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DEPARTMENT OF COMMERCIAL INTELLIGENCE AND STATISTICS, INDIA

ESTIMATES
OF
AREA AND YIELD
OF
Principal Crops in India
1940-41

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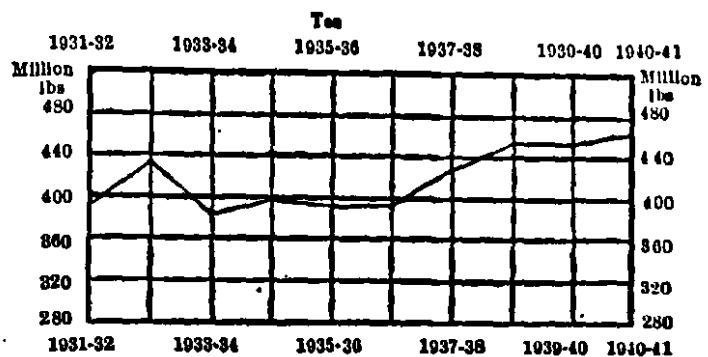
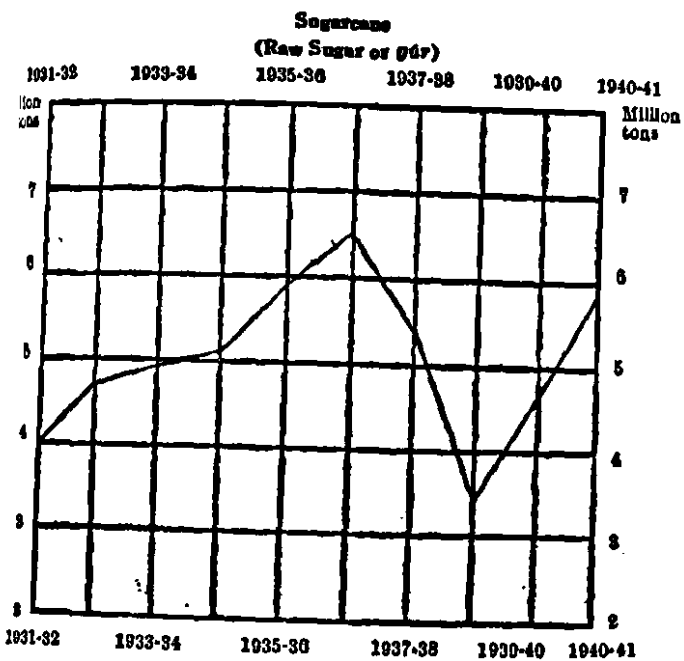
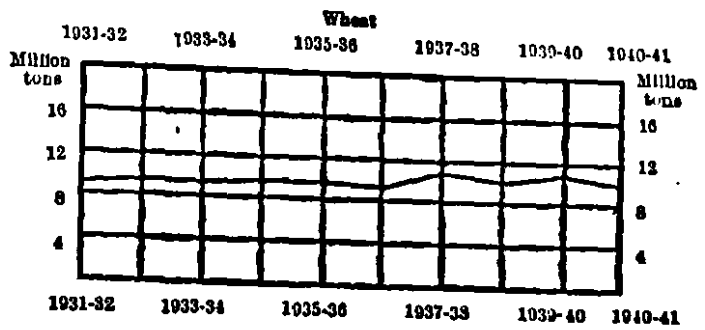
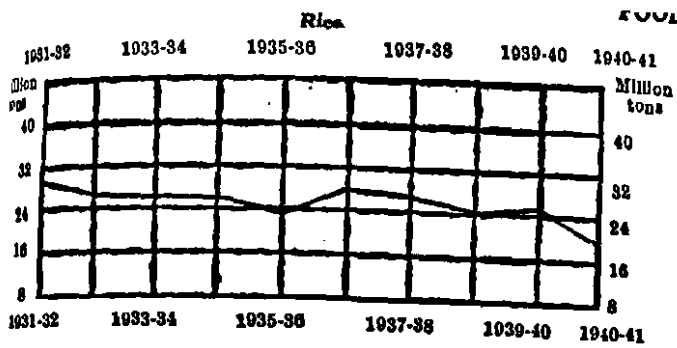
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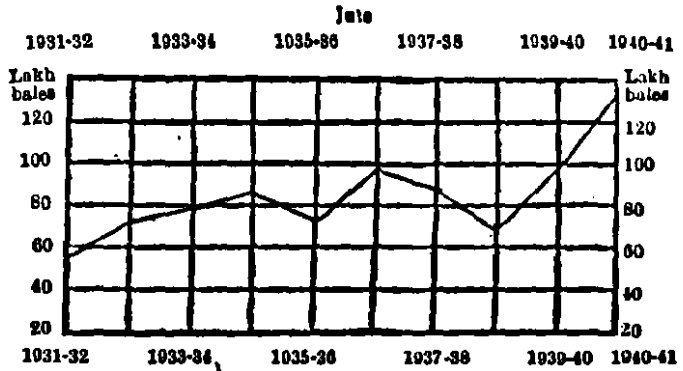
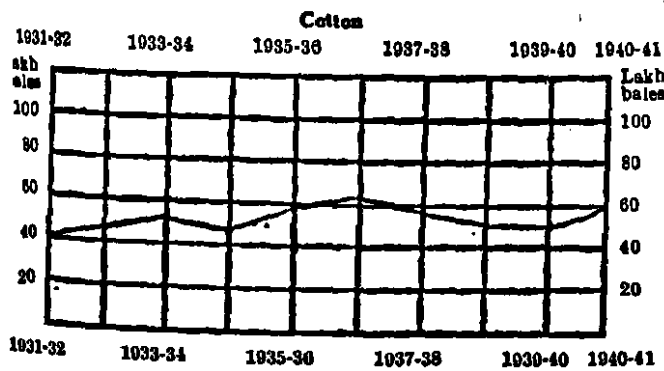
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Charts showing the yield of certain principal crops from 1931-32 to 1940-41.

