	2,949.30	—	—	—
Hirakud power unit	1,627.00	101.60	101.96	203.56

Information about the other items and their labour components was not available.

As can be seen, quite a significant part of the total cost was disbursed on labour. "At the time of peak construction year after year — during the last three years — the total number of labour employed was well over 30,000 and the workers were drawn from all parts of India.... It was obviously beyond the resources of a single state, Orissa, to mobilize the huge mass of workmen and machinery to start the work. Efforts had, therefore, to be made to get workers, particularly those skilled in various trades, from all over the country.... Stonecutters came from the South, blacksmiths, carpenters, welders, etc. from the Punjab and engineers and supervisory staff originate from, apart from these two, several other States.... The position of employment as regards unskilled labour, however, considerably changed with the participation of local workers in large number subsequently. They are now about 70 per cent of the total number of unskilled workers. Majority of them are from Ganjam district and the neighbouring areas; a good number comes also from Bilaspur district in Madhya Pradesh. During the last six years a large number of local people have been trained in various skilled jobs and they now form 45 per cent of the total skilled strength.... Nearly 70 per cent of the total labour strength has been employed and directed by the contractors."[8]

Employment at Hirakud was necessarily seasonal. While the peak employment was over 30,000 the number dwindled to 10,000 or less during the rainy season — July to September — each year. The unskilled workers

[8] "Mobilizing an army of workers for the Hirakud Project," Hirakud Dam Supplement to *The Times of India*, January 15, 1957.

got Rs. 1.50 per day, the women Re. 1; the skilled workers got Rs. 60 per month. For highly skilled workers the rate was up to Rs. 180 per month.

The following gives the labour statistics for January 1955 separately for departments and contractors distributed between Oriya and Non-Oriya.[9]

	Departmental	*Contractors*	*Total*
Oriya	6,638	14,423	21,061
Non-Oriya	4,672	11,841	16,513
Total	11,310	26,264	37,574

5. *Long-term projection*

In the short-term projection discussed in Chapter VII, we have allowed for minimum necessary change only. Naturally, in the long-term projection this assumption does not hold good. We might expect that the full potentialities of irrigation will be realized by then. One very likely development seems to be in regard to the cultivation of sugarcane. As in the other regions of India, the tendency to extend the area under this crop to the utmost will also probably manifest itself in these areas. So also the varieties of sugarcane grown today will very likely be replaced by the more heavy yielding and the better suited and improved ones. Judging from the results achieved in other regions in India, we might expect that the methods of cultivation will also change radically and the sugarcane yield per acre might rise to 50 tons instead of the present 18 tons per acre with the added advantage of more sucrose content. If this happens, one may naturally expect more sugar factories to be set up in the area and possibly the processing of the by-products of this industry might also develop.

Another likely possibility seems to be the utmost extension of the acreage under jute in the delta zone. In the delta area, the conditions are favourable for a rather rapid extension of the area under jute because it is already grown there today. It is also likely that in Sambalpur the prejudice against growing a second crop on *Bahal* lands will go and more valuable crops may be grown on these lands. Orchards are also likely to develop in Sambalpur.

A third possibility seems to be the likely displacement of the area under pulses by some more valuable crops. Both in Sambalpur and the delta we have, in the crop pattern of the short period, allowed for a considerable proportion of the *rabi* area under pulses. Pulses do not require heavy watering and are not considered irrigated crops. To put perennially irrigated land under pulses means an uneconomic and unproductive use of land. It was

[9] Handout to the press party visiting Hirakud on 11 and 12 February, 1955.

allowed to stay in the short period in our discussion because it fitted into the present crop structure. Today a large proportion of the area put under *kharif* paddy is put under a long maturing variety which is harvested in December. The only crop that can be grown after this is a short catch crop that does not require much watering and which matures before summer, and pulses fit the bill perfectly. Displacement of pulses in the long period would require a change in paddy cultivation in the first instance. This may be expected to come about in the long period. Also may be mentioned the possibility of improvement in the technique of paddy cultivation. Today paddy is sown broadcast. With the availability of irrigation, it may be discarded in favour of transplantation which improves yields considerably. And one may also venture to say that if this comes then the Japanese method of rice cultivation may not be far behind.

These, by no means, exhaust the possibilities of the long period. We have indicated a few lines which are really projections of present technical possibilities. With technical progress going at the rate it is, it is difficult to say today what the possibilities of the future would be.

What is true of the long-term projection of the primary direct benefits of irrigation is also true of the secondary and tertiary benefits. As it is, we have been able to indicate only a little in regard to these but it is quite obvious that the potentialities in this regard are quite sizeable. We have already referred to the possibility of more sugar factories coming up and at the tertiary level the further processing of sugar, bagasse and molasses developing. Confectionary, paper and power alcohol manufacturing would seem to be the natural lines of further development. If the production of oilseeds increases, then oil crushing and later on soap manufacture may possibly develop. A development of orchards can give rise to the possibility of a canning industry developing in the region.

In regard to hydro-electricity we have been able to calculate the secondary benefits somewhat more firmly. We have also indicated the industries that might develop at the tertiary stage from ferro-manganese, aluminium, etc. These potentialities are likely to be exploited in the long period.

The long-term development prospects with reference to flood control are in the nature of the more intensive use of resources freed from the constant threat of flood. Very little can be said in this regard at present.

6. Concluding Observations

Whether short-term or long-term, the economic benefits flowing from any major capital work originate in the response which the people give to the challenge created by it. As we have emphasized often, the quantum and the rate of flow of benefits over time will basically depend upon the response of the people. The Hirakud Dam creates a potential but to exploit the potential quickly and effectively is a task that the people have to

perform. It may be truly said that the benefits are a function of the response of the people.

Because it is basically so, there is no reason to adopt a *non possumus* attitude and leave things to drift and shift. And this is where Government policy comes in. In backward undeveloped economies with democratic governments, the governments have both to follow and to lead the people. Economic development is a long-term phenomenon and the Government has to play a leading role in this because it can be more far-seeing than the people. That is why developmental planning has acquired such an importance in the present era. In exploiting the potential created by planned capital works further planning can play a very crucial role. We feel that this is inadequately realized in India today. One gets the impression that the planning authorities often consider their duty done when they plan and complete a capital work. The exploitation of the potential thus created is regarded as beyond their sphere of responsibility. This is often reflected in the pained surprise some of them express when they find that the potential created remains unexploited.

This attitude, of course, is neither new nor uncommon so far as governments and planning authorities go. The history of land reclamation and irrigation projects in the United States over the past several decades is replete with such examples and how the Government policy had to shift from the mere construction of a capital work (irrigation or land reclamation) gradually to further development planning and recently to the full development of the region to be irrigated or reclaimed, even to the construction of farm houses and provision of equipment to the farm, let alone extension and demonstration farms.[10]

In the absence of such a complete follow-through, it was found that the lands to be developed had to have one or two crops of croppers themselves before full development could take place.

In India, irrigation is an old problem about which there is considerable experience and information. This experience, however, is not often fully taken into account, and the obvious lessons seem to be unlearnt, to judge from the recent official pronouncements. In the case of the Hirakud project, so far as irrigation is concerned, there has been a slight movement forward. At the beginning of the Hirakud project no follow-through was thought of. The dam was to be constructed and the main and subsidiary canals were to be dug. Then the responsibility of the project authorities ended. The construction of field channels was to be done by the cultivators themselves, and this after the sad experience of the Orissa Canals in Cuttack district! Fortunately this was revised later and the construction of field channels has

[10] See Roy E. Huffman, *Irrigation Development and Public Works Policy*, New York, Ronald Press Company, 1953, Chapters 8 : Development of Irrigated Farms, pp. 94, 121. / *President's Water Resources Policy Commission Report*, Vol. I, 1950, Washington.

been now taken over by the Government in both the Sambalpur and the delta zones.

But there the progress seems to have come to a stop. We have already referred to the meagre and inadequate effort at extension work, at the delay in establishing the most suitable crop rotations, etc. All these have been neglected. This is bound to affect the pace of development as well as its extent.

It can never be stressed too often that the calculations of benefits contained in this report assume that the people and the Government will respond to the challenge thrown down by the construction of this huge capital work. The Government has to play a crucial role in evoking this response for increasing the volume of total benefits and also for quickening the rate of their accrual. This requires a considerable additional investment in planning, education, extension, etc. Economic development truly consists of increased capital investment in productive capacity on the one side and on the other, and perhaps a more important side, increased investment in human beings. A democracy can neglect the latter only at its peril.

APPENDICES

Appendix I

LETTERS EXCHANGED AND OTHER DOCUMENTS

I. Letter (No. W/5000/CE dated 15th August, 1952) from Mr. Kanwar Sain, Member (Designs), Government of India, Central Water and Power Commissions, New Delhi, to Prof. D. R. Gadgil, Director, Gokhale Institute of Politics and Economics, Poona 4.

Dear Mr. Gadgil,

I have read your publication No. 17 "Economic Effects of Irrigation" with great interest. The findings of your surveys may have a very far reaching effect on the future of river valley projects. You must have seen the publication of the Inter-agency Federal River Basin Committee on the methods of "Appraisal of Cost and Benefits of River Valley Projects".

2. I have been thinking that it will be a useful thing if the benefits and costs of the Hirakud Dam Project could be prepared on the basis on which economic effects of irrigation both direct and indirect have been surveyed by you for the Godavari and Pravara canals. If your Institute would be willing to undertake this study could you give me an estimate of time and cost to enable me to put up the proposal before the Hirakud Control Board at its next meeting on September 17, 1952. The area which will be covered by the surveys is about 600,000 acres in Sambalpur District and about 800,000 acres in the Cuttack and Puri Districts of Orissa. I shall be glad to have a reply from you by the end of this month to enable me to include this item in the agenda of the Control Board.

Your sincerely,
Sd/- Kanwar Sain

II. Professor Gadgil's reply dated 23rd August 1952.

Dear Mr. Sain,

I have to acknowledge with thanks your letter dated 15th August, 1952. I was very glad to hear of the interest of the Control Board in the question of assessing net economic benefits of river-valley projects.

The problem of the appraisal of costs and benefits for a project in contemplation or under construction is materially different from the assessment of benefits in case of a project completed many years ago. In the case of a project

still under construction the investigational methods adopted by us for assessing the benefits of the Godavari and Pravara canals could not be used. In the latter case, conditions after irrigation are known, and for assessing the difference made by irrigation some assumptions have to be made only regarding conditions before irrigation. The position is reversed in case of a project still under construction. Here the problem is not one of measuring an actuality but one of forecasting what conditions in the future would be like, and of estimating the benefits on the basis of the forecast. Forecasting future conditions involves the attempt to build up as full a picture as possible of conditions of economic activity in the tract after irrigation. The framing of such a picture is not easy and cannot be done by an economist working by himself. For example, future developments will depend to a material extent on land policies. The organization of land use, the determination of size of holdings, the types of tenure allowed, etc. will vitally affect land utilization. Also, detailed projection of the pattern of land use by crop combination and rotation and the periods of time and the outlay required to bring about given developments would be other essential pieces of data. Moreover, for estimating the nature and costs of the large number of subsidiary public works on which planned development of a tract will depend, expert engineering advice would be necessary. The work of projection of conditions in the future could thus be done only co-operatively; the minimum different types of authoritative advice, other than that of an economist, required for the purpose being those regarding (*i*) land policy decisions, (*ii*) land utilization with special reference to cropping system, and (*iii*) public works. Such a body of experts working together will be able to evolve procedures for forecasting future conditions and on application of these to particular regions might be able to produce results which have some validity and significance. The actual field investigations today would be confined to assessing the present situation and the work of projecting the future would involve little field investigation. I may refer in this connection, to the series of reports produced by the Columbia Basin Joint Investigations in the U.S.A. Though nothing equally elaborate is possible or necessary in India, the benefits and costs would have to be assessed in a similar manner through co-operative work of experts in different fields.

I feel that the Central Water and Power Commission should examine this approach not only for the Hirakud Project but also for developing a general methodology regarding appraisal of costs and benefits of all large-scale projects undertaken or to be undertaken in India. In my opinion an economist working by himself could not do the whole work. However, in case the Commission or the Control Board are interested in working out my suggestion in a general way or as for any particular project, I shall be glad personally and through the resources of the Institute to co-operate in the effort.

Your sincerely,
Sd/- D. R. Gadgil

III. Mr. Sain's letter in reply dated 25th August, 1952.

Dear Mr. Gadgil,

Thank you for your letter dated August 23, 1952.

2. I was fully aware of the difference between assessing a project which has been completed and a project which is yet under construction. I, however, thought that the experience gained in the former would be of value in assessing the benefits from the latter. After all we can forecast the future only in the light of the experience gained in the past. If this cannot be done then the experience of the past serves only a very partial advantage to the Society.

3. I also agree that the forecasting of the future is not so easy nor may it be entirely the work of an economist. All along I have been thinking that whosoever works on the problem would have the benefit of experience of the engineers working on the project as well as of the revenue and land authorities of the Government of Orissa. What I was anxious to obtain is the experience of an economist who has worked on a completed project such as Godavari and Pravara Canals.

4. I am keen that a proper assessment of some of the irrigation schemes should be made. I shall be grateful if you personally and through the resources of the Institute could co-operate in the efforts. I shall be glad to know further the way and the terms in which your Institute would be prepared to co-operate in this effort.

5. .....

Yours sincerely,
Sd/- Kanwar Sain

IV. Professor Gadgil's letter dated 2nd October, 1952 to Mr. Sain.

Dear Mr. Sain,

I enclose herewith a note* prepared by the Institute regarding the survey for assessing benefits of the Hirakud Project. The note has been made fairly detailed. In case, however, you desire any explanations or elaborations of any points I shall be glad to furnish them.

Yours sincerely,
Sd/- D. R. Gadgil

* This note is printed in Chapter II

V. Resolution (No. 5 F) of 2nd January, 1954, of the Government of Orissa in the Finance Department.

The question of having a comprehensive economic survey of Orissa was under the consideration of the State Government for some time past. In the absence of such a survey Government are handicapped in framing the right economic and fiscal policies as the basic data required for the purpose can only be had through such a comprehensive survey. The proposal could not be proceeded with so far because of the lack of trained and experienced personnel for undertaking the survey.

2. At the instance of the Government of India the Gokhale Institute of Politics and Economics, Poona, agreed to undertake an enquiry into the economic benefits resulting from the construction of the Hirakud Dam and prepared a scheme for the purpose. A copy of the scheme is given in the Appendix to this Resolution. It was originally intended that the economic enquiry would form a part of the Hirakud Dam Project and its cost would be debited to the project. Subsequently, however, it was suggested that the cost of this enquiry should not be debited to the project, but should be borne by the Government of Orissa. After careful consideration of the matter, the State Government have decided to undertake the financial responsibility for the proposed enquiry by the Gokhale Institute of Politics and Economics, Poona, as this enquiry could form a part of the comprehensive Economic Survey of the State under their contemplations and the presence of the staff of the Institute in the State in connection with Hirakud Dam enquiry could be utilized for training local personnel in carrying out the proposed economic survey in the other parts of the State.

3. The Finance Minister, accompanied by Dr. S. Misra, the Head of the Department of Economics, Ravenshaw College, Cuttack, went to Poona in November 1953 and had detailed discussions with Professor D. R. Gadgil, Director, Gokhale Institute of Politics and Economics and other members of the staff of the Institute in connection with the proposed economic survey and enquiry. Though it was the intention of Government that the Institute would be entrusted with the work of planning and carrying out the economic survey of the entire State, for various reasons, the Institute did not find itself in a position to extend its survey work beyond the area affected by the Hirakud Dam. However, the Director of the Institute has kindly agreed that the Institute would give its expert advice regarding the design and plan of the enquiry, methods of its conduct, recruitment and training of staff, etc. for the other areas of the State as well, though the actual conduct of the survey of these areas and the preparation of the report on the findings of the enquiry would not be directly undertaken by the Institute. It has, therefore, been decided that the proposed economic survey and enquiry would be divided into two parts, A and B for each of which a separate organization would be set up though both the organizations would work with full co-operation and consultation with one another.

Part A of the survey will consist of the enquiry into the economic benefits of the Hirakud Dam. This work would be undertaken by the Gokhale Institute and will be carried out by that body. Shri N. V. Sovani, Assistant Director of the Gokhale Institute of Politics and Economics, will be placed in fulf charge of this enquiry and will visit Orissa as and when necessary. A lump grant will be made to the Institute for meeting the cost of the proposed enquiry and the Institute would set up a local field organization with its headquarters in Hirakud area. The Government of Orissa have agreed to lend the Institute the services of such local administrative and field staff as may be necessary for the conduct of the enquiry. The terms of reference of the proposed enquiry will be communicated to the Institute separately.

Part B of the enquiry will be concerned with the economic survey of the whole State and will be placed under the charge of Dr. S. Misra, Head of the Department of Economics, Ravenshaw College, Cuttack. This will repeat most of the enquiries designed by the Institute for the survey of the Hirakud area in the rest of the State and will also supplement this with specific enquiries directed towards getting additional data necessary and useful for the main objectives of the economic survey. The organization of the Gokhale Institute in the Hirakud area will also carry out these supplementary enquiries for the State survey within the project area. The terms of reference for Part B of the survey will also be decided separately. A separate lump sum would be placed at the disposal of Dr. Misra for meeting the expenses of the cost of the survey in other areas of the State.

Appendix II

ADDITIONAL DATA ON AGRICULTURE IN SAMBALPUR, CUTTACK AND PURI.

(A) FARM BUSINESS.

SAMBALPUR ZONE

Size of Farms: Table No. S.1 gives a distribution of the farms according to the size of their cultivated holdings. The average size of the cultivated holding was 5.2 acres; nearly 58 per cent of the cultivators, however, had holdings of less than 5 acres in size. The distribution of cultivators in different size groups was fairly uniform; only the very smallest were considerably less in number in the Sambalpur zone than in the Delta. The concentration of cultivated land holdings was, however, pronounced: cultivators with less than 5 acres of cultivated land, accounting for 38 per cent of the total farmers, cultivated only 27 per cent of the total cultivated land. On the other hand, the 11.7 per cent biggest cultivators with more than 10 acres of cultivated land each, cultivated in all over one-third (34.2 per cent) of the total cultivated land.

The average land revenue payable per acre came to Re. 0.86 and there was no noticeable difference in this respect between the different groups of cultivators.

Family Members: Table No. S.2 gives the composition of the sample farm families classified by the size of their cultivating holdings and the distribution of their members by sex, age, occupation, etc. The average size of the cultivator's family was about five. The bigger cultivators had larger families than smaller cultivators. It might be due to the prevalence of joint family system in the larger size classes.

The proportion of earners to total members in each size class increased from 44 per cent in the smallest size class to 62 per cent in the fifth size class and then declined in the higher classes following. It is precisely these size classes that reported employment of annual farm servants. As the size increased a larger number of family members may be employed on the farm, but after a stage, farm labourers were employed to do the increasing work, children and women keeping mostly out of it.

Females were mostly part-time workers on home farms, assisting in operations like weeding and harvesting. As the size of holdings increased, proportion of female earners to total adult females declined. Very few of them reported any subsidiary occupation.

Land Utilization: Table No. S.3 presents information regarding the reasons for keeping the land fallow on sample farms. All land occupied for cultivation was not put under crops during the year 1955-6. About 9 per cent of the total "cultivated land" was fallow. More than 50 per cent of this land remained fallow during the year due to "want of seed" with the farmer; nearly 12 per cent was reported unculturable; for the remainder no reasons were given for its being fallow.

The gross cropped area during the year amounted to 739.90 acres. Table No. S.4 gives the distribution of this area under different crops. The complete dependence of this region on a single crop, paddy, is obvious from the Table. Nearly 92 per cent of the gross cropped area or about 80 per cent of the net cultivated area was under paddy. Pulses were grown on 3.74 per cent of the gross cropped area, groundnut on 1.65 per cent and sugarcane on 0.85 per cent only. The area cropped more than once was less than one per cent of the gross cropped area, and that meant that a very small proportion of the land was cultivated more than once during a year. Pulses and grams were grown both as *kharif* and *rabi* crops and the land that grew these as also groundnut, etc. was not put under rice. These lands were mostly *At* or upper *Mal* lands, unsuitable for paddy cultivation.

A little over seven per cent of the gross cropped area was reported to be irrigated. Irrigation was purely seasonal and protective, confined to the *kharif* season when the tanks and *bandhs* were quite full due to rains. They were too inadequate to serve any irrigated crop during the *rabi* season. The bigger cultivators accounted for more than half of the reported irrigated area.

One of the most important factors that went to determine the quality of land in this region was its situation. The undulating surface of the country-side was responsible for this. The lands situated at the highest level were called *At* lands; these were inferior lands, sometimes rocky and mostly liable to erosion. The fields here were not levelled or ridged and in most cases had a very thin topsoil. Lands slightly lower down the slope were called *Mal* lands, the lowest lands being *Bahal*, the best lands of the region. This land got plenty of water supply and had a thicker layer of better soil. *Berna* lands were situated where two slopes met and thus got water from both directions. *Bercha* was a specially prepared land for growing cash crops like sugarcane or garden crops. The 60 odd types of land classified in the *Sambalpur Settlement Report* can be reduced to these five main categories.

According to our survey the total cultivated area was divided among these five land classes in the following proportions: (See table on next page).

The figures show wide divergence except for *Berna* and *Bercha* lands. The proportions of *At* and *Mal* lands at the time of the Settlement during the twenties of this century were put at 37 and 31 per cent respectively, in the whole District of Sambalpur and the whole Sonepur State. Our Survey for the commanded region puts *At* at about 12 and *Mal* at about 42 per cent. *Bahal* land, on the other hand was about 28 per cent according to our survey, whereas it was only 15 per cent at the time of the Settlement.

Land Class	Our Survey	Settlement* Sambalpur Dtstrict	Sonepur State	Total of Sambalpur and Sonepur
At	12·27	38·00	32·00	37·00
Mal	41·73	34·00	20·00	31·00
Bercha & Bari	2·53	2·00	2·00	2·00
Berna	15·42	14·00	21·00	15·00
Bahal	27·86	12·00	25·00	15·00
Unspecified	00·19	00·00	00·00	00·00
	100·00	100·00	100·00	100·00

* Settlement Reports of Sambalpur district and Sonepur State quoted in the *Report on the Direct Benefits from Irrigation of the Hirakud Dam Project* (Sambalpur Zone), Superintendent, Orissa Government Press, Cuttack, 1947.

These differences may be real or spurious. Assuming the classification made at the time of the land settlement to be correct there are two reasons why they may be different today. Firstly, the settlement figures quoted above pertain to the whole district of Sambalpur and the entire Sonepur State, whereas the commanded area of the Hirakud canal system covers only parts of both. The bulk of this commanded area was in the Bargarh plains, leaving the high land and mountainous area of Sambalpur out of account. The proportion of the higher *At* land was thus likely to be considerably less in these plains than in the upland region. The presumption is reinforced by the fact that in Sonepur State through which two big rivers—the Mahanadi and the Tel—flow and which, therefore, is at least partly, situated in their valleys, the proportion of the higher land *At* was less than in Sambalpur. Secondly, lands classified as *At Mal* or *Berna* do not necessarily remain the same all throughout. With proper ridging and levelling *At* lands can and do become *Mal* and *Mal* lands are converted into *Berna* or *Behal* by lowering the level of the land by digging out the fields. The Settlement classification was made over three decades ago. Lot of things including a world war had taken place since then. It is only natural that the area of *Bahal, Berna* or *Mal* lands should have increased at the cost of the *At* lands. Indeed *At* land was generally considered unsuitable for paddy cultivation; proper ridging and levelling for this purpose automatically transferred this land to the *Mal* group. At the time of the Settlement only 76 per cent of the net cultivated area was reported to be under paddy. Today, according to data obtained through our survey, the area under paddy was 85 per cent of the total.

A less important factor in this connection may be mentioned here. *Bahal* lands being the best, usually did not go out of cultivation, unless one decided to dig a pond or build a house on the *Bahal* field. Such instances were, how-

ever, not many. Inferior *At* land may on the other hand, be put to a variety of non-agricultural uses.

The above factors go to indicate the forces that might have affected the land classification in the region since the last Settlement operation. We have no concrete measure of the influence of these forces. The latest official figures are of the Settlement in the 'twenties; even a detailed examination of the *Patwari* records could not reveal any changes, since the *Patwari* was not supposed to record the changes in the type of land at any time between two settlement operations. In any event our survey figures may be taken as indicating the broad classification of land as it exists today.

Assets: For purposes of farm business analysis only three items of assets have been taken into account, owned land, livestock and farm implements. Farm building should also have been taken into account, but it was not possible during the investigations to obtain information about residential and farm buildings separately, the store houses or godowns being in most places parts of the residential houses, and in some cases there being no separate godowns or store rooms. The other assets of the farmer, like houses (including homestead land), Bank deposits, loans advanced, etc. are separately noted in the Table No. S.5.

Over 92 per cent of the total assets of sample farms were accounted for by land owned by the farmer. Livestock came next with 6.60 per cent, the smallest being farm implements (1.23 per cent).

The value of owned land per acre was reported on an average to be about Rs. 680. This was an average for the different types of land. There was, however, considerable difference between the values of various types of land. The following table shows the estimated values of the different types of land in this region at the time of our survey:—

At	Rs. 500
Mal	Rs. 594
Berna	Rs. 694
Bercha	Rs. 811
Bahal	Rs. 852
Average	Rs. 680

These were based on the estimates of farmers about the value of their own lands. In this the value of *At* and *Mal* lands appeared to have been somewhat overestimated.

Most of the farmers owned most of the land they cultivated. The value of this asset per family went on increasing as the size of the cultivated holding of the families increased.

The same can be said of livestock. The average value of livestock per farm was reported to be Rs. 246/-. A comparison of the value of this asset for different groups of farmers, however, showed only an erratic trend since estimated value of livestock varied from farm to farm.

The average value of implements per family came to about Rs. 48/- and that per acre of net cultivated area to about Rs. 9. Excepting for the group of the very smallest cultivators there was no noticeable difference in the average per acre value of implements among the different groups. The slight differences were due mainly to the possession of bullock-carts by some cultivators.

Livestock : Table No. S. 6 gives the number and value of livestock of sample farms classified by size. As we noted above, 144 of the total number of sample farms possessed bullocks (draught animals). The net cultivated area per pair of bullocks increases as we move from the smaller to the larger cultivated holdings, illustrating the nature of these overheads in farm business. The same, however, cannot be said of cows and other livestock. The smaller cultivators (those with less than five acres per family) reported a smaller number of cows per farm than the bigger ones. This was mostly due to the difficulty of feeding them, dairy being a business of no importance in the region. Therefore, it was only those farmers who had more land and greater resources who could afford to keep cows. There were 2·4 bullocks reported per family. But families with less than 3 acres of cultivated land had less than a pair on an average. Indeed nine families in the smaller groups had no bullocks. Seven had only one and the rest a pair or more. These proportions were different for the upper groups where most farms had at least a pair, only 3 reporting one and one reporting no bullock. The other kinds of livestock were of little significance. Most of the bullocks were purchased. Indeed the home-bred bullocks formed less than 20 per cent of the total number of bullocks. The stock in the region was inferior.

Table No. S.7 presents information about the sale and purchase of livestock on sample farms. There was very little of sale or purchase of livestock reported. Only one bullock was reported to have been sold during the year whereas 13 were reported as purchased. With regard to cows and others no sales or purchases were reported. The value of sales amounted to only about 12 per cent of the value of purchases. This big gap can be explained by the fact that livestock dealers were mostly people who did not belong to the region under our survey and were naturally not likely to feature in the sample. If this is so, it means that the supply centres were located outside the commanded region. Any increase in the demand for bullock labour as a result of the extension of irrigation and consequent intensive farming, may be reflected, immediately at least, in increased purchase of bullocks and the impact may mostly be on places and people outside the region.

Eleven bullocks (or about three per cent of the total number of bullocks) were reported to have died during the year. The purchases during the year, therefore, made up for this and sale. On the other hand, deaths, etc. among milch and other cattle were made up by births; no purchases were made.

Income from Livestock : Table No. S. 8 presents information about the produce and sale of livestock products during 1955-6 on sample of farms classified by size. As we saw above, draught animals (bullocks) outnumber-

ed cows and calves in the region. Excluding calves, on an average there was only one cow per family (there were no buffaloes). But there was hardly any milk yield reported. Only one family out of 154 surveyed had reported 14 seers of milk yield during the year. With regard to the others, it appeared milk yield had gone unreported. Though to the extent that these yields have been under-reported the total income and receipts would be understated, it is quite clear that the milk yield in the region was insignificant. Farmyard manure was the only livestock product reported.

Farm Implements : Table No. S. 9 presents information about farm implements on sample farms classified by size. All farm implements were either purchased or made to order. In this region no improved farm implements, like iron ploughs, pumps, etc. were used. Even the irrigation equipment was rather simple. The wooden ploughs needed to be changed every two-three years. We found almost all groups of farmers reporting some purchase. The total value of purchases came to about 9 per cent of the total value of existing implements. This may be taken to be the average rate of depreciation of farm implements.

Investment-Disinvestment : Table No. S. 10 presents information about the investment and disinvestment during 1955-6 on sample farms in Sambalpur zone. Considering investments in physical assets of the farm and their improvement and also disinvestments we found that there was an overall net investment in farm business in the region. Except a stray sale of a bullock there was no other disinvestment of physical assets reported.

The per family investment in physical assets of the farm during the year amounted to Rs. 20·7. This was a little over five per cent of the total value of assets per farm. About 30 per cent of this investment went into purchase of land, 29 per cent into purchase of livestock, some 20 per cent into purchase of farm implements and nearly 16 per cent was spent on making permanent improvements to land.

The overall picture was one of insignificant investment expenditure. Taking each asset separately we find that the total investment expenditure on land (purchase and land improvement considered together) was only a fraction of one per cent of the total value of land owned. Similarly with regard to livestock, the investment expenditure amounted only to three per cent of the total value of this asset. In case of implements it was about nine per cent.

Most of these investment expenditures were made by farmers with holdings between three and ten acres, a little over half of the farmers surveyed. Farmers with less than one acre and those with more than 10 acres reported only small expenditures on purchase of implements and improvements to land.

Besides these, there were other types of investment expenses incurred by farmers. Some of these like expenditure on construction of residential houses or purchase of gold bullion or ornaments might be excluded from farm busines account. If, however, financial investment and disinvestment expenditures

like repayment or borrowing are taken into account this net investment situation will practically vanish, because, though debts to the tune of Rs. 1,904 were repaid during the year, fresh borrowings amounted to Rs. 5,097 resulting in a net borrowing of Rs. 3,193. This means that on the whole the farmers showed a net disinvestment to a very slight extent. If the other investments not directly connected with farm business are also taken into account the position will again become one of net investment. But either way the figure was too small and insignificant. There was hardly any investment or disinvestment activity, excepting normal routine purchases of bullocks and implements which were in the nature of replacement expenditure.

