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## NOTES

### PROGRESS OF AGRICULTURE IN U.S.S.R.

An attempt is made in the following note to bring out the progress of agriculture in the U.S.S.R. based mainly on the data in the "National Economy of the U.S.S.R., Statistical Year Book, 1961," published by the Central Statistical Board of that country.

#### *Agriculture in U.S.S.R. prior to 1953*

The main problem of agriculture in U. S. S. R. is the long winter. Over a vast area, the climate is not suitable for agriculture. In fact, arable land constituted only 10 per cent of the total geographical area. Prior to 1953, not much emphasis was laid on the development of agriculture, probably because priority was given to the development of heavy industries. In the result, agricultural development lagged behind. By 1953, the problem of shortages particularly of foodstuffs, became very acute in spite of many material incentives given to the farmer and called for some drastic measures for achieving the required level of production within a period of two to three years.

#### *Policy Change in 1953*

This led to the announcement of the policy change in 1953 relating to both the nature and the procedure of planning. The decentralization of planning machinery in favour of increasing local initiative and drive reduced the central control. Emphasis was laid on the profit motive of the farmer. Prior to the change, the collective farmer had to sell almost all his products to the State. The change in policy witnessed a cut in the sales to the Government. The policy change resulted in the introduction of the programme for extension of cultivation under which it was proposed to bring under the plough 40 million hectares of virgin and fallow lands from Kazhakstan and the eastern regions of the country.

Further since 1953, considerable stress was laid on irrigation, drainage and land reclamation. Large scale reclamation of marshes covered with scrubs and wood was undertaken. All these measures resulted in an increase in agricultural production, particularly grain and cotton.

#### *Basic Characteristics of Soviet Agriculture*

The main characteristic feature of the Soviet agriculture is that it is entirely socialized. It has as its basis two forms of property, viz., (i) State property and (ii) collective farm property and includes 2 major organizations : (a) collective farms, and (b) State farms. The Machine and Tractor Stations (M.T.S.) which formed a separate organization till 1961 were subsequently abolished and now each farm has its own M. T. S. This arrangement has made it possible to put the land and machinery in the same hands and to create conditions for the better use of productive forces in agriculture. The collective farms are supervised by the Union as well as Republic Ministries of Agriculture while 80-90 per cent of the State farms are managed by the Union Ministry of State Farms, a small property by the Republic Ministries of State Farms and some by the different Technical Ministries, especially the Ministry of Meat and Milk Production.

*Salient Features of Agriculture—Place of Agriculture in National Economy*

The national income or the gross social product reached 153 billion roubles in 1961 and according to preliminary figures, it rose to 161.5 billion roubles in 1962. Over the period 1913-1961, the index of national income (1913=100) rose to 2,497. The corresponding figures in respect of U.S.A., England and France were only 364, 210 and 207,<sup>1</sup> respectively. Similarly, the index in respect of per capita income rose to 1,824 in respect of Soviet Union as against 193 and 181 respectively, in the case of U.S.A. and England. In recent years, the share of agriculture in the Gross Social Product has been gradually declining while that of industry and construction more than compensated the decline in agriculture.

TABLE I—COMPOSITION OF GROSS SOCIAL PRODUCT

(IN TERMS OF PRICES OF CORRESPONDING YEARS AS PER CENT OF THE TOTAL)

	1958	1959	1960	1961
Total Social Product .. .. .	100	100	100	100
1. Industry .. .. .	59.3	61.4	62.4	63.0
2. Construction .. .. .	9.9	10.3	10.5	10.2
3. Agriculture .. .. .	20.4	17.3	16.2	16.1
4. Transport and Communication .. ..	3.7	4.1	4.2	4.3
5. Trade, Procurement Material and Technical Supply .. .. .	6.7	6.9	6.7	6.4

Source : National Economy of the U.S.S.R., Statistical Year Book, 1961, p. 76.

The index of gross output of industry and agriculture together (1950=100) moved up to 276 in 1961. While industrial output rose to 330 by 1961, that of agriculture reached only 167. After a fall of 7 points in 1951, it gradually rose to 104 by 1953. Through 1953-1961, however, the agricultural output steadily increased by as much as 63 points.

The development of Soviet agriculture can be assessed on the basis of the number of farms, State as well as collective, and the average number of households supported by a collective farm. At the end of 1961, there were 41,300 collective farms and 8,281 State farms. Between 1950-1961, the number of collective farms declined owing to the amalgamation of small collective farms. However, the average number of households covered by a collective farm rose from 13 in 1928 to 399 in 1961.