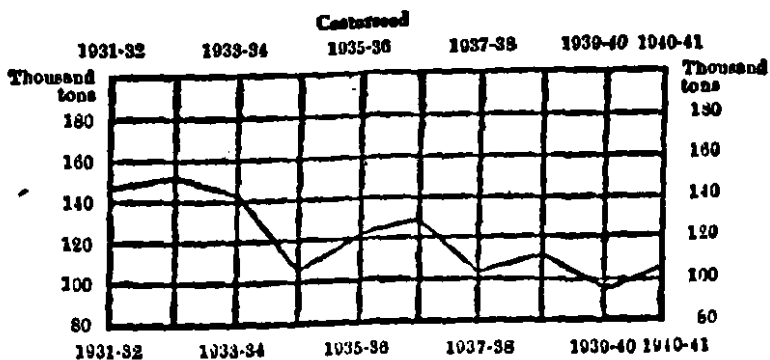
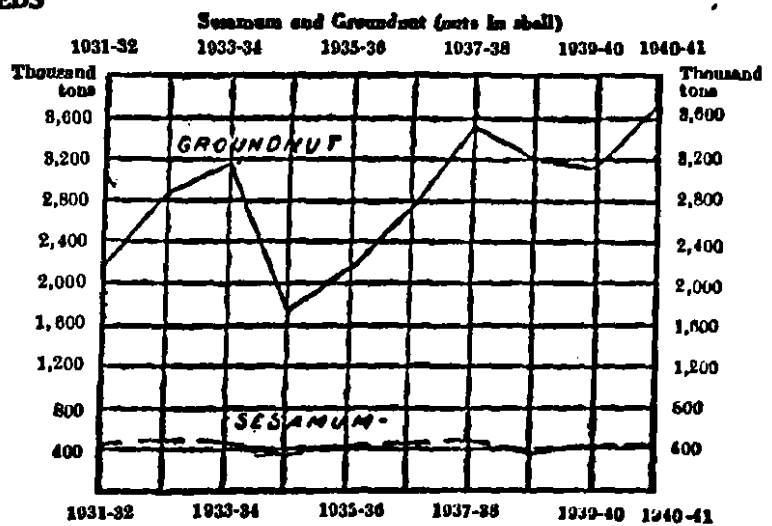
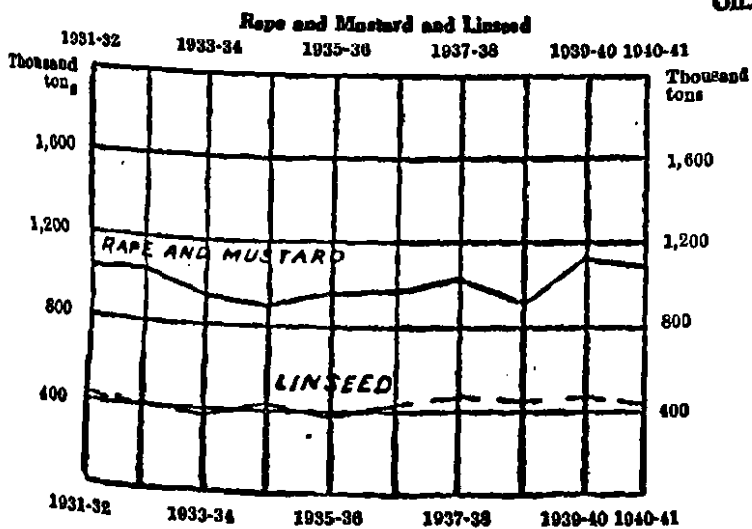
FOOD CROPS



FIBRES



OILSEEDS



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APPENDIX I

METHOD OF FRAMING ESTIMATES OF CROPS

There are three factors necessary for framing an estimate of outturn, namely, the area, the standard normal outturn per acre, and the fraction representing the relation of the crop reported on to the normal crop per acre.

As regards area, there exists in the villages of most provinces an agency capable of reporting the acreage of crops with great accuracy, wherever the fields have been mapped and surveyed. The tracts, for which statistics are ordinarily not obtainable, are yearly diminishing in extent; but owing to the absence of maps or the non-existence of trained village establishments they still represent a considerable aggregate area. These tracts consist chiefly of permanently-settled estates, lands held on privileged tenure, and unsurveyed areas. For these tracts, the acreage as well as the outturn cannot be more than a rough estimate. Such estimates of areas, once framed, are liable to become stereotyped and repeated year after year without regard to the influence of exceptional seasons or changes in the economic condition of the tracts. In order to prevent this, provision has been made for the annual revision of these estimates by careful comparison with the conditions prevailing in those adjoining areas of a similar character for which accurate information is available, and by means of such special enquiries as may be possible.

In dealing with the calculation of the areas under crops, two other matters demand consideration, namely, (1) whether the area returned should be the area sown or that successfully cropped, and (2) whether, when the forecast crop is sown mixed with other crops, it is preferable that the total area covered by the mixed crops should be exhibited, or that such area only should be shown as is estimated to represent the acreage covered by the forecast crop only. As regards (1), the general rule is that the returns should exhibit the areas actually sown whether the crop comes to maturity or not, the principle underlying this rule being that the failure of crop should affect not its area but its outturn. An exception to this rule is, however, made when fields, owing to the failure of the first sowings, have been devoted to other crops. In this case the area first sown with the forecast crop may be omitted. As to (2), the areas covered by the several crops in a mixed field are estimated in various ways in the different provinces, and the estimates are based on formulæ prescribed by the provincial authorities in individual cases, as it has not been found practicable to prescribe one uniform method of calculation. For purposes of the forecasts, the area to be returned must be the area covered by the forecast crop, exclusive of the area covered by the other crops with which it is mixed.

Next with regard to the standard normal outturn. A normal crop may be defined as "that crop which past experience has shown to be the most generally recurring crop in a series of years; the typical crop of the local area; the crop which the cultivator has a right (as it were) to expect, and with which he is (or should be) content, while if he gets more he has reason to rejoice, and if less he has reason to complain"; or in other words, it is the "figure which in existing circumstances might be expected to be attained in the year if the rainfall and season were of a character ordinary for the tract under consideration, that is, neither very favourable nor the reverse". Briefly, it is stated to be "the average yield on average soil in a year of average character". This normal or average yield will not necessarily correspond with the average of a series of years' figures, which is an arithmetical average. The Agricultural Departments* maintain a statement of the normal or average yield per acre of land of average quality (under the two major heads of irrigated and unirrigated land) for the several crops in each district. In order to test the accuracy of these standards of normal or average yield and to revise them, if necessary, a system of crop-cutting experiments is in force in almost all the provinces. Under this system plots of land of average quality are selected and the crops grown on them are cut and weighed in the presence of responsible officers of the District staff or of the provincial Agricultural or Land Records Department. These experiments have to be carried out every year in respect of all the principal crops, and in accordance with rules specially framed by the several provincial authorities. The results of the experiments are reported to the head of the provincial Agricultural or Land Records Department, who, on a careful scrutiny of all the reports received by him and after such further investigations as he may deem necessary, revises or verifies the standards previously adopted for the districts or the province. This revision is ordinarily made once in five years.

The third factor—the fraction representing the relation of the crop reported on to the normal crop per acre—is what is known as the "anna estimate" or the "percentage estimate". In many parts of India the cultivators estimate the crop outturn in annas or sixteenths, as there are sixteen annas in a rupee. They take a certain number of annas to represent the normal outturn and estimate the outturn of the year of report as so many annas higher or lower than the normal. But in some tracts sixteen annas express a bumper crop, while in others the same term expresses a normal crop, and the number of annas taken to represent a normal outturn varies between 12 and 16. Consequently, the anna estimate of one tract is not always amenable to comparison or combination with that of another tract. The percentage estimate is the American system under which 100 is taken to denote a normal crop and the estimated outturn of the year of report is stated as a percentage of that crop. In 1897 a question

* Land Records Department in the case of the Central Provinces and Berar.

arose as to whether the anna notation or the American notation should be used in making crop estimates, and it was strongly urged upon the Government of India that as the cultivators and village officers entrusted with the duty of collecting data for crop reports were mostly accustomed to the Indian system, *i.e.*, the anna notation, the adoption of any other system would tend to confuse the estimate. Local Governments and Administrations were, therefore, permitted to adopt such scale of notation as might be suited to local conditions, the object being to secure that the returns should be in terms of a normal crop. But since the anna standard thus adopted would not possess any fixed or uniform value, it was laid down that in published forecasts the anna notation should not be used, the American notation being used in its stead *i.e.*, 100 being taken to represent a normal crop and the estimated outturn being stated as a percentage of that crop, and the conversion of the anna estimate into the percentage estimate, being made either by the District Officer or by the provincial authorities.