TABLE No. S.1

Sambalpur Zone: Distribution of sample farms according to the area (in acres) cultivated, owned, etc., (during 1955-6)

Groups	Area	Farms		Cultivated area						Average size of cultivated holding	Total owned area		Average Land Revenue payable per acre (Rs.)
		No.	% of the Total	Total		Owned		Leased in			Area	Out of this leased out	
				Area	% of the Total	Area	% of net cultivated	Area	% of net cultivated				
1	Less than 1·00	12	7·79	6·90	0·86	5·35	77·54	1·55	22·46	0·58	20·21	14·86	0·98
2	1 to 1·99	27	17·53	40·69	5·06	35·14	86·36	5·55	13·64	1·51	37·85	2·71	0·73
3	2 to 2·99	18	11·69	45·63	5·67	43·43	95·18	2·20	4·82	2·54	44·90	1·47	1·02
4	3 to 3·99	22	14·29	75·59	9·40	73·44	97·16	2·15	2·84	3·44	73·44	—	0·84
5	4 to 4·99	11	7·14	49·33	6·13	46·58	94·43	2·75	5·57	4·48	47·83	1·25	0·88
6	5 to 6·99	28	18·18	161·64	20·10	144·61	89·46	17·03	10·54	5·77	144·61	—	1·03
7	7 to 9·99	18	11·69	148·62	18·48	142·87	96·13	5·75	3·87	8·26	142·87	—	0·86
8	10·00 and above	18	11·69	275·72	34·30	262·74	95·29	12·98	4·71	15·32	266·43	3·69	0·58
Total		154	100%	804·12	100%	754·16	93·79	49·96	6·21	5·22	778·14	23·98	0·80

TABLE No. S.2

Sambalpur Zone: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families

Groups*	Family members			Male members		Female members		Male earners		Female earners		Total earners		
	Male	Female	Total	Adult	Non-adult	Adult	Non-adult	Adult	Non-adult	Adult	Non-adult	Male	Female	Total
1	23	28	51	15	8	16	12	15	—	7	—	15	7	22
2	49	51	100	32	17	34	17	29	1	27	—	30	27	57
3	37	36	73	26	11	22	14	24	1	16	1	25	17	42
4	46	54	100	34	12	30	24	31	1	25	1	32	26	58
5	32	29	61	17	15	18	11	16	2	10	—	18	10	28
6	73	70	143	50	23	50	20	44	3	34	—	47	34	81
7	55	66	121	39	16	47	19	35	3	27	—	38	27	65
8	68	61	129	39	29	41	20	35	—	21	—	35	21	56
Total	383	395	778	252	131	258	137	229	11	167	2	240	169	409

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE NO. S.2—(*Contd.*)

Sambalpur Zone: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families

Groups*	Male adult earners' occupations					Female Adult earners' occupations					Non-adult earners' occupations		
	Agriculture		Labour		Other occupations	Agriculture		Labour		Other occupations	Agriculture	Labour	Other occupations
	Full-Time	Part-Time	Agriculture	Non-Agriculture		Full-Time	Part-Time	Agriculture	Non-Agriculture				
1	8	—	3	1	3	—	6	—	1	—	—	—	—
2	25	—	1	1	2	—	25	1	—	1	—	—	1
3	22	—	—	—	2	—	14	2	—	—	2	—	—
4	26	—	2	1	2	1	22	—	—	2	1	—	1
5	14	—	1	—	1	1	9	—	—	—	1	—	1
6	40	—	1	2	1	4	29	—	—	1	1	—	2
7	31	—	1	3	—	—	24	—	3	—	1	—	2
8	31	1	—	1	2	1	20	—	—	—	—	—	—
Total	197	1	9	9	13	7	149	3	4	4	6	—	7

*These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE NO. S.2—(*Contd.*)

Sambalpur Zone: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families.

Groups*	Male adult earners with subsidiary occupations				Female adult earners with subsidiary occupations				Number of migrants for work during the part of the year	Number of attached farm servants
	Agriculture	Labour		Other occupations	Agriculture	Labour		Other occupations		
		Agriculture	Non-Agriculture			Agriculture	Non-Agriculture			
1	6	1	3	2	1	2	—	—	1	—
2	4	12	2	5	1	5	—	5	—	2
3	—	7	3	4	2	1	—	3	—	—
4	1	13	1	5	1	2	—	1	—	—
5	1	4	—	4	—	2	—	1	—	2
6	1	6	2	8	—	6	—	5	—	7
7	3	7	—	2	3	2	—	2	—	4
8	—	—	1	4	4	—	—	—	—	22
Total	16	50	12	34	8	20	—	18	1	37

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE NO. S.3

Sambalpur Zone: Reported reasons for the cultivated land (area in acres) in the sample remaining fallow (during 1955-6)

*Groups**	*Total fallow*	*Reasons of fallow*						
		Shortage of seeds	*Want of farm implements, etc.*	*Want of money*	*Sandy*	*High and stony*	*Others*	*Reasons not stated*
1	0·25	—	—	—	—	0·05	—	0·20
2	0·94	0·38	—	—	0·40	0·16	—	—
3	2·13	0·61	0·12	—	0·25	0·50	—	0·65
4	2·97	2·22	—	—	—	—	0·60	0·15
5	4·93	4·10	—	—	—	—	—	0·83
6	11·31	4·39	—	0·26	—	4·41	—	2·25
7	10·68	6·23	—	—	—	1·32	—	3·13
8	35·95	19·76	—	—	—	2·07	—	14·12
Total	69·16	37·69	0·12	0·26	0·65	8·51	0·60	21·33

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE NO. S.4

Sambalpur Zone: Distribution of the net cultivated area in the sample farms classified by the size (area in acres) of their cultivated holdings, under different crops (during 1955-6)

Group*	Paddy	Wheat	Other cereals	Total cereals	Green gram	Black gram	Kulthi	Chana	Total pulses and grams	Ground-nut	Other oil-seeds and condi-ments and spices	Jute
1	6·08	—	0·12	6·20	0·05	—	—	—	0·05	—	—	—
2	38·08	—	—	38·08	—	0·60	0·30	—	0·90	0·35	—	—
3	40·18	—	—	40·18	—	1·65	1·00	—	2·65	—	—	—
4	68·21	—	0·50	68·71	1·25	0·46	—	0·25	1·96	0·82	—	—
5	41·95	—	—	41·95	—	0·10	1·00	—	1·10	1·10	0·05	—
6	133·48	0·08	0·58	134·14	3·93	4·01	1·80	2·00	11·74	4·27	0·51	0·07
7	128·14	0·10	0·50	128·74	0·30	2·66	1·00	0·50	4·46	2·70	0·15	0·20
8	224·30	0·97	2·00	227·27	—	4·60	0·20	—	4·80	2·96	1·60	0·04
Total	680·42	1·15	3·70	685·27	5·53	14·08	5·30	2·75	27·66	12·20	2·31	0·31

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE No. S.4—*(Contd.)*

Sambalpur Zone: Distribution of the net cultivated area in the sample farms classified by the size (area in acres) of their cultivated holdings, under different crops (during 1955-6)

*Groups**	*Sugarcane*	*Potato*	*Vegetables*	*Total*	*Orchards and others*	*Gross cropped area*	*Fallow*	*Area cropped more than once*	*Net cultivated area*	*Area irrigated during the current year*	
										Net	*Gross*
1	—	—	0·40	6·65	—	6·65	0·25	—	6·90	0·40	0·40
2	0·37	—	0·28	39·98	—	39·98	0·94	0·23	40·69	0·12	0·12
3	0·17	—	0·75	43·75	—	43·75	2·13	0·25	45·63	0·42	0·42
4	0·53	—	0·95	72·97	0·05	73·02	2·97	0·40	75·59	4·45	4·45
5	—	—	0·20	44·40	0·25	44·65	4·93	0·25	49·33	4·95	4·95
6	1·32	—	0·28	152·33	0·08	152·41	11·31	2·08	161·64	4·53	4·53
7	1·41	0·05	0·73	138·44	—	138·44	10·68	0·50	148·62	9·41	9·41
8	2·52	0·15	0·66	240·00	1·00	241·00	35·95	1·23	275·72	30·95	30·95
Total	6·32	0·20	4·25	738·52	1·38	739·90	69·16	4·94	804·12	55·23	55·23

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE No. S.5

Sambalpur Zone: Total farm and other assets and outstanding debts of sample farms classified by the size (area in acres) of their cultivated holdings (during 1955-6)

(Value in Rs.)

Groups*	Farm assets					Other assets				Grand total value of assets	Outstanding debts	
	Land (own)		Implement value	Livestock value	Total value	Value of homestead land and houses	Value of non-farm implements	Other financial assets	Total		Value	Per cent of farm assets
	Area	Value										
1	20·21	12,541 (89·35%)	248 (1·77%)	1,247 (8·88%)	14,036 (100%)	9,280	—	—	9,280	23,316	110	0·78
2	37·85	25,456 (87·39%)	366 (1·26%)	3,307 (11·35%)	29,129 (100%)	11,515	20	—	11,535	40,664	1,713	5·88
3	44·90	29,318 (93·38%)	429 (1·37%)	1,648 (5·25%)	31,395 (100%)	8,230	—	—	8,230	39,625	1,203	3·83
4	73·44	42,544 (91·17%)	497 (1·06%)	3,626 (7·77%)	46,667 (100%)	20,460	—	10	20,470	67,137	1,060	2·27
5	47·83	31,208 (92·66%)	387 (1·15%)	2,084 (6·19%)	33,679 (100%)	12,000	100	—	12,100	45,779	1,482	4·40
6	144·61	90,995 (90·04%)	1,791 (1·77%)	8,279 (8·19%)	101,065 (100%)	26,850	—	—	26,850	127,915	3,988	3·95
7	142·87	90,814 (91·95%)	857 (0·87%)	7,090 (7·18%)	98,761 (100%)	16,405	—	—	16,405	115,166	1,016	1·03
8	266·43	204,668 (94·00%)	2,471 (1·14%)	10,584 (4·86%)	217,723 (100%)	53,330	200	920	54,450	272,173	6,131	2·82
Total	778·14	527,544 (92·15%)	7,046 (1·23%)	37,865 (6·62%)	572,455 (100%)	158,070	320	930	159,320	731,775	16,703	2·92

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE NO. S.6

Sambalpur Zone: The number and value of different kinds of livestock on the sample farms classified by the size (area in acres) of their cultivated holdings (at the beginning of 1955-6) (*Value in Rs.*)

Groups*	Draught cattle		Milch cattle		Calves		Value of other live-stock	Total value of livestock	Number of families with draught animal			
	No.	Value	No.	Value	No.	Value			Nil	One	Two	More than two
1	12	717	7	395	6	115	20	1,247	6	—	6	—
2	49	2,870	9	318	2	35	84	3,307	1	5	19	2
3	31	1,330	9	220	6	90	8	1,648	2	2	13	1
4	47	3,107	11	404	10	85	30	3,626	1	2	15	4
5	27	1,740	5	255	3	35	54	2,084	—	1	7	3
6	75	5,745	40	1,712	31	709	113	8,279	—	—	17	11
7	62	4,786	43	1,759	33	544	1	7,090	—	—	7	11
8	69	6,495	36	2,600	48	1,453	36	10,584	—	—	6	12
Total	372	26,790	160	7,663	139	3,066	346	37,865	10	10	90	44

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE No. S.7

Sambalpur Zone: The purchase, sale, death, birth, etc., of different kinds of livestock on the sample farms, arranged by size in acres, (during the year and the number at the end of 1955-6) (Value in Rs.)

Groups*	Purchase							Sale							Death and disposal							Birth and acquiring			Total No. at the end of the year		
	Draught cattle		Milch cattle and calves		Other livestock		Total value	Draught cattle		milch cattle and calves		Other livestock		Total value	Draught cattle		Milch cattle and calves		Other livestock		Total value	Draught Cattle	Milch cattle & calves	Other livestock	Draught cattle	Milch cattle and calves	Other livestock
	No.	Value	No.	Value	No.	Value		No.	Value	No.	Value	No.	Value		No.	Value	No.	Value	No.	Value							
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	13	1
2	3	175	—	—	—	—	175	—	—	—	—	—	—	—	—	—	1	70	1	2	72	—	2	—	52	12	2
3	1	35	—	—	—	—	35	—	—	—	—	—	—	—	—	—	—	—	2	2	2	—	—	—	32	15	5
4	3	266	—	—	—	—	266	1	120	—	—	—	—	120	4	107	1	15	—	—	122	—	—	—	45	20	—
5	3	200	—	—	—	—	200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	30	8	17
6	1	180	—	—	—	—	180	—	—	—	—	—	—	—	5	377	3	52	—	—	429	—	3	—	71	71	15
7	2	106	—	—	—	—	106	—	—	—	—	—	—	—	1	4	1	15	—	—	19	—	2	—	63	77	1
8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	3	—	—	—	—	—	8	10	68	89	25
Total	13	962	—	—	—	—	962	1	120	—	—	—	—	120	11	488	9	152	3	4	644	—	15	16	373	305	66

* These groups have the same acreages and the same number of farms as in Table No. S·1.

TABLE NO. S.8

Sambalpur Zone : Livestock produce and sale on sample farms classified by the size in acres (during 1955-6)

*Groups**	*Milk*		*Farm yard manure*	*Dung cakes*	*Total of all items*
	Quantity in mds.	*(Value in Rs.)*	*(Value in Rs.)*	*(Value in Rs.)*	*(Value in Rs.)*
1	—†	—	143·00 (80·91%)	33·75 (19·09%)	176·75 (100%)
2	0·35	7·00 (1·16%)	323·00 (53·33%)	275·62 (45·51%)	605·62 (100%)
3	—	—	275·50 (63·94%)	155·37 (36·06%)	430·87 (100%)
4	—	—	352·00 (58·83%)	246·37 (41·17%)	598·37 (100%)
	—	—	200·00 (61·18%)	126·87 (38·82%)	326·87 (100%)
6	—	—	879·50 (77·34%)	257·75 (22·66%)	1,137·25 (100%)
7	—	—	546·00 (77·68%)	156·87 (22·32%)	702·87 (100%)
8	—	—	1,157·00 (87·49%)	165·44 (12·51%)	1,322·44 (100%)
Total	0·35	7·00 (·013%)	3,876·00 (73·12%)	1,418·04 (26·75%)	5,301·04 (100%)

† No sales reported.

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE No. S.9

Sambalpur Zone: Value of farm implements, their sale and purchase on sample farms classified by size in acres (during 1955-6)

(Value in Rs.)

*Groups**	*Value of implements at the beginning of the year*	*Value of implements per farm*	*Value of implements purchased during the year*	*Value of implements sold during the year*	*Value of implements discarded as useless during the year*
1	248	20·67	15·62	—	0·75
2	366	13·56	61·00	—	8·00
3	429	23·83	28·25	—	1·50
4	497	22·59	110·94	—	43·06
5	387	38·18	25·75	—	8·00
6	1,791	63·96	103·37	—	107·87
7	857	47·61	207·69	—	90·44
8	2,471	137·28	65·62	—	137·06
Total	7,046	45·75	618·24	—	396·68

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE NO. S.10

Sambalpur Zone: Investment and Disinvestment on sample farms classified by size in acres (during 1955-6)

PART I—INVESTMENT

(Value in Rs.)

Groups*	Total purchase of land		Permanent Improvements to land	Purchase of livestock	Purchase of implements	Total of columns 1 to 4	Construction or purchase of houses	Purchase of ornaments	Purchase of other financial assets	Repayments of debts	Advancing loans	Total of columns 6 to 10	Grand Total of all items
	Area (acres)	Value (Rs.)											
	1		2	3	4	5	6	7	8	9	10	11	12
1	—	—	5·00	—	15·62	20·62	—	—	—	—	—	—	22·62
2	—	—	—	175·00	61·00	236·00	40·00	—	—	127·37	—	167·37	403·37
3	—	—	—	35·00	28·25	63·25	—	—	—	38·00	—	38·00	101·25
4	1·00	1,000·00	—	266·00	110·94	1,376·94	60·00	45·00	—	64·00	—	169·00	1,545·94
5	—	—	—	200·00	25·75	225·75	—	—	—	—	—	—	225·75
6	—	—	146·62	180·00	103·37	429·99	198·00	80·00	—	1,022·50	—	1,300·50	1,730·49
7	—	—	190·00	106·00	207·69	503·69	36·00	—	—	138·00	—	174·00	677·69
8	—	—	169·00	—	65·62	234·62	—	110·00	—	514·00	—	624·00	858·62
Total	1·00	1,000·00	510·62	962·00	618·24	3,090·86	334·00	235·00	—	1,903·87	—	2,472·87	5,563·73

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

TABLE No. S.10—(Contd.)

Sambalpur Zone: Investment and Disinvestment on sample farms classified by size in acres (during 1955-6)

PART II—DISINVESTMENT

(Value in Rs.)

Groups*	Sale of Land		Sale of Livestock	Sale of implements	Total of columns 1 to 3	Sale of houses	Sale of ornaments	Sale of other financial assets	Recovery of loans	Other disinvestments	Incurring new debts	Total of columns 5 to 10	Grand total of all items
	Area (acres)	Value Rs.											
	1		2	3	4	5	6	7	8	9	10	11	12
1	—		—	—	—	—	—	—	—	—	—	—	—
2	—		—	—	—	—	—	—	—	—	528·00	528·00	528·00
3	—		—	—	—	—	—	—	—	—	79·00	79·00	79·00
4	—		120·00	—	120·00	—	—	—	—	—	212·00	212·00	332·00
5	—		—	—	—	—	—	—	—	—	152·00	152·00	152·00
6	—		—	—	—	—	—	—	—	—	1,142·00	1,142·00	1,142·00
7	—		—	—	—	—	—	—	—	—	672·00	672·00	672·00
8	—		—	—	—	—	—	—	—	—	2,312·00	2,312·00	2,312·00
Total	—		120·00	—	120·00	—	—	—	—	—	5,097·00	5,097·00	5,217·00

* These groups have the same acreages and the same number of farms as in Table o. S. 1.

TABLE NO. S.10—(Contd.)

Sambalpur Zone: Investment and Disinvestment on sample farms classified by size in acres (during 1955-6)

PART III—INVESTMENT AND DISINVESTMENT

(*Value in Rs.*

*Groups**	*No. of farms*	*Total investment in physical assets of farms*	*Total investment in houses*	*Total investment in ornaments, etc.*	*Total repayment of debts*	*Total investment*	*Total disinvestment in physical assets of farm*	*Total disinvestment in houses*	*Total disinvestment in ornaments etc.*	*Total new debts incurred*	*Total disinvest-ment*	*Net investment or disinvestment*
1	12	20·62	—	—	—	20·62	—	—	—	—	—	+ 20·62
2	27	236·00	40·00	—	127·37	403·37	—	—	—	528·00	528·00	− 124·63
3	18	63·25	—	—	38·00	101·25	—	—	—	79·00	79·00	+ 22·25
4	22	1,376·94	60·00	45·00	64·00	1,545·94	120·00	—	—	212·00	332·00	+1,213·94
5	18	225·75	—	—	—	225·75	—	—	—	152·00	152·00	+ 73·75
6	28	429·99	198·00	80·00	1,022·50	1,730·49	—	—	—	1,142·00	1142·00	+ 588·49
7	18	503·69	36·00	—	138·00	677·69	—	—	—	672·00	672·00	+ 5·69
8	18	234·62	—	110·00	514·00	858·62	—	—	—	2,312·00	2,312·00	−1,453·38
Total	154	3,090·86	334·00	235·00	1,903·87	5,563·73	120·00	—	—	5,097·00	5,217·00	+ 346·73

* These groups have the same acreages and the same number of farms as in Table No. S. 1.

\+ Where the investment is more than disinvestment. − Where the disinvestment is more than investment.

CUTTACK :

Cuttack : The Mahanadi Delta region of Cuttack district is a thickly populated region and the pressure on land is great. The average size of the cultivated holding was reported to be 2·83 acres only, nearly half of what it was for Sambalpur (Table No. C 1). The smallness of holdings is brought out more clearly by the fact that nearly two-thirds of the total number of cultivators had holdings of less than this average size. Indeed, over one-fifth of the cultivators had less than one acre, one - fourth had between one and two acres and another 22 per cent had between two and three acres only. And these two-thirds of the cultivators cultivated amongst themselves only one-third (36 per cent) of the total cultivated area. The smallest 20 per cent cultivated only four per cent of the total land. On the other hand, cultivators with five acres or more of cultivated holding were only 13 per cent of the total; but they cultivated nearly 40 per cent of the total area. Cultivators with more than 10 acres were less than three per cent only, but cultivated 13 per cent of the total area.

As in the data relating to the first round survey, these go to show the extreme smallness of holdings on the one hand, and the concentration of cultivated land in the hands of few cultivators on the other.

Most, but not all, the land cultivated by these farmers was owned. Nearly 75 per cent of the total land cultivated by the sample farmers was owned by them also, the rest having been leased in from others. The very smallest as also the very biggest and the middle group of cultivators (with between four and five acres of land) reported relatively lesserl eased-in-land than others. Of the total land leased-in also, the group of cultivators with between one and four acres each accounted for more than 50 per cent.

There was very little leasing out of land, the land leased out being only about seven per cent of the total area leased in. Almost the entire area leased out was leased out by the small cultivators, those with less than three-acre holdings.

Leasing-in land to increase the size of one's operating farm unit was more prevalent among the medium cultivators. The bigger land owners, unless they leased out land, mostly cultivated their own. The very small owners, on the other hand, possibly found it more paying than tenancy or possibly did not lease in more land for a variety of factors like lack of equipment, capital, etc. which might be summed up by saying that they lacked an adequate base for farming on their own.

Family Members : Table No. C. 2 presents information regarding the composition of the sample farm families. The average family size was 5·3. Larger holdings and larger families went together. The proportion of earners in the family declined with the increase in the size of holding. This was particularly so in case of female earners.

The small cultivators treated cultivation as only a part-time occupation. The proportion of earners working full time on their farms increased with

an increase in the size of farm. Employment of labour in agriculture was reported in the three smallest-size classes. Employment in other occupations was reported in all-size classes but the largest number in this category was concentrated in the smallest-size groups.

The same was the case with regard to subsidiary occupations. The proportion of earners with subsidiary occupations varied between 60 to 80 per cent in the three smallest-size classes and then sharply declined in the larger-size classes. Most of the subsidiary employment was in agriculture and labour. Few females reported any subsidiary occupations. Migration for work outside the area was reported in all-size classes. The migrants were rather heavily concentrated in size groups of two to four acres. Only big farmers reported farm servants.

Land Utilization : The classification of land into different types in the delta was based on two factors : quality of the soil and the situation of land. Unlike the Sambalpur zone, however, the delta is a flat country, only very gently sloping towards the sea. Land was classified into two main types *Beali* and *Sarad*. *Beali* land was situated somewhat higher than *Sarad*, and water drained out more quickly from these lands. For that reason they were used for growing the short duration paddy crop which was reaped in August-September. *Sarad*, being the lower land, grew medium and long duration paddy. Of the total cultivated area surveyed in Cuttack district, only about 10 per cent was reportedly *Beali*, the rest *Sarad*.*

The canal irrigation system in the district of Cuttack was nearly 90 years old. This irrigation was not perennial. Most of the canals and distributaries went dry during the four summer months, excluding the navigation canals, which also went dry by April of each year. This non-perennial irrigation, served the needs of *kharif* paddy, potato, jute, and pulses to a certain extent. However, not all land in the commanded area of the district was irrigated. The survey showed that only about 44 per cent of the total cultivated area was irrigated by these canals. All this land was irrigated during the *kharif* season for paddy mainly, and to a smaller extent for jute. During the *rabi* season only about 25 per cent of this area was irrigated for growing a second crop like pulses or to a much smaller extent, potato. All this of course was not canal irrigation, some non-canal areas were irrigated by water lifted from rivers, etc.

Not all land occupied for cultivation was put under the crop during the year. Only about three per cent of the total cultivated land was reported to be fallow. This, of course, was much less than in the Sambalpur zone. The reported reasons for keeping most of this land fallow are presented in Table No. C.3.

* There are four or five main classes of soil on the basis of which cultivated land in the region can be classified. But we had no enquiries conducted in the matter and no data were available on that point.

Table No. C.4 presents data regarding the crop pattern of the sample farms in 1954-5. Paddy, naturally was the most dominant crop of the area occupying about 69 per cent of the gross cropped area. Pulses came next, occupying 27 per cent of the gross cropped area. Only about 2·37 per cent of the gross cropped area was under jute. The other crops like potato, sugarcane, wheat, tobacco, etc. occupied less than one per cent of the area.

Thus paddy and pulses-particularly *mug* or green gram-stood out as the two important crops of the area. Pulses were mostly grown as catch crops, sown on paddy lands after the harvesting of paddy. Most of the pulse crop was unirrigated, the irrigated pulses, according to our survey, accounting for less than a third of the total area under pulses.

Assets : Table No. C.5 presents information regarding the value of farm and non-farm assets of sample farms. The average value of farm assets per farm taking owned land, livestock and farm implements only was reported to be Rs. 1577 only. Nearly 89 per cent of this was accounted for by land, only about 10 per cent by livestock and the rest by farm implements.

The average value of land per acre in this area during the year of the survey was reported to be about Rs. 600. The average value of irrigated land (mostly canal irrigated) was estimated at about Rs. 700 only per acre, and unirrigated land at Rs. 530 per acre.

The average value of livestock owned per farm was estimated at Rs. 151 only. The larger the cultivated holding the greater was the holding of livestock. On the other hand, the value of livestock per acre went on diminishing as one moved from the smaller cultivator groups to larger ones, excepting the group of the biggest cultivators. This was also true of the number of bullocks per acre of cultivated land. Except for the very smallest cultivators the tendency was for number of bullocks per acre of cultivated land to decrease as one moved from small to large-size groups of farms.

The average value of farm implements per farm was a little over Rs. 22, per acre of cultivated land it was nearly Rs. 8. The value of implements per farm increased as the size of holding increased, until it reached the last group of 10 and more acres. The tendency was different if we look into the value of implements per cultivated acre. The value of implements per acre for the smallest cultivators was higher than for the rest, and excepting the very biggest group of cultivators it was practically the same for the different groups. For the biggest cultivators, however, it was the smallest. It is not quite clear why the very biggest cultivators in the region should report less of farm implements judged by their value per farm than most others.

For reasons already stated it was not possible to obtain data separately for farm houses. The other assets of the farm family like houses, shares and deposits, etc. came to about Rs. 900 per family; houses, excluding the land on which they stood, being valued at about Rs. 600 on an average.

Livestock: Table No. C. 6 gives the number and value of livestock on sample farms in Cuttack. The main livestock on sample farms were bullocks and

cows only a few farmers reporting some goats, sheep or poultry. There were no buffaloes in the region. Out of a total of 260 farms surveyed, 211 had bullocks. Most of the farms without bullocks were in the smallest-size groups, where also most farms had no bullocks or only one. Excepting this group of smallest cultivators the net cultivated area per pair of bullocks went on increasing as the size of the holding increased. In general, it can be said that owning of milch cattle was larger among larger cultivators. The fact that milk was in greater demand in these areas than in the Sambalpur zone, might explain the difference between the two regions in this respect.

The average value of a bullock was reported to be Rs. 70 only. Most of these bullocks were reportedly purchased (Tables Nos. C. 7 and C. 8). Of the total stock of bullocks reported at the beginning of the year, only three per cent were home-bred and 97 per cent had been purchased. The extraordinary purchase rate would appear rather surprising when one remembers the fact that there was no or little special breeding of bullocks in this region. The peculiar custom of not using the home bred bullock on one's own farm for cultivation might account for these large purchases. During the year 49 bullocks or 13 per cent of the total stock were purchased, and 42 bullocks or 11·6 per cent of the total stock were sold. The data for sale and purchase of draught cattle relate to the cultivators only. Among non-cultivators there might be families, who were either engaged in regular livestock breeding business or in the sale of draught cattle. There, however, will be no non-cultivating families, excepting the pure trader, who also purchase draught cattle. We have no special information of such families. But it would be safe, in view of the small difference between the sale and purchase figures, to assume that there were practically as many sales as purchases of draught animals in this region. The difference between the value of sales and purchases of draught cattle was, however, much greater. Whereas the average value of bullocks purchased during the year was reported to be Rs. 70 (the same as the value of the existing stock), the sale value of a bullock was reported to be Rs. 48 only. Purchases roughly covered the total deaths and sales of draught cattle, total purchases being 49 and total sales and deaths numbering 52. Most purchases and sales and even deaths were confined to the smaller cultivators.

Milch cattle including young stock increased from 498 in the beginning of the year to 512 at the end. Out of this the cows numbered only 263, less than the total number of bullocks. The total number of cows and young stock sold during the year was higher than the number purchased, apparently the excess sales were to non-cultivators who wished to possess milch cattle. The deaths were more than made up by births. Though there was no regular breeding of milch cattle, the practice of selling the surplus milch animals to non-agriculturists was noticeable in this region.

Receipts from Livestock : Tables present information about the receipts from livestock on sample farms during 1954-5. The two important products of livestock were milk and milk products, and cattle droppings.

The droppings of cattle were partly used as farmyard manure and partly turned into dung cakes to be used as fuel. They accounted for half of the total livestock prbduce. The other half was milk and milk products. A little was derived from eggs and some from sale of hides and skins.

Most of the livestock produce was used in the farm or by the family. A negligible quantity of the farmyard manure was sold, almost the entire quantity being used on the farm. So also with dung cakes, which were used by the farm family as fuel. Only milk and milk products were sold to some extent. A little over one-third of the total milk produced and over half of the total milk products made were sold. Milk products consisted mostly of curd, buttermilk and *ghee*, and these were produced for the market since they fetched a good price.

Farm Implements : Table No. C. 9 gives the value, sales and purchases of implements on sample farms in 1954-5. The farm implements used were of the traditional sort, even the iron plough having made little headway here so far. The bullock cart was the only expensive farm equipment, and that too was not to be found everywhere. In some of the grids none of the sample farm families had bullock carts. These were mainly areas liable to floods where carts could not be used for transport during the rainy season. During the rest of the year they had mostly to purchase farm produce rather than sell. No non-farm work in which the bullock carts were necessary was available in these areas. The innumerable streams and rivers that had to be negotiated to go from one place to another in these flooded areas made bullock cart a useless means of transport. To add to it was the almost complete absence of made-roads in the area.

The average value of farm implements per farm family came to about Rs. 22 only. One-third of this was replaced every year, which might roughly indicate the rate of depreciation, a rate considerably higher than in the Sambalpur zone.

Investment and Disinvestment : Table No. C. 10 presents data regarding investment and disinvestment on sample farms in 1954-5. The average per farm investment in the total physical assets of the farm was very small. And over 50 per cent of the total annual investment was in land, the remaining being in livestock and implements.

In regard to investment in land, though purchase or sale of land were investment or disinvestment activities from the individuals' point of view, they were only transfer expenditures for the community as a whole. The real investment was investment in land improvement which was precious a little. The transactions in livestock and implements have already been examined.

In regard to disinvestment, there was no sale of implements and the sale of land and livestock were the only two items which were roughly equal in importance.

Most of this investment or disinvestment activity was confined to the middle and small peasants, the large ones reporting very little of it.

Whether one includes land transactions or excludes them, on each item and on the total, there was some net investment reported. In regard to land it meant that cultivators reported a net purchase of land, obviously from non-cultivators : only 2·91 acres were reported as sold whereas 6·91 acres were purchased.

We have so long been discussing investment in the physical assets of the farm. There were other investment activities also, such as (a) financial investments which might at least partly be related to farm business and (b) other pure non-farm investment activities like construction or major repair to houses, purchase of bullion and ornaments, etc. If borrowing and repayment as also recovery of loans and lending were considered as disinvestment or investment activities then the result was a very small net disinvestment. If the other investment activities like construction of houses and purchase of ornaments were taken into account, then the net position was investment to a certain extent.

It is, however, not possible to say how much of the house-building expense was in the nature of major repairs and replacement expense and how much was real net addition to new houses. As for land it was a transfer expenditure and purchase of livestock or implements was mostly replacement expenditure. Though it is difficult to calculate net investment or disinvestment in the sense of a net real addition to assets, it is quite clear from the above that almost all the so-called investment expenditure was really replacement expenses.