When these three factors have been determined, they are multiplied with each other to arrive at the required quantitative estimate of outturn. Thus, if the area be 60,000 acres, the standard of normal outturn 500 lbs. per acre, and the percentage estimate 80, the required quantitative estimate would be $60,000 \times 500 \times \frac{80}{100} = 24,000,000$ lbs.

APPENDIX II

METHODS OF COLLECTING THE STATISTICS PROVINCE BY PROVINCE

Ajmer-Merwara
(Total cultivated area
2,20,000 acres)

The estimates for Ajmer-Merwara relate to the whole of the district. So far as *khalsa*,* *jagir*,† and minor *istimrari*‡ villages are concerned, the *patwari* is responsible for making field-to-field inspections of every village in his circle at each harvest. These inspections commence on 1st September for the autumn harvest and on 1st February for the spring harvest. The *patwari* notes down the results of his local inquiries and inspections in his field book. A certain percentage of the entries made by the *patwari* is checked and corrected, when necessary, by the *girdawar* or *kanungo*,§ who also inspects the crops at each harvest. The *tahsil* officers further test a certain number of entries, and the Sub-Divisional Officer also makes a general inspection of crops at each harvest. As soon as the inspection of the harvest is complete, an abstract statement of area and outturn is compiled separately for each *girdawar*'s circle and *tahsil*, and these statements are then consolidated for the three sub-divisions in the district office. An assumed normal outturn per acre for each crop has been fixed at settlement. Crop estimates are annually made by the revenue officers and the results recorded. These sets of figures give a useful check on the outturn estimates made by the *patwaris*. The exact area sown in the sub-divisions is obtained from the abstract statements. In the large *istimrari* estates the preparation of the field books is done by the estate officials. These field books contain fairly accurate information in regard to wheat, the outturn of which in maunds is generally appraised for the purpose of payment of the cultivators' rent; but as regards cotton and sesamum the figures are conjectural, as no crop-cutting experiments are made, the rents being charged in cash. The Government agency does not supervise the collection of figures in large *istimrari* estates.

Assam
(Total cultivated area
6,518,000 acres)

The estimates for Assam relate to all the districts in which the respective crops reported on are grown to any extent. For all districts the information is received from District Officers. The areas of crops except cotton and tea are collected by the Land Records staff for the temporarily-settled plains districts and the plains portion of Garo Hills and those for the hills are based on estimates revised quinquennially by the District Officers except in the case of forecast crops for which estimates have to be made annually. In the permanently-settled tracts of Sylhet and Goalpara the areas of jute are reported by the village *choukidari panchayats*. For other crops except cotton and tea the areas are estimated in Sylhet by the Deputy Commissioner on the basis of the population figures and the surveyed areas of the temporarily-settled parts of the district; in Goalpara they are obtained from zamindars. Tea statistics in all districts are supplied by the tea garden managers and proprietors. The areas of cotton are obtained in Cachar from *patwaris* for the plains sub-divisions and for the North Cachar Hills estimate is made by the Sub-Divisional Officer; in Sylhet information is obtained from the Collector of *dao* tax, in the Garo Hills from hill *mauzadars*, in Nowgong from the supervisor *kanungo* of hills sub-circle, in Sibsagar and Goalpara from *mandals* or other village officers, in Khasi and Jaintia Hills from *dolois* and *sirdars*, and in the Naga and Lushai Hills from intelligent chiefs. The figures are checked only in the temporarily-settled tracts by the circle Sub-Deputy Collectors; in the permanently-settled districts of Sylhet and Goalpara there is no real check at all. The estimates of outturn are based on the normal yield obtained from the results of crop-cutting experiments.

Bengal
(Total cultivated area
24,782,000 acres)

The estimates for Bengal relate to all the districts of the province where the respective crops are grown. In the absence of any revenue agency in the province, the figures are based mainly on rough approximate estimates made by District Officers, and are more or less conjectural. The District Officers obtain information from the Sub-Divisional Officers through the agency of the Police or the Circle Officers where appointed as a permanent measure. The quantitative estimates of yield formerly given in the forecasts were based on standards provisionally adopted. The standards have now been revised on the basis of the results obtained from crop-cutting experiments conducted over a series of areas and seasons.

Bihar
(Total cultivated area
18,431,000 acres)

The estimates for Bihar relate to all the districts of the province where the respective crops are grown. Survey and Settlement operations have been completed in all the districts except one, in which the settlement figures serve as a check on the estimates of acreage based on the information furnished by the police. In the absence of any revenue agency in the province, the figures are based mainly on rough approximate estimates made by District Officers, and are more or less conjectural. The District Officers obtain information from the Sub-Divisional Officers through the agency of the Police. The system of making crop-cutting tests, as in other provinces, over a series of areas and seasons for the ascertainment of standards of yield was in force in the districts of this province for some thirty-two years, but has been shown to be seriously defective and is under revision.

NOTE.—The cultivated area shown in the margin represents the average net area actually sown with all crops in the respective Provinces and States during the three years ending 1939-40.

* *Khalsa* villages are those which pay full revenue to Government.

† Land granted revenue-free on condition of military service or as a charitable endowment.

‡ A tenure which, though the revenue is assigned, is charged with a permanently fixed quit rent.

§ Circle Inspector.

The estimates, therefore, of yield given in the forecasts are based on standards adopted provisionally by the provincial Department of Agriculture on the basis of information obtained from other sources. During the years 1928-29 to 1930-31 some interesting experiments were conducted in every district on a method of sampling by cutting and weighing a small portion from a large number of fields selected at random, a method which was devised by Mr. (now Sir John) Hubback. Several thousand experiments were carried out, and the results indicate that the average outturn of paddy in those years was about 19 maunds per acre. The Local Government has, however, decided to postpone further experiments for the present.

The estimates for the Bombay province include all British districts and States where the respective crops are grown to any extent. In the British districts, the area under different crops is ascertained in the first instance by village officers and recorded in village returns, which are checked by Circle Inspectors and other revenue officers, and compiled by the former for their circles and then for the *taluka*.* The *taluka* figures are totalled up for each district in the office of the Collector of the district who, after scrutiny, sends them to the Director of Agriculture of the province. The information received is for villages for which regular statistics are available, the proportion of reporting area being 92.4 per cent. From 1909-10, however, estimates for the non-reporting areas have been made so far as possible and included in the table. In the case of Indian States the acreage is estimated on the best local data available. The approximate numerical strength of the reporting agency is 182 in the province. Local estimates of crop condition are converted to quantitative figures on the basis of a formula showing the average yield of crops. This formula is revised every five years, the revision being based on the ascertainment of actual yield in different parts of the province by careful local enquiry by officers of the provincial Agricultural Department. The unit of area in the formula is the district, and irrigated and unirrigated crops are separately dealt with. Each year's estimate of the condition of crops is prepared by the *mamlatdars*† (or *mahalkaris*‡ where the *taluka* is sub-divided) from notes which they make and from reports from village accountants and Circle Inspectors. The estimate is sent to the Collector who frames an estimate for the district and sends it direct to the Director of Agriculture, Bombay, who, in the light of the general prospects of the season, makes the quantitative calculations. For Indian States, condition estimates are obtained direct from the Political authorities concerned and the formulae for adjoining British districts are applied.