TABLE No. C.1

Cuttack District: Distribution of sample farms according to area (in acres) cultivated, owned, etc., (during 1954-5)

Groups	Area	Farms		Cultivated area						Average size of cultivated holding	Total owned area		Average land revenue payable per acre (Rs.)
				Total		Owned		Leased in					
		No.	% of the total	Area	% of the total	Area	% of net cultivated	Area	% of net cultivated		Area	Out of this leased out	
1	Less than 1·00	55	21·15	30·53	4·14	24·56	80·45	5·97	19·55	0·56	26·86	2·30	3·84
2	1 to 1·99	66	25·39	95·61	12·98	69·44	72·63	26·17	27·37	1·45	72·60	3·16	3·77
3	2 to 2·99	58	22·31	143·18	19·44	98·72	68·95	44·46	31·05	2·47	104·53	5·81	3·32
4	3 to 3·99	27	10·38	92·79	12·60	64·45	69·46	28·34	30·54	3·44	64·45	—	3·70
5	4 to 4·99	19	7·31	84·90	11·53	71·63	84·37	13·27	15·63	4·47	71·63	—	3·27
6	5 to 6·99	17	6·54	101·37	13·76	73·34	72·35	28·03	27·65	5·96	73·58	0·24	3·15
7	7 to 9·99	11	4·23	90·47	12·28	70·97	78·45	19·50	21·55	8·22	71·41	0·44	2·59
8	10·00 and above	7	2·69	97·73	13·27	83·34	85·28	14·39	14·72	13·96	83·73	0·39	3·30
	Total	260	100%	736·58	100%	556·45	75·55	180·13	24·45	2·83	568·79	12·34	3·32

TABLE No. C.2

Cuttack District: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families

Groups*	Family members			Male Members		Female members		Male earners		Female earners		Total earners		
	Male	Female	Total	Adult	Non-adult	Adult	Non-adult	Adult	Non-adult	Adult	Non-adult	Male	Female	Total
1	103	108	211	69	34	70	38	66	4	23	—	70	23	93
2	147	143	290	98	49	97	46	91	4	24	—	95	24	119
3	159	165	324	98	61	115	50	93	3	23	—	96	23	119
4	74	69	143	53	21	46	23	49	2	3	—	51	3	54
5	51	71	122	36	15	42	29	33	1	—	—	34	—	34
6	62	63	125	39	23	43	20	33	3	5	—	36	5	41
7	45	45	90	33	12	35	10	28	3	1	—	31	1	32
8	40	38	78	25	15	27	11	20	—	—	—	20	—	20
Total	681	702	1,383	451	230	475	227	413	20	79	—	433	79	512

* These groups have the same acreages and the same number of farms as in Table No. C. 1

TABLE No. C.2—(Contd.)

Cuttack District: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families

Groups*	Male adult earners' occupation					Female adult earners' occupation					Non-adult earners' occupation		
	Agriculture		Labour		Other occupation	Agriculture		Labour		Other occupation	Agriculture	Labour	Other occupation
	Full-time	Part-time	Agriculture	Non-agriculture		Full-time	Part-time	Agriculture	Non-agriculture				
1	21	—	30	—	15	—	1	10	1	11	—	1	3
2	73	1	8	1	8	3	4	3	—	14	—	—	4
3	80	—	4	1	8	2	3	5	—	13	—	—	3
4	45	—	—	—	4	—	1	—	—	2	1	—	1
5	29	—	—	—	4	—	—	—	—	—	—	—	1
6	29	—	1	—	3	—	—	—	—	5	—	—	3
7	27	1	—	—	—	—	—	—	—	1	1	—	2
8	17	—	—	—	3	—	—	—	—	—	—	—	—
Total	321	2	43	2	45	5	9	18	1	46	2	1	17

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.2—(Contd.)

Cuttack District: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families

Groups*	Male adult earners with subsidiary occupation				Female adult earners with subsidiary occupation				No. of migrants for work during part of the year	No. of attached farm servants
	Agriculture	Labour		Other occupation	Agriculture	Labour		Other occupation		
		Agriculture	Non-agriculture			Agriculture	Non-agriculture			
1	35	14	2	4	6	2	—	—	1	—
2	12	42	4	16	1	1	1	—	2	—
3	10	39	4	20	5	1	—	—	4	2
4	1	17	2	9	—	—	—	—	3	1
5	3	5	1	3	—	—	—	—	1	2
6	4	6	3	4	—	—	—	—	—	7
7	—	6	—	6	—	—	—	—	—	3
8	1	—	—	4	—	—	—	—	1	5
Total	66	129	16	66	12	4	1	—	12	20

* These groups have the same acreages and the same number of farms as in Table No. C. 1

TABLE NO. C.3

Cuttack District: Reported reasons for the cultivated land (area in acres) in the sample farms remaining fallow (during 1954-5)

Groups*	Total fallow	Reasons of fallow							
		Shortage of seeds	Due to seasonal vagaries	Sandy land	High and stony land	Low land	Shrub and bush etc.	Others	Reasons not stated
1	1·22	—	—	0·50	0·06	—	—	0·27	0·39
2	0·68	—	—	0·22	0·04	0·10	—	0·02	0·30
3	2·27	—	0·07	—	0·66	0·18	—	0·47	0·89
4	1·56	—	0·08	0·58	0·09	—	—	—	0·81
5	2·94	—	0·03	—	0·49	0·50	—	0·99	0·93
6	3·86	—	—	1·80	0·08	—	0·36	—	1·62
7	0·65	—	—	0·11	0·13	0·16	—	—	0·25
8	7·84	3·00	0·66	0·68	—	0·16	3·04	—	0·30
Total	21·02	3·00	0·84	3·89	1·55	1·10	3·40	1·75	5·49

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.4

Cuttack District: Distribution of the net cultivated area in the sample farms classified by the size (area in acres) of their cultivated holdings, under different crops (during 1954-5)

Groups*	Beali paddy	Sarad paddy	Wheat	Other cereals	Total cereals	Green gram	Black gram	Kulthi	Chana	Other pulses and grams	Total pulses and grams	Other oil seeds and condiments and spices	Jute
1	3·69	23·94	—	0·23	27·86	10·05	1·78	2·88	0·56	0·11	15·38	0·12	2·53
2	7·51	84·51	—	0·12	92·14	27·26	9·93	4·64	0·93	—	42·76	0·05	3·43
3	10·84	123·31	0·48	0·35	134·98	38·85	9·82	7·85	3·88	0·38	60·78	0·25	5·31
4	9·18	79·34	—	0·30	88·82	19·39	4·64	3·61	0·91	—	28·55	—	2·00
5	10·16	70.05	—	0·10	80·31	14·88	5·11	11·90	1·97	—	33·86	—	4·00
6	6·72	88·18	—	—	94·90	19·91	2·67	4·53	0·55	—	27·66	—	2·71
7	6·04	79·81	0·08	1·00	86·93	14·95	12·09	4·61	—	—	31·65	—	2·54
8	3·19	83·54	—	—	86·73	20·42	2·62	2·01	3·37	—	28·42	—	3·00
Total	57·33	632·68	0·56	2·10	692·67	165·71	48·66	42·03	12·17	0·49	269·06	0·42	25·52

* These groups have the same aereages and the same number of farms as in Table No. C. 1.

TABLE No. C.4—(Contd.)

Cuttack District: Distribution of the net cultivated area in the sample farms classified by the size (area in acres) of their cultivated holdings, under different crops (during 1954-5)

*Groups**	*Sugarcane*	*Tobacco*	*Potato*	*Vegetables*	*Pan groves*	*Total*	*Orchards and others*	*Gross cropped area*	*Fallow*	*Area cropped more than once*	*Net cultivated area*	*Area irrigated during the current year*	
												Net	*Gross*
1	—	—	0·16	0·16	—	46·21	—	46·21	1·22	16·90	30·53	14·90	21·52
2	0·08	—	0·59	0·17	—	139·22	0·65	139·87	0·68	44·94	95·61	53·46	72·76
3	0·10	—	0·19	—	—	201·61	0·94	202·55	2·27	61·64	143·18	72·08	91·96
4	—	0·06	0·08	—	0·11	119·62	0·27	119·89	1·56	28·66	92·79	42·52	50·10
5	0·10	—	0·20	—	—	118·47	0·05	118·52	2·94	36·56	84·90	33·13	41·48
6	0·11	—	0·52	—	—	125·90	0·88	126·78	3·86	29·27	101·37	52·20	66·09
7	0·04	0·10	—	—	—	121·26	0·33	121·59	0·65	31·77	90·47	37·57	45·57
8	0·10	0·05	—	—	—	118·30	0·11	118·41	7·84	28·52	97·73	18·53	18·53
Total	0·53	0·21	1·74	0·33	0·11	990·59	3·23	993·82	21·02	278·26	736·58	324·39	407·91

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.5

Cuttack District: Total farm and other assets and outstanding debts of sample farms classified by the size (area in acres) of their cultivated holdings (during 1954-5)

Part I (*Value in Rs.*)

Groups*	Farm assets					Other assets					Grand total value of assets	Outstanding debts	
	Land		Value of implements	Value of livestock	Total Value	Value of homestead land	Value of houses	Value of non-farm implements	Other financial assets	Total value		Value	% of farm assets
	area	value											
1	26·86	20,726 (87·18%)	369 (1·55%)	2,679 (11·27%)	23,774 (100%)	1,355	21,705	—	—	23,060	46,834	2,888	12·15
2	72·60	59,931 (88·36%)	971 (1·43%)	6,923 (10·21%)	67,825 (100%)	3,936	33,770	270	220	38,196	106,021	5,162	7·61
3	104·53	76,641 (90·65%)	951 (1·13%)	6,953 (8·22%)	84,545 (100%)	2,062	31,905	—	—	33,967	118,512	7,411	8·77
4	64·45	42,847 (88·75%)	777 (1·61%)	4,656 (9·64%)	48,280 (100%)	585	16,915	33	1,000	18,533	66,813	3,433	7·11
5	71·63	45,117 (89·80%)	703 (1·40%)	4,419 (8·80%)	50,239 (100%)	643	17,045	—	—	17,688	67,927	2,498	4·97
6	73·58	44,002 (88·08%)	863 (1·73%)	5,092 (10·19%)	49,957 (100%)	472	17,225	—	—	17,697	67,654	3,180	6·37
7	71·41	31,401 (87·24%)	833 (2·32%)	3,759 (10·44%)	35,993 (100%)	906	12,170	—	—	13,076	49,069	3,033	8·43
8	83·73	43,954 (89·54%)	302 (0·62%)	4,831 (9·84%)	49,078 (100%)	215	9,550	—	—	9,765	58,843	3,996	8·14
Total	568·79	364,610 (89·00%)	5,769 (1·41%)	39,312 (9·59%)	409,691 (100%)	10,174	160,285	303	1,220	171,982	581,673	31,601	7·71

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.5—(Contd.)

Cuttack District: Total farm and other assets and outstanding debts of sample farms classified by the size (area in acres) of their cultivated holdings (during 1954-5)

Part II (per farm) *(Value in Rs.)*

Groups*	Farm assets					Other assets					Grand total value of assets	Outstanding debts	
	Land (own)		Value of implements	Value of livestock	Total value	Value of homestead land	Value of houses	Value of non-farm implements	Other financial assets	Total value		Value	% of farm assets
	Area	Value											
1	0·49	376·84	6·71	48·71	432·26	24·64	394·63	—	—	419·27	851·53	52·51	12·15
2	1·10	908·05	14·71	104·89	1,027·65	59·64	511·67	4·09	3·33	578·73	1,606·38	78·21	7·61
3	1·80	1,321·39	16·40	119·88	1,457·67	35·55	550·09	—	—	585·64	2,043·31	127·78	8·77
4	2·39	1,586·93	28·78	172·44	1,788·15	21·67	626·48	1·22	37·04	686·41	2,474·56	127·15	7·11
5	3·77	2,374·58	37·00	232·58	2,644·16	33·84	897·11	—	—	930·95	3,575·11	131·47	4·97
6	4·33	2,588·35	50·77	299·53	2,938·65	27·76	1,013·24	—	—	1,041·00	3,979·65	187·06	6·37
7	6·49	2,854·63	75·73	341·73	3,272·09	82·36	1,106·37	—	—	1,188·73	4,460·82	275·73	8·43
8	11·96	6,277·86	43·14	690·14	7,011·14	30·71	1,364·29	—	—	1,395·00	8,406·14	570·86	8·14
Total	2·19	1,402·34	22·19	151·20	1,575·73	39·13	616·48	1·17	4·69	661·47	2,237·20	121·54	7·71

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.6

Cuttack District: The number and value of different kinds of livestock on the sample farms classified by the size (area in acres) of their cultivated holdings (at the beginning of 1954-5)

Part I (*Value in Rs.*)

Groups*	Draught cattle		Milch cattle		Calves		Value of other livestock	Total value of livestock	Number of families with draught animals			
	No.	Value	No.	Value	No.	Value			Nil	One	Two	More than two
1	19	992	21	605	40	934	148	2,679	37	17	1	—
2	75	4,464	42	1,608	48	675	176	6,923	8	41	17	—
3	86	4,693	53	1,425	39	657	178	6,953	4	23	30	1
4	50	3,071	38	1,164	26	349	72	4,656	—	4	23	—
5	38	2,960	25	1,037	24	352	70	4,419	—	2	15	2
6	35	3,108	35	1,336	29	440	208	5,092	—	3	11	3
7	33	3,111	21	397	13	169	82	3,759	—	1	2	8
8	28	3,254	28	1,458	11	119	—	4,831	—	—	1	6
Total	364	25,653	263	9,030	230	3,695	934	39,312	49	91	100	20

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.6—(Contd.)

Cuttack District: The number and value of different kinds of livestock on the sample farms classified by the size (area in acres) of their cultivated holdings (at the beginning of 1954-5)

Part II (per farm, per acre) *(Value in Rs.)*

Groups*	Per farm			Per acre of net cultivated area		
	Draught cattle	Milch cattle	Other livestock	Draught cattle	Milch cattle	Other livestock
1	0·35	1·11	0·75	0·62	2·00	1·34
2	1·17	1·44	0·36	0·81	0·99	0·25
3	1·34	1·71	0·59	0·54	0·69	0·24
4	1·89	2·30	0·56	0·55	0·67	0·16
5	2·00	2·79	0·68	0·45	0·62	0·15
6	2·23	3·76	1·24	0·37	0·63	0·21
7	2·91	3·00	1·64	0·35	0·36	0·20
8	4·00	6·43	—	0·29	0·46	—
Total	1·39	1·97	0·64	0·49	0·70	0·23

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.7

Cuttack District: The purchase, sale, death, birth, etc. of different kinds of livestock on the sample farms, arranged by size in acres, (during the year and the number at the end of 1954-5)

(Value in Rs.)

Groups*	Purchase							Sale						
	Draught cattle		Milch cattle and calves		Other livestock		Total value	Draught cattle		Milch cattle and calves		Other livestock		Total value
	No.	Value	No.	Value	No.	value		No.	Value	No.	Value	No.	Value	
1	4	185	—	—	2	25	210	3	182	4	70	3	50·50	302·50
2	19	1,387	2	24	—	—	1,411	14	590	1	20	—	—	610·00
3	11	586	—	—	—	—	586	16	751	2	94	1	50·00	895·00
4	4	211	—	—	—	—	211	2	166	3	19	—	—	185·00
5	6	663	—	—	3	19	682	6	317	1	120	—	—	437·00
6	3	285	—	—	—	—	285	—	—	3	78	—	—	78·00
7	2	125	—	—	—	—	125	1	10	—	—	—	—	10·00
8	—	—	2	70	—	—	70	—	—	—	—	—	—	—
Total	49	3,442	4	94	5	44	3,580	42	2,016	14	401	4	100·50	2,517·50

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.7—(Contd.)

Cuttack District: The purchase, sale, death, birth, etc. of different kinds of livestock on the sample farms, arranged by size in acres, (during the year and the number at the end of 1954-5)

(Value in Rs.)

Groups*	Death and disposal							Birth and acquiring					Total No. at the end of the year		
	Draught cattle		Milch cattle and calves		Other livestock		Total value	No. of draught cattle	Milch cattle and calves		No. of other livestock	Total value	Draught cattle	Milch cattle and calves	Other livestock
	No.	Value	No.	Value	No.	Value			No.	Value					
1	1	15	2	9	2	—	24·00	—	6	22	7	22·00	19	61	41
2	3	65	4	170	1	4·00	239·00	—	8	5	3	5·00	77	95	24
3	3	90	3	45	1	2·50	137·50	—	12	—	5	—	78	99	34
4	1	20	1	60	3	2·50	82·50	—	2	—	—	—	51	62	15
5	—	—	1	25	1	22·00	47·00	—	6	—	1	—	38	53	13
6	—	—	3	25	5	32·50	57·50	—	6	—	1	—	38	64	21
7	2	111	3	12	—	—	123·00	—	2	—	1	—	32	33	18
8	—	—	6	40	—	—	40·00	—	10	—	—	—	28	45	—
Total	10	301	23	386	13	63·50	750·50	—	52	27	18	27·00	361	512	166

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.8

Cuttack District: Livestock produce and sale on sample farms classified by the size in acres (during 1954-5)

Groups †	Milk				Milk Products		Eggs, etc.	
	Total produced		Total sold		Total produced	Total sold	Total produced	Total sold
	Quantity in maunds	Value (in Rs.)	Quantity in maunds	Value (in Rs.)	(in Rs.)	(in Rs.)	(in Rs.)	(in Rs.)
1	9·09	186·75 (28·78%)	—	—	1·25 (0·19%)	—	13·75 (2·12%)	11·25 (81·82)*
2	64·44	1,035·00 (46·01%)	38·70	626·62 (60·54%)*	194·50 (8·64%)	146·00 (75·06%)*	0·25 (0·01%)	—
3	20·30	366·75 (23·71%)	7·31	132·50 (36·13%)*	103·25 (6·68%)	42·50 (41·16%)*	8·12 (0·53%)	—
4	17·20	272·50 (22·25%)	—	—	266·62 (21·77%)	114·00 (42·76%)*	1·25 (0·10%)	—
5	27·63	438·50 (41·89%)	3·33	56·50 (12·88%)*	33·50 (3·20%)	18·62 (55·61%)*	—	—
6	66·49	946·25 (51·92%)	23·03	368·75 (38·97%)*	215·37 (11·82%)	138·12 (64·13%)*	—	—
7	13·02	230·00 (29·67%)	3·00	60·00 (26·09%)*	101·00 (13·03%)	16·00 (15·84%)*	13·50 (1·74%)	9·37 (69·48%)*
8	58·73	733·44 (54·56%)	16·76	216·87 (29·57%)*	140·62 (10·46%)	135·62 (96·44%)*	—	—
Total	276·90	4,209·19 (39·49%)	92·13	1,461·24 (34·72%)*	1,056·11 (9·91%)	610·86 (57·84%)*	36·87 (0·35%)	20·62 (55·93%)*

* Percentage shown below the sold value is the proportion of total produce of the particular commodity.

† These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.8—(Contd.)

Cuttack District: Livestock produce and sale on sample farms classified by the size in acres (during 1954-5)

Groups †	Farmyard manure		Dung cakes		Hides, etc.		Total		
	Total produced (in Rs.)	Total sold (in Rs.)	Total produced (in Rs.)	Total sold (in Rs.)	Total produced (in Rs.)	Total sold (in Rs.)	Total produced (in Rs.)	Total sold (in Rs.)	Total Balance (in Rs.)
1	261·25 (40·25%)	10·00 (3·83%)*	166·00 (25·58%)	—	20·00 (3·08%)	20·00 (100%)*	649·00 (100%)	41·25 (6·36%)*	607·75
2	543·25 (24·14%)	—	477·00 (21·20%)	25·00 (5·24%)*	—	—	2,250·00 (100%)	797·62 (35·45%)*	1,452·38
3	549·25 (35·51%)	10·00 (1·82%)*	519·25 (33·57%)	—	—	—	1,546·62 (100%)	185·00 (11·96%)*	1,361·62
4	373·50 (30·49%)	—	311·00 (25·39%)	—	—	—	1,224·87 (100%)	114·00 (9·31%)*	1,110·87
5	283·19 (27·06%)	—	291·50 (27·85%)	—	—	—	1,046·69 (100%)	75·12 (7·18%)*	971·57
6	383·75 (21·06%)	—	277·00 (15·20%)	7·50 (2·71%)*	—	—	1,822·37 (100%)	514·37 (28·23%)*	1,308·00
7	252·37 (32·56%)	—	178·25 (23·00%)	—	—	—	775·12 (100%)	85·37 (11·01%)*	689·75
8	186·81 (13·89%)	—	283·50 (21·09%)	7·50 (2·65%)*	—	—	1,344·37 (100%)	359·99 (26·78%)*	984·38
Total	2,833·37 (26·58%)	20·00 (0·71%)*	2,503·50 (23·48%)	40·00 (1·60%)*	20·00 (0·19%)	20·00 (100%)	10,659·04 (100%)	2,172·72 (20·38%)	8,486·32

* Percentage shown below the sold value is the proportion of total produce of the particular commodity.

†These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.9

Cuttack District : Value of farm implements, their sale and purchase on sample farms classified by size in acres (during 1954-5)

(*Value in Rs.*)

*Groups**	*Value of implements at the beginning of the year*	*Value of implements per farm*	*Value of implements purchased during the year*	*Value of implements sold during the year*	*Value of implements discarded as useless during the year*
1	369	6·71	186·94	0·62	26·94
2	971	14·71	390·19	—	58·19
3	951	16·40	436·00	—	67·50
4	777	28·78	224·00	—	31·81
5	703	37·00	274·69	—	37·87
6	863	50·77	205·50	—	59·00
7	833	75·73	152·25	0·75	48·75
8	302	43·14	74·12	—	2·94
Total	5,769	22·19	1,943·69	1·37	333·00

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.10

Cuttack District: Investment and disinvestment on sample farms classified by size in acres (during 1954-5)

Part I (Investment) *(Value in Rs.)*

*Groups**	*Total purchase of land*		*Permanent improvements to land*	*Purchase of live-stock*	*Purchase of implements*	*Total of columns 1 to 4*	*Construction or purchase of houses*	*Purchase of ornaments*	*Purchase of other financial assets*	*Repayments of debts*	*Advancing loans*	*Total of columns 6 to 10*	*Grand total of all items*
	Area (acres)	*Value (Rs.)*											
	1		2	3	4	5	6	7	8	9	10	11	12
1	0·45	306·00	22·00	210·00	186·94	724·94	500·00	138·00	—	165·31	—	803·31	1,528·25
2	0·89⅓	503·00	22·50	1,411·00	390·19	2,326·69	659·00	418·25	—	487·62	30·00	1,594·87	3,921·56
3	1·49½	845·00	106·87	586·00	436·00	1,973·87	1,590·00	213·50	—	1,206·69	—	3,010·19	4,984·06
4	1·57	710·00	94·50	211·00	224·00	1,239·50	534·00	350·00	—	218·75	—	1,102·75	2,342·25
5	2·20	2,250·00	64·00	682·00	274·69	3,270·69	700·00	482·50	—	73·56	—	1,256·06	4,526·75
6	0·02	150·00	370·00	285·00	205·50	1,010·50	250·00	345·00	—	910·00	—	1,505·00	2,515·50
7	0·28	250·00	33·25	125·00	152·25	560·50	—	—	—	10·50	—	10·50	571·00
8	—	—	36·00	70·00	74·12	180·12	—	765·00	—	200·00	—	965·00	1,145·12
Total	6·91	5,014·00	749·12	3,580·00	1,943·69	11,286·81	4,233·00	2,712·25	—	3,272·43	30·00	10,247·68	21,534·49

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.10—(Contd.)

Cuttack District: Investment and disinvestment on sample farms classified by size in acres (during 1954-5)

Part II (Disinvestment)

(Value in Rs.)

*Groups**	*Sale of land*		*Sale of livestock*	*Sale of implements*	*Total of columns 1 to 3*	*Sale of houses*	*Sale of ornaments*	*Sale of other financial assets*	*Recovery of loans*	*Other disinvestments*	*Incurring new debts*	*Total of columns 5 to 10*	*Grand total of all items*
	Area (acres)	*Value (Rs.)*											
	1		2	3	4	5	6	7	8	9	10	11	12
1	0·12	60·00	302·00	0·62	363·12	—	50·00	—	—	—	1,365·50	1,415·50	1,778·62
2	0·20	100·00	610·00	—	710·00	—	136·00	—	220·00	—	1,655·25	2,011·25	2,721·25
3	0·44	105·00	895·00	—	1,090·00	—	—	—	—	—	1,876·00	1,876·00	2,966·00
4	0·34½	770·00	185·00	—	955·00	—	—	—	—	—	833·50	833·50	1,788·50
5	0·98	1,058·00	437·00	—	1,495·00	—	—	—	—	—	990·00	990·00	2,485·00
6	0·52½	175·00	78·00	—	253·00	—	—	—	—	—	984·00	984·00	1,237·00
7	—	—	10·00	0·75	10·75	—	—	—	—	—	448·00	448·00	458·75
8	0·30	400·00	—	—	400·00	—	—	—	—	—	440·00	440·00	840·00
Total	2·91	2,758·00	2,517·50	1·37	5,276·87	—	186·00	—	220·00	—	8,592·25	8,998·25	14,275·12

* These groups have the same acreages and the same number of farms as in Table No. C. 1.

TABLE No. C.10—(Contd.)

Cuttack District: Investment and disinvestment on sample farms classified by size in acres (during 1954-5)

Part III (Investment and disinvestment) *(Value in Rs.)*

*Groups**	*Total investment in physical assets of farm*	*Total investment in houses*	*Total investment in ornaments and others, etc.*	*Total repayment of debts*	*Total investments*	*Total disinvestment in physical assets of farm*	*Total disinvestment in houses*	*Total disinvestment in ornaments and others, etc.*	*Total new debts incurred*	*Total disinvestments*	*Net investment or disinvestment*
1	724·94	500·00	138·00	165·31	1,528·25	363·12	—	50·00	1,365·50	1,778·62	− 250·37
2	2,326·69	659·00	448·25	487·62	3,921·56	710·00	—	356·00	1,655·25	2,721·25	+ 1,200·31
3	1,973·87	1,590·00	213·50	1,206·69	4,984·06	1,090·00	—	—	1,876·00	2,966·00	+ 2,018·00
4	1,239·50	534·00	350·00	218·75	2,342·25	955·00	—	—	833·50	1,788·50	+ 553·75
5	3,270·69	700·00	482·50	73·56	4,526·75	1,495·00	—	—	990·00	2,485·00	+ 2,041·75
6	1,010·50	250·00	345·00	910·00	2,525·50	253·00	—	—	984·00	1,237·00	+ 1,278·50
7	560·50	—	—	10·50	571·00	10·75	—	—	448·00	458·75	+ 112·25
8	180·12	—	765·00	200·00	1,145·12	400·00	—	—	440·00	840·00	+ 305·12
Total	11,286·81	4,233·00	2,742·25	3,272·43	21,534·49	5,275·87	—	406·00	8,592·25	14,275·12	+ 7,259·37

* These groups have the same acreages and the same number of farms as in Table No. C. 1.
+ Where the investment is more than disinvestment.
− Where the disinvestment is more than investment.

PURI

Puri : Of the twenty sample grids in the delta, seven were in Puri district. In all 140 farms selected as in Sambalpur and Cuttack were surveyed. The analysis that follows relates to these 140 farms and the data are for the year 1954-5

Size of Holdings : Table No. P. 1 presents data regarding the area of owned, cultivated, etc. land on sample farms in Puri. The average size of cultivated holding was a little larger than in Cuttack, 3·68 acres. Nearly two-thirds of the cultivators, however, had less than four acres of land. Farmers with less than one, one to two and two to three acres were more or less the same in number and accounted for 55 per cent of the total. These, in short, were the more dominant size groups. The smaller cultivators (having less than four acres), however, cultivated only about one-third of the total cultivated land, whereas the bigger one-third of the cultivators cultivated the remaining two-thirds. Cultivators with more than ten acres of cultivated land each, cultivated over one-fifth of the total land.

Tenancy was more prevalent here than in the Cuttack – part of the delta. A little less than one-third of the total cultivated land was reported to be leased in, whereas hardly two per cent of the total owned land was leased out. Excepting the last two groups of biggest cultivators, most others had more than this proportion of their total cultivated land leased in.

In this connection one special feature of the region might be noted here. In Puri, joint cultivation was practised to a greater extent than in the other two regions. For a particular plot of land a number of cultivators came together and put in the labour and incurred expenses proportionately and shared the produce in the same proportion. Therefore, one farmer may be a partner with a varying number of other farmers for different plots and he might be jointly cultivating with them. For the purpose of analysis here all plots of land, in which the sample cultivator had any share in cultivation were considered as part of his cultivated holding and the expenses contributed by the other partners were included in costs while their receipts were included in the rent payments of sample farmers.

Family Members : Table No. P. 2 gives a classification of the members of the sample farm families by age, sex and occupation . The average size of farm family was reported to be 5·5 . Generally speaking, the size of family increased with increase in the size of the farm.

The proportion of earners to total family members went on diminishing as the size of holding increased. This was mainly due to the rapid decline in the number of female earners with an increase in the size of the farm.

Most of the earners were full-time workers either in agriculture or in casual labour. The proportion of workers working on their own farms (or on their own) increased as the size of the farm increased. And the proportion reporting wage employment as the main occupation decreased as farm size increased. The proportion of earners with subsidiary occupations to total earners generally decreased as the size of the farm increased.

Very few migrants to outside places for work during the year were reported.

Land Utilization : All land held for cultivation was not cropped during the year. Fallow land, however, accounted for only two per cent of the total (Table No. P. 3).

About 65 per cent of the gross cropped area was reported to be under paddy, about six per cent under *Beali* paddy and the rest under *Sarad* (Table No. P. 4). Pulses were next in importance, occupying about 20 per cent of the gross cropped area. *mug* and *kulthi* were the main pulses. Though the acreage under potato and sugarcane, as also vegetables, was very small, almost every size-group reported some land under these crops. Orchard crops like coconut and *pan* (betel leaf) were grown to a considerable extent in the coastal areas of Puri. The area under these accounted for less than one per cent of the gross cropped area. Most of the area under coconut was reported by the bigger cultivators. Nearly 31 per cent of the gross cropped area was cropped more than once. Most of this land was put under pulses which were grown as catch crops on paddy land after paddy was harvested.

There was no canal irrigation in this region . The total area irrigated constituted about 2·85 per cent of the net cultivated area. All this was through lift irrigation, wells and streams or rivers being the sources of supply. Though all crops like potato, sugarcane, vegetables, *pan*, etc. were irrigated they occupied only one-third of the total irrigated area. The rest of the gross irrigated area was put under paddy.

Assets : The average value of farm assets, taking land, livestock, farm implements and shares in co-operative societies, etc. into account, was reported to be about Rs. 1276 per farm (Tables No. P. 5 and P.6). Nearly 80 per cent of this was owned land, about 10 per cent livestock and the remaining farm implements and other assets. The value of livestock and implements per farm went on increasing as the size of holding increased indicating the larger requirement of both these with increasing farm size. But cattle or implements per cultivated acre decreased as the size of holding became larger. This was, however, up to a point only. Holdings with seven acres or more of land again showed an increased stock of cattle and implements.

The farmers had certain liabilities too. The total outstanding debt summed these up. Comparing the two figures we find that outstanding debt was only about eight per cent of the total value of farm assets.

Land values in Puri were reportedly lower than in Cuttack. The value of land per acre was put at Rs. 430 in Puri as against about Rs. 530 in Cuttack. The greater pressure on land in Cuttack, the greater liability of lands to floods in Puri, etc. might to a certain extent account for this. The average value of a residential house was put at Rs. 544 only.

Livestock : The average value of livestock owned per family was Rs. 412 (Table No. P. 7). Most of this was on account of bullocks which were the highest priced animals. Leaving the young ones aside, there were more bullocks

than cows with the farmers. The average value of a bullock was put at Rs. 54 whereas the average value of a cow was a little over Rs. 21 only, and that of a calf between Rs. 12 and Rs. 13.

The bigger cultivators had more bullocks and cows per farm. On the other hand, the number of bullocks per acre of cultivated land went on diminishing as the size of cultivated holding increased, illustrating the nature of the economic overhead. The cultivators with less than four acres of land, had less than a pair of bullocks on an average. Indeed only 36 of them had a pair or more, 36 had only one and 21 farms had no bullocks at all. None of the bigger cultivators were without bullocks.