The estimates for the Central Provinces and Berar relate to all the British districts of the province in which the respective crops reported on are grown. As regards Indian States, which are now in direct political relationship with the Government of India, the information is at present received direct in the Department of Commercial Intelligence and Statistics, India, and included in the all-India forecasts. The figures of acreage for cotton, sesamum, rice, sugarcane, jowar, groundnut, rape and mustard and castor are estimates based on the reports of the local officials of the Land Records staff. The figures of wheat and linseed represent the actual areas sown with these crops as disclosed by field-to-field inspection by *patwaris*.§ The reporting agency consists of 338 Revenue Inspectors, with, on an average, 20 *patwaris* working under each Revenue Inspector. Each *tahsil* || has usually 4 Revenue Inspectors. Information in regard to probable area sown and estimated outturn is in the first instance reported by the *patwari*, who is in close touch with the agricultural operations in the villages of his charge, to the Revenue Inspector. The Revenue Inspector bases his report for his circle on the reports of *patwaris* which he checks from his knowledge of his circle and the opinions of cultivators and submits it direct to the District Superintendent of Land Records. Although this information for the *tahsil* does not pass through the *tahsildar* the latter submits a short note on the state of crops in his *tahsil* based on the observation and knowledge gained in the course of his tours so as to reach the District Superintendent of Land Records at the same time as the reports of the Revenue Inspectors. The District Superintendent of Land Records corrects and compiles the reports of the Revenue Inspectors for the district and submits them to the Deputy Commissioner who in consultation with the Superintendent of Land Records frames his estimates for his district. Ordinarily the Deputy Commissioner consults leading agriculturists and representative business firms and occasionally local boards also in the case of more important crops and to assist him in estimating more accurately the probable outturn in the final reports he has a certain number of crop experiments conducted for the more important crops on representative soils. On receipt of the returns from each district the information is compiled for the province as a whole in the office of the provincial Director of Land Records. The provincial Director of Land Records frames his final estimate of the crop for the province as a whole in free consultation with the Agricultural Department and with due regard to the seasonal conditions of the year and his personal knowledge. Standards of outturn were framed for each crop from the results of crop-cutting experiments on selected fields under the supervision

Bombay
(Total cultivated area
23,073,000 acres)

Central Provinces
and Berar
(Total cultivated area
24,303,000 acres)

* A sub-division of a district under the management of a *tahsildar*.

† The chief revenue and police officer in charge of a *taluka*.

‡ A revenue or police officer in charge of a sub-division of a *taluka*.

§ Village accountants.

|| Sub-division of a district.

of responsible and selected officials during the years 1884-85 to 1887-88. These standards have been revised from time to time on the basis of the results of crop-cutting experiments since made. In the year 1920-21 the substitution of anna estimates for American notation was introduced in accordance with the wishes of the Board of Agriculture, who, in 1919, decided that it would be better to abandon all attempts to impress on the reporting agency what is meant by the expression "normal crop", and secondly, that the use of American notation in which 100 is meant to signify a normal crop should be discontinued. The Board considered that in the long run better statistics would be obtained if the reporting agency were allowed to follow its traditional method of reporting the crop in the anna notation.

Coorg
(Total cultivated area
147,000 acres)

The estimates for rice furnished by Coorg are based on the results of annual crop inspections and experiments. Crop inspections are made by each *shanbog** for his circle under the supervision of the *parpattigar* † and the detailed particulars entered in the crop inspection registers and summarised in the crop abstracts, the totals of which are compiled in the office of the Deputy Director of Land Records and Agriculture. About 30 crop experiments are conducted annually by subordinates of the Revenue Department and *subedars*‡ (*tahsildars*) and also a few by the Deputy Director of Land Records and Agriculture, in whose office the estimates of yield, given in the forecast, are calculated on the basis of the average for the province.

Delhi
(Total cultivated area
195,000 acres)

The estimates for the Delhi province relate to all villages included within the province. The figures of area are based on actual measurements by the village revenue staff. Estimates of yield are recorded by the *tahsildar* after personal enquiry from the leading agriculturists. No crop-cutting experiments are conducted in the province.

Madras
(Total cultivated area
31,024,000 acres)

In the Madras province, the estimates relate to all the districts in which the respective crops are grown. Approximately two-thirds of the cultivated land in the province are Government or *raiyatwari* land, and have been carefully surveyed. All the village officers therein are appointed and controlled by Government officials. In the ordinary course of his work the village accountant sends every month to the Revenue Inspector (the officer in charge of a group of villages varying in number) a detailed statement of the sowings in his village. For those crops for which forecasts are prepared, the Revenue Inspector, who is himself a touring officer, reports to his *tahsildar*§ the area in his range under those crops, with his estimates of the average yield expressed in so many annas of the normal crop, when outturns are required. The *tahsildar* consolidates all these figures and reports the total direct to the Director of Industries with, in the case of outturn, his estimated yield (also expressed in annas of the normal). The remaining third of the province is *whole inam* || or *zamindari* (consisting of large proprietary estates), of which only a part has been accurately surveyed, and for which, somewhat similar returns are prepared and dealt with accordingly. In the remaining cases, *viz.*, Agencies in the East Godavari district, the estimating is done in the office of the Director of Industries with reference to previous year's final audited figures, the character of the season, and the figures of neighbouring Government areas. The States of Pudukkottai and Banganapalle send similar reports direct to the Director of Industries for cotton only. No other State in the province prepares any crop forecast. Thus, for each forecast return, separate reports (223 for cotton, 17 for senna, 16 for pepper, 10 for ginger and 221 for other crops) are received in the office of the Director of Industries, where they are scrutinized and tabulated. More accurate figures of areas cultivated are obtainable at the end of the year after all the village accounts have been checked. These figures are published later in the provincial Season and Crop Report. The figures reported by *tahsildars* in their final forecasts are checked by a comparison with the forecast reports and the Season and Crop Reports for previous years, and thus an attempt is made to rectify obviously inaccurate reporting. Standard rates of outturn have been determined for each crop on a consideration of the latest crop-cutting experiments, of the results on the Government farms, of the local knowledge of the Director of Agriculture and his staff in comparing the yields from adjoining districts, and of the results of a comparison of the figures of yield with the figures of net export and the estimate of consumption. The Director of Industries checks the rate of yield reported by *tahsildars* with the estimates received from the district officers of the Department of Agriculture.

North-West Frontier
Province
(Total cultivated area
2,067,000 acres)

The estimates for the North-West Frontier Province relate to all the districts of the province in which the respective crops reported on are grown, including the North Waziristan agency in the case of sugarcane and both North Waziristan and Kurram agencies in the case of wheat and cotton. The figures of area are based on actual measurements made by the *patwaris* in their field-to-field inspection at each harvest. They are further checked by higher revenue officers. The estimates of the standard yield are based principally on data derived from a large number of crop-cutting experiments made during the progress of settlement operations. They were framed for each assessment circle, which is the unit of area, and separately for lands irrigated by canals, by wells, for alluvial (*sailab*) lands, and for lands entirely dependent on rain. The standards are applied to the estimates of condition of crops received from the District Officers, who frame their estimates in consultation with local agriculturists.

* Village accountant. † A revenue officer in charge of a sub-division of a *taluk*. ‡ Revenue officer in charge of a *taluk*.
§ A sub-divisional officer. || Entire villages granted rent-free.

The exact number of agriculturists consulted by the District Officers is not available, but it must necessarily be several hundreds.

The estimates for Orissa relate to all the districts of the province where the respective crops are grown. The Koraput district and parts of the Ganjam district have never been surveyed or settled. In the Sambalpur district, according to the triennial maintenance of records, only one third of the villages of the district is inspected by *patwaris* and Revenue Inspectors from field-to-field. The statistics are prepared on receipt of information from the Revenue Inspectors, who in their turn supply such information from personal experience and enquiry from people of other villages of their circle where maintenance operation is not due for the year. In the other districts of North Orissa, information is obtained from the Sub-divisional Officers through the agency of the Police. The figures thus obtained are approximate estimates and are more or less conjectural. The settlement figures serve as a check on the estimates of acreage based on the information furnished by the Police. In the *raiyatwari* portions of the ex-Madras area, the village officers supply figures to the Revenue Inspectors who in their turn send the figures to the Taluk Officers. The Taluk Officer consolidates these figures and reports the total to the District Officers, with, in the case of outturn, his estimated yield. For the *zamindari* and *inam* areas, somewhat similar returns are prepared and dealt with accordingly. In the remaining cases, i.e., the agencies of the Ganjam and Koraput districts, the estimating is based on the observations of Revenue officers with reference to previous year's final figures, the character of the season and the figures of the neighbouring Government areas, and information obtained from the revenue staff of the local landlords. Since the formation of the province, no crop-cutting experiments have been made. The figures of standard yields are generally those followed by the Department of Agriculture, Bihar and Orissa.

The estimates for the Punjab relate to all the British districts in which the respective crops are grown. As regards Indian States of the province, reports on wheat and cotton are furnished by all the States in which these two crops are grown to any considerable extent. No estimates for any other crop are prepared by any State. The figures of area for all the British districts up to 1912-13 were based on actual measurements by the village revenue staff. Estimates of yield were recorded by District Officers after personal enquiry from *tahsildars* and leading agriculturists. The total number of agriculturists consulted by the District Officers and *tahsildars* amounts to several thousands. From 1913-14, however, this method is followed only in districts in which the respective crops are grown to a considerable extent. For other districts the provincial Director of Agriculture prepares conventional forecasts based on the actual average area figures for the previous five years and an assumed average outturn as determined by him to meet the character of the harvest.

The estimates for Sind relate to all the districts of the province and the Khairpur State in which respective crops are grown to any extent. In the British districts of the province, the area under different crops is ascertained by local officers and the Director of Agriculture, Sind, receives district by district figures. The information received is for villages for which regular statistics are available the proportion of reporting area being 99.6 per cent. From 1909-10, however, estimates for the non-reporting areas have been made so far as possible and included in the table. The approximate numerical strength of the reporting agency is 60. Local estimates of crop condition are converted to quantitative figures on the basis of a formula showing the average yield of crops. This formula is revised every five years, the revision being based on the ascertainment of actual yield in different parts of the province by careful local enquiry by officers of the provincial Agricultural Department. The unit of area in the formula is the district, and irrigated and unirrigated crops are separately dealt with. Each year's estimate of the condition of crops is prepared by local officers and is sent direct to the Director of Agriculture, Sind, who in the light of the general prospect of the season makes the quantitative calculations.

The estimates prepared by the United Provinces include all the districts of the province except Almora and Garhwal for which the required particulars are not available as no regular village papers are kept up by *patwaris* (village accountants) in these two districts.* The area is taken from the crop statements based on field-to-field inspections, which are compiled by *patwaris* and checked by higher revenue officers. The estimates of the standard yield are based on the results ascertained from crop-cutting experiments conducted annually in selected districts. The standards, which are different for irrigated and unirrigated crops, are revised every five years on a consideration of the results of the crop-cutting experiments, and are applied to the condition of the crops reported by District Officers, selected Landholders, Supervisor Kanungoes, Agricultural Supervisors and Cane Development Officers whose number exceeds fifteen hundred.

The figures are furnished to the Commissioner of Agriculture by the Revenue Heads of each *taluka* (*Vahivatdar*). These are prepared in villages by the village clerks (*Talatis*) from the form recording crops grown in every survey number. These entries are checked by the inspecting officers. The outturn is usually returned as so many annas in the rupee and also as so many lbs. of 40 tolas per *bigha*. The crop returns are finally consolidated and checked in the office of the Commissioner of Agriculture. With regard to the standard yields per acre, these are not yet separately ascertained as pertaining to Baroda territories. Whenever a reference to these becomes necessary, those ascertained for the contiguous British territory, with which Baroda territory is closely interlaced, are utilised. Arrangements are in progress to make regular crop-cutting experiments.

* Since 1938-39 conventional estimates for these tracts are being made and included in the provincial returns.

Central India

In the Central India States, estimates are framed for wheat and cotton. The methods differ with the different States. In most States the acreage returns are prepared by *tahsils* from the field measurements of the *patwaris* and then compiled for the whole State. In some cases the outturn estimates are similarly compiled after check on the spot by the higher revenue officials in consultation with the cultivators; in others they are merely an approximation from the acreage figures; in a few States fields are selected in the different circles as bearing an average yield, the crop is cut and weighed, the outturn for the circle is calculated from the result, and the totals of the circles form the return for the State.

Gwalior
(Total cultivated area
4,583,000 acres)

The figures of acreage for cotton and wheat furnished by the State relate to all the districts together with *jagirs*. The figures for wheat and cotton refer to the actual area sown as disclosed by field-to-field inspection by *patwaris* in *khalsa* villages after verification. *Girdawar ganungoes* report the figures of the respective circles to *tahsils*, from *tahsils* they are reported to the Director, Land Records, through the *sudah* of each district. During the years 1919-20 to 1923-24, the standard of outturn for each crop was fixed through responsible and selected Revenue Officers according to the results of the crop-cutting experiments. The standard is the basis for framing an estimate of yield for each crop, each year, with such modification as seems necessary according to the condition of the weather and the standing crop.