Most of the bullocks were 'purchased', the purchased bullocks accounting for 90 per cent of the total (Table No. P. 7). The reason for this extraordinarily high rate of purchase was the same as in Cuttack. It is, however, difficult to know how many were real purchases and how may essentially exchanges with others. During the year, 15 bullocks were sold and 8 died, whereas 25 were reported as purchased. The sales as well as purchases mostly took place during the *rabi* season (roughly January to June) which was for this region an off season for agriculture. Most of the purchases as also sales were reported by the smaller cultivators. The average purchase value of a bullock was about Rs. 65 whereas the average sale value was reported to be Rs. 35 only. There was also some sale and purchase of milch cattle, 10 purchased and eight sold. The purchases, however, equalled sales, dead ones being mostly replaced through births.

The number of bullocks purchased constituted about 11 per cent of the total number of bullocks. The value of these purchases formed about eight per cent of the total reported value of bullocks.

Receipts from Livestock : The farmers, besides using the farm bullocks for work on farm , got milk, eggs, etc. from other livestock. Table No. P. 8 indicates that farmyard manure and dungcakes accounted for three-fourths of the total value of livestock products. Milk and milk products accounted for the rest. Dungcakes were used entirely as fuel for domestic use, and only about 10 per cent of the farmyard manure was sold, the rest being used on the farm itself. On the other hand, nearly 40 per cent of milk and milk products were sold. The smaller cultivators sold a larger part of the milk, the larger ones consuming the bulk at home. Only about 10 per cent of the total livestock produce was marketed.

It would, however, be incorrect to maintain that the milch cattle was maintained for 'dairy business'. The average yield of milk per cow during the year was reported to be about 22·4 seers only. The feed and fodder expenses on milch cattle were equally ridiculously low. The average expenses per cow (including calves) came to Rs. 4 per annum (or if we assume the expenditure on account of the calves to be nil it came to Rs. 7 per annum). It is no wonder an average cow cost only Rs. 22-23. The cows were there because keeping them cost practically nothing and farmers got a little milk, besides farmyard manure.

Farm Implements : The average value of farm implements per farm was Rs. 43·5 only (Table No. P. 9). The annual purchases of farm implements per farm were reported to be about Rs. 6 only. This constituted 14 per cent of the total value of implements. This sum might be considered as the cost of depreciation since there was hardly any new addition, and most expenses were incurred for replacements.

Investment and Disinvestment : Table No. P. 10 presents data regarding the investment and disinvestment on sample farms in Puri in 1954-5. A little less than half the total investment into physical assets of the farm was in land. Nearly a fifth of the total amount was in making improvements in the land and the remaining in the purchase of land which was more a transfer expenditure than an investment for the region as a whole. About 32 per cent of the remaining investment was on implements and the rest on livestock.

Sale of land, livestock or implements was less than the purchase of these items. And consequently there was a net investment of over Rs. 3800 on the whole. This, however, could not be considered as net investment in the sense of net additions to capital assets. In case of purchase or sale of land as we saw, it is a transfer expense. In the case of expenditure on implements or livestock it was more likely to be replacement expenditure.

If one adds investment and disinvestment expenses on household account, like construction, etc. of houses or purchase or sale of ornaments, the net investment by the farmers appears larger than before. But the same difficulty can be raised with regard to house construction. It was not clear how much of it was major repair and replacement expenditure and how much of it net addition to this asset in the region.

When financial investment and disinvestment items like repayments and borrowings were taken into account, the net investment figure becomes negligible.

It, therefore, appears that there was hardly any investment activity here worth the name.

TABLE NO. P.1

Puri District: Distribution of sample farms according to area (in acres) cultivated, owned, etc., (during 1954-5)

Groups	Area	Farms		Cultivated area						Total owned area			Average land revenue payable per acre (Rs.)
				Total		Owned		Leased in		Average size cultivated holding			
		No.	% of the total	Area	% of the total	Area	% of the net cultivated	Area	% of the net cultivated		Area	Out of this leased out	
1	Less than 1·00	26	18·57	16·04	3·12	8·04	50·12	8·00	49·88	0·62	9·08	1·04	2·30
2	1 to 1·99	28	20·00	41·70	8·10	31·74	76·12	9·96	23·88	1·49	32·20	0·46	2·84
3	2 to 2·99	23	16·43	55·81	10·85	32·55	58·32	23·26	41·68	2·43	37·94	5·39	2·57
4	3 to 3·99	16	11·43	54·88	10·67	32·98	60·10	21·90	39·90	3·43	33·23	0·25	1·86
5	4 to 4·99	14	10·00	60·49	11·76	28·02	46·32	32·47	53·68	4·32	28·02	—	1·81
6	5 to 6·99	13	9·29	76·76	14·92	51·41	66·98	25·35	33·02	5·90	51·41	—	2·41
7	7 to 9·99	12	8·57	99·22	19·28	69·89	70·44	29·33	29·56	8·27	70·89	1·00	2·98
8	10 and above	8	5·71	109·64	21·30	93·31	85·11	16·33	14·89	13·71	97·48	4·17	1·99
	Total	140	100%	514·54	100%	347·94	67·62	166·60	32·38	3·68	360·25	12·31	2·36

TABLE NO. P.2

Puri District: Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families.

Groups*	Family members			Male members		Female members		Male earners		Female earners		Total earners		
	Male	Female	Total	Adult	Non-Adult	Adult	Non-Adult	Adult	Non-Adult	Adult	Non-Adult	Male	Female	Total
1	56	60	116	35	21	43	17	33	5	15	—	38	15	53
2	55	57	112	36	19	42	15	35	—	7	—	35	7	42
3	53	53	106	35	18	37	16	30	3	6	1	33	7	40
4	48	46	94	30	18	34	12	30	1	4	—	31	4	35
5	35	41	76	26	9	29	12	26	1	2	—	27	2	29
6	45	37	82	31	14	31	6	28	—	2	—	28	2	30
7	40	50	90	30	10	34	16	25	—	—	—	25	—	25
8	47	42	89	28	19	30	12	25	—	—	—	25	—	25
Total	379	386	765	251	128	280	106	232	10	36	1	242	37	279

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.2—(Contd.)

Puri District : Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families.

Groups*	Male adult earners' occupations					Female adult earners' occupations					Non-adult earners' occupations		
	Agriculture		Labour		Other occupations	Agriculture		Labour		Other occupations	Agriculture	Labour	Other occupations
	Full-time	Part-time	Agriculture	Non-agriculture		Full-time	Part-time	Agriculture	Non-agriculture				
1	8	1	19	2	3	—	1	6	1	7	—	—	3
2	15	1	10	—	9	—	1	1	—	5	—	—	—
3	21	1	2	—	6	—	3	—	—	3	1	1	2
4	21	1	3	—	6	—	—	1	—	3	1	—	2
5	24	2	2	—	—	2	—	—	—	—	—	—	1
6	25	—	—	—	2	—	—	—	—	—	—	—	—
7	15	—	—	—	8	—	—	—	—	2	—	—	—
8	22	—	—	—	3	—	—	—	—	—	—	—	—
Total	151	6	36	2	37	2	5	8	1	20	2	1	8

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.2—(Contd.)

Puri District : Distribution of members of sample farm families by sex, age, main and subsidiary occupation, classified by the size of the cultivated holdings of the families.

Groups*	Male adult earners with subsidiary occupations				Female adult earners with subsidiary occupations				Number of migrants for work during the part of the year	Number of attached farm servants
	Agriculture	Labour		Other occupations	Agriculture	Labour		Other occupations		
		Agriculture	Non-Agriculture			Agriculture	Non-Agriculture			
1	23	5	—	—	1	—	—	—	—	—
2	15	7	—	8	—	—	—	1	1	—
3	6	15	—	3	—	—	—	—	—	2
4	6	13	—	3	—	—	—	—	1	1
5	2	13	—	—	—	2	—	—	—	1
6	2	8	—	5	—	—	—	—	—	3
7	5	5	—	2	—	—	—	—	—	6
8	1	—	3	—	—	—	—	—	—	9
Total	60	66	3	21	1	2	—	1	2	22

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE NO. P.3

Puri District: Reported reasons for the cultivated land (area in acres) in the sample remaining fallow (during 1954-5)

Groups*	Total fallow	Reasons for fallow							
		Due to seasonal vagaries	Lack of money	Ditch or pool etc.	Sandy	High and stony	Low land	Others	Reasons not stated
1	0·14	—	—	—	—	—	—	—	0·14
2	0·56	—	—	0·03	—	0·14	—	0·23	0·16
3	2·13	0·40	0·18	0·06	—	0·19	—	—	1·30
4	1·43	—	—	—	—	—	—	—	1·43
5	1·45	—	—	0·04	—	—	—	—	1·41
6	2·69	—	—	0·05	0·12	—	—	0·12	2·40
7	0·91	—	—	0·15	—	—	—	0·35	0·41
8	4·23	—	—	0·08	2·11	—	0·32	—	1·72
Total	13·54	0·40	0·18	0·41	2·23	0·33	0·32	0·70	8·97

*These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE NO. P.4

Puri District: Distribution of the net cultivated area in the sample farms classified by the size (area in acres) of their cultivated holdings under different crops (during 1954-5)

Groups*	Beali paddy	Sarad paddy	Other cereals	Total cereals	Green gram	Black gram	Kulthi	Chana	Total pulses and grams	Oil seeds and condiments and spices	Sugarcane	Potato
1	1·64	13·93	—	15·57	3·88	1·25	2·81	0·17	8·11	—	0·06	—
2	4·56	35·96	—	40·52	9·89	2·29	6·27	—	18·45	0·17	0·55	0·21
3	5·82	47·12	—	52·94	12·34	1·45	8·85	—	22·64	0·64	—	0·32
4	5·69	45·57	0·60	51·86	12·68	3·01	8·04	—	23·73	0·14	0·32	0·14
5	7·45	51·10	0·18	58·73	14·15	4·29½	12·49	—	30·93½	2·10½	0·08	0·43
6	3·71	68·04	—	71·75	7·83	1·70½	11·98	0·04	21·55½	2·90½	—	0·06
7	7·46	89·26	—	96·72	29·47	6·70	15·48	—	51·65	0·11	—	—
8	12·29	89·75	0·25	102·29	20·43	4·70	14·51	—	39·64	—	0·24	1·21
Total	48·62	440·73	1·03	490·38	110·67	25·40	80·43	0·21	216·71	6·07	1·25	2·37

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.4—(Contd.)

Puri District : Distribution of the net cultivated area under different crops in the sample farms classified by size (area in acres) during 1954-5

*Groups**	*Vegetables*	*Pan groves*	*Total*	*Orchards and others*	*Gross cropped area*	*Fallow*	*Area cropped more than once*	*Net cultivated area*	*Area irrigated during the current year*	
									Net	*Gross*
1	0·11	—	23·85	—	23·85	0·14	7·95	16·04	0·17	0·17
2	0·32	0·04	60·26	0·03	60·29	0·56	19·15	41·70	1·71	1·71
3	0·07	—	76·61	0·35	76·96	2·13	23·28	55·81	0·61	1·03
4	—	—	76·19	0·27	76·46	1·43	23·01	54·88	0·98	1·26
5	0·23	—	92·51	—	92·51	1·45	33·47	60·49	2·12	2·41
6	0·08	—	96·35	1·68	98·03	2·69	23·96	76·76	0·65	0·65
7	—	0·43	148·91	1·05	149·96	0·91	51·65	99·22	3·10	3·10
8	0·40	—	143·78	3·00	146·78	4·23	41·37	109·64	5·34	5·34
Total	1·21	0·47	718·46	6·38	724·84	13·54	223·84	514·54	14·68	15·67

*These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE NO. P.5

Puri District : Total farm and other assets and outstanding debts during 1954-5 of sample cultivators classified by size (area in acres) of their cultivated holdings

Part I (*Value in Rs.*)

Groups*	Farm assets					Other assets					Grand total of assets (value)	Outstanding debts	
	Land		Value of implements	Value of livestock	Total value	Value of homestead land	Value of houses	Value of non-farm implements	Other financial assets	Total value		Value	Per cent of farm assets
	Area	Value											
1	9·08	3,846 (70·39%)	320 (5·86%)	1,298 (23·75%)	5,464 (100%)	291	5,205	—	—	5,496	10,960	2,119	38·78
2	32·20	13,552 (85·12%)	492 (3·09%)	1,877 (11·79%)	15,921 (100%)	135	9,330	76	15	9,556	25,477	1,717	10·78
3	37·94	14,554 (84·95%)	748 (4·37%)	1,830 (10·68%)	17,132 (100%)	518	8,830	68	400	9,816	26,948	1,918	11·20
4	33·23	11,809 (80·59%)	575 (3·92%)	2,270 (15·49%)	14,654 (100%)	751	7,110	—	—	7,861	22,515	1,068	7·29
5	28·02	10,459 (81·99%)	572 (4·49%)	1,725 (13·52%)	12,756 (100%)	515	5,700	20	—	6,235	18,991	2,068	16·21
6	51·41	18,112 (85·61%)	859 (4·06%)	2,186 (10·33%)	21,157 (100%)	534	9,105	—	32	9,671	30,828	825	3·90
7	70·89	31,589 (87·85%)	1,433 (3·99%)	2,936 (8·16%)	35,958 (100%)	1,210	15,750	—	—	16,960	52,918	2,952	8·21
8	97·48	50,938 (92·25%)	1,090 (1·98%)	3,187 (5·77%)	55,215 (100%)	5,898	15,150	—	—	21,048	76,263	2,749	4·98
Total	360·25	154,859 (86·87%)	6,089 (3·42%)	17,309 (9·71%)	178,257 (100%)	9,852	76,180	164	447	86,643	2,64,900	15,416	8·65

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.5—(Contd.)

Puri District : Total farm and other assets and outstanding debts during 1954-5 *of sample cultivators classified by size (area in acres) of their cultivated holdings*

(Value in Rs.)

Part II (Per farm)

*Groups**	*Farm assets*					*Other assets*					*Grand Total of assets (value)*	*Outstanding debts*	
	Land		*Value of implements*	*Value of livestock*	*Total value*	*Value of homestead land*	*Value of houses*	*Value of non-farm implements*	*Other financial assets*	*Total value*		*Value*	*% of farm assets*
	Area	*Value*											
1	0·35	147·92	12·31	49·92	210·15	11·20	200·19	—	—	211·39	421·54	81·50	38·78
2	1·15	484·00	17·57	67·04	568·61	4·82	333·21	2·71	0·54	341·28	909·89	61·32	10·78
3	1·65	632·78	32·52	79·57	744·87	22·52	383·91	2·96	17·39	426·78	1,171·65	83·39	11·20
4	2·08	738·06	35·94	141·88	915·88	46·94	444·37	—	—	491·31	1,407·19	66·75	7·29
5	2·00	747·07	40·86	123·21	911·14	36·79	407·14	1·43	—	445·36	1,356·50	147·71	16·21
6	3·95	1,393·23	66·08	168·15	1,627·46	41·08	700·38	—	2·46	743·92	2,371·38	63·46	3·90
7	5·91	2,632·41	119·42	244·67	2,996·50	100·83	1,312·50	—	—	1,413·33	4,409·83	246·00	8·21
8	12·19	6,367·25	136·25	398·38	6,901·88	737·25	1,893·75	—	—	2,631·00	9,532·88	343·63	4·98
Total	2·57	1,106·13	43·49	123·64	1,273·26	70·37	544·15	1·17	3·19	618·88	1,892·14	110·11	8·65

* These groups have the same acreages and the same number of farms as in Table No. P.I.

TABLE NO. P.6

Puri District: The number and value of different kinds of livestock at the beginning of 1954-5 on the sample farms classified by size (area in acres)

Part I *(Value in Rs.)*

Groups*	Draught cattle		Milch cattle		Calves		Value of other livestock	Total value of livestock	Number of families with draught animal			
	No.	Value	No.	Value	No.	Value			Nil	One	Two	More than two
1	20	726	11	277	12	175	120	1,298	12	10	2	2
2	27	930	20	422	13	184	341	1,877	6	17	5	—
3	37	1,363	14	184	16	209	74	1,830	3	5	14	1
4	29	1,697	17	400	13	131	42	2,270	—	4	11	1
5	28	1,345	8	177	14	198	5	1,725	—	3	8	3
6	28	1,505	24	511	12	132	38	2,186	—	—	11	2
7	27	2,132	26	621	15	177	6	2,936	—	1	8	3
8	27	2,220	28	536	25	301	130	3,187	—	—	2	6
Total	223	11,918	148	3,128	120	1,507	756	17,309	21	40	61	18

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.6—(Contd.)

Puri District: The number and value of different kinds of livestock at the beginning of 1954-5 on the sample farms classified by size (area in acres)

Part II—(Per farm, per acre)

Groups*	Per farm			Per acre of net cultivated area		
	Draught cattle	Milch cattle	Other livestock	Draught cattle	Milch cattle	Other livestock
1	0·69	1·04	0·81	1·12	1·68	1·31
2	1·04	1·11	1·29	0·70	0·74	0·86
3	1·61	1·35	0·65	0·66	0·56	0·27
4	1·88	1·81	0·94	0·55	0·53	0·27
5	2·00	1·64	0·21	0·46	0·38	0·05
6	2·15	2·85	1·00	0·36	0·48	0·17
7	2·33	3·83	0·42	0·28	0·46	0·05
8	3·38	7·13	2·00	0·25	0·52	0·15
Total	1·61	2·01	0·89	0·44	0·55	0·24

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.7

Puri District: The purchase, sale, death, birth, etc. of different kinds of livestock on the sample farms, arranged by size in acres, during and at the end of 1954-5 (Value in Rs.)

Groups*	Purchase							Sale							Death and disposal							Birth and acquiring			Total no. at the end of the year		
	Draught cattle		Milch cattle and calves		Other livestock		Total value	Draught cattle		Milch cattle and calves		Other livestock		Total value	Draught cattle		Milch cattle and calves		Other livestock		Total value	No. of draught cattle	No. of milch cattle and calves	No. of other livestock	Draught cattle	Milch cattle and calves	Other livestock
	No.	Value	No.	Value	No.	Value		No.	Value	No.	Value	No.	Value		No.	Value	No.	Value	No.	Value							
1	3	145	1	14	—	—	159·00	1	25	1	45	—	—	70·00	4	50	1	3	—	—	53·00	—	5	2	18	27	21
2	5	196	1	20	1	0·50	216·50	3	75	2	18	1	2·50	95·50	—	—	4	57	8	3·25	60·25	—	2	9	29	31	36
3	2	126	1	12	—	—	138·00	1	25	2	70	—	—	95·00	1	40	3	20	—	—	60·00	—	1	—	37	31	15
4	7	478	—	—	—	—	478·00	5	345	1	100	—	—	445·00	1	20	2	30	—	—	50·00	—	2	2	30	29	15
5	—	—	3	87	—	—	87·00	—	—	1	39	—	—	39·00	—	—	—	—	—	—	—	—	—	1	28	23	3
6	5	288	—	—	—	—	288·00	4	47	—	—	—	—	47·00	1	15	2	35	—	—	50·00	—	6	2	28	37	13
7	1	100	4	172	—	—	272·00	—	—	1	40	—	—	40·00	—	—	—	—	—	—	—	—	2	—	30	44	5
8	2	280	—	—	—	—	280·00	1	7	—	—	—	—	7·00	1	20	2	27·50	6	48	95·50	—	7	—	27	57	16
	25	1,613	10	305	1	0·50	1,918·50	15	524	8	312	1	2·50	838·50	8	145	14	172·50	14	51·25	368·75	—	25	16	227	279	124

* These groups have the same acreages and the same number of farms as in Table No. P.1.

Groups*	Milk				Milk products		Eggs, etc.	
	Total produced		Total sold		Total produced value	Total sold value	Total produced value	Total sold value
	Quantity in mds.	Value+	Quantity in mds.	Value				
1	1·80	36·00 (8·74%)	1·00	20·00 (55·56%)†	9·00 (2·18%)	4·00 (44·44%)†	—	—
2	23·63	391·69 (39·82%)	12·15	219·75 (56·10%)†	8·00 (0·81%)	8·00 (100%)†	5·94 (0·60%)	—
3	4·33	86·50 (12·71%)	3·93	78·50 (90·75%)†	—	—	6·44 (0·95%)	4·37 (67·86%)
4	11·53	188·75 (25·84%)	5·33	86·25 (45·70%)	—	—	—	—
5	1·93	38·50 (8·11%)	—	—	—	—	—	—
6	2·83	56·62 (8·86%)	—	—	16·00 (2·50%)	—	6·25 (0·98%)	—
7	13·95	231·56 (27·24%)	—	—	—	—	10·44 (1·23%)	—
8	23·15	370·81 (34·86%)	9·85	147·69 (52·24%)	—	—	—	—
Total	83·15	1,400·43 (24·00%)	32·26	552·19 (39·43%)†	33·00 (0·57%)	12·00 (36·36%)†	29·07 (0·50%)	4·37 (15·03%)†

* These groups have the same acreages and the same number of farms as in Table No. P.1.

† Percentage shown below the sold value is the proportion of total produce of the particular commodity.

+ Value is in Rs.

TABLE No. P.8—(Contd.)

Puri District: Livestock produce and sale on sample farms classified by size (in acres) during 1954-5

Groups*	Farmyard manure		Dung cakes		Total		
	Total produced value	Total sold value	Total produced value	Total sold value	Total produced value	Total sold value	Total balance value
1	215·00 (52·19%)	—	152·00 (36·89%)	—	412·00 (100%)	24·00 (5·83%)†	388·00
2	388·00 (39·45%)	18·00 (4·64%)†	190·00 (19·32%)	—	983·63 (100%)	245·75 (24·98%)†	737·88
3	392·00 (57·59%)	9·00 (2·30%)†	195·75 (28·75%)	—	680·69 (100%)	91·87 (13·50%)†	588·82
4	374·50 (51·28%)	—	167·12 (22·88%)	—	730·37 (100%)	86·25 (11·81%)	644·12
5	307·50 (64·80%)	—	128·50 (27·09%)	—	474·50 (100%)	—	474·50
6	328·00 (51·30%)	—	232·50 (36·36%)	9·00 (3·87%)†	639·37 (100%)	9·00 (1·41%)	630·37
7	413·50 (48·65%)	—	194·50 (22·88%)	—	850·00 (100%)	—	850·00
8	468·00 (43·99%)	26·00 (5·56%)†	225·00 (21·15%)	—	1,063·81 (100%)	173·69 (16·33%)†	890·12
Total	2,886·50 (49·47%)	53·00 (1·84%)	1,485·37 (25·46%)	9·00 (0·61%)	5,834·37 (100%)	630·56 (10·81%)†	5,203·81

* These groups have the same acreages and the same number of farms as in Table No. P.1.

† Percentage shown below the sold value is the proportion of total produce of the particular commodity.

Puri District : Value of farm implements, their sale and purchase on sample farms classified by size (in acres), during 1954-5

(*Value in Rs.*)

*Groups**	*Value of implements at the beginning of the year*	*Value of implements per farm*	*Value of implements purchased during the year*	*Value of implements sold during the year*	*Value of implements discarded as useless during the year*
1	320	12·31	53·56	—	14·25
2	492	17·57	94·87	—	12·37
3	748	32·52	111·50	22·00	30·44
4	575	35·94	100·12	—	24·31
5	572	40·86	48·06	—	29·44
6	859	66·08	127·94	2·81	56·81
7	1,433	119·42	50·75	—	13·56
8	1,090	136·25	301·50	—	53·00
Total	6,089	43·49	888·30	24·81	234·18

* These groups have the same acreages and the same number of farms as in Table No. P.1.

TABLE No. P.10

Puri District: Investment and disinvestment on sample farms classified by size (in acres) during 1954-5

Part I—(Investment) *(Value in Rs.)*

Groups*	Total purchase of land		Permanent improvements to land	Purchase of live-stock	Purchase of implements	Total of columns 1 to 4	Construction or purchase of houses	Purchase of ornaments	Purchase of other financial assets	Repayments of debts	Advancing loans	Total of columns 6 to 10	Grand total of all items
	Area (Acres)	Value											
	1		2	3	4	5	6	7	8	9	10	11	12
1	0·04	50·00	—	159·00	53·56	262·56	210·75	—	—	133·62	—	344·37	606·93
2	1·83	820·75	45·00	216·50	94·87	1,177·12	20·00	—	—	560·69	—	580·69	1,757·81
3	0·50	308·00	24·50	138·00	111·50	582·00	—	257·00	—	363·19	100·00	720·19	1,302·19
4	0·33	90·00	—	478·00	100·12	668·12	200·00	251·25	—	130·00	—	581·25	1,249·37
5	0·15	82·00	10·00	87·00	48·06	227·06	656·00	340·00	—	437·00	—	1,433·00	1,660·06
6	—	—	73·69	288·00	127·94	489·63	980·00	60·00	—	245·37	100·00	1,385·37	1,875·00
7	0·40	120·00	321·00	272·00	50·75	763·75	—	50·00	—	216·94	—	266·94	1,030·69
8	1·00	800·00	198·00	280·00	301·50	1,579·50	100·00	340·00	—	673·25	—	1,113·25	2,692·75
Total	4·25	2,270·75	672·19	1,918·50	888·30	5,749·74	2,166·75	1,298·25	—	2,760·06	200·00	6,425·06	12,174·80

* These groups have the same acreages and the same number of farms as in Table No. P. 1.

TABLE No. P.10—(Contd.)

Puri District: Investment and disinvestment on sample farms classified by size (in acres) during 1954-5

Part II—(Disinvestment) *(Value in Rs.)*

*Groups**	*Sale of land*		*Sale of livestock*	*Sale of implements*	*Total of columns 1 to 3*	*Sale of houses*	*Sale of ornaments*	*Sale of other financial assets*	*Recovery of loans*	*Other disinvest-ments*	*Incurring new debts*	*Total of columns 5 to 10*	*Grand total of all items*
	Area (Acres)	*Value Rs.*											
	1		2	3	4	5	6	7	8	9	10	11	12
1	—	—	70·00	—	70·00	—	169·00	—	—	—	574·31	743·31	813·31
2	0·42	300·00	95·00	—	395·50	—	20·00	—	—	150·00	1,115·75	1,285·75	1,681·25
3	—	—	95·00	22·0	117·00	—	171·37	—	100·00	—	827·06	1,098·43	1,215·43
4	0·02	50·00	445·00	—	495·00	—	14·00	—	—	—	1,208·87	1,222·87	1,717·87
5	—	—	39·00	—	39·00	—	18·00	—	—	—	1,279·56	1,297·56	1,336·56
6	—	—	47·00	2·81	49·81	—	—	—	—	—	608·62	608·62	658·43
7	0·51	300·00	40·00	—	340·00	—	—	—	—	—	1,001·37	1,001·37	1,341·37
8	0·90	400·00	7·00	—	407·00	—	—	—	—	—	2,223·25	2,223·25	2,630·25
Total	1·85	1,050·00	838·50	24·81	1,913·31	—	392·37	—	100·00	150·00	8,838·79	9,481·16	11,394·47

* These groups have the same acreages and the same number of farms as in Table No. P. 1.

TABLE No. P.10—(Contd.)

Puri District: Investment and disinvestment on sample farms classified by size (in acres) during 1954-5

Part III—(Investment and disinvestment) *(Value in Rs.)*

*Groups**	*Total investment in physical assets of farms*	*Total investment in houses*	*Total investment in ornaments and others, etc.*	*Total repayment of debts*	*Total investments*	*Total disinvestment in physical assets of farm*	*Total disinvestment in houses*	*Total disinvestment in ornaments and others, etc.*	*Total new debts incurred*	*Total disinvestments*	*Net investment or disinvestment*
1	262·56	210·75	—	133·62	606·93	70·00	—	169·00	574·31	813·31	−206·38
2	1,177·12	20·00	—	560·69	1,757·81	395·50	—	170·00	1,115·75	1,681·25	+ 76·56
3	582·00	—	357·00	363·19	1,302·19	117·00	—	271·37	827·06	1,215·43	+ 86·76
4	668·12	200·00	251·25	130·00	1,249·37	495·00	—	14·00	1,208·87	1,717·87	−468·50
5	227·06	656·00	340·00	437·00	1,660·06	39·00	—	18·00	1,279·56	1,336·56	+323·50
6	489·63	980·00	160·00	245·37	1,875·00	49·81	—	—	608·62	658·43	+1216·75
7	763·75	—	50·00	216·94	1,030·69	340·00	—	—	1,001·37	1,341·37	−310·68
8	1,579·50	100·00	340·00	673·25	2,692·75	407·00	—	—	2,223·25	2,630·25	+ 62·50
Total	5,749·74	2,166·75	1,498·25	2,760·06	12,174·80	1,913·31	—	642·37	8,838·79	11,394·47	+780·33

* These groups have the same acreages and the same number of farms as in Table No. P. 1.

\+ Where the investment is more than disinvestment.

− Where the disinvestment is more than investment.

(B) EMPLOYMENT DATA REGARDING AGRICULTURAL LABOUR

TABLE NO. S.11

Sambalpur Zone : Employment and wage earnings of agricultural labourers (casual labourers) in 1954-5

(Value in Rupees)

	Nature of work	No. of labourers		April—May				June—July				August—September				October—November			
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1	In agriculture both in and outside the village	45	T	485	231	135	366	1,377	474	476	950	1,191	503	286	789	1,509	787	503	1,290
			A	10·8	5·1	3·0	8·1	30·6	10·5	10·6	21·1	26·5	11·2	6·4	16·6	33·5	17·5	11·2	28·7
2	In non-agriculture both in and outside the village	40	T	1,076	75	930	1,005	471	12	427	439	664	12	614	626	437	12	448	460
			A	26·9	1·9	23·2	25·1	11·8	0·3	10·7	11·0	16·6	0·3	15·4	15·7	10·9	0·3	11·2	11·5
3	Total work done	53	T	1,561	306	1,065	1,371	1,848	486	903	1,389	1,855	515	900	1,415	1,946	799	951	1,750
			A	29·4	5·8	20·1	25·9	34·9	9·1	17·1	26·2	35·0	9·7	17·0	26·7	36·7	15·1	17·9	33·0

1 = Number of days worked 2 = Value of payments in kind 3 = Cash wages 4 = Total

T = Total A = Average

TABLE No. S.11—(Contd.)