Hyderabad
(Total cultivated area
27,286,000 acres)

The estimates for the Hyderabad State relate to all the districts of the State including non-Government areas, such as *jagirs*, etc. *Raiyatwari* tenure prevails in the State, and, with exceptions which are diminishing annually, the whole area has been surveyed and settled. The reporting agency is the *patwari* or village accountant. His return is scrutinised by the *tahsildar* and forwarded to the *talukdar* (collector), who transmits the same to the Director of Statistics of the State. The estimates of standard yields were hitherto mainly based on estimates made by experienced cultivators or headmen of villages. Provisional standards for the various crops of each district have, after taking all relevant factors into consideration, now been fixed by the Agricultural Adviser to the State and are being adopted for the present. Arrangements are in progress for regular crop-cutting experiments. Twelve annas represent a normal crop.

Mysore
(Total cultivated area
6,320,000 acres)

The estimates furnished by the Mysore State relate to all the districts of the State in which the respective crops are grown. As regards area the information is based on the entries made by the *shanbog* (village accountant) in his crop-inspection book and checked by the higher revenue officers. The outturn is noted by the *shanbog* in terms of annas (16 annas being taken for a normal or 100 per cent crop) from which the total yield is determined by reference to the standard normal outturn per acre fixed for each *taluk*. The figures are finally scrutinized and consolidated in the Revenue Commissioner's office.

Rajputana

The estimates for wheat and cotton furnished by the States in Rajputana are generally defective in consequence of the absence of figures for unsurveyed areas and privileged tenures in many cases.

APPENDIX III

SUMMARY OF THE SEASONAL OR OTHER CONDITIONS AFFECTING PRICES OF FOOD GRAINS, ETC., IN EACH QUINQUENNIUM FROM 1861—65.

A general rise of prices took place about 1860. With the suppression of the Mutiny and the transfer of the administration to the Crown, there commenced a new era of commercial and industrial activity. The resources of the country were developed by the construction of roads and railways, the improvement of harbours and the extension of irrigation. The cotton famine caused by the American War of Secession (1861—65) gave a great impetus to the cultivation of cotton in India, which, while the war lasted, brought large profits to the cultivator and the merchant. The influx of the precious metals which had begun about the time of the Mutiny was thus further stimulated, and from about the second year of the war a great rise of prices took place throughout the cotton-growing districts of western and central India, as also in a smaller degree in other parts of the country. Prices were also raised by the famine of 1861 in the Upper Doab of the province of Agra and the neighbouring districts of the Punjab and Rajputana and by the scarcity in Cutch.

On the collapse of the inflation caused by the American War, prices would have fallen but for the great famine of 1866 in Orissa, which extended into Bengal proper, Bihar, Madras, and the eastern part of the Central Provinces. Another notable famine—that of 1869—affected western Rajputana and parts of northern India, and the extension of scarcity, towards the west and south, produced a rise of prices in Bombay, the Central Provinces, and Hyderabad.

During 1871—75 prices were not seriously disturbed by any calamity except the scarcity in Bihar of 1874 and although large purchases of grain were then made by the Government and scarcity prevailed in the adjoining districts of the United Provinces, the disturbance of prices was not widely felt. The export trade in rice expanded greatly in 1872-73, and was on a large scale throughout the decade 1871—80. It showed greater contraction in 1874, the year of the Bihar famine, than in the Deccan famine three years later.

In this quinquennium occurred the great famine of 1877-78, which affected an enormous tract in western and southern India and extended with diminished intensity into the north, causing a general rise of prices of food-grains all over India. The export trade in wheat, which had begun in a small way after the opening of the Suez Canal in 1870, received a check in the years 1878—80.

Speaking generally, all crops except rice were good or abundant during these years, though there was scarcity in a portion of the Punjab in 1884 and distress in parts of Bengal and Madras in 1885. The rice crop was bad between 1883 and 1885 owing to drought and floods, but wheat was plentiful, and the average price for all grains was low.

It is difficult to find adequate reasons for the great rise in prices which took place during these five years for the 1889 famine in Ganjam (accompanied by distress in Orissa, and scarcity in Bihar) was only of local importance, and prices had already reached their highest point in 1888. The export trade in food-grains was not larger than in the preceding quinquennium.

The high prices ruling during 1886—90 were still further raised in 1891-92 by prolonged drought causing scarcity and distress in Madras, Bombay, the Deccan, and Bihar. A strong Indian demand for rice was coupled with large exports, and at the same time there was an unprecedented exportation of wheat owing to the failure of crops in Europe, so that Indian prices rose almost to famine levels. With better seasons prices fell, but the lowest point reached in 1891—95, was still above the average level of the previous quinquennium; and, as in that period, the importation of silver for coinage continued on a large scale until the closure of the mints in June, 1893.

This quinquennium witnessed two distinct famines. The first one occurred in the latter part of 1896 and extended into 1897; and the second occurred in the latter half of 1899 and continued, like the previous one, through the ensuing year. These famines bore a close resemblance to each other in this that they were more or less equally intense and equally widespread. The fall in prices associated with the closing year of the preceding quinquennium was thus one of short duration. In September, 1896, a sudden rise took place in the prices of food-grains. In November, famine prices were declared in northern and central India, and soon after they became general. The autumn harvest of 1897 relieved the tension somewhat, and the bumper crops of 1898 saw prices assume a relatively low level. But this improvement was again not sustained, for the complete failure of the south-west monsoon in 1899 followed by poor winter rains re-induced famine prices in the following year. The monsoon of 1900 was more favourable than its predecessor; still it was not of such a character as to efface altogether the ill-effects of the previous season of drought.

There was no very marked return to ordinary price levels in 1901 and 1902 as the weather conditions were generally not favourable, except perhaps for rice. But in the next two years, and particularly in 1904, agricultural conditions were distinctly good, especially in the case of the wheat crop. There was in these two years a corresponding improvement in prices of food-grains, especially of rice and wheat; but a set-back was experienced in 1905. The seasonal conditions of that year were marred by a partial failure of the monsoon in northern and western India and by heavy rain and floods in Bengal and Eastern Bengal. A sharp and rapid rise in the prices of articles of Indian produce, especially food-grains, began in 1905.

The rise was sustained in 1906 as the spring crops of that year, except wheat, were generally not good and the autumn crops were damaged more or less by excessive rain and floods, particularly in Bengal and Eastern Bengal. Agricultural prospects were to a certain extent improved by the good winter rains which, though late, saved a part of the spring harvest of 1907 in northern India. But as unfavourable conditions prevailed in other parts of the country particularly in Bengal, prices remained unaffected: and when the failure of the south-west monsoon occurred famine conditions declared themselves over a large area. The wheat and oilseeds harvests of 1908 were very poor owing to deficient and badly distributed rainfall. Neither were the autumn crops good. The rise of prices was accentuated in 1907 and 1908 by the widespread failure of the crops in northern India. The wheat crop of 1909 showed an advance on the previous year, though the winter rains were generally deficient and the untimely rain in April damaged a quantity of the grain on the threshing floor in parts where the crop was reaped early. The monsoon was exceptionally favourable, and there was a considerable increase in the total outturn of the staple crops. There was a phenomenal rice crop in the two Bengals, the extended cultivation having been stimulated by low prices of jute. As a result there was a general decline in prices in 1909. The timely and well-distributed winter rains brought fine crops to harvest in the spring of 1910. The monsoon of that year was, on the whole, favourable and the crops good. Prices continued to fall; but in the case of rice a strong demand from China operated to keep the rates at the level of the previous year.

The spring crops of 1911 were on the whole good, though frost and rust affected them in parts of northern and western India, and prices continued to fall. The monsoon of that year, however, was not very favourable particularly in northern and western India where the autumn crops suffered more or less from drought, and prices of rice showed an upward tendency accentuated by strong export demand. The spring crops of 1912 suffered through drought in western and in parts of northern India and prices rose; and although the monsoon of that year was not on the whole unfavourable, the strong export demand maintained the prices of rice at a high level. The rise in prices continued in 1913 and the spring crops of that year were affected adversely by deficient rains in the Punjab and in the western parts of the United Provinces and in the Bombay Presidency. The monsoon, on the whole, was not very satisfactory. In 1914, the spring crops suffered through drought in many districts in northern and western India, chiefly in the United Provinces, Rajputana, and Sind. The monsoon was, on the whole, favourable for the autumn crops, except in parts of northern and western India where heavy rains in September were injurious to the cotton crop. The winter rice crop was adversely affected by deficient rainfall during the months of September, October, and November in Bengal, Bihar and Orissa and the United Provinces; elsewhere conditions were favourable. The spring crops of 1915 were good, except in parts of Bengal, Bihar and Orissa, and the eastern districts of the United Provinces, where the crops were affected by drought. The monsoon of 1915, however, was not very favourable. It arrived late and was weak and irregular in parts of the Bombay Presidency and of the Punjab; the rainfall in the north-eastern, central and southern India, on the other hand, was good. Excessive rain, however, caused serious floods in Assam and in parts of Bengal and the United Provinces.

The spring crops of 1916, except linseed, were seriously affected by the failure of winter rains, especially in the unirrigated tracts. The monsoon of 1916 was particularly good: it arrived early and continued late, the distribution being remarkably uniform. There was ample moisture for the maturing of the autumn crops, which were distinctly better than those of 1915. The monsoon of 1917 gave abundant rainfall throughout the country, especially in north-west India. The heavy and continuous rains adversely affected the growth of some of the autumn crops, such as cotton and indigo, but provided a good seed-bed for those crops that are harvested in the spring. Some of the latter crops, especially winter oilseeds, suffered somewhat through the holding-off of the winter rains. The monsoon rains of 1918 began earlier than usual but were very weak over nearly the whole country outside the north-east India. The winter rainfall was greatly defective. These adverse climatic conditions affected both the autumn and the spring crops. The monsoon of 1919 gave a rainfall above the average, though it retreated from northern India earlier than usual. The season was, on the whole, favourable and a crop larger than that of the previous year was harvested, except in the case of indigo. The spring crops were affected in places by hail, frost, rust and winds. The monsoon of 1920 started well but ended badly. The rainfall during the year was in defect over most of the country, the only exceptions being south Madras and parts of north-east India. As a consequence a smaller yield than that of the preceding year was obtained for nearly all the crops.

The spring crops of 1921 were affected by drought and hot winds. The monsoon of that year began normally and gave generally good rain in all the provinces. The season was favourable to the *kharif* (autumn) crops which yielded a much better outturn than in the preceding season. The spring crops of 1922 gave a good outturn. The monsoon of that year gave generally normal rain in central and north-western India. The season was favourable to the *kharif* (autumn) crops also which gave a good yield. In 1923 also the spring crops yielded a satisfactory outturn. The monsoon of that year though late in appearance gave fairly well-distributed rain over the greater part of the country except in Sind, Gujarat and parts of Madras. The yield of the autumn crops was, however, not as satisfactory as in the previous year. The spring crops of 1924 yielded less than in the previous season. The monsoon of that year was late in establishing itself, particularly in north-west India, but the rainfall was slightly above the normal and fairly well-distributed over most of the country. The season was fairly good for the autumn crops. In 1925, the spring crops were affected to some extent by frost, hail, rust and high winds and gave only a fair outturn. The monsoon of that year, though not uniformly satisfactory, was, on the whole, favourable. The season was fairly favourable to the autumn crops.

The spring crops of 1926 were affected by defective winter rains and gave only a moderate outturn. The monsoon rainfall of that year was a little above the normal. Seasonal conditions were, on the whole, fairly good for the autumn crops. The spring crops of 1927 gave, on the whole, a good outturn. The monsoon rains of that year were, on the whole, normal and the season was favourable for the autumn crops. In 1928, the condition of the spring crops was unsatisfactory but the autumn crops of that year gave generally good yields. The spring crops of 1929 gave a fair outturn. The monsoon of that year was adequate and generally well-distributed. The yield of the autumn

crops was, however, generally less than in the preceding season. The spring crops of 1930 gave an exceptionally good outturn. The monsoon of that year gave fairly well-distributed rain over the country. The season was favourable to the *kharif* (autumn) crops also which gave a good yield.

The spring crops of 1931 gave fairly good yields. The monsoon of that year was, on the whole, well-distributed. The season was fairly favourable to the autumn crops also. In 1932 also the spring crops yielded a fairly good outturn. The monsoon of that year was fairly normal and gave, on the whole, well-distributed rains over the country. The season was favourable to the autumn crops also which generally showed a better outturn than that of the previous year. The spring crops of 1933 gave a somewhat better outturn than in the previous season. The monsoon of that year started a little earlier than usual and was, on the whole, well-distributed. The season was fairly favourable to the autumn crops also. The spring crops of 1934 were damaged in places by cold spell and frost and gave, on the whole, a fair outturn. The monsoon of that year appeared somewhat later than usual but there were no prolonged breaks and the rainfall was fairly well-distributed. The season was not very favourable to the autumn crops also. In 1935 also the spring crops gave a fair outturn. The monsoon of that year was, on the whole, normal, although defective in some provinces and unusually dry during its retreating period. The season was fairly favourable to the autumn crops but jute and winter rice crops were adversely affected by unfavourable weather conditions.

The spring crops of 1936 gave fairly good yields. The monsoon rainfall was, on the whole, normal but it was somewhat unevenly distributed. The season was favourable to the autumn crops which showed a better outturn than that of the previous year. The spring crops of 1937 gave a somewhat better outturn than in the previous season. The monsoon rains of the year were, on the whole, normal. The yield of the autumn crops was, however, generally less than in the preceding season. The spring crops of 1938, although affected in places by rain, hail and drought, gave, on the whole, a good outturn. The monsoon rainfall of that year was marked by spells of heavy rains, resulting in floods in places. The season was, on the whole, fair to the autumn crops, the outturn of which was smaller than that of the previous season. The spring crops of 1939, though affected in places by rain, hailstorm, drought, and strong winds gave, on the whole, a fairly good outturn. The monsoon rainfall of that year, though deficient in places, was, on the whole, normal. The season was fairly favourable to the autumn crops, which gave a better outturn than in the previous season. The spring crops of 1940 gave, on the whole, a good outturn. The monsoon of that year appeared somewhat later than usual, but the rainfall was, on the whole, normal. The season was also fairly favourable to the autumn crops, although the rice crop was adversely affected by unfavourable weather conditions.