Sambalpur Zone : Employment and wage earnings of agricultural labourers (casual labourers) in 1954-5

(*Value in Rupees*)

	Nature of work	No. of labourers		December—January				February—March				Total			
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1	In agriculture both in and outside the village	45	T	559	322	82	404	261	134	38	172	5,382	2,451	1,520	3,971
			A	12·4	7·2	1·8	9·0	5·8	3·0	0·8	3·8	119·6	54·5	33·8	88·3
2	In non-agriculture both in and outside the village	40	T	1,090	32	1,047	1,079	1,175	32	1,113	1,145	4,913	175	4,579	4,754
			A	27·2	0·8	26·2	27·0	29·4	0·8	27·8	28·6	122·8	4·4	114·5	118·9
3	Total work done	53	T	1,649	354	1,129	1,483	1,436	166	1,151	1,317	10,295	2,626	6,099	8,725
			A	31·1	6·7	21·3	28·0	27·1	3·1	21·7	24·8	194·2	49·5	115·1	164·6

1 = Number of days worked 2 = Value of payments in kind 3 = Cash wages 4 = Total

T = Total A = Average

TABLE No. C.11

Cuttack District: Employment and wage earnings of agricultural labourers in 1954-5

(Value in Rupees)

	Nature of work	No. of labourers		April—May				June—July				August—September				October—November			
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Casual labour																			
1	In agriculture both in and outside the village	105	T	3,018	289	2,245	2,534	4,967	441	3,954	4,395	4,345	347	3,639	3,986	2,760	469	1,819	2,288
			A	28·7	2·7	21·4	24·1	47·3	4·2	37·7	41·9	41·4	3·3	34·7	38·0	26·3	4·5	17·3	21·8
2	In non-agriculture both in & outside the village	73	T	871	25	913	938	183	35	118	153	143	39	82	121	350	14	299	313
			A	11·9	0·3	12·5	12·8	2·5	0·5	1·6	2·1	2·0	0·5	1·1	1·6	4·8	0·2	4·1	4·3
3	Total work done	108	T	3,889	314	3,158	3,472	5,150	476	4,072	4,548	4,488	386	3,721	4,107	3,110	483	2,118	2,601
			A	36·0	2·9	29·2	32·1	47·7	4·4	37·7	42·1	41·6	3·6	34·5	38·1	28·8	4·5	19·6	24·1
Farm servants																			
1	In agriculture both in and outside the village	22	T	1,203	349	196	545	1,264	365	209	574	1,177	401	147	548	1,064	406	120	526
			A	54·7	15·9	8·9	24·8	57·4	16·6	9·5	26·1	53·5	18·2	6·7	24·9	48·4	18·5	5·4	23·9
2	In non-agriculture both in and outside the village	10	T	37	2	43	45	—	—	—	—	—	—	—	—	3	1	—	1
			A	3·7	0·2	4·3	4·5	—	—	—	—	—	—	—	—	0·3	0·1	—	0·1
3	Total work done	22	T	1,240	351	239	590	1,264	365	209	574	1,177	401	147	548	1,067	407	120	527
			A	56·4	16·0	10·9	26·9	57·4	16·6	9·5	26·1	53·5	18·2	6·7	24·9	48·5	18·5	5·4	23·9

1 = Number of days worked 2 = Value of payments in kind 3 = Cash wages 4 = Total

T = Total A = Average

TABLE No. C.11—(*Contd.*)

Cuttack District: Employment and wage earnings of agricultural labourers in 1954-5

(*Value in Rupees*)

	Nature of work	No. of labourers		December—January				February—March				Total				Bulk receipts during the year			Grand total income
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	In kind	In cash	Total	
Casual labour																			
1	In agriculture both in	105	T	3,878	3,211	417	3,628	2,566	360	1,831	2,191	21,534	5,117	13,905	19,022	—	—	—	19,022
	and outside the village		A	36·9	30·6	4·0	34·6	24·4	3·4	17·4	20·8	205·0	48·7	132·5	181·2	—	—	—	181·2
2	In non-agriculture both	73	T	195	—	157	157	1,001	6	1,073	1,079	2,743	119	2,642	2,761	—	—	—	2,761
	in and outside the village		A	2·7	—	2·2	2·2	13·7	0·1	14·7	14·8	37·6	1·6	36·2	37·8	—	—	—	37·8
3	Total work done	108	T	4,073	3,211	574	3,785	3,567	366	2,904	3,270	24,277	5,236	16,547	21,783	—	—	—	21,783
			A	37·7	29·7	5·3	35·0	33·0	3·4	26·9	30·3	224·8	48·5	153·2	201·07	—	—	—	201·07
Farm servants																			
1	In agriculture both in	22	T	939	936	22	958	1,026	319	152	471	6,673	2,776	846	3,622	930	—	930	4,552
	and outside the village		A	42·7	42·5	1·0	43·5	46·6	14·5	6·9	21·4	303·3	126·2	38·4	164·6	42·3	—	42·3	206·9
2	In non-agriculture both	10	T	180	76	—	76	46	15	23	38	266	94	66	160	—	—	—	160
	in and outside the village		A	18·0	7·6	—	7·6	4·6	1·5	2·3	3·8	26·6	9·4	6·6	16·0	—	—	—	16·0
3	Total work done	22	T	1,119	192	22	1,034	1,072	334	175	509	6,939	2,870	912	3,782	930	—	930	4,712
			A	50·9	46·0	1·0	47·0	48·7	15·2	7·9	23·1	315·4	130·5	41·4	171·9	42·3	—	42·3	214·2

1 = Number of days worked 2 = Value of payments in kind 3 = Cash wages 4 = Total
T = Total A = Average

TABEL No. P.11

Puri District: Employment and wage earnings of agricultural labourers in 1954-5

(Value in Rupees)

	Nature of work	No. of labourers		April—May				June—July				August—September			
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Casual labour															
1	In agriculture both in	62	T	1,666	215	879	1,094	2,221	453	1,045	1,498	2,321	654	906	1,560
	and outside the village		A	26·9	3·5	14·2	17·7	35·8	7·3	16·9	24·2	37·4	10·5	14·6	25·1
2	In non-agriculture both	61	T	1,011	37	784	821	588	44	364	408	432	31	268	299
	in and outside the village		A	16·6	0·6	12·9	13·5	9·6	0·7	6·0	6·7	7·1	0·5	4·4	4·9
3	Total work done	65	T	2,677	252	1,663	1,915	2,809	497	1,409	1,906	2,753	685	1,174	1,859
			A	41·2	3·9	25·6	29·5	43·2	7·6	21·7	29·3	42·4	10·5	18·1	28·6
Farm servants															
1	In agriculture both in	5	T	163	60	63	123	197	75	73	148	218	86	72	158
	and outside the village		A	32·6	12·0	12·6	24·6	39·4	15·0	14·6	29·6	43·6	17·2	14·4	31·6
2	In non-agriculture both	3	T	68	21	20	41	40	15	7	22	25	10	4	14
	in and outside the village		A	22·7	7·0	6·7	13·7	13·3	5·0	2·3	7·3	8·3	3·3	1·3	4·6
3	Total work done	5	T	231	81	83	164	237	90	80	170	343	96	76	172
			A	46·2	16·2	16·6	32·8	47·4	18·0	16·0	34·0	48·6	19·2	15·2	34·4

T = Total
A = Average

1 = No. of days worked
2 = Value of payments in kind

3 = Cash wages
4 = Total

TABLE NO. P.11—(*Contd.*)

Puri District: Employment and wage earnings of agricultural labourers in 1954-5

(*Value in Rupees*)

	Nature of work	No. of labourers		October—November				December—January			
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Casual labour											
1	In agriculture both in and outside the village	62	T	2,275	990	577	1,567	2,326	1,131	486	1,617
			A	36·7	16·0	9·3	25·3	37·5	18·2	7·8	26·0
2	In non-agriculture both in & outside the village	61	T	514	24	332	356	457	32	282	314
			A	8·4	0·4	5·4	5·8	7·5	0·6	4·6	5·2
3	Total work done	65	T	2,789	1,014	909	1,923	2,783	1,163	768	1,931
			A	42·9	15·6	14·0	29·6	42·8	17·9	11·8	29·7
Farm servants											
1	In agriculture both in and outside the village	5	T	216	87	70	157	189	77	65	142
			A	43·2	17·4	14·0	31·4	37·8	15·4	13·0	28·4
2	In non-agriculture both in & outside the village	3	T	20	10	—	10	40	20	—	20
			A	6·7	3·3	—	3·3	13·3	6·7	—	6·7
3	Total work done	5	T	236	97	70	167	229	97	65	162
			A	47·2	19·4	14·0	33·4	45·8	19·4	13·0	32·4

T = Total
A = Average

1 = No. of days worked
2 = Value of payments in kind

3 = Cash wages
4 = Total

TABLE NO. P.11—(*Contd.*)

Puri District: Employment and wage earnings of agricultural labourers in 1954-5

(*Value in Rupees*)

	Nature of work	No. of labourers		February—March				Total				Bulk receipts during the year			Grand total income
				(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	In kind	In cash	Total	
Casual labour															
1	In agriculture both in and outside the village	62	T	922	172	439	611	11,731	3,615	4,332	7,947	80	—	80	8,027
			A	14·9	2·8	7·1	9·9	189·2	58·3	69·9	128·2	1·3	—	1·3	129·5
2	In non-agriculture both in & outside the village	61	T	1,382	51	994	1,045	4,384	219	3,024	3,243	—	—	—	3,243
			A	22·7	0·8	16·3	17·1	71·9	3·6	49·6	53·2	—	—	—	53·2
3	Total work done	65	T	2,304	223	1,433	1,656	16,115	3,834	7,356	11,190	80	—	80	11,270
			A	35·4	3·5	22·0	25·5	247·9	59·0	113·2	172·2	1·2	—	1·2	173·4
Farm servants															
1	In agriculture both in and outside the village	5	T	132	45	60	105	1,115	430	403	833	82	76	158	991
			A	26·4	9·0	12·0	21·0	223·0	86·0	80·6	166·6	16·4	15·2	31·6	198·2
2	In non-agriculture both in & outside the village	3	T	76	26	21	47	269	102	52	154	74	34	108	262
			A	25·4	8·7	7·0	15·7	89·7	34·0	17·3	51·3	24·7	11·3	36·0	87·3
3	Total work done	5	T	208	71	81	152	1,384	532	455	987	156	110	266	1,253
			A	41·6	14·2	16·2	30·4	276·8	106·4	91·0	197·4	31·2	22·0	53·2	250·6

T = Total
A = Average

1 = No. of days worked
2 = Value of payments in kind

3 = Cash wages
4 = Total

APPENDIX III

ADDITIONAL DATA ON RURAL INDUSTRY AND TRADE IN SAMBALPUR, CUTTACK AND PURI DISTRICTS.

TABLE No. S.12

Sambalpur Zone : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.	Name of the industry	No. of samples surveyed	Workers in the family									Total skilled	Total unskilled	Total
			Male			Female			Child					
			Skilled	Unskilled	Total	Skilled	Unskilled	Total	Skilled	Unskilled	Total			
1	*Weaving*													
	(a) Entire zone	35	48	5	53	1	45	46	3	5	8	52	55	107
	(b) Barapali	63	96	6	102	7	88	95	2	—	2	105	94	199
2	Goldsmithy	9	9	—	9	—	2	2	—	—	—	9	2	11
3	Fishing	3	4	—	4	—	3	3	—	—	—	4	3	7
4	Puffed rice preparing	11	5	1	6	13	—	13	—	—	—	18	1	19
5	Bamboo work	6	6	—	6	6	—	6	—	—	—	12	—	12
6	Tailoring	1	2	—	2	—	—	—	—	—	—	2	—	2
7	Cobbler	1	1	—	1	—	—	—	—	—	—	1	—	1
8	Hotel	1	1	—	1	—	—	—	—	—	—	1	—	1
9	Brass and bell metal works	10	13	—	13	—	1	1	—	—	—	13	1	14
10	Rope making	2	2	—	2	2	—	2	—	—	—	4	—	4
11	Carpentry	2	2	—	2	—	—	—	—	—	—	2	—	2
12	Blacksmithy	2	3	—	3	—	—	—	—	—	—	3	—	3
13	Confectionary	1	2	—	2	—	2	2	—	—	—	2	2	4
14	Cowdung cake preparing	1	—	—	—	1	—	1	—	—	—	1	—	1
15	Bidi making	1	1	—	1	—	1	1	—	—	—	1	1	2
16	Mason	1	1	—	1	—	—	—	—	—	—	1	—	1
17	Pottery	2	3	—	3	—	3	3	—	—	—	3	3	6
18	Oil ghani	1	1	—	1	—	1	1	—	—	—	1	1	2
19	Paddy husking	2	—	—	—	2	—	2	—	—	—	2	—	2
20	Painting	1	1	—	1	—	—	—	—	—	—	1	—	1
21	Sculpture	1	1	—	1	—	1	1	—	—	—	1	1	2
22	Broomstick making	1	1	—	1	—	—	—	—	—	—	1	—	1
23	Mridung making	4	4	—	4	—	—	—	—	—	—	4	—	4

TABLE NO. S.12—(*Contd.*)

Sambalpur Zone : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.	Employees			Total			Present value of implements	Value of investment in the implements during the year	Working capital	Present value of capital
	Skilled	Unskilled	Total	Skilled	Unskilled	Total	Rs.	Rs.	Rs.	Rs.
1 (a)	—	—	—	52	55	107	966·69	176·56	2,064·87	3,208·12
(b)	—	—	—	105	94	199	2,401·12	125·00	5,632·00	8,158·12
2	—	—	—	9	2	11	62·50	0·12	124·00	186·62
3	—	—	—	4	3	7	25·25	—	1·00	26·25
4	—	—	—	18	1	19	7·44	10·56	183·00	201·00
5	—	—	—	12	—	12	9·50	0·50	53·25	63·25
6	—	—	—	2	—	2	202·00	—	1·00	203·00
7	—	—	—	1	—	1	8·25	2·00	64·00	74·25
8	1	1	2	2	1	3	9·75	—	15·00	24·75
9	—	—	—	13	1	14	1,626·25	196·75	1,925·00	3,748·00
10	—	—	—	4	—	4	1·75	0·37	54·00	56·12
11	—	—	—	2	—	2	61·50	—	—	61·50
12	—	—	—	3	—	3	48·62	11·25	42·50	102·37
13	—	—	—	2	2	4	—	—	5·00	5·00
14	—	—	—	1	—	1	0·25	—	—	0·25
15	—	—	—	1	1	2	0·12	—	—	0·12
16	—	—	—	1	—	1	4·50	—	—	4·50
17	—	—	—	3	3	6	6·56	16·00	0·50	23·06
18	—	—	—	1	1	2	6·25	—	20·00	26·25
19	—	—	—	2	—	2	4·00	—	5·00	9·00
20	—	—	—	1	—	1	—	—	—	—
21	—	—	—	1	1	2	13·94	—	11·87	25·81
22	—	—	—	1	—	1	—	—	—	—
23	—	—	—	4	—	4	—	—	—	—

TABLE NO. S.12—(*Contd.*)

Sambalpur Zone : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.		Value of gross production and wage etc. receipts during last year (Rs.)	Total actual cost (last year) (Rs.)								Net receipts during last year (Rs.)
			Cost of raw materials	Wages paid	Transport expenses	Cost of fuel and power	Taxes and fees	Interest paid during last year	Repair and maintenance expenses	Total	
1	(a)	49,677·00	31,136·75	48·00	—	—	77·00	—	169·00	31,430·75	18,246·25
	(b)	62,445·00	35,427·50	—	—	—	81·00	—	607·75	36,116·25	26,328·75
2		2,265·00	147·75	—	—	7·00	—	—	19·00	173·75	2,091·25
3		1,900·00	99·50	—	—	—	178·12	—	23·00	300·62	1,599·38
4		6,621·00	3,265·00	—	—	697·50	—	—	—	3,962·50	2,658·50
5		1,233·00	656·25	—	—	—	14·00	—	14·00	684·25	548·75
6		475·00	—	—	—	—	—	—	15·00	15·00	460·00
7		180·00	64·00	—	—	—	—	—	2·00	66·00	114·00
8		6,230·00	5,030·00	164·00	—	360·00	2·50	—	5·00	5,561·50	668·50
9		24,385·31	17,960·75	—	17·62	1,717·56	9·56	—	145·31	19,850·80	4,534·51
10		754·50	560·00	—	—	—	10·50	—	—	570·50	184·00
11		980·00	—	—	—	—	—	—	—	—	980·00

TABLE NO. S.12—(*Contd.*)

Sambalpur Zone : *Production, sales, expenses, etc. of different industrial (rural) establishments in* 1954-5 *(General samples only)*

Serial No.	*Value of gross production and wage etc. receipts during last year (Rs.)*	*Total actual cost (last year) (Rs.)*								*Net receipts during last year (Rs.)*
		Cost of raw materials	*Wages paid*	*Transport expenses*	*Cost of fuel and power*	*Taxes and fees*	*Interest paid during last year*	*Repair and maintenance expenses*	*Total*	
12	405·37	25·00	—	—	40·00	—	—	—	65·00	340·37
13	1,060·00	700·00	—	—	—	2·62	—	—	702·62	357·38
14	180·00	—	—	—	—	—	—	—	—	180·00
15	774·00	—	—	—	—	—	—	—	—	774·00
16	540·00	—	—	—	—	—	—	—	—	540·00
17	325·50	—	—	—	80·00	—	—	1·00	81·00	244·50
18	1,062·50	1,000·00	—	—	—	—	—	5·00	1,005·00	57·50
19	365·50	168·00	—	—	—	—	—	—	168·00	197·50
20	180·00	—	—	—	—	—	—	—	—	180·00
21	252·00	65·94	—	4·00	16·69	—	—	2·00	88·63	163·37
22	0·62	—	—	—	—	—	—	—	—	0·62
23	630·00	—	—	—	—	—	—	—	—	630·00

TABLE No. S.13

Sambalpur Zone: Turnover, expenses, etc. of trading (rural) establishments dealing in different commodities in 1954-5

Serial No.	*Name of trade*	*No. of samples*	*Area occupied by shops and godowns (in sq. ft.)*	*Rent for shops and godowns (Rs.)*	*Value of owned land and buildings occupied by shops (Rs.)*	*Value of the stock on the day of investigation (Rs.)*	*Value of total annual turnover (Rs.)*
1	Grocery	7	416	71·25	1,204·00	4,851·94	28,720·00
2	Selling *pan*	3	141	60·00	585·00	22·62	6,368·00
3	Selling tobacco	2	70	—	—	180·00	2,350·00
4	Selling cattle	1	108	—	—	50·00	1,150·00
5	Selling yarn	1	110	—	5,000·00	1,978·00	36,000·00
6	Selling fuel	1	1,575	60·00	—	6·00	2,500·00
7	Selling bangles	1	—	—	—	70·00	2,600·00
8	Contractor	2	54	—	—	1,690·00	2,500·00

TABLE NO. S.13—(*Contd.*)

Sambalpur Zone: Turnover, expenses, etc. of trading (rural) establishments dealing in different commodities in 1954-5

Serial No.	Persons employed			Expenses (Rs.)					Total net income last year (Rs.)	Outstanding debts (in Rs.)	
	Male	Female	Total	Wages and salaries paid	Light charges	Taxes and fees	Other expenses	Total		Principal	Interest
1	6	7	13	—	28·12	530·25	12·00	570·37	5,156·00	160·00	19·19
2	2	2	4	—	6·00	0·87	—	6·87	780·00	—	—
3	2	2	4	—*	—	62·00	—	62·00	650·00	—	—
4	3	2	5	—	—	—	—	—	144·00	—	—
5	1	—	1	—	—	14·00	150·00	164·00	2,250·00	—	—
6	2	—	2	100·00	—	66·00	—	166·00	500·00	—	—
7	1	1	2	—	—	—	—	—	540·00	300·00	12·75
8	88	—	88	—*	—	—	—	—	2,700·00	—	—

Note:— Persons employed include 64 employees—one male in fuel selling, 61 males in contracting and two females in tobacco selling.

* Information was not available on these items.

TABLE No. C.12

Cuttack District : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.	Name of industry	No. of samples surveyed	Workers in the family											
			Skilled male	Unskilled male	Total male	Skilled female	Unskilled female	Total female	Skilled child	Unskilled child	Total child	Total skilled	Total unskilled	Total
1	Weaving	7	6	—	6	6	3	9	—	2	2	12	5	17
2	Goldsmithy	7	12	—	12	—	—	—	—	—	—	12	—	12
3	Pottery	1	1	—	1	2	—	2	—	—	—	3	—	3
4	Bamboo work	7	8	—	8	9	—	9	—	—	—	17	—	17
5	Cane work	2	2	—	2	—	—	—	—	—	—	2	—	2
6	Carpentry	2	2	—	2	—	—	—	—	—	—	2	—	2
7	Puffed rice	1	—	—	—	1	—	1	—	—	—	1	—	1
8	Confectionary	3	3	—	3	—	—	—	—	—	—	3	—	3
9	Oil ghani	2	4	—	4	1	1	2	—	—	—	5	1	6
10	Drum making	1	1	1	2	—	1	1	—	—	—	1	2	3
11	Rope making	1	—	—	—	2	—	2	—	—	—	2	—	2
12	Blacksmithy	2	3	—	3	—	—	—	—	—	—	3	—	3
13	Paddy husking	17*	—	—	—	20	—	20	—	—	—	20	—	20
14	Repairing	1	1	—	1	—	—	—	—	—	—	1	—	1
15	Dairy	5	5	—	5	5	—	5	—	2	2	10	2	12
16	Parching	4	2	—	2	6	—	6	—	—	—	8	—	8
17	Brass and bell metal	3	5	—	5	—	—	—	—	—	—	5	—	5
18	Stone cutting	2	3	—	3	—	—	—	—	—	—	3	—	3
19	Bidi-making	2	3	—	3	—	—	—	—	—	—	3	—	3
20	Mason	1	1	—	1	—	—	—	—	—	—	1	—	1
21	Thread work	1	1	—	1	—	—	—	—	—	—	1	—	1
22	Bangles making	1	1	—	1	—	—	—	—	—	—	1	—	1
23	Flower garland making	1	1	—	1	—	—	—	—	—	—	1	—	1

* Includes 15 labourers in paddy husking. They have neither any capital investment nor any expense.

TABLE No. C.12—(*Contd.*)

Cuttack District: Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 *(General samples only)*

Serial No.	Employees			Total			Present value of implements (Rs.)	Value of investment in implements during the year (Rs.)	Working capital (Rs.)	Present value of total capital (Rs.)
	Skilled	Unskilled	Total	Skilled	Unskilled	Total				
1	2	—	2	14	5	19	372·44	69·00	200·00	641·44
2	1	—	1	13	—	13	110·50	12·62	133·50	256·62
3	—	—	—	3	—	3	1·50	—	—	1·50
4	—	—	—	17	—	17	24·44	—	50·00	74·44
5	—	—	—	2	—	2	11·00	—	1·00	12·00
6	—	—	—	2	—	2	25·12	3·00	10·50	38·62
7	—	—	—	1	—	1	1·19	1·00	2·00	4·19
8	—	—	—	3	—	3	27·44	34·00	74·00	135·44
9	—	—	—	5	1	6	72·56	21·50	180·00	274·06
10	—	—	—	1	2	3	10·62	2·50	—	13·12
11	—	—	—	2	—	2	—	—	0·50	0·50
12	—	—	—	3	—	3	99·06	1·50	25·00	125·56
13	—	—	—	20	—	20	9·00	—	17·00	26·00
14	—	—	—	1	—	1	—	1·50	5·00	6·50
15	—	—	—	10	2	12	692·25	3·00	15·00	710·25
16	—	—	—	8	—	8	23·56	2·06	13·44	39·06
17	—	1	1	5	1	6	721·75	29·50	105·00	856·25
18	—	—	—	3	—	3	40·00	6·00	—	46·00
19	4	—	4	7	—	7	2·19	5·69	120·00	127·88
20	—	—	—	1	—	1	11·50	—	—	11·50
21	—	—	—	1	—	1	0·12	—	0·25	0·37
22	—	—	—	1	—	1	0·06	—	19·12	19·18
23	—	—	—	1	—	1	1·87	—	1·00	2·87

TABLE No. C.12—(*Contd.*)

Cuttack District: Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.	Value of gross production and wages received during last year (Rs.)	Total actual cost (last year)								Net receipts during last year (Rs.)
		Cost of raw materials (Rs.)	Wages paid (Rs.)	Trasnport expenses (Rs.)	Cost of fuel and power (Rs.)	Taxes and fees (Rs.)	Interest paid during last year (Rs.)	Repair and maintenance expenses (Rs.)	Total (Rs.)	
1	4,593·87	3,031·75	10·00	5·00	0·31	—	—	123·00	3,170·06	1,423·81
2	5,417·00	2,223·37	22·50	—	218·75	—	—	33·00	2,497·62	2,919·38
3	363·87	—	—	—	—	—	—	—	—	363·87
4	1,408·50	706·31	—	—	—	—	—	16·00	722·31	686·19
5	123·12	—	—	—	—	—	—	1·00	1·00	122·12
6	567·25	—	—	—	—	—	—	7·50	7·50	559·75
7	91·25	38·00	—	—	5·00	—	—	—	43·00	48·25
8	2,332·00	1,707·37	—	—	100·00	—	—	—	1,807·37	524·63
9	3,328·69	2,530·44	—	—	60·00	—	—	16·50	2,606·94	721·75
10	430·00	197·50	—	—	—	—	—	3·00	200·50	229·50
11	75·62	4·00	—	—	—	—	—	—	4·00	71·62
12	1,230·71	350·00	—	29·00	68·50	—	—	—	447·50	783·21

TABLE No. C.12—(*Contd.*)

Cuttack District: Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 *(General samples only)*

Serial No.	Value of gross production and wages received during last year (Rs.)	Total actual cost (last year)								Net receipts during last year (Rs.)
		Cost of raw materials (Rs.)	Wages paid (Rs.)	Transport expenses (Rs.)	Cost of fuel and power (Rs.)	Taxes and fees (Rs.)	Interest paid during last year (Rs.)	Repair and maintenance expenses (Rs.)	Total (Rs.)	
13	1,679·28	310·00	—	—	—	—	—	—	310·00	1,369·28
14	268·75	32·00	—	—	10·00	—	—	4·00	46·00	222·75
15	1,325·12	230·00	—	—	10·00	—	—	13·00	253·00	1,072·12
16	328·96	—	—	—	23·75	—	—	4·00	27·75	301·21
17	2,410·00	293·62	40·00	—	340·00	—	—	140·00	813·62	1,596·38
18	599·50	—	—	—	—	0·75	—	10·00	10·75	588·75
19	4,006·25	1,561·25	1,165·00	190·00	50·00	2·00	—	—	2,968·25	1,038·00
20	600·00	—	—	—	—	—	—	—	—	600·00
21	9·75	3·12	—	—	—	—	—	—	3·12	6·63
22	46·87	14·62	—	—	4·50	—	—	—	19·12	27·75
23	129·25	5·00	—	—	—	—	—	5·00	10·00	119·25

TABLE No. C.13

Cuttack District: Turnover, expenses, etc. of trading (rural) establishments dealing in different commodities in 1954-5

Serial No.	Name of trade	No. of samples	Area occupied by shops and godowns (in sq. ft.)	Rent for shops and godowns (Rs.)	Value of owned land and building occupied by shops (Rs.)	Value of the stock on the day of investigation (Rs.)	Value of total annual turnover (Rs.)	Persons employed		
								Male	Female	Total
1	Grocery	17	40,024	331·00	4,830·00	9,086·00	111,390·00	19	2	21
2	Selling bamboo and wood	1	5,000	—	1,000·00	200·00	3,000·00	1	—	1
3	*Paan* business	6	—	—	—	33·87	4,700·00	6	—	6
4	Selling glass bangles	4	—	—	—	49·00	1,485·00	4	—	4
5	Selling bidi	1	20	48·00	200·00	—	500·00	1	—	1
6	Selling sweetmeats	1	20	—	—	—	400·00	1	—	1
7	Cattle dealer	9	203	—	140·00	404·00	18,630·00	8	2	10
8	Rice and vegetable shops	7	88	—	500·00	314·25	3,166·00	7	—	7
9	Selling fish	5	—	—	—	290·50	2,400·00	5	1	6
10	Betel shop	3	18	3·25	5·00	21·94	1,250·00	3	—	3
11	Cloth and yarn shop	3	176	36·00	500·00	107·00	7,940·00	3	—	3
12	Stationery shop	2	24	1·50	7·00	59·31	1,330·00	2	—	2
13	Selling brass and bell metal pots	2	—	—	—	442·00	3,800·00	3	—	3
14	Leather business	1	—	—	—	20·00	220·00	1	—	1
15	Lime business	1	—	—	—	3·50	480·00	1	—	1
16	Kerosene oil selling	1	—	—	—	—	96·00	1	—	1

Note:—Only in case of grocers two male employees were reported.

TABLE NO. C.13—(*Contd.*)

Cuttack District : Turnover, expenses, etc. of trading (rural) establishments dealing in different commodities in 1954-5

Serial No.	Expenses (Rs.)						Total net income last year (Rs.)	Outstanding debts (in Rs.)	
	Wages and salaries paid	Light charges	Taxes and fees	Other expenses	Interest paid	Total		Principal	Interest
1	1,080·00	431·75	491·00	140·00	326·00	2,468·75	20,160·00	4,140·00	358·00
2	—	20·00	—	—	—	20·00	800·00	—	—
3	—	—	—	30·19	—	30·19	1,425·00	—	—
4	—	—	—	115·00	—	115·00	565·00	—	—
5	—	—	—	—	—	—	100·00	—	—
6	—	5·25	—	—	—	5·25	200·00	—	—
7	—	—	120·00	28·12	15·00	163·12	2,955·00	400·00	58·75
8	—	—	10·00	231·94	—	241·94	1,664·00	—	—
9	—	—	30·00	—	—	30·00	990·00	200·00	—
10	—	27·25	12·00	—	—	39·25	435·00	—	—
11	—	35·00	125·00	—	—	160·00	1,480·00	150·00	—
12	—	—	—	—	—	—	445·00	—	—
13	—	—	—	50·00	—	50·00	650·00	—	—
14	—	—	—	20·00	—	20·00	150·00	—	—
15	—	—	—	—	—	—	120·00	—	—
16	—	—	—	—	—	—	24·00	—	—

TABLE NO. P.12

Puri District : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.	Name of industry	Number of samples covered	Workers in the family									
			Skilled male	Unskilled male	Total male	Skilled female	Unskilled female	Total female	Skilled child	Unskilled child	Total child	Total skilled
1	Weaving	7	8	—	8	7	3	10	—	1	1	15
2	Pottery	1	1	—	1	—	—	—	—	—	—	1
3	Brass and bell metal	1	2	—	2	—	—	—	—	—	—	2
4	Blacksmithy	1	2	—	1	—	—	—	2	—	2	3
5	Palm leaf work	1	1	—	1	1	1	2	—	—	—	2
6	Bamboo work	2	3	—	3	3	—	3	—	1	1	6
7	Stone cutting	1	1	—	1	—	—	—	—	—	—	1
8	Carpentry	1	1	—	1	—	—	—	—	—	—	1
9	Confectionary	4	4	—	4	4	—	4	—	—	—	8
10	Oil ghani	1	1	—	1	—	—	—	—	—	—	1
11	Rope making	3	—	—	—	4	—	4	—	—	—	4
12	Parched rice	1	1	—	1	1	—	1	—	—	—	2
13	Cane work	3	4	—	4	2	1	3	—	—	—	6
14	Net work	1	1	—	1	—	—	—	—	—	—	1
15	Paddy husking	10*	—	—	—	10	—	10	—	—	—	10
16	Tailoring	1	1	—	1	—	—	—	—	—	—	1
17	Fishing	1	—	—	—	1	—	1	—	—	—	1
18	Goldsmithy	7†	9	—	9	—	—	—	1	—	1	10
19	Spinning	1	—	—	—		—	1	—	—	—	1

* Includes six labourers in paddy husking. They have neither any capital investment nor any expense.

† Includes one employee in this work.