APPENDIX IV

DATES ON OR ABOUT WHICH THE ALL-INDIA FORECASTS OF CROPS
ARE ISSUED BY THE DEPARTMENT OF COMMERCIAL INTELLIGENCE
AND STATISTICS, INDIA.

RICE--

1st forecast	.	.	.	.	.	.	.	.	.	October	20
2nd "	.	.	.	.	.	.	.	.	.	December	20
Final "	.	.	.	.	.	.	.	.	.	February	20

WHEAT--

1st forecast	.	.	.	.	.	.	.	.	.	January	25
2nd "	.	.	.	.	.	.	.	.	.	March	6
3rd "	.	.	.	.	.	.	.	.	.	April	15
4th "	.	.	.	.	.	.	.	.	.	May	20
Final "	.	.	.	.	.	.	.	.	.	August	6

SUGARCANE--

1st forecast	.	.	.	.	.	.	.	.	.	August	20
2nd "	.	.	.	.	.	.	.	.	.	October	20
Final "	.	.	.	.	.	.	.	.	.	February	5

COTTON--

1st forecast	.	.	.	.	.	.	.	.	.	August	15
2nd "	.	.	.	.	.	.	.	.	.	October	15
3rd "	.	.	.	.	.	.	.	.	.	December	15
Final "	.	.	.	.	.	.	.	.	.	February	15
Supplementary forecast	.	.	.	.	.	.	.	.	.	April	15

JUTE *--

Preliminary forecast	.	.	.	.	.	.	.	.	.	July (First week)	
Final forecast	.	.	.	.	.	.	.	.	.	September (Third week)	
Supplementary Review	.	.	.	.	.	.	.	.	.	March (Last week)	
Final Review	.	.	.	.	.	.	.	.	.	September (First week)	

LINSEED, RAPE AND MUSTARD--

1st forecast	.	.	.	.	.	.	.	.	.	January	1
2nd "	.	.	.	.	.	.	.	.	.	March	15
Final "	.	.	.	.	.	.	.	.	.	June	1

SESAMUM (*til* or *jinjili*)--

1st forecast	.	.	.	.	.	.	.	.	.	September	1
2nd "	.	.	.	.	.	.	.	.	.	October	20
Final "	January	15
Supplementary forecast	April	20

CASTOR SEED	February	20
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GROUNDNUT--

1st forecast	August	20
2nd "	October	20
Final "	February	15

APPENDIX V

SEASONS OF SOWING AND HARVESTING OF THE CROPS AND THE TRACTS WHERE THEY ARE MAINLY GROWN.

CROP	SEASON OF		WHERE MAINLY GROWN	
	Sowing	Harvesting	British Provinces	Indian States ^a
Rice—				
Winter (a) . . .	April to August	November to January	Bengal, Madras, Bombay, Sind, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar, Assam, North-West Frontier Province and Coorg.	Mysore, Madras States, Central India States, Punjab States, Kashmir, Hyderabad, Baroda, Bombay States, Eastern Agency States, Khairpur (Sind) and United Provinces States.
Autumn . . .	April to July	August to December		
Summer . . .	January to March	March to June		
Wheat— (Rabi or spring crop)	October to December	March to May	Bengal, Madras, Bombay, Sind, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar, North-West Frontier Province, Ajmer-Merwara and Delhi.	Mysore, Central India States, Rajputana States, Punjab States, Kashmir, Hyderabad, Baroda, Eastern Agency States (e), Bombay States, Gwalior, Khairpur (Sind) and United Provinces States.
Sugarcane (b) . . .	February to May	November to April	Bengal, Madras, Bombay, Sind, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar, Assam, North-West Frontier Province and Delhi.	Mysore, Madras States, Central India States, Rajputana States, Punjab States, Kashmir, Baroda, Hyderabad, Bombay States, Gwalior, and United Provinces States.
Tea . . .	Seeds sown between November and March and seedlings transplanted when at least 6 months old.	May to December in Northern India and January to December in South India.	Bengal, Madras, United Provinces, Bihar, Punjab, Coorg and Assam.	Travancore and Cochin (Madras), Tripura (Bengal), Mandi (Punjab) and Mysore.
Cotton (c)—				
Early . . .	March to August	September to April	Bengal, Madras, Bombay, Sind, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar, Assam, North-West Frontier Province, Ajmer-Merwara and Delhi.	Mysore, Madras States, Central India States, Rajputana States, Punjab States, Kashmir, Hyderabad, Baroda, Rampur, (United Provinces) Tripura (Bengal), Bombay States, Khairpur (Sind) and Gwalior.
Late . . .				
Jute— (Autumn crop)	March to May	July to September	Bengal, Bihar, Orissa and Assam.	Cooch Behar and Tripura (Bengal).
Linseed— (Rabi or spring crop)	August to November	January to April	Bengal, Madras, Bombay, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar and Assam.	Central India States, Rajputana States, Punjab States, Kashmir, Hyderabad, Bombay States, Eastern Agency States (e), Gwalior and United Provinces States.
Rape and Mustard— (Rabi or spring crop)	Ditto	Ditto	Bengal, Madras, Bombay, Sind, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar, Assam, North-West Frontier Province and Delhi.	Mysore, Central India States, Rajputana States, Punjab States, Kashmir, Hyderabad, Baroda, Bombay States, Khairpur (Sind), Gwalior and Eastern Agency States.
Sesamum— Kharif or autumn crop . . .	May to August	August to December	Bengal, Madras, Bombay, Sind, United Provinces, Bihar, Orissa, Punjab, Central Provinces and Berar, Assam and Ajmer-Merwara.	Mysore, Madras States, Central India States, Rajputana States, Punjab States, Kashmir, Baroda, Hyderabad, Bombay States, Khairpur (Sind), Gwalior and Eastern Agency States.
Rabi or summer crop	January and February	May to July		
Castor— Kharif (Autumn) . . .	May to July	January and February	Madras, Bombay, Central Provinces and Berar, Bihar, Orissa, Sind and United Provinces.	Hyderabad, Mysore, Baroda and Bombay States.
Rabi (Spring) . . .	September to November.	March and April.		
Groundnut (d) . . .	May to August	September to January	Madras, Bombay, United Provinces, Central Provinces and Berar, and Orissa.	Mysore, Banganapalle (Madras), Central India States, Hyderabad, Bombay States, Rajputana States, Baroda and Gwalior.
Coffee . . .	Rainy season	October to April	Madras, Orissa and Coorg	Travancore and Cochin (Madras) and Mysore.
Rubber . . .	.....	.....	Madras and Coorg . . .	Travancore and Cochin (Madras) and Mysore.

^a Incomplete.

(a) In Madras, the seasons vary greatly. The first crop is sown between May and December and the second crop between October and March. The first crop is harvested between September and April and the second crop between January and June.

(b) The sowing season commences a little earlier in Bombay and Central Provinces and Berar; and harvesting extends up to August in Madras.

(c) In parts of Southern India, sowing continues till December and harvesting till July.

(d) A summer variety is also grown on a comparatively small area in Madras in January to April and harvested in May to July.

(e) Former Central Provinces States only.

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