TABLE No. P.12—(*Contd.*)

Puri District : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 *(General samples only)*

Serial No.	*Employees*					*Total*			*Present value of implements*	*Value of investment in implements during the year*	*Working capital*	*Present value of total capital*	*Value of gross production and wage receipts during last year*
	Total Unskilled	*Total*	*Skilled*	*Unskilled*	*Total*	*Skilled*	*Unskilled*	*Total*	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)
1	4	19	—	—	—	15	4	19	240·56	12·00	63·12	315·68	3,565·12
2	—	1	—	—	—	1	—	1	11·00	—	—	11·00	97·19
3	—	2	2	—	2	4	—	4	30·00	—	10·00	40·00	950·00
4	—	3	—	—	—	3	—	3	19·75	0·12	29·75	49·62	701·00
5	—	2	—	—	—	2	—	2	7·50	—	3·00	10·50	271·56
6	2	8	—	—	—	6	2	8	9·50	—	3·00	12·50	756·25
7	—	1	—	—	—	1	—	1	6·00	—	—	6·00	100·00
8	—	1	—	—	—	1	—	1	19·50	—	—	19·50	416·00
9	—	8	—	—	—	8	—	8	51·00	0·81	39·37	91·18	1,510·37
10	—	1	—	—	—	1	—	1	69·06	—	20·00	89·06	58·00
11	—	4	—	—	—	4	—	4	1·19	—	6·00	7·19	341·00
12	—	2	—	—	—	2	—	2	8·50	4·00	15·00	27·50	417·00
13	1	7	—	—	—	6	1	7	7·50	0·25	10·00	17·75	473·62
14	—	1	—	—	—	1	—	1	0·50	—	10·00	10·50	40·00
15	—	10	2	1	3	12	1	13	23·37	1·69	50·00	75·06	1,791·37
16	—	1	—	—	—	1	—	1	233·00	—	50·00	283·00	2,689·25
17	—	1	4	—	4	5	—	5	50·00	—	10·00	60·00	240·00
18	—	10	1	—	1	11	—	11	111·62	—	113·00	224·62	11,710·75
19	—	1	—	—	—	1	—	1	0·12	—	1·00	1·12	32·00

TABLE No. P.12—(*Contd.*)

Puri District : Production, sales, expenses, etc. of different industrial (rural) establishments in 1954-5 (General samples only)

Serial No.	*Total actual cost (last year)*								*Net receipts during last year*
	Cost of raw materials	*Wages paid*	*Transport expenses*	*Cost of fuel and power*	*Taxes and fees*	*Interest paid during last year*	*Repair and maintenance expenses*	*Total*	
	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)	(*Rs.*)
1	2,357·25	—	—	0·62	—	—	56·75	2,414·62	1,150·50
2	12·81	—	—	25·63	—	—	—	38·44	58·75
3	72·50	353·00	—	99·00	—	—	2·75	527·25	422·75
4	423·00	—	—	40·00	—	—	5·00	468·00	233·00
5	10·75	—	—	—	—	—	1·50	12·25	259·31
6	278·75	—	—	—	—	—	0·75	279·50	476·75
7	—	—	—	—	3·00	—	3·00	6·00	94·00
8	—	—	—	—	—	—	4·00	4·00	412·00
9	749·19	—	—	55·00	5·00	—	—	809·19	701·18
10	—	—	—	10·00	—	—	20·00	30·00	28·00
11	129·75	—	—	—	—	—	—	129·75	211·25
12	195·00	—	—	96·00	—	—	—	291·00	126·00
13	222·00	—	7·00	—	—	—	2·00	231·00	242·62
14	8·75	—	—	—	—	—	—	8·75	31·25
15	935·00	43·19	—	—	—	—	—	978·19	813·18
16	2,085·62	—	—	—	—	—	40·00	2,125·62	563·63
17	—	—	—	—	—	—	10·00	10·00	230·00
18	9,259·50	240·00	—	137·25	—	—	23·75	9,660·50	2,050·25
19	8·75	—	—	—	—	—	—	8·75	23·25

TABLE NO. P.13

Puri District: Turnover, expenses, etc. of trading (rural) establishments dealing in different commodities in 1954-5

Serial No.	*Name of trade*	*No. of samples*	*Area occupied by shops and godowns (In sq. ft.)*	*Rent for shops and godowns (Rs.)*	*Value of owned land and building occupied by shops (Rs.)*	*Value of the stock on the day of investigation (Rs.)*	*Value of total annual turnover (Rs.)*
1	Grocery	11	795	114·00	1,900·00	565·12	11,410·00
2	Vegetable selling	2	—	—	—	55·00	4,788·00
3	Selling cloth, etc.	1	70	—	200·00	17·44	1,000·00
4	Selling yarn	1	60	—	125·00	306·25	5,000·00
5	Stationery shops	3	24	—	50·00	116·25	1,900·00
6	Selling cattle	1	—	—	—	—	1,500·00
7	Selling pulses & grams	1	49	—	100·00	3·00	900·00
8	Selling dry-fish	1	—	—	—	1·87	400·00
9	*Paan* business	9	16	—	—	10·00	14,780·00
10	Selling khili *paan*	1	—	—	—	—	200·00
11	Selling coconut	2	—	—	—	—	425·00
12	Selling thread	1	—	—	—	1·00	150·00
13	Selling lime	1	50	—	50·00	1·87	130·00

TABLE No. P.13—(*Contd.*)

Puri District: Turnover, expenses, etc. of trading (rural) establishments dealing in different commodities in 1954-5

Serial No.	Persons employed			Expenses (Rs.)					Total net income last year	Outstanding debts (in Rs.)	
	Male	Female	Total	Wages and salaries paid	Light charges	Taxes and fees	Other expenses	Total		Principal	Interest
1	14	1	15	—	149·94	4·87	28·00	182·81	2,585·00	320·00	50·00
2	2	—	2	—	—	—	—	—	570·00	100·00	25·00
3	1	—	1	—	—	—	—	—	200·00	—	—
4	1	—	1	—	—	7·00	60·00	67·00	156·25	—	—
5	5	—	5	—	11·50	1·75	—	13·25	505·00	—	—
6	2	—	2	—	—	5·00	—	5·00	400·00	—	—
7	1	—	1	—	3·00	6·25	3·00	12·25	120·00	50·00	3·12
8	1	1	2	—	—	—	—	—	100·00	50·00	12·50
9	9	—	9	—	16·00	—	230·00	246·00	3,870·00	—	—
10	—	1	1	—	14·00	—	—	14·00	60·00	—	—
11	2	—	2	—	—	—	—	—	425·00	—	—
12	—	1	1	—	—	—	—	—	50·00	—	—
13	1	—	1	—	—	—	20·00	20·00	88·00	—	—

Note: No persons reported as employed on wages or salaries.

APPENDIX IV

REPORT ON THE SURVEY OF SAMBALPUR, CUTTACK AND PURI TOWNS

[Note :

Industrial, trading establishments, and services and professions in the three towns: As in the rural areas, in the survey of Sambalpur, Cuttack and Puri towns samples of trading and industrial establishments were selected for intensive enquiry. The samples were, however, selected with the help of the household survey schedules. Each case of an owner or operator of a trading or industrial establishment, or a professional, or one engaged in services found in the sample households (for income and employment enquiry) was covered by the intensive enquiry.

With regard to wholesalers, an attempt was made to cover all the wholesalers in the town, since very few came up in the sample.

The data presented in the Table Nos. S., C., P.,—27 & 28 only sum up certain basic features of these establishments.

In all the three towns and particularly in Cuttack* and Sambalpur, the survey of wholesalers was the least satisfactory. The respondents were very suspicious and non-cooperative. In many cases they just refused to talk with our investigators; in others they gave palpably wrong and misleading figures. The data, therefore, are of limited validity, particularly those relating to turnover, and income.

In regard to retailers also one had to face similar difficulties, particularly in Cuttack where the atmosphere at the time was not quite conducive to such a survey. In general, it might be said that the reliability of information varied inversely with the size of the operating unit.]

SAMBALPUR TOWN

Population: Sambalpur had a population of 23,525 in 1951. From 1901 the population of the town had recorded a continuous increase. From 12,870[1]

* In Cuttack while the city survey was done by the Utkal University Team, we carried out intensive enquiries regarding trade, industry and professions there.

[1] " At this census the Deputy Commissioner excluded a number of hamlets containing over 5,000 inhabitants which do not really belong to the town. If these are deducted from the population of last census, for purposes of comparison, the result is an increase of 37 per cent. Sambalpur must naturally be a prosperous town as it is the centre of trade for most of the Sambalpur District." Census of India, 1901, Vol. XIII Central Provinces, Part I, Report, p. 23.

in 1901 it had increased to 13,574 in 1921, and from this to 17,079 in 1941. The total increase between 1901 and 1921 was a little more than six per cent but the increase between 1921 and 1941 was of the order of 26 per cent. During 1941-51 an increase of 38 per cent was recorded. This was largely due to the influx of people into the town because of the commencement of the construction of the Hirakud Dam in the neighbourhood. The sex ratio of the population at various censuses is given below:

Number of females per 1,000 males in

1901	1911	1921	1931	1941	1951
970	1030	1020	950	1009	835

It is possible that the increase in the sex ratio in 1911 and 1921 reflected the selective mortality caused by the plague and the influenza epidemics. During 1921-31 the males increased faster but the females again gained in the succeeding decade. During 1941-51 the population increased by 6,446 persons of which 4,293 were males.

Our sample consisted of 537 households in Sambalpur. It represented nine per cent of the total households listed in the register of citizens in 1951. The total population of the sample was 2,264. Estimating from this, we put the population of Sambalpur at 24,900 in the middle of 1954, three years after the census.

Size of the family: Table No. S.14 gives the distribution of sample families according to their size. The average size of the family was 4.21. Nearly 50 per cent of the families in the sample consisted of 2, 3, and 4 members each and they were almost evenly distributed between these categories. Uni-member families accounted for a little more than 10 per cent of the families.

Caste composition: Table No. S.15 presents the distribution of sample families by caste groups. The biggest single group in the sample was that of Brahmin families accounting for 15.5 per cent. Next to them was the class of Scheduled Castes and Scheduled Tribes accounting together for 13 per cent of the sample families. Between seven and eight per cent each were accounted for by artisan castes, Keuta (fishermen) and Gauda (milkmen). Between six and seven per cent each were Kayasth or Karan, Marwadi-Agarwals, and Mohammedans. The Caste Hindu families were 78 per cent of the total in the sample. A notable feature was the rather sizeable proportion of non-indigenous trading castes in Sambalpur. Marwadi, Agarwals, and Gujaratis formed about eight per cent of the sample families.

Earners and non-earners: Table No. S.16 gives the distribution of earners and non-earners in the sample families according to sex. A detailed age distribution of earners and non-earners is presented in Table No. S.17. Attention may be drawn in this connection to the age-group 10-15 in this table which includes persons of 15 years of age and are, according to our definition, adults.

Of the total population of the sample 35 per cent were earners. The ratio of earners to non-earners was 1 : 1·83. The earners included 32 unemployed, *i.e.*, four per cent of the total earners. These included two non-adults. Of the total earners only 1.25 per cent were non-adults or juvenile earners. Female earners were 16.5 per cent of the total and of these six were non-adults. There were 5 male earners to every female earner. The ratio of earners to non-earners among females was 1 : 8.

The detailed age distribution of earners and non-earners shows that in the total population of the sample six per cent were 56 or more years of age. It is significant that among earners nearly seven per cent belonged to this age-group.

Occupational distribution of population

We now present information regarding the occupational distribution of heads of families. Later similar information about the total earners in the sample families has been presented. Table No. S.21 gives the distribution of heads into the industrial classes in the I. S. I. classification.

Instead of commenting on this table we now proceed to furnish data regarding the total earners in the families in the sample and their distribution occupation-wise, as occupation is, by and large, an individual attribute and can best be discussed for the whole body of earners instead of for the heads of families only. Table No. S.18 gives the occupttional distribution of male and female earners in the sample.

The largest group of earners in the sample, 28.6 per cent, was in "services", 19 per cent each in manufacturing, and trade and commerce, the three categories accounting for about two-thirds of the total earners. About nine per cent were in agriculture, livestock, etc., and four to five per cent each in construction, sanitary services, and transport. Sambalpur, judging from the occupational distribution of earners, was mainly an administrative centre and a minor trading and manufacturing centre.

The character of the occupational structure can be more vividly appreciated by an examination of the sub-groups of occupations in each of the bigger categories. In the services category 33 per cent of the earners were in government service, 13 per cent were domestic servants and cooks, 10 per cent were in the State Police force, seven per cent each in laundry, and hair-cutting, and six per cent in educational services.

In the trade and commerce category only six per cent were in wholesale trade and the rest in retail trade. A little more than 37 per cent were in retail trade of cereals, and 10 per cent in that of stationery.

In the manufacturing group 14 per cent were engaged in manufacturing textile products, 8.5 per cent in making textile garments and six per cent in handloom weaving. A further 12 per cent were engaged in the production of sweetmeats, about seven per cent in that of silver and goldware, about five per cent in manufacturing earthernware, and between four and five per cent each were engaged in repairing bicycles, and motor vehicles.

Those engaged in agriculture, livestock etc. accounted for nine per cent of the total earners in the sample. Thirty six per cent were engaged in fishing, and a further 27 per cent in the production of cereal crops.

The categories of construction and electricity, gas, water, and sanitary services were numerically small and were not dominated by any prominent sub-groups. In the category, 'transport, storage and communications' containing a little more than four per cent of the earners, 55 per cent were rikshaw pullers, coolies, etc., while 27 per cent were engaged in transport by motor vehicles.

Judging from the occupational distribution it would seem broadly that Sambalpur was mainly an administrative centre and only incidentally an industrial and commercial one. Manufacturing was mainly centred round textiles, mainly of the handloom variety. The very small proportion engaged in wholesale trade showed that trade was mostly of the retail local character, and Sambalpur was by no means an important wholesale trading centre.

Earnings of earners in different industrial groups

In Table No. S.19 information regarding the earnings during the previous year of earners in sample families grouped by industries has been presented.

For bringing out the prominent features of the distribution of the earnings in different industries it is necessary to indicate the relative level of earnings in respect to one another, and secondly, to bring out the dispersion of earnings in each industry. As the sample size was small, we thought it would not be very helpful to comment on the earnings of sub-groups in the main industrial categories. We have mainly confined ourselves to the latter. In order to facilitate further the type of analysis envisaged above the 1st, 2nd, 3rd quartile earnings in each of the industrial categories have been calculated and presented in Table No. S.20. The Table also presents the ratios of 1st and 2nd, and 2nd and 3rd quartile earnings in each of the categories.

For a general indication of the level of earnings we can take the median as quite adequate and fairly representative. Examining the median earnings we find that they recorded the highest level in distributive services (trade and commerce), and the lowest in agriculture, livestock, forestry, etc. (The median earnings in "activities not adequately described" were even lower than in agriculture etc., but we have deliberately treated the earnings in agriculture, etc. as the lowest because they were clearly traceable to a precise group of industries and occupations and because activities inadequately described were really a heterogeneous mass of unclassified industrial and occupational activities.) In the remaining six groups of industries two distinct clusters in respect of earnings were noticeable. The median earnings of transport and storage and services were Rs. 673 and Rs. 693. While those of the remaining three namely construction, manufacturing, comprising mostly textiles and electricity, gas, water, etc. services, ranged between Rs. 407 and Rs. 491.

The ratio between the lowest and the highest median earnings was 1 : 2.3. That between agriculture, etc. and transport and services was around 1 : 1.7; between agriculture and the remaining three around 1 : 1.80. It is important to note that trade and commerce recorded the highest earnings of all, a fact which reflects upon the cost of distributive services.

Switching to the relative earnings in the same categories we find that the range of the variation of the ratio of the 1st and 2nd quartile and 2nd and 3rd quartile earnings was quite narrow, between 1: 1.3 and 1:2.1. The ratio of the 1st and 3rd quartile earnings in any range was not higher than 1 : 4·2. The range of dispersion was not associated with the relative level of earnings in different categories.

Family income: Information regarding the earnings of earners in sample families does not exhaust the information on income. It does not cover unearned income of earners nor does it give an adequate idea of family incomes. We present that information in two tables. In Table No. S.22 the sample families have been classified by income groups. In Table No. S.21 the families have been classified by the industry and occupation of the head of the family and the total income of families in that class. Nearly seven to eight per cent of the total sample families were concentrated in the income ranges between Rs. 251 and Rs. 2,000 per year. A little more than 60 per cent of the families had incomes ranging from Rs. 501 to Rs. 2,000. The median income was around Rs. 940. The per capita income was Rs. 400.

TABLE NO. S.14

Sambalpur Town : Distribution of sample families according to size

No. of members in the family	*Total No. of families*	*Per cent to the total*
1	57	10·6
2	93	17·3
3	83	15·5
4	87	16·2
5	72	13·4
6	56	10·4
7	38	7·1
8	21	3·9
9	12	2·2
10 and above	17	3·2
Not stated	1	0·2
Total	537	100·0

TABLE NO. S.15

Sambalpur Town: Sample families classified by caste and community

Serial No.	Castes	Total families	Per cent to the total
1	Brahmins	83	15·5
2	Kayastha, Karan	34	6·3
3	Khandayat	21	3·9
4	Kulta, Aghria, Chasa, Odia	31	5·8
5	Artisan Castes (*1)	43	8·0
6	Keuta (fisherman)	41	7·6
7	Gauda (milkman)	39	7·3
8	Vaishya and Gola etc. (trading community)	8	1·5
9	Other Oriya Caste Hindus (*2)	58	10·8
10	Marwari Agarwal	34	6·3
11	Other Non-Oriya Caste Hindus	27	5·0
12	Scheduled Castes	59	11·0
13	Scheduled Tribes	10	1·9
14	Muslims	36	6·7
15	Other religious groups	13	2·4
	Total	537	100·0

(*1) This includes Teli 13, Tanti 11, Kumbhar 6, Bania 3, Badhei 3, Kansari 4 and the other artisan Castes.

(*2) This includes Bhandari 9, Mali 11, Dumal 6, Jyotish etc. 3, and the other Caste Hindus.

TABLE NO. S.16

Sambalpur Town: Distribution of earners and non-earners in the sample population by sex

Sex	Earners	Non-earners	Total
Male	670 (56·4%)	517 (43·6%)	1,187 (100%)
Female	133 (12·2%)	955 (87·8%)	1,088 (100%)
Total	803 (35·3%)	1,472 (64·7%)	2,275 (100%)

TABLE No. S.17

Sambalpur Town: Age distribution of earners and non-earners in the sample population

Age (Groups)	Earners		Non-earners		Unemployed persons		Total	
	No.	Per cent to the total	No.	Per cent to the total	No.	Per cent to the total	No.	Per cent to the total
0- 5	1	0·1	316	21·5	—	—	317	13·9
6-10	4	0·5	265	18·0	—	—	269	11·8
11-15	12	1·6	198	13·5	2	6·3	212	9·3
16-20	51	6·6	155	10·5	7	21·9	213	9·4
21-25	102	13·2	117	7·9	13	40·6	232	10·2
26-30	138	17·9	92	6·2	4	12·5	234	10·3
31-35	109	14·2	73	5·0	2	6·3	184	8·1
36-40	117	15·2	69	4·7	1	3·1	187	8·2
41-45	88	11·4	37	2·5	—	—	125	5·5
46-50	55	7·1	35	2·4	1	3·1	91	4·0
51-55	36	4·7	33	2·2	1	3·1	70	3·1
56 and above	55	7·1	82	5·6	1	3·1	138	6·1
Not stated	3	0·4	—	—	—	—	3	0·1
Total	771	100·0	1,472	100·0	32	100·0	2,275	100·0

TABLE No. S.18

Sambalpur Town: Occupational distribution of earners in the sample population

S. No.	Main Industry	Male	Female	Total
1	Agriculture, livestock, forestry, fishing, and hunting	57	13	70 (9·1%)
2	Manufacturing	126	30	156 (20·2%)
3	Construction	29	9	38 (4·9%)
4	Electricity, gas, water, and sanitary services	19	12	31 (4·0%)
5	Distributive Services (trade and commerce)	126	23	149 (19·3%)
6	Transport, storage, and communication	36	—	36 (4·7%)
7	Services	189	31	220 (28·6%)
8	Activities not adequately described	51	13	64 (8·3%)
9	Not stated	6	1	7 (0·9%)
	Total	639	132	771 (100%)

TABLE No. S.19

Sambalpur Town: Distribution of earners in the sample according to industry, and their total annual income, in 1954-55

Serial No.	Income (in Rs.)												No. of earners who also reported other than cash income
	1 to 150	151 to 250	251 to 500	501 to 1,000	1,001 to 2,000	2,001 to 3,500	3,501 to 5,000	5,001 to 7,500	7,501 to 10,000	Above 10,000	Not stated	Total	
1	10 (14·3%)	10 (14·3%)	27 (38·6%)	15 (21·4%)	4 (5·7%)	2 (2·9%)	1 (1·4%)	—	—	—	1 (1·4%)	70 (100%)	—
2	10 (6·4%)	20 (12·8%)	50 (32·1%)	43 (27·6%)	28 (17·9%)	4 (2·6%)	1 (0·6%)	—	—	—	—	156 (100%)	—
3	5 (13·2%)	5 (13·2%)	11 (28·9%)	8 (21·0%)	5 (13·2%)	2 (5·3%)	1 (2·6%)	1 (2·6%)	—	—	—	38 (100%)	2
4	3 (9·7%)	—	20 (64·5%)	3 (9·7%)	4 (12·9%)	—	—	1 (3·2%)	—	—	—	31 (100%)	—
5	4 (2·7%)	9 (6·0%)	29 (19·5%)	37 (24·9%)	32 (21·5%)	9 (6·0%)	6 (4·0%)	9 (6·0%)	1 (0·7%)	6 (4·0%)	7 (4·7%)	149 (100%)	3
6	—	2 (5·5%)	10 (27·8%)	16 (44·4%)	6 (16·7%)	1 (2·8%)	—	—	—	—	1 (2·8%)	36 (100%)	—
7	11 (5·0%)	14 (6·4%)	55 (25·0%)	65 (29·5%)	50 (22·7%)	7 (3·2%)	2 (0·9%)	1 (0·5%)	3 (1·4%)	2 (0·9%)	10 (4·5%)	220 (100%)	—
8	3 (4·7%)	9 (14·1%)	39 (60·9%)	10 (15·6%)	3 (4·7%)	—	—	—	—	—	—	64 (100%)	—
9	2 (28·6%)	1 (14·2%)	—	2 (28·6%)	—	—	—	—	—	—	2 (28·6%)	7 (100%)	2
Total	48 (6·2%)	70 (9·1%)	241 (31·3%)	199 (25·8%)	132 (17·1%)	25 (3·3%)	11 (1·4%)	12 (1·6%)	4 (0·5%)	8 (1·0%)	21 (2·7%)	771 (100%)	7

TABLE No. S.20

Sambalpur Town: Quartile incomes of earners in industry-groups in 1954-5

Serial No.	*Quartile earnings in rupees*				
	Q1	Q2	Q3	Q1 : Q2	Q2 : Q3
1	223·50	385·26	659·33	1 : 1·72	1 : 1·71
2	296·00	491·00	930·23	1 : 1·66	1 : 1·89
3	241·00	455·54	969·75	1 : 1·89	1 : 2·13
4	310·37	407·25	542·67	1 : 1·31	1 : 1·33
5	445·96	892·89	1,860·37	1 : 2·00	1 : 2·08
6	419·75	672·87	946·31	1 : 1·60	1 : 1·41
7	376·00	693·31	1,251·00	1 : 1·84	1 : 1·80
8	276·64	379·21	481·77	1 : 1·37	1 : 1·27
9	—	—	—		
Total	323·10	541·20	1,035·09	1 : 1·67	1 : 1·91

TABLE No. S.21

Sambalpur Town: Total incomes of sample households classified according to the industry of the head in 1954-5

Serial No.	*No. of households*	*Total income of the households (Rs.)*
1	52	67,040
2	92	95,670
3	23	38,340
4	15	19,090
5	96	311,200
6	28	25,400
7	164	298,500
8	39	30,740
9	28	23,790
Total	537	909,770

Total No. of persons in the households surveyed: 2,275

Income per capita: Rs. 399·90

TABLE No. S.22

Sambalpur Town: Distribution of sample families according to total income during 1954-5

Income group	*No. of households*	*Percentage to the total*
Rs.		
1 to 150	3	0·6
151 to 250	8	1·5
251 to 500	90	16·8
501 to 1,000	194	36·1
1,001 to 2,000	138	25·7
2,001 to 3,500	45	8·4
3,501 to 5,000	21	3·9
5,001 to 7,500	6	1·1
7,501 to 10,000	6	1·1
Above 10,000	14	2·6
Not stated	12	2·2
Total	537	100·0

TABLE NO. S.27

Sambalpur Town: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Name of industrial establishment	No. of samples surveyed	No. of persons engaged									Total No. of casual and piece rate workers	Value of total capital investment (in Rs.)		Amount borrowed (in Rs.)
			Family members			Employed			Total				Fixed	Working	
			Male	Female	Total	Male	Female	Total	Male	Female	Total				
1	Pottery	4	8	7	15	—	—	—	8	7	15	—	566·00	34·50	300·00
2	Sweetmeats preparing	9	19	—	19	8	—	8	27	—	27	—	4,075·00	1,060·00	680·00
3	Bidi making	4	10	—	10	1,258	—	1,258	1,268	—	1,268	—	36,300·00	331,000·00	—
4	Sawing	5	8	—	8	54	—	54	62	—	62	—	52,000·00	105,000·00	10,000·00
5	Fishing	9	10	—	10	—	—	—	10	—	10	—	1,197·50	34·00	70·00
6	Goldsmithy	6	7	—	7	—	—	—	7	—	7	—	676·00	950·00	—
7	Tailoring	5	5	—	5	5	—	5	10	—	10	—	2,841·62	91·00	1,235·00
8	Weaving (Cotton)	3	7	2	9	—	—	—	7	2	9	—	281·00	120·00	—
9	Weaving (Tussar)	4	15	—	15	1	—	1	16	—	16	—	372·00	354·00	180·00
10	Weaving (Cotton & Tussar)	1	4	2	6	—	—	—	4	2	6	—	240·00	200·00	50·00
11	Oil pressing	2	3	1	4	—	—	—	3	1	4	—	855·00	100·00	—
12	Khil pan preparing and selling	2	3	—	3	—	—	—	3	—	3	—	30·00	43·50	30·00

TABLE No. S.27—(Contd.)

Sambalpur Town: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Name of industrial establishment	No. of samples surveyed	No. of persons engaged									Total No. of casual and piece rate workers	Value of total capital investment in Rs.		Amount borrowed (in Rs.)
			Family members			Employed			Total				Fixed	Working	
			Male	Female	Total	Male	Female	Total	Male	Female	Total				
13	Puffed rice preparing	2	4	3	7	—	—	—	4	3	7	—	312·00	102·00	40·00
14	Dairy farm	2	4	1	5	3	—	3	7	1	8	—	4,466·00	480·00	2,150·00
15	Hotel (meals)	2	4	—	4	3	—	3	7	—	7	—	6,091·00	1,045·50	—
16	Iron work (blacksmithy)	1	1	1	2	—	—	—	1	1	2	—	64·00	5·00	10·00
17	Painting	1	1	—	1	—	—	—	1	—	1	—	5·00	4·00	5·00
18	Bidi making	1	—	1	1	—	—	—	—	1	1	—	2·00	6·00	—
19	Channa preparing and selling	1	4	—	4	—	—	—	4	—	4	—	—	25·00	—
20	Furniture making	1	1	—	1	6	—	6	7	—	7	—	—	400·00	—
21	Watch repairing	1	1	—	1	—	—	—	1	—	1	—	150·00	—	—
22	Cart, etc. repairing	1	4	—	4	—	—	—	4	—	4	—	100·00	—	—
	Total	67	123	18	141	1,338	—	1,338	1,461	18	1,479	—	110,624·12	441,054·50	14,750·00

TABLE No. S.27—(Contd.)

Sambalpur Town: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Expenses during last year (in Rs.)											
	Wages and salaries paid	*Raw materials used*	*Fuel and power cost*	*Water charges*	*Transport expenses*	*Selling cost*	*Rent*	*Taxes*	*Maintenance and repair expenses*	*Total expenses (excluding depreciation)*	*Depreciation charges*	*Total expenses (including depreciation)*
1	45·00	320·00	665·00	—	—	80·00	81·00	21·25	8·75	1,221·00	10·26	1,231·26
2	1,908·00	24,579·50	2,735·75	856·00	36·00	—	2,340·00	30·75	77·00	32,563·00	132·52	32,695·52
3	279,000·00	520,392·00	3,510·00	2,400·00	9,150·00	—	3,100·00	26,184·00	—	843,736·00	—	843,736·00
4	47,107·50	—	16,309·00	1,135·00	3,000·00	—	5,172·00	8,896·50	8,650·00	90,270·00	417·76	90,687·76
5	—	381·00	—	—	—	—	48·00	94·63	63·00	586·63	109·48	696·11
6	—	27·00	151·00	—	—	—	—	39·74	85·00	302·74	32·31	335·05
7	2,700·00	1,130·50	350·00	—	—	—	840·00	9·50	189·00	5,219·00	81·76	5,300·76
8	—	1,839·50	57·00	—	—	—	—	3·75	15·00	1,915·25	6·83	1,922·08
9	—	3,639·00	92·00	—	100·00	—	72·00	3·75	75·00	3,981·75	26·83	4,008·58
10	—	4,855·00	25·00	—	15·00	—	—	4·50	60·00	4,959·50	9·21	4,968·71
11	—	1,046·00	18·00	—	24·00	—	—	16·12	20·00	1,124·12	41·43	1,165·55

TABLE NO. S.27—(Contd.)

Sambalpur Town: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Expenses during last year (in Rs.)											
	Wages and salaries paid	Raw materials used	Fuel and power cost	Water charges	Transport expenses	Selling cost	Rent	Taxes	Maintenance and repair expenses	Total expenses (excluding depreciation	Depreciation charges	Total expenses (including depreciation)
12	—	1,601·75	46·00	—	—	—	96·00	—	1·25	1,745·00	2·01	1,747·01
13	105·00	1,087·00	415·00	—	—	—	—	—	—	1,607·00	3·25	1,610·25
14	878·00	2,840·00	82·00	—	—	—	144·00	—	—	3,944·00	158·48	4,102·48
15	900·00	2,986·00	1,156·00	60·00	20·00	—	1,320·00	90·00	40·00	6,572·00	80·28	6,652·28
16	—	180·00	20·00	—	—	—	—	—	—	200·00	2·41	202·41
17	—	50·00	—	—	—	—	—	—	—	50·00	4·00	54·00
18	—	360·00	12·00	—	—	—	30·00	—	—	402·00	0·73	402·73
19	—	200·00	84·00	—	—	—	—	9·00	—	293·00	0·75	293·75
20	2,400·00	2,530·00	—	—	500·00	—	180·00	7·00	—	5,617·00	—	5,617·00
21	—	1,350·00	—	—	24·00	—	360·00	24·00	—	1,758·00	3·21	1,761·21
22	—	—	240·00	—	—	—	—	9·00	5·00	254·00	0·13	254·13
Total	335,043·50	571,394·25	25,967·75	4,451·00	12,869·00	80·00	13,783·00	35,443·49	9,289·00	1,008,320·99	1,123·64	1,009,444·63

TABLE No. S.27—(Contd.)

Sambalpur Town: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	*Value of total production last year* (*in Rs.*)	*Gross receipts*			*Total gross receipts last year* (*in Rs*).	*Net income last year** (*in Rs.*)
		Value of sale last year (*in Rs.*)	*Receipts from repairs, etc. last year* (*in Rs.*)	*Receipts from wages last year* (*in Rs.*)		
1	2,214·56	2,215·00	—	—	2,215·00	994·00
2	45,260·00	46,160·00	—	—	46,160·00	13,597·00
3	947,000·00	947,000·00	—	—	947,000·00	103,264·00
4	—	—	—	283,187·00	283,187·00	192,917·00
5	7,800·00	7,800·00	—	—	7,800·00	7,213·37
6	—	—	326·00	2,675·50	3,001·50	2,698·76
7	—	—	12·00	7,310·00	7,322·00	2,103·00
8	3,300·00	3,300·00	—	—	3,300·00	1,384·75
9	8,805·00	9,925·00	—	—	9,925·00	5,943·25
10	8,424·00	8,440·00	—	—	8,440·00	3,480·50
11	2,056·00	2,056·00	—	—	2,056·00	931·88
12	6,060·00	6,060·00	—	—	6,060·00	4,315·00

* Gross receipts minus expenses excluding depreciation.

TABLE No. S.27—(Contd.)

Sambalpur Town: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Value of total production last year (in Rs.)	Gross receipts			Total gross receipts last year (in Rs.)	Net income last year* (in Rs.)
		Value of sale last year (in Rs.)	Receipts from repairs etc. last year (in Rs.)	Receipts from wages last year (in Rs.)		
13	1,880·00	1,880·00	—	—	1,880·00	273·00
14	9,225·00	9,225·00	—	—	9,225·00	5,281·00
15	8,114·25	8,114·25	—	—	8,114·25	1,542·25
16	300·00	360·00	—	—	360·00	160·00
17	500·00	500·00	—	—	500·00	450·00
18	540·00	540·00	—	—	540·00	138·00
19	490·00	490·00	—	—	490·00	197·00
20	5,770·00	5,770·00	—	—	5,770·00	153·00
21	—	—	1,800·00	—	1,800·00	42·00
22	—	—	1,500·00	—	1,500·00	1,246·00
Total	1,057,738·81	1,059,835·25	3,638·00	293,172·50	1,356,645·75	348,324·76

* Gross receipts minus expenses excluding depreciation.

TABLE NO. S.28

Sambalpur Town : Turnover, expenses, etc., of trading establishments dealing in different commodities in 1954-5

Serial No.	Name of trade	No. of establishments surveyed	Total capital invested (Rs.)	Approximate value of store on the day of visit (Rs.)	Total annual turnover (Rs.)	No. of persons employed						Expenses during last year (in Rs.)			
						Family members		Employees		Total		Wages and salaries paid	Rent paid shop and godown	Light charges	Total
						Male	Female	Male	Female	Male	Female				
1	Stationery shop	16	17,380·00	28,520·00	83,325·00	16	—	1	—	17	—	240·00	2,550·00	643·05	3,433·05
2	Vegetable shop	7	267·05	182·75	13,344·00	5	6	—	—	5	6	—	336·00	—	336·00
3	Grocery shop	16	18,056·00	17,840·00	78,880·00	19	2	2	—	21	2	324·00	2,182·00	426·00	2,932·00
4	Betel shop	13	1,240·00	1,329·05	26,530·00	16	—	—	—	16	—	—	480·00	114·00	594·00
5	Fuel business	3	1,315·00	968·00	8,968·00	4	1	3	—	7	1	1,440·00	468·00	—	1,908·00
6	Cloth shop	10	29,500·00	55,800·00	160,900·00	14	—	2	—	16	—	1,152·00	3,000·00	429·00	4,581·00
7	Fish selling	3	240·00	330·00	10,100·00	2	3	—	—	2	3	—	—	—	—
8	Petrol & kerosene selling	2	19,000·00	10,300·00	220,000·00	2	—	5	—	7	—	1,740·00	1,680·00	408·00	3,828·00
9	Electrical store	2	28,000·00	27,000·00	15,900·00	2	—	2	—	4	—	1,080·00	360·00	84·00	1,524·00
10	Seja selling	1	50·00	200·00	1,000·00	1	—	—	—	1	—	—	120·00	—	120·00
11	Ornament selling	1	5,000·00	10,000·00	20,000·00	1	—	—	—	1	—	—	—	120·00	120·00
12	Liquor selling	1	2,000·00	1,500·00	3,600·00	1	—	—	—	1	—	—	—	—	—
13	Painting	1	4,000·00	6,080·00	2,000·00	1	—	1	—	2	—	540·00	—	288·00	828·00
	Total	76	126,048·05	160,049·80	644,547·00	84	12	16	—	100	12	6,516·00	11,176·00	2,512·00	20,204·05

CUTTACK CITY*

Population: The population of Cuttack city in 1951 was 102,505, just about double of what it was in 1901. Going back to the times before 1901, the population figures for 1881 and 1891 show that the population of the city was 42,656 and 47,186 respectively in those years. However, these figures are not comparable with those for 1901, etc., because the latter belong to the area within city limits as it was in 1951. The broad idea conveyed by the pre-1901 figures is that the population of the city was increasing during the preceding decades but presumably not very rapidly. The Census Report for 1901 recorded that the population of Cuttack city increased by nine per cent during the decade 1891-1901 and that "the advent of the railway has doubtless been the main factor in the somewhat rapid increase." [1]

During 1901-1911 the population increased by 2·2 per cent. Even this increase was possibly mainly accounted for by the extension of the area of the city. The Census Report of 1911 observed: "In that year (1901) it contained a detachment of the Madras regiment but it has since ceased to be a military station and there is consequently a slightly less of population on that account", and a footnote contains the information that "the old Cantonment has been absorbed by the Municipality. Its population at the time of the census was 3,508." [2]

In the next decade the population of the city recorded a decline of about three per cent and that was largely due to the mortality caused by the influenza epidemic of 1918. [3]

Between 1921 and 1931 the population recorded an increase of 28 per cent which according to the Census Report of 1931 might be regarded as representing little more than the natural growth since 1911. "To some extent the population of this town was temporarily augmented in 1931 by the presence of a fairly large staff engaged in settlement work." [4]

In the next decade there was an increase of about 14 per cent. Cuttack, in 1937, gained the status of a provincial capital when Orissa was made an in-

* As noted earlier the survey of families in Cuttack town was not directly carried out by us but by the Utkal University. The sampling design and the questionnaire used were, however, almost identical with those in the surveys of Puri and Sambalpur carried out by us. The data was tabulated by the Utkal University team to suit their purposes, and tables prepared by them were not necessarily similar or comparable with similar tables prepared by us for Puri and Sambalpur towns and presented here. In this section on Cuttack town we have presented the tables similar to ours prepared by the Utkal University team, with only a few comments. The full report of the investigation will be made available by the Utkal University in the near future. We are grateful to them for allowing us to make use of the tables presented here.

1 Census of India, 1901, Vol. VI, Bengal, Part I, Report—1902, p. 33.

2 Census of India, 1911, Bengal, Bihar, and Orissa, Part I—Report, 1913, p. 39.

3 Census of India, 1921, Vol. VII, Part I—Report, Bihar, and Orissa, 1923, p. 88.

4 Census of India, 1931, Vol. VII, Bihar and Orissa, Part I—Report 1933, p. 97.

dependent province, and a part of the increase in the population of the city must have been due to migration of government officers and offices to Cuttack which were formerly not there. During 1941-51 came the largest increase so far in the city population amounting to 38 per cent.

The 10 per cent sample investigated by the Utkal University inquiry in 1954-55 contained 10,286 persons. This gives an estimate of the population of the city in that year as almost the same as in 1951. In a way this was not surprising because the new capital of Orissa, Bhuvaneshwar, was slowly drawing away government offices and personnel from Cuttack for the last 4-5 years, and Cuttack was gradually ceasing to be the capital of the State. That in the face of this it was maintaining its population may indicate that it had not stopped growing in other respects.

The following figures give the number of females for 1,000 males in Cuttack at each of the censuses since 1901.

1901	1911	1921	1931	1941	1951
855	845	870	795	786	757

If the figure for 1921 is ignored, there is a continuous decreasing tendency for the number of females to males. The 1921 figure is affected by the heavy mortality due to the influenza epidemic and may be ignored as being not normal. The growing deficiency of females may indicate growing male imigration and urbanization.

Caste composition: Table No. C.15 gives the classification of sample families according to community. In the total population 45 per cent were Caste Hindus, 16 per cent were Scheduled Castes, and 23 per cent other backward classes. The rest about 16 per cent belonged to other religions like Mohammedanism, Christianity, etc. Among the Caste Hindus, the three large groups were of Brahmins, Karan, Mahanty and Kayastha, and Khatriya and Khandayats. They were 10.7 per cent, 12 per cent and 11.8 per cent respectively in the total population. Next to these came Keuta, Dhibara and Kaibarta and Gauda and other Caste Hindus each accounting for a little less than five per cent of the total population. Among the Scheduled Castes the most numerous were Bauri, Pana and Mahantar and Hadi. The Muslims formed nine per cent of the total population and the Christians accounted for a little over four per cent.

Size of the family: Table No. C.23 gives the classification of sample families by caste and size. The largest concentration was in families with three to six members. These categories contained nearly 53 per cent of the total families in the sample. Five-member and six-member families were a little more than 14 per cent each, while four-member families were about 13 per cent. Three-member families formed 11 per cent of the total families in the sample. The average size of the family was 5.5.

Age, sex, earner and non-earner: Table No. C.16-17 classifies the sample population by age, sex, earner, and non-earner. The number of females per

1,000 males in the sample was 923, much higher than in the census. This was due to the sample being a household sample which excluded the predominantly male population of institutions, etc. which the census included. The adult population formed 61 per cent of the population. The proportion of adults among males was higher than that among females, perhaps a typical characteristic of an urban population.

About 27 per cent of the sample population were earners. For each earner in the population there were 2.68 non-earners. Among male adults 80 per cent were earners. Among adult females only six per cent were earners. There were very few non-adult earners in the sample.

Occupational distribution of earners: Table No. C.19 gives the distribution of earners in the sample according to their occupational and income class. The earners are grouped here, unlike in Puri or Sambalpur, not according to industry but according to their occupations.

The largest group of earners (18.7 per cent) was engaged in sale and related occupations, while the second largest group containing 13.5 per cent of the total earners was in printing and miscellaneous processing, etc. Agriculture, hunting, mining, etc. accounted for 7.4 per cent of the total earners. The median income of all earners was Rs. 446. The middle 50 per cent of incomes ranged between Rs. 272 and Rs. 744.

Family income and occupation: Table No. C.24 presents the distribution of the heads of sample families by their occupation and the total incomes of their families.

Broadly speaking the occupational distribution of earners discussed earlier and that of the heads of sample families was similar, except in the category of pensioners, unemployed, beggars, etc. This category contained nearly 11 per cent of the total of heads of families in the samples. Only 1.6 per cent of the total earners in the sample were in that category.

The median family income in the sample was Rs. 656 while the first and third quartile incomes were Rs. 389 and Rs. 1,282 respectively.

TABLE NO. C.15

Cuttack City: Sample families classified by caste and community

Sr. No.	*Caste*	*No. of families*	*Per cent to the total*
1	Brahmin	200	10·7
2	Karan, Kayastha	225	12·0
3	Khatriya, Khandayat	220	11·8
4	Chasa, Pradhan	26	1·4
5	Jotish, Jogi and Baishnba	32	1·7
6	Tanti, Meher, Rangani, Patra, Bhulia	39	2·1
7	Kumbhar	19	1·0
8	Kamar	11	0·6
9	Teli, Kuber	83	4·5
10	Kanshari	4	0·2
11	Bania	38	2·0
12	Badhai	17	0·9
13	Chitrakar	4	0·2
14	Keuta, Dhibara and Kaibarta	92	4·9
15	Gudia	30	1·6
16	Gauda	90	4·8
17	Barik	37	2·0
18	Marwari, Agarwal	22	1·2
19	Telugus	62	3·3
20	Marahatta	3	0·2
21	Other Caste Hindus	89	4·8
22	Dhoba	37	2·0
23	Mehantar and Hadi	28	1·5
24	Pana	32	1·7
25	Other Scheduled Castes	98	5·3
26	Scheduled Tribes	15	0·8
27	Muslims	170	9·1
28	Christians	78	4·2
29	Sikhas	5	0·3
30	Other religions	2	0·1
31	Not stated	58	3·1
	Total	1,866	100·0

TABLE NO. C.16-17

Cuttack City: Sex and age distribution of earners and non-earners in the sample population

S. No.	Age groups	Earners			Non-earners			Total population			Per cent to the total
		Male	Female	Total	Male	Female	Total	Male	Female	Total	
1	0-4 years	2	1	3	711	684	1,395	713	685	1,398	13·6
2	5-14 „	10	2	12	1,377	1,277	2,654	1,387	1,279	2,666	25·9
3	15-24 „	479	28	507	412	838	1,250	891	866	1,757	17·1
4	25-34 „	717	55	772	31	686	717	748	741	1,489	14·5
5	35-44 „	649	44	693	7	495	502	656	539	1,195	11·6
6	45-54 „	462	37	499	22	379	401	484	416	900	8·8
7	55-64 „	195	16	211	66	218	284	261	234	495	4·8
8	65-74 „	76	4	80	52	115	167	128	119	247	2·4
9	75 years and above	18	2	20	45	60	105	63	62	125	1·2
10	Not stated	—	—	—	5	9	14	5	9	14	0·1
	Total	2,608	189 (27·2%)	2,797	2,728	4,761 (72·8%)	7,489	5,336	4,950 (100%)	10,286	100·0

15 years and above — Adults 60·5%

Less than 15 years — Non-adults 39·5%

TABLE No. C.19

Cuttack City: Distribution of earners in the sample according to main occupation, and their total annual income in 1954-5

Serial No.	Name of occupation	Annual income (in Rs.)											Total
		1-150	151-250	251-500	501-1,000	1,001-2,000	2,001-3,500	3,501-5,000	5,001-7,500	7,501-10,000	10,001 & above	Not stated	
1	Managerial, administrative, and executive occupations	—	—	—	1	3	3	7	6	3	6	—	29(1·1)
2	Professional, technical and related occupations	4	6	37	61	35	38	18	12	6	6	5	228(8·9)
3	Subordinate administrative and executive occupations	6	6	122	141	39	17	3	—	1	1	1	337(13·0)
4	Ministerial occupations	—	—	7	44	127	27	6	—	—	1	—	212(8·2)
5	Sales and related occupations	15	37	163	149	64	21	16	4	6	8	5	488(18·8)
6	Agriculture, hunting, mining, food processing, etc.	13	21	96	50	7	4	—	—	—	—	1	192(7·4)
7	Textiles, leather, woodwork, etc.	9	11	72	89	9	—	—	—	—	—	—	190(7·3)
8	Construction, general engineering, and related occupations	4	9	69	111	42	6	1	1	—	—	—	243(9·4)
9	Transport and communications, other production, etc.	—	8	37	44	22	2	—	—	—	—	—	113(4·3)
10	Printing, miscellaneous processes, etc.	43	68	168	58	8	—	1	—	—	—	2	348(13·4)
11	Service occupations	23	14	46	50	15	6	1	1	3	2	11	172(6·6)
12	Pensioner, unemployed and beggar, etc.	1	—	1	1	3	1	—	1	—	—	34	42(1·6)
	Total	118	180	818	799	374	125	53	25	19	24	59	2,594(100%)

Numbers in brackets indicate percentage to the total.

TABLE No. C.23

Cuttack City: Distribution of sample families according to caste and family size

No. of persons in the family	Castes				Total	
	Caste Hindus and backward classes	Scheduled Tribes	Scheduled Castes	Other religions	No. of families	Per cent to the total
1	123	2	16	12	153	8·2
2	106	—	28	14	148	7·9
3	141	3	45	19	208	11·2
4	158	4	47	30	239	12·8
5	176	2	52	35	265	14·2
6	181	2	47	39	269	14·4
7	121	—	30	38	189	10·1
8	103	1	20	20	144	7·7
9 and 10	101	—	13	22	136	7·3
11 and above	71	—	18	26	115	6·2
Total	1,281 (68·6%)	14 (0·8%)	316 (16·9%)	255 (13·7%)	1,865 (100%)	100·0

The average size of the family—5·5 members.

TABLE NO. C.24

Cuttack City: Distribution of sample families according to the occupation of the head and total annual income in 1954-5

Serial No.	Occupation of the head of the family	Total income (in Rs.)											Total
		1-150	151-250	251-500	501-1,000	1,001-2,000	2,001-3,500	3,501-5,000	5,001-7,500	7,501-10,000	10,001- & above	Not stated	
1	Managerial, administrative, and executive	—	—	—	—	2	2	2	8	3	7	—	24(1·3)
2	Professional, technical and related occupations	—	4	13	38	31	38	16	16	8	8	—	172(9·2)
3	Subordinate administrative and executive	—	3	44	129	50	18	7	—	1	2	—	254(13·6)
4	Ministerial	—	—	1	21	78	31	9	—	—	2	—	142(7·6)
5	Sale and related occupations	3	13	57	94	82	24	9	6	3	9	—	300(16·1)
6	Agriculture, hunting, mining, and food processing	3	9	34	48	16	6	—	1	2	—	—	119(6·4)
7	Textile, leather, and wood-work	—	6	22	64	15	3	1	—	—	—	—	111(5·9)
8	Construction, general engineering, and electrical	—	2	22	65	49	10	3	—	—	—	—	151(8·1)
9	Transport and communications	—	—	24	37	20	5	—	1	—	—	—	87(4·7)
10	Printing, miscellaneous and other production process	6	16	80	69	19	6	—	—	—	—	—	196(10·5)
11	Service occupation	8	12	15	33	20	10	5	1	1	3	—	108(5·8)
12	Pensioners, unemployed, beggars, and not stated	6	7	32	56	44	32	10	5	2	6	2	202(10·8)
	Total	26	72	344	654	426	185	62	38	20	37	2	1,866(100%)

Figures in brackets indicate percentage.

TABLE No. C.27

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Name of the industrial establishments	No. of samples surveyed	No. of persons engaged									Total no. of casual and piece-rate workers	Value of total capital investment (in Rs.)		Amount borrowed (in Rs.)
			Family members			Employees			Total				Fixed	Working	
			Male	Female	Total	Male	Female	Total	Male	Female	Total				
1	Restaurant	43	58	17	75	25	—	25	83	17	100	—	1,388·62	608·00	612·00
2	Hotel	19	26	—	26	53	1	54	79	1	80	—	1,038·50	7,439·00	3,000·00
3	Baramaja, (preparing and selling)	1	1	—	1	—	—	—	1	—	1	—	20·00	—	—
4	Chana Chur,(preparing and selling)	1	1	—	1	—	—	—	1	—	1	—	3·00	—	—
5	Bakery	2	3	—	3	—	—	—	3	—	3	—	12·00	—	—
6	Goldsmithy	32	65	—	65	30	—	30	95	—	95	20	470·50	6,580·05	6,530·00
7	Mason	35	37	—	37	—	—	—	37	—	37	—	47·37	—	—
8	Dairy	9	16	5	21	2	—	2	18	5	23	—	48·12	352·00	220·00
9	Carpenter	15	22	—	22	6	—	6	28	—	28	—	107·00	2,920·00	3,000·00
10	Pottery	11	21	3	24	3	—	3	24	3	27	7	—	3,076·05	10,000·00
11	Fishing	20	43	1	44	—	—	—	43	1	44	—	138·50	72·50	140·00
12	Weaving	29	41	32	73	—	—	—	41	32	73	7	144·00	1,384·00	250·00
13	Tailoring	28	38	2	40	5	—	5	43	2	45	1	1,693·69	2,023·00	3,375·00
14	Blacksmithy	6	8	—	8	1	—	1	9	—	9	—	5·00	82·00	10·00
15	Bamboo-work	7	11	7	18	—	—	—	11	7	18	—	44·00	55·00	—
16	Horn-work	5	6	—	6	—	—	—	6	—	6	—	95·00	155·00	—
17	Painting and polishing	2	3	—	3	—	—	—	3	—	3	—	—		—
18	Block making	2	2	—	2	2	—	2	4	—	4	—	—	250·00	—
19	Fireworks	1	2	—	2	—	—	—	2	—	2	—	—	—	—
20	Manufacture of palm leaf walls	2	3	—	3	—	—	—	3	—	3	—	3·00	15·00	—

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Name of the industrial establishments	No. of samples surveyed	No. of persons engaged									Total no. of casual and piece-rate workers	Value of total capital investment (in Rs.)		Amount borrowed (in Rs.)
			Family members			Employees			Total				Fixed	Working	
			Male	Female	Total	Male	Female	Total	Male	Female	Total				
21	Preparing and selling of gundi	1	1	1	2	—	—	—	1	1	2	—	—	50·00	—
22	Manufacture of lime from shells	1	3	—	3	—	—	—	3	—	3	—	50·00	500·00	—
23	Preparing and selling cow-dung cakes	1	—	1	1	—	—	—	—	1	1	—	0·75	—	—
24	Selling meat	2	4	—	4	—	—	—	4	—	4	—	—	160·00	—
25	Brass pot making	2	3	—	3	—	—	—	3	—	3	—	46·00	90·00	—
26	Tin repairing	1	2	—	2	—	—	—	2	—	2	—	1·05	5·00	—
27	Washerman (laundry)	1	1	1	2	1	—	1	2	1	3	—	47·00	50·00	40·00
28	Manufacture of medicines	6	7	1	8	6	—	6	13	1	14	—	3·00	265·00	—
29	Idol making	7	7	1	8	1	—	1	8	1	9	—	25·00	67·00	—
30	Cloth-dyeing	2	5	—	5	15	—	15	20	—	20	—	18,072·00	20,325·00	—
31	Tying ornaments by thread	2	2	2	4	—	—	—	2	2	4	—	—	205·00	—
32	Book-binding	2	2	—	2	—	—	—	2	—	2	—	—	3·00	—
33	Manufacture of oil by ghani	3	3	4	7	1	—	1	4	4	8	—	74·00	35·00	50·00
34	Shoe-making	9	11	—	11	—	—	—	11	—	11	—	—	104·00	466·00
35	Tea preparing and selling	2	2	—	2	—	—	—	2	—	2	—	2·00	10·00	—
36	Tiffin preparing and selling	1	1	—	1	—	—	—	1	—	1	—	4·31	1·00	140·00
37	Confectionary	1	3	—	3	6	—	6	9	—	9	—	7,500·00	1,000·00	—
38	Silversmithy	1	2	—	2	—	—	—	2	—	2	—	—	—	1,200·00
39	Flower garland making and selling	3	4	4	8	—	—	—	4	4	8	—	3·25	6·00	—

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Name of the industrial establishment	No. of samples surveyed	No. of persons engaged									Total no. of casual and piece rate workers	Value of total capital investment (in Rs.)		Amount borrowed (in Rs.)
			Family members			Employees			Total				Fixed	Working	
			Male	Female	Total	Male	Female	Total	Male	Female	Total				
40	Paper packets making	2	2	1	3	—	—	—	2	1	3	—	—	40·00	—
41	Hair cutting saloon	4	6	—	6	2	—	2	8	—	8	—	480·00	3·50	125·00
42	Aerated water preparing	1	1	—	1	—	—	—	1	—	1	—	—	100·00	—
43	Hair oil preparing and selling	1	1	—	1	5	—	5	6	—	6	—	—	8,000·00	—
44	Repairing of fountain pens	1	2	—	2	—	—	—	2	—	2	—	—	—	—
45	Repairing of umbrellas	3	3	—	3	—	—	—	3	—	3	—	4·05	25·00	—
46	Gunny repairing	1	1	—	1	—	—	—	1	—	1	—	—	4·00	—
47	Printing press	1	1	1	2	2	—	2	3	1	4	—	—	250·00	2,000·00
48	Hat making	1	1	—	1	—	—	—	1	—	1	2	—	—	—
49	Contractor	2	—	—	—	—	—	—	—	—	—	—	—	—	—
50	Bidi making	2	2	—	2	—	—	—	2	—	2	—	2·50	—	—
51	Gudakhu manufacturing	1	3	—	3	—	—	—	3	—	3	—	—	500·00	3,000·00
52	Tin-smithy (making)	2	3	—	3	—	—	—	3	—	3	—	—	12·00	—
53	Rickshaw repairing garage	3	4	—	4	—	—	—	4	—	4	—	—	—	—
54	Watch repairing	2	2	—	2	—	—	—	2	—	2	—	—	300·00	—
55	Cycle repairing	3	2	—	2	—	—	—	2	—	2	—	5·00	15·00	—
	Grand Total	348	504	84	588	166	1	167	670	85	755	37	31,578·21	57,137·10	34,158·00

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Expenses during last year (in Rs.)											
	Wages and salaries paid	*Raw materials used*	*Fuel and power charges*	*Water charges*	*Transport expenses*	*Selling cost*	*Rent paid*	*Taxes paid*	*Maintenance and repairing expenses*	*Total expenses (excluding depreciation)*	*Depreciation charges*	*Total (including depreciation)*
1	8,004·00	88,084·48	9,591·50	276·00	118·50	15·00	4,245·00	594·96	73·00	111,002·44	650·95	111,653·39
2	12,669·00	74,543·62	9,705·88	—	781·00	—	6,170·00	1,057·00	425·00	105,351·50	498·41	105,849·91
3	—	286·00	26·25	—	—	—	—	—	—	312·25	7·61	319·86
4	—	574·00	90·00	—	—	—	—	—	—	664·00	1·97	665·97
5	—	2,064·00	107·35	—	—	—	—	58·00	—	2,229·35	0·96	2,230·31
6	14,820·00	122,924·64	3,728·50	—	—	315·00	3,516·00	259·62	137·00	145,700·76	617·11	146,317·87
7	—	—	—	—	—	—	—	24·00	126·00	150·00	111·50	261·50
8	360·00	9,299·00	865·00	—	—	—	120·00	216·75	—	10,860·75	70·41	10,931·16
9	3,822·20	22,997·50	96·00	—	517·00	—	—	5·00	105·00	27,542·70	155·57	27,698·27
10	1,100·00	2,831·00	3,574·00	5·00	22·00	20·00	20·00	104·87	20·00	7,696·87	154·38	7,851·25
11	—	349·25	30·00	—	—	—	60·00	167·00	135·00	741·25	291·16	1,032·41
12	652·00	40,115·00	692·50	—	—	—	550·40	125·62	123·00	42,258·52	187·57	42,446·09
13	3,150·00	10,525·28	730·25	—	—	3·00	600·00	261·56	611·00	15,881·09	840·37	16,721·46
14	360·00	2,305·00	293·05	—	—	—	72·00	—	—	3,030·05	6·53	3,036·58
15	—	1,530·62	—	—	—	—	24·00	—	9·50	1,564·12	2·25	1,566·37
16	480·00	2,594·00	185·50	—	40·00	—	—	—	15·00	3,314·50	77·40	3,391·90
17	—	—	—	—	—	—	—	—	—	—	16·11	16·11
18	600·00	765·37	95·00	—	60·00	30·00	—	18·00	50·00	1,618·37	1·39	1,619·76
19	500·00	245·00	—	—	—	5·00	36·00	62·00	3·00	851·00	2·85	853·85
20	—	470·00	—	—	—	—	—	7·05	3·50	480·55	4·86	485·41

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Expenses during last year (in Rs.)											
	Wages and salaries paid	*Raw materials used*	*Fuel and power charges*	*Water charges*	*Transport expenses*	*Selling cost*	*Rent paid*	*Taxes paid*	*Maintenance and repairing expenses*	*Total expenses (excluding depreciation)*	*Depreciation charges*	*Total (including depreciation)*
21	—	1,440·00	20·00	—	—	—	—	—	—	1,460·00	0·78	1,460·78
22	250·00	2,012·00	300·00	—	300·00	—	—	240·00	2·00	3,104·00	24·74	3,128·74
23	—	—	—	—	—	—	—	—	—	—	0·75	0·75
24	—	7,100·00	10·00	—	150·00	—	180·00	300·00	10·00	7,750·00	12·17	7,762·17
25	—	1,881·00	70·00	—	—	—	—	—	19·00	1,970·00	26·75	1,996·75
26	—	87·25	15·00	—	—	—	—	—	—	102·25	1·91	104·16
27	600·00	214·50	320·00	—	—	—	240·00	—	—	1,374·50	8·95	1,383·45
28	1,284·00	3,666·00	479·00	—	—	178·00	240·00	6·00	37·00	5,890·00	115·08	6,005·08
29	300·00	2,065·50	447·00	—	—	—	—	38·00	—	2,850·50	50·35	2,900·85
30	7,385·00	33,446·87	1,705·00	—	500·00	—	1,800·00	253·00	215·12	45,304·99	543·59	45,848·58
31	—	288·75	5·00	—	—	—	240·00	21·62	5·00	560·37	6·68	567·05
32	—	59·00	4·50	—	—	—	—	2·00	5·50	71·00	3·65	74·65
33	300·00	—	—	—	82·00	—	—	25·00	130·00	537·00	80·85	617·85
34	—	4,136·75	—	—	—	—	72·00	—	46·00	4,254·75	16·61	4,271·36
35	—	1,207·50	32·00	—	—	—	—	—	—	1,239·50	9·00	1,248·50
36	—	250·00	50·00	—	—	—	—	—	2·00	302·00	5·25	307·25
37	90·00	1,295·05	94·00	—	130·00	10·00	—	120·00	—	1,739·05	1,176·66	2,915·71
38	—	50·00	700·00	—	—	—	300·00	—	400·00	1,450·00	101·25	1,551·25
39	—	535·50	15·00	—	—	—	—	—	1·50	552·00	14·34	566·34
40	—	1,134·00	—	—	—	—	—	—	—	1,134·00	3·74	1,137·74

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Expenses during last year (in Rs.)											
	Wages and salaries paid	*Raw materials used*	*Fuel and power charges*	*Water charges*	*Transport expenses*	*Selling cost*	*Rent paid*	*Taxes paid*	*Maintenance and repairing expenses*	*Total expenses (excluding depreciation)*	*Depreciation charges*	*Total (including depreciation)*
41	933·33	320·00	95·05	—	135·00	—	720·00	28·06	177·00	2,408·44	78·36	2,486·80
42	240·00	80·00	—	—	—	—	—	28·00	—	348·00	—	348·00
43	2,820·00	7,000·00	370·00	—	300·00	4,000·00	—	371·05	150·00	15,011·05	103·05	15,114·10
44	—	2,616·00	—	—	—	—	90·00	—	1·00	2,707·00	3·01	2,710·01
45	—	293·31	—	—	—	—	—	9·50	6·00	308·81	5·83	314·64
46	—	100·00	—	—	—	—	—	—	—	100·00	1·00	101·00
47	1,200·00	349·00	120·00	—	—	—	65·00	15·00	—	1,749·00	275·16	2,024·16
48	800·00	940·00	—	—	5·00	—	—	8·00	—	1,753·00	11·09	1,764·09
49	—	—	—	—	—	—	—	—	—	—	—	—
50	—	—	—	—	—	—	—	—	1·00	1·00	0·83	1·83
51	24·00	503·05	53·25	—	12·00	—	—	12·00	5·00	609·30	2·68	611·98
52	—	2,906·00	245·00	—	30·00	—	—	—	100·00	3,281·00	44·65	3,325·65
53	—	—	—	—	—	—	—	24·00	25·00	49·00	3·02	52·02
54	—	—	—	—	—	—	60·00	—	5·00	65·00	6·35	71·35
55	—	160·00	3·00	—	—	—	84·00	—	5·00	252·00	36·17	288·17
Grand Total	62,743·53	458,640·79	34,963·58	281·00	3,182·50	4,576·00	19,504·40	4,462·66	3,184·12	591,538·58	6,473·66	598,012·24

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Value of total production last year (in Rs.)	Value of sale last year (in Rs.)	Receipts from repairs last year (in Rs.)	Receipts from wages last year (in Rs.)	Total gross receipts last year (in Rs.)	Net income last year (in Rs.)
1	161,844·37	161,844·37	—	—	161,844·37	50,841·93
2	130,062·00	128,562·00	—	—	128,562·00	23,210·50
3	832·50	832·50	—	—	832·50	520·25
4	1,080·00	1,080·00	—	—	1,080·00	416·00
5	2,875·00	2,875·00	—	—	2,875·00	645·65
6	99,381·25	144,381·25	6,570·00	47,681·25	198,632·50	52,931·74
7	—	—	5,980·00	13,060·00	19,040·00	18,890·00
8	19,595·00	19,595·00	—	—	19,595·00	8,734·25
9	46,545·00	46,545·00	8,065·00	1,720·00	56,330·00	28,787·30
10	14,701·25	12,456·25	—	—	12,456·25	4,759·38
11	16,675·00	16,675·00	100·00	—	16,775·00	16,033·75
12	58,869·25	58,854·25	—	1,062·50	59,916·75	17,658·23
13	7,390·00	7,390·00	1,002·00	24,545·75	32,937·75	17,056·66
14	4,760·00	4,760·00	450·00	120·00	5,330·00	2,299·95
15	4,325·00	4,200·00	—	—	4,200·00	2,635·88
16	5,600·00	5,600·00	—	800·00	6,400·00	3,085·50
17	—	—	—	1,050·00	1,050·00	1,050·00
18	4,425·00	4,425·00	—	—	4,425·00	2,806·63
19	2,405·00	2,405·00	—	—	2,405·00	1,554·00
20	555·00	555·00	—	850·00	1,405·00	924·45

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	*Value of total production last year* (*in Rs.*)	*Value of sale last year* (*in Rs.*)	*Receipts from repairs last year* (*in Rs.*)	*Receipts from wages last year* (*in Rs.*)	*Total gross receipts last year* (*in Rs.*)	*Net income last year* (*in Rs.*)
21	2,400·00	2,400·00	—	—	2,400·00	940·00
22	3,960·00	3,960·00	—	—	3,960·00	856·00
23	125·00	125·00	—	—	125·00	125·00
24	10,275·00	10,275·00	—	—	10,275·00	2,525·00
25	5,500·00	5,500·00	—	—	5,500·00	3,530·00
26	2,000·00	2,000·00	100·00	—	2,100·00	1,997·75
27	—	—	—	2,694·00	2,694·00	1,319·50
28	9,190·00	9,190·00	—	1,950·00	11,140·00	5,250·00
29	4,800·00	4,770·00	—	560·00	5,330·00	2,479·50
30	78,450·00	78,450·00	—	—	78,450·00	33,145·01
31	1,777·50	1,777·50	—	—	1,777·50	1,217·13
32	—	—	35·00	490·00	525·00	454·00
33	—	—	—	3,136·00	3,136·00	2,599·00
34	5,494·00	5,142·00	2,900·00	2,000·00	10,042·00	5,787·25
35	1,900·00	1,900·00	—	—	1,900·00	660·50
36	337·05	337·05	—	—	337·05	35·05
37	1,860·00	1,860·00	—	—	1,860·00	120·95
38	1,500·00	1,500·00	—	—	1,500·00	50·00
39	2,291·87	2,291·87	50·00	—	2,341·87	1,789·87
40	1,670·00	1,670·00	—	—	1,670·00	536·00

TABLE No. C.27—(Contd.)

Cuttack City: Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

S. No.	Value of total production last year (in Rs.)	Value of sale last year (in Rs.)	Receipts from repairs last year (in Rs.)	Receipts from wages last year (in Rs.)	Total gross receipts last year (in Rs.)	Net income last year (in Rs.)
41	5,900·00	5,900·00	—	—	5,900·00	3,491·56
42	478·15	478·15	—	—	478·15	130·15
43	30,000·00	25,000·00	—	—	25,000·00	9,988·95
44	2,800·00	2,800·00	2,500·00	—	5,300·00	2,593·00
45	—	—	2,010·00	—	2,010·00	1,701·19
46	—	—	700·00	—	700·00	600·00
47	2,000·00	2,000·00	—	—	2,000·00	251·00
48	2,500·00	2,200·00	—	—	2,200·00	447·00
49	—	—	—	—	—	—
50	—	—	—	798·00	798·00	797·00
51	960·00	960·00	—	—	960·00	350·70
52	7,500·00	7,500·00	—	625·00	8,125·00	4,844·00
53	—	—	1,200·00	—	1,200·00	1,151·00
54	—	—	730·00	—	730·00	665·00
55	—	—	1,000·00	—	1,000·00	748·00
Grand Total	767,589·19	803,022·19	33,392·00	103,142·50	939,556·69	348,018·11

TABLE NO. C.28

Cuttack City : Turnover, expenses, etc., of trading establishments dealing in different commodities in 1954-5

Serial No.	Name of trade	No. of establishments surveyed	Total capital invested (Rs.)	Approximate value of store on the day of visit (Rs.)	Total annual turnover (Rs.)	No. of persons employed						Expenses during last year (in Rs.)			
						Family members		Employees		Total		Wages and salaries paid	Rent paid (shop and godown)	Light charges	Total
						Male	Female	Male	Female	Male	Female				
1	Stationery shop	7	3,550·00	2,700·00	37,000·00	8	—	—	—	8	—	—	1,291·25	252·00	1,543·25
2	Vegetable shop	25	1,553·00	814·05	99,840·00	31	—	3	—	34	—	900·00	724·96	374·00	1,998·96
3	Grocery shop	65	57,940·00	75,140·00	898,680·00	93	4	27	—	120	4	14,616·00	10,848·00	3,160·37	28,624·37
4	Pan, biri shop	48	2,999·00	1,874·00	115,750·00	59	6	2	—	61	6	816·00	2,502·00	1,841·25	4,799·25
5	Timber and fuel wood shop	2	3,500·00	12,000·00	33,000·00	3	—	2	—	5	—	1,200·00	58·00	40·00	1,298·00
6	Cloth shop	14	59,950·00	119,150·00	376,949·00	29	—	7	—	36	—	4,740·00	4,158·00	2,136·00	11,034·00
7	Fish selling	9	268·00	33·00	36,000·00	9	—	—	—	9	—	—	282·05	124·05	406·10
8	Hardware stores	5	32,050·00	5,250·00	162,800·00	5	—	1	—	6	—	1,200·00	324·00	272·05	1,796·05
9	Kerosene selling	7	71·00	47·09	20,720·00	8	—	—	—	8	—	—	—	—	—
10	Medicine shop	12	59,100·00	71,700·00	141,200·00	13	—	17	—	30	—	8,220·00	5,482·00	1,236·00	14,938·00
11	Milk selling	4	147·00	22·87	7,500·00	6	2	—	—	6	2	—	—	—	—
12	Meat shop	4	300·00	40·00	20,500·00	4	—	—	—	4	—	—	343·62	15·00	358·62

TABLE NO. C.28—(*Contd.*)

Cuttack City : Turnover, expenses, etc., of trading establishments dealing in different commodities in 1954-5

Serial No.	Name of trade	No. of establishments surveyed	Total capital invested (Rs.)	Approximate value of store on the day of visit (Rs.)	Total annual turnover (Rs.)	No. of persons employed						Expenses during last year (in Rs.)			
						Family members		Employees		Total		Wages and salaries paid	Rent paid (shop and godown)	Light charges	Total
						Male	Female	Male	Female	Male	Female				
13	Ornament shop	4	155,150·00	151,200·00	367,700·00	7	—	4	—	11	—	8,400·00	2,700·00	240·00	11,340·00
14	Aluminium utensil shop	2	850·00	2,020·00	13,000·00	2	—	—	—	2	—	—	—	102·00	102·00
15	Hotel	3	87·00	45·00	4,800·00	3	—	—	—	3	—	—	—	24·00	24·00
16	Book shop	2	13,000·00	28,500·00	55,000·00	2	—	8	—	10	—	3,480·00	1,920·00	168·00	5,568·00
17	Newspaper selling	1	250·00	10·00	2,400·00	1	—	—	—	1	—	—	—	—	—
18	Flower selling	1	1·05	—	200·00	1	—	—	—	1	—	—	—	—	—
19	Slippers (leather) selling	1	300·00	100·00	2,200·00	1	—	—	—	1	—	—	5·00	2·05	7·05
20	Electrical goods selling	1	3,500·00	3,000·00	3,600·00	1	—	—	—	1	—	—	—	120·00	120·00
21	Hen and eggs selling	1	61·00	—	1,200·00	1	—	—	—	1	—	—	—	—	—
22	Selling papers	1	50,000·00	100,000·00	300,000·00	1	—	4	—	5	—	5,400·00	1,920·00	240·00	7,560·00
23	Horn article selling	1	—	—	220·00	1	—	—	—	1	—	—	—	—	—
24	Selling grass	1	1·00	0·25	240·00	1	—	—	—	1	—	—	—	—	—
25	Rickshaw hiring	1	500·00	—	400·00	1	—	—	—	1	—	—	—	—	—
	Total	222	445,128·05	573,646·26	2,698,899·00	291	12	75	—	366	12	48,972·00	32,558·88	9,986·77	91,517·65

PURI

Population: In 1951 the population of Puri town was 49,057, only 233 persons less than in 1901. The census populations of Puri town up to 1941 were *de facto* populations and they were swelled by the presence of pilgrims in the town. To assess the variations in the permanent or *de jure* population of the town the 1931 Census Superintendent of Bihar and Orissa constructed the following table:*

	1891-1901	1901-1911	1911-1921	1921-1931	1901-1931
1. Actual variation	+20,540	—9,648	—992	—1,126	—11,766
2. Variation in the number of pilgrims	+15,000	—12,000	—2,750	—250	—15,000
3. Variation in the permanent population	+5,540	+2,352	+1,758	—876	+3,234

The increases from 1901 were of small magnitude and a slight decline was recorded in the decade 1921–31. During 1931-41 there was an increase of 3,487 persons followed by a substantial one of 8,002 during 1941-51. (No figures regarding pilgrims, etc. are available for these two censuses.) In 1931-41 about 60 per cent of the increase was among males and the rest among females. During 1941-51, however, males accounted for less than half of the total increase in the population.

The population of our sample was 4,678 and estimating from this we get a population of 46,780 as our sample consisted of 10 per cent households. Allowing for non-coverage, etc. this gives a population estimate of about 50,000 in 1954, slightly higher than in 1951.

The fluctuations in the male and female populations noted above are reflected in the changing sex-ratio of the population of the town. The following gives the number of females per 1,000 males in the population of Puri town for all censuses beginning with 1901.

No. of females per 1,000 *males*					
1901	1911	1921	1931	1941	1951
905	734	772	840	810	850

In our sample there were 943 females to 1,000 males. This was much higher than the 1951 figure, but it was not unexpected because our sample was a

* Census of India, 1931, Vol.VII, Bihar & Orissa, Part I, Report, p. 97.

household sample and excluded the predominantly male population of vagrants and inmates of public institutions.

Size of the family: Table No. P.14 gives the distribution of sample families by their size. The average size of the family was 4.3. The size of the families in the sample presented a normal distribution. Nearly half the families were to be found in the class of families with two, three, and four members each and they were found to be almost equally divided in these three size-classes. The total number of sample families in each of the classes of families with more than four members were successively smaller. Uni-member families formed 13 per cent of the total sample families.

Caste composition: Table No. P.15 gives the distribution of the heads of sample families according to the castes to which they belonged. The biggest single group in the population of Puri was of Brahmins who constituted nearly one-fourth of the total. Next to them came Kayastha or Karan who were about 18 per cent. The Scheduled Castes accounted for slightly more than 13 per cent of the total and the artisan castes about 10 per cent. There were only a very small percentage of persons of other religions in the town. Almost 85 per cent were Caste Hindus. The predominance of Brahmins in a religious town like Puri was not unexpected. The non-Oriya castes formed a little less than three per cent of the total population.

Earners and non-earners: Table No. P.17 gives the distribution of the sample population by age for earners and non-earners separately. Table No. P. 16 gives a sexwise classification of earners and non-earners. About one-third of the total population in the sample was of earners and the rest of non-earners, the ratio of earners to non-earners being 1 : 2.1. Among males there were 1.26 earners per one non-earner, while among females there were 11.4 non-earners to every earner. For one female earner there were 7.3 male earners.

There were 74 unemployed persons in the sample who formed about 5 per cent of the total earners. Nearly 55 per cent of them were of ages between 16 and 25 years, *i.e.* they belonged mainly to the young age groups indicating that many of them were new entrants into the labour-force seeking their first jobs.

Among the earners as a whole the proportion of persons in the prime of life was very high. Nearly 69 per cent of the total earners were between the ages of 21 and 50 years. Juvenile earners (below 15 years) numbered 32 and constituted two per cent of the total earners.

Occupational distribution of earners: Table Nos. P.—18, 19, 25 and 26 give the distribution of earners according to occupations, earner status, education, earning, age, and sex. In the following we comment on each of these aspects.

The general occupational picture was very much undifferentiated. Nearly 38 per cent of the total earners were found in the services, about 22 per cent in trade and commerce, and 15 per cent in manufacturing. A further nearly

eight per cent were in agriculture, etc. These four classes together accounted for nearly 80 per cent of the total earners. In the remaining occupations there were very small proportions of the total earners in the sample.

The undifferentiated character of the occupational distribution is clearly brought out if we examine further the composition of each of these major groups. In the services group, which was the largest in the lot, 42 per cent of the constituents were those performing religious services, while a further 21 per cent were in government service. The predominance of religious services in a religious town was quite natural. So also, Puri, being district centre, there was a large number of government employees. The next largest group, trade and commerce, was almost wholly composed of retail traders, and nearly 40 per cent of these were dealing in grains and grocery. This only showed that Puri was not a trading place of any importance. The trade there mainly catered to the local needs. In the next large group, manufacturing, the only sizable group was that of sweetmeat makers accounting for 16 per cent of the total in the group. This was again connected with the religious character of the town and mainly related to the temple of Jagannath. In the next group of those engaged in agriculture and allied pursuits nearly two-thirds were engaged in fishing and the rest in the cultivation of cereals. There was nothing very much to comment upon in the remaining small groups.

Occupations and earnings: The earnings during the preceding year of earners in sample families classified by occupations are given in Table No. P.19. As the occupations are not very differentiated, as remarked earlier, we shall confine our comments to the broad industrial groups only. This procedure is departed from only in a small number of cases. In Table No. P.20 the 1st, 2nd, 3rd quartile earnings in different divisions are also given.

In agriculture, etc. 52 per cent of the earners were in the earning range Rs. 251-500, and a further 21 per cent in the next range of Rs. 501-1,000. The median income was Rs. 421. In manufacturing the median earning was Rs. 335, the ratio between the 1st and the 3rd quartile earnings being 1 : 3.17. The median income was Rs. 425 with the third quartile earnings, 2.74 times that of the first quartile earnings.

In services there was a wider dispersion of earnings partly because of its heterogeneous and miscellaneous character. The median earnings were Rs. 487, and the middle 50 per cent of earnings ranged from Rs. 262 to Rs. 921. The ratio of first to third quartile earnings was 1 : 3.5.

Family incomes: Information regarding total family income is presented in Table No. P.21 which presents the total income of families classified by the industry and occupations of their heads.

A little less than 40 per cent of the sample families were concentrated in the income range between Rs. 501 and Rs. 1,000. A further 25 per cent were in the range Rs. 251 to Rs. 500. The median income was about Rs. 720. The per capita income came to about Rs. 360.

TABLE NO. P.14

Puri Town : Distribution of sample families according to size

No. of members in the family	*Total no. of families*	*Per cent to the total*
1	151	13·1
2	191	16·5
3	184	15·9
4	198	17·1
5	149	12·9
6	127	11·0
7	60	5·2
8	40	3·5
9	24	2·1
10 and above	30	2·6
Not stated	1	0·1
Total	1,155	100·0

TABLE NO. P.15

Puri Town : Sample families classified by caste and community

Serial No.	*Castes*	*Total families*	*Per cent of the total*
1	Brahmins	286	24·8
2	Karan, Kayastha	211	18·3
3	Khatriya, Khandayat	58	5·0
4	Chasa, Pradhan	82	7·1
5	Artisan castes (*1)	114	9·9
6	Keuta (fisherman)	12	1·0
7	Gauda (milkman)	26	2·2
8	Gudia, Kumuti (trading community)	38	3·3
9	Other Oriya Caste Hindus (*2)	112	9·7
10	Non-Oriya Caste Hindus	34	2·9
11	Scheduled Castes	157	13·6
12	Scheduled Tribes	3	0·3
13	Muslims	16	1·4
14	Other religions	5	0·4
15	Not stated	1	0·1
	Total	1,155	100·0

*1 This includes Teli 38, Tanti 24, Kumbhar 19, Bania 18, Badhai 7, and other artisan castes 8.

*2 This includes Jyotish, Jogi 22, Bhandari 25, Baisya 15 and the rest other Caste Hindus.

TABLE NO. P.16

Puri Town : Sex distribution of the sample population into earners and non-earners

Sex	*Earners*	*Non-earners*	*Total*
Male	1,339 (55·7%)	1,065 (44·3%)	2,404 (100%)
Female	178 (7·8%)	2,092 (92·2%)	2,270 (100%)
Unspecified	—	13 (100%)	13 (100%)
Total	1,517 (32·4%)	3,170 (67·6%)	4,687 (100%)

TABLE NO. P.17

Puri Town : Age distribution of the sample population according to earners and non-earners

Age groups (years)	*Earners*		*Non-earners*		*Unemployed persons*		*Total*	
	No.	*Per cent to the total*	*No.*	*Per cent to the total*	*No.*	*Per cent to the total*	*No.*	*Per cent to the total*
0- 5	1	0·1	663	20·9	—	—	664	14·2
6-10	4	0·3	562	17·7	—	—	566	12·1
11-15	27	1·9	416	13·1	7	9·5	450	9·6
16-20	99	6·8	322	10·2	25	33·8	446	9·5
21-25	155	10·7	216	6·8	16	21·6	387	8·3
26-30	204	14·1	188	5·9	8	10·8	400	8·5
31-35	164	11·4	137	4·3	4	5·4	305	6·5
36-40	212	14·7	168	5·3	3	4·0	383	8·2
41-45	156	10·8	104	3·3	5	6·8	265	5·7
46-50	156	10·8	108	3·4	—	—	264	5·6
51-55	94	6·5	55	1·8	3	4·0	152	3·2
56 and above	170	11·8	229	7·2	1	1·4	400	8·5
Not stated	1	0·1	2	0·1	2	2·7	5	0·1
Total	1,443	100·0	3,170	100·0	74	100·0	4,687	100·0

TABLE No. P.18

Puri Town : Occupational distribution of earners in the sample

Serial No.	*Main industry*	*Male*	*Female*	*Total*
1	Agriculture, livestock, forestry, fishing, and hunting	101	11	112 (7·8%)
2	Manufacturing	175	45	220 (15·2%)
3	Construction	38	3	41 (2·8%)
4	Electricity, gas, water, and sanitary services	31	21	52 (3·6%)
5	Distributive services (trade and commerce)	276	36	312 (21·6%)
6	Transport, storage, and communications	55	2	57 (3·9%)
7	Services	512	33	545 (37·8%)
8	Activities not adequately described	68	12	80 (5·6%)
9	Not stated	9	15	24 (1·7%)
	Total	1,265	178	1,443 (100%)

TABLE NO. P.19

Puri Town : Distribution of earners in the sample classified by industry, according to their total annual income in 1954-5

Serial No.	Income (in Rs.)												No. of earners who have also reported other than cash income
	1 to 150	151 to 250	251 to 500	501 to 1,000	1,001 to 2,000	2,001 to 3,500	3,501 to 5,000	5,001 to 7,500	7,501 to 10,000	Above 10,000	Not stated	Total	
1	5 (4·5%)	10 (8·9%)	60 (53·6%)	24 (21·4%)	2 (1·8%)	1 (0·9%)	—	—	—	—	10 (0·9%)	112 (100%)	2
2	20 (9·1%)	36 (16·4%)	73 (33·2%)	54 (24·5%)	11 (5·0%)	4 (1·8%)	11 (5·0%)	3 (1·4%)	7 (3·2%)	—	1 (0·4%)	220 (100%)	1
3	—	3 (7·3%)	17 (41·5%)	21 (51·2%)	—	—	—	—	—	—	—	41 (100%)	—
4	—	7 (13·5%)	36 (69·2%)	9 (17·3%)	—	—	—	—	—	—	—	52 (100%)	—
5	9 (2·9%)	50 (16·0%)	109 (34·9%)	107 (34·3%)	16 (5·1%)	9 (2·9%)	3 (1·0%)	8 (2·6%)	1 (0·3%)	—	—	312 (100%)	3
6	2 (3·5%)	3 (5·3%)	17 (29·8%)	29 (50·9%)	6 (10·5%)	—	—	—	—	—	—	57 (100%)	—
7	66 (12·1%)	58 (10·6%)	146 (26·8%)	147 (27·0%)	62 (11·4%)	33 (6·0%)	6 (1·1%)	6 (1·1%)	1 (0·2%)	—	20 (3·7%)	545 (100%)	28
8	5 (6·3%)	14 (17·5%)	39 (48·7%)	15 (18·7%)	4 (5·0%)	2 (2·5%)	—	—	—	—	1 (1·3%)	80 (100%)	1
9	8 (33·3%)	8 (33·3%)	6 (25·0%)	1 (4·2%)	—	—	—	—	—	—	1 (4·2%)	24 (100%)	9
Total	115 (8·0%)	189 (13·1%)	503 (34·8%)	407 (28·2%)	101 (7·0%)	49 (3·4%)	20 (1·4%)	17 (1·2%)	9 (0·6%)	—	33 (2·3%)	1,443 (100%)	44

TABLE No. P.20

Puri Town : Quartile incomes of earners in industry-groups

Serial No.	1st quartile income (Rs.)	Median income (Rs.)	3rd quartile income (Rs.)
1	300·42	420·83	687·50
2	247·22	334·93	785·71
3	384·62	500·00	761·90
4	291·67	381·94	472·22
5	295·87	474·77	810·19
6	382·36	586·21	827·59
7	262·41	487·16	920·92
8	256·41	384·62	566·67
9	107·81	193·75	302·08
Total	274·23	449·55	807·80

TABLE No. P.21

Puri Town : Total incomes of sample households classified according to the industry of the head

Serial No.	No. of households	Total income of the households (Rs.)
1	80	60,440
2	150	110,790
3	36	23,760
4	33	20,960
5	206	215,720
6	47	33,990
7	433	611,330
8	51	39,610
9	119	102,510
Total	1,155	1,219,110

Total No. of persons in the sample households: 4,637
Income per capita: Rs. 263·10.

TABLE No. P.25

Puri Town : Distribution of earners in industry-groups according to earners' status

Serial No.	*Employees*	*Casual workers*	*Self-employed*	*Employers*	*Total*
1	12	3	97	—	112
2	20	50	130	20	220
3	—	39	2	—	41
4	52	—	—	—	52
5	36	7	238	31	312
6	12	38	7	—	57
7	291	19	217	18	545
8	23	49	8	—	80
9	1	4	19	—	24
Total	447	209	718	69	1,443

TABLE NO. P.26

Puri Town : Distribution of earners in industry-groups according to their education

Serial No.	Illiterate	Only read and write	Upper primary	Middle English	Up to Matric	Matric	Under-graduate	Graduate	Post-graduate	Not stated	Total
1	80	26	3	2	1	—	—	—	—	—	112
2	77	110	9	12	4	4	1	1	—	2	220
3	14	24	2	—	—	1	—	—	—	—	41
4	31	14	3	—	4	—	—	—	—	—	52
5	47	170	56	16	10	7	4	1	1	—	312
6	30	19	2	1	2	3	—	—	—	—	57
7	76	204	42	62	37	68	10	29	17	—	545
8	45	21	3	6	2	—	—	—	—	2	80
9	13	8	1		— —	1	—	1	—	—	24
Total	414	596	121	99	60	84	15	32	18	4	1,443

TABLE NO. P.27

Puri Town : Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Name of industrial establishment	No. of samples surveyed	No. of persons engaged									Total No. of casual & piece-rate workers	Value of total capital investment (in Rs.)		Amount borrowed
			Family members			Employees			Total						
			Male	Female	Total	Male	Female	Total	Male	Female	Total		Fixed	Working	
1	Tiffin preparing	20	34	6	40	7	—	7	41	6	47	—	748·00	338·00	1,060·00
2	Carpenter	2	5	—	5	—	—	—	5	—	5	—	180·00	5·00	—
3	Paper packets making	1	1	—	1	—	—	—	1	—	1	—	2·00	10·00	—
4	Painter	1	3	—	3	—	—	—	3	—	3	—	10·00	1·00	—
5	Puffed rice preparing	3	1	3	4	—	—	—	1	3	4	—	7·00	13·00	—
6	Pottery	14	26	8	34	—	—	—	26	8	34	—	3,147·00	659·00	670·00
7	Preparing chana chur	1	1	2	3	—	—	—	1	2	3	—	—	—	—
8	Goldsmithy	10	11	—	11	1	—	1	12	—	12	—	1,086·00	1,097·00	700·00
9	Tailor	3	4	—	4	—	—	—	4	—	4	—	67·00	63·00	400·00
10	Shoemaker	2	1	—	1	—	—	—	1	—	1	—	260·00	10·00	—
	Total	57	87	19	106	8	—	8	95	19	114	—	5,507·00	2,196·00	2,830·00

TABLE No. P.27—(Contd.)

Puri Town : Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	Expenses during last year (in Rs.)											
	Wages and salaries paid	Raw materials used	Fuel and power cost	Water charges	Transport expenses	Selling cost	Rent	Taxes	Maintenance and repair expenses	Total expenses (excluding depreciation)	Depreciation charges	Total expenses (including depreciation
1	1,308·00	35,835·47	1,964·97	—	30·00	—	849·00	130·00	6·00	40,123·44	119·50	40,242·94
2	—	—	—	—	—	—	—	—	10·50	10·50	33·27	43·77
3	—	1,412·97	4·12	—	—	—	—	—	0·50	1,417·59	0·31	1,417·90
4	—	10·00	—	—	—	—	—	—	1·06	11·06	2·00	13·06
5	—	1,861·46	393·12	—	—	—	—	—	—	2,254·58	6·79	2,261·37
6	—	814·37	3,760·12	—	504·00	—	—	42·74	2·93	5,124·16	22·36	5,146·52
7	—	427·19	37·00	—	—	—	—	—	—	464·19	0·32	464·51
8	240·00	84·57	146·75	12·00	—	—	660·00	—	12·22	1,155·54	127·08	1,282·62
9	—	463·37	5·00	—	—	—	468·00	8·00	74·00	1,018·37	51·45	1,069·82
10	1,642·50	1,845·63	—	—	333·00	—	336·00	—	10·75	4,167·88	12·95	4,180·83
Total	3,190·50	42,755·03	6,311·08	12·00	867·00	—	2,313·00	180·74	117·96	55,747·31	376·03	56,123·34

TABLE No. P.27—(Contd.)

Puri Town : Production, sales, receipts and expenses, etc., of industrial establishments in 1954-5

Serial No.	*Value of total production last year* (*in Rs.*)	*Gross receipts*			*Total gross receipts last year* (*in Rs.*)	*Net income last year* * (*in Rs.*)
		Value of sale last year (*in Rs.*)	*Receipts from repairs last year* (*in Rs.*)	*Receipts from wages last year* (*in Rs.*)		
1	52,165·50	52,165·50	—	—	52,165·50	12,042·06
2	—	—	80·00	1,570·00	1,650·00	1,639·50
3	1,480·00	1,480·00	—	—	1,480·00	62·41
4	40·00	40·00	—	—	40·00	28·94
5	2,435·00	2,435·00	—	—	2,435·00	180·42
6	14,875·00	14,875·00	—	—	14,875·00	9,750·84
7	626·00	650·00	—	—	650·00	185·81
8	—	—	845·00	4,017·28	4,862·28	3,706·74
9	—	—	180·00	5,623·75	5,803·75	4,785·38
10	10,280·00	11,000·00	770·00	—	11,770·00	7,602·12
Total	81,901·50	82,645·50	1,875·00	11,211·03	95,731·53	39,984·22

* Gross receipts minus expenses excluding depreciation.

TABLE No. P.28

Puri Town : Turnover, expenses, etc., of trading establishments dealing in different commodities in 1954-5

Serial No.	Name of trade	No. of establishments surveyed	Total capital invested (Rs.)	Approximate value of stores on the day of visit (Rs.)	Total annual turnover (Rs.)	No. of persons employed						Expenses during last year (in Rs.)			
						Family members		Employees		Total		Wages and salaries paid	Rent paid (shop and godown)	Light charges	Total
						Male	Female	Male	Female	Male	Female				
1	Selling coconut	3	17·00	23·05	3,720·00	2	1	—	—	2	1	—	90·00	—	90·00
2	Photo selling	3	232·00	49·00	5,170·00	5	—	—	—	5	—	—	90·00	38·00	128·00
3	Stationery shop	8	22,851·00	32,110·00	71,470·00	13	—	4	—	17	—	1,860·00	1,039·00	579·00	3,478·00
4	Cloth shop	6	33,250·00	70,480·00	176,650·00	11	—	10	—	21	—	6,540·00	1,569·00	936·00	9,045·00
5	Medicine shop	6	6,580·00	30,200·00	106,330·00	7	—	11	—	18	—	9,240·00	2,688·00	694·00	12,622·00
6	Selling earthen pots, etc.	4	65·00	55·00	11,090·00	4	2	—	—	4	2	—	288·00	30·00	318·00
7	Selling fish	13	—	31·00	40,350·00	11	16	—	—	11	16	—	17·25	12·00	29·25
8	Selling books	4	60·00	93·00	4,800·00	4	—	—	—	4	—	—	—	—	—
9	Selling fuel	5	682·00	1,673·00	12,450·00	4	1	1	—	5	1	1,800·00	331·00	78·00	2,209·00
10	Selling utensils	2	1,060·00	2,150·00	12,000·00	4	—	—	—	4	—	—	180·00	168·00	348·00
11	Selling milk	8	325·00	86·00	29,520·00	12	2	—	—	12	2	—	1,045·00	198·00	1,243·00
12	Betel shop	26	2,216·00	1,710·12	65,450·00	37	3	1	—	38	3	120·00	1,829·56	831·75	2,781·31
13	Selling vegetables	24	647·00	1,270·62	71,025·00	35	3	1	—	36	3	135·00	2,079·37	691·05	2,905·42
14	Sweetmeat shop	9	860·00	231·00	23,020·00	13	2	7	—	20	2	1,147·00	945·50	558·00	2,650·50
15	Brass utensil shop	3	1,200·00	3,105·00	12,690·00	4	—	—	—	4	—	—	180·00	66·00	246·00

TABLE No. P. 28— (Contd.)

Puri Town : Turnover, expenses, etc., of trading establishments dealing in different commodities in 1954-5

Serial No.	Name of trade	No. of establishments surveyed	Total capital invested (Rs.)	Approximate value of stores on the day of visit (Rs.)	Total annual turnover (Rs.)	No. of persons employed						Expenses during last year (in Rs.)			
						Family members		Employees		Total		Wages and salaries paid	Rent paid (shop and godown)	Light charges	Total
						Male	Female	Male	Female	Male	Female				
16	Kerosene and petrol selling	6	10,045·00	40,024·00	60,578·00	5	—	5	—	10	—	2,640·00	612·00	420·00	3,672·00
17	Selling spare parts of cycle, motor, etc.	2	4,500·00	9,000·00	16,000·00	3	—	1	—	4	—	900·00	444·00	120·00	1,464·00
18	Selling mali, patafuli, etc.	2	85·00	87·00	5,200·00	5	—	—	—	5	—	—	84·00	36·00	120·00
19	Selling ornaments (gold-silver)	2	4,100·00	5,775·00	12,950·00	4	—	—	—	4	—	—	534·00	168·00	702·00
20	Aluminium and iron utensils shop	4	8,000·00	10,800·00	39,450·00	6	—	4	—	10	—	1,560·00	1,664·00	552·00	3,776·00
21	Tiffin, tea-stall	11	270·00	79·00	27,440·00	15	3	—	—	15	3	—	954·00	372·00	1,326·00
22	Grocery shop	45	15,087·00	18,470·00	335,867·00	62	13	8	—	70	13	5,100·00	5,456·25	1,753·37	12,309·62
23	Selling vermilion	1	15·00	15·00	1,250·00	1	—	—	—	1	—	—	—	—	—
24	Paper toy selling	1	5·00	5·00	240·00	1	—	—	—	1	—	—	—	—	—
25	Selling pedi and baskets	1	20·00	10·00	4,300·00	2	—	—	—	2	—	—	—	—	—
26	Selling flowers	1	0·25	1·05	540·00	1	—	—	—	1	—	—	—	—	—
27	Selling pressed rice, etc.	1	10·00	18·00	2,240·00	1	—	—	—	1	—	—	—	24·00	24·00
28	Selling tilak and sipa	1	55·00	3·00	660·00	1	—	—	—	1	—	—	22·05	12·00	34·05
29	Glass bangles selling	1	400·00	500·00	1,590·00	1	—	—	—	1	—	—	41·25	51·00	92·25
	Total	203	112,637·25	228,053·84	1,154,040·00	274	46	53	—	327	46	31,042·00	22,183·23	8,388·17	61,613·40

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