1. Relates to the year 1960.

### Land Utilization

Of the total land area of 2,227.2 million hectares as on November 1, 1961, about 1,040 million hectares were used by agricultural establishments and farms. Total cultivated land at 224.4 million hectares formed 10 per cent of the total land area. Of the total cultivated area, more than 50 per cent was accounted for by 41,300 collective farms (123.5 million hectares). The State farms, on the other hand, utilised about 100 million hectares. About 41.8 million hectares of virgin and disused land was ploughed up in the main virgin land development areas. As a result total crop area expanded to 204.6 million hectares.

### Crop Area

Of the total crop area, about 63 per cent constituted area under grains while another 25 per cent was occupied by fodder crops. Industrial crops occupied hardly 7 per cent. Though the total crop area increased between 1913 and 1961, the area under grains declined sharply. At the same time area occupied by fodder crops increased from 2.8 per cent in 1913 to 18.3 per cent in 1953 and thence to 25.4 per cent in 1961. The increase in the area under fodder crops has to be viewed in the context of the increased importance attached to livestock breeding since 1953.

TABLE II—CROP AREAS IN THE U.S.S.R.

(in million hectares)

	1913	1940	1953	1958	1959	1960	1961
1. Total Crop Area .. ..	118.2	150.4	157.2	195.6	196.3	203.0	204.6
2. All Grain Crops .. ..	104.6 (88.7)	110.5 (73.5)	106.7 (67.9)	125.2 (64.0)	119.7 (61.0)	121.7 (60.0)	128.3 (62.7)
3. Industrial Crops .. ..	4.9 (4.2)	11.8 (7.9)	11.5 (7.3)	12.3 (6.3)	12.4 (6.3)	13.1 (6.5)	13.6 (6.6)
4. Vegetables and Melons ..	5.1 (4.3)	10.0 (6.6)	10.3 (6.6)	11.6 (5.9)	11.6 (5.9)	11.2 (5.5)	10.8 (5.3)
5. Fodder Crop .. ..	3.3 (2.8)	18.1 (12.0)	28.7 (18.3)	46.5 (23.8)	52.6 (26.8)	57.0 (28.1)	51.9 (25.4)

Note : Figures within brackets indicate percentage to the total.

Source : National Economy of the U.S.S.R., Statistical Year Book, 1961. Pp. 311-12.

The yield per hectare in respect of all grains declined from 8.2 centners in 1913 to 7.8 centners in 1953 and thereafter stood around 10-11 centners between 1953 and 1961. Regarding individual crops, while maize, wheat, rice and cotton registered a rise in the yield per hectare between 1913 and 1953, that of oats, lagumes and sugar beat declined. However, compared to the position in 1953, the yield per hectare was generally higher in 1961 in respect of all the crops.

*Agricultural Output*

Of the total crop area, about 43 per cent was under State farms and other State agricultural enterprises while the collective farms covered 54 per cent. The collective and State farms made a big step forward in improving the utilization of land whereby the total grain output showed a sizable increase. Despite unfavourable climatic conditions in a number of major agricultural areas, gross grain harvest amounted to 8.4 billion poods (1 pood = 16.38 Kg.) or 138 million tons, registering an increase of 60 per cent over 1913 (Table III). Since 1953, there had been a sharp increase in the grain production such as wheat, maize, potatoes, etc. This has to be viewed in the context of the various measures taken, particularly the virgin land programme.

TABLE III—TOTAL OUTPUT OF GRAIN (GRANERY HARVEST) AND INDUSTRIAL CROPS  
(All Categories of Agricultural enterprises)

	1913	1940	1953	1958	1960	1961
<b>All Grains</b>						
in million poods .. ..	5253	5830	5036	8621	8203	8422
in million tons .. ..	86.0	95.5	82.5	141.2	134.4	138.0
<b>Important Crops</b>						
Wheat (million tons) .. ..	26.3	31.7	41.3	76.6	64.3	66.5
Maize in complete and milky wax ripeness (in terms of dry grains) .. ..	2.1	5.1	3.7	16.7	18.7	24.3
Cotton .. ..	0.7	2.2	3.9	4.3	4.3	4.5
Sugar beat .. ..	11.3	18.0	23.2	54.4	57.7	50.9
Oilseeds .. ..	1.0	3.2	3.1	5.2	4.3	5.4
Legumes .. ..	1.1	2.5	1.1	1.8	2.7	4.0
Sun flower .. ..	0.8	2.6	2.6	4.6	4.0	4.8
Potatoes .. ..	31.9	75.9	72.6	86.5	84.4	84.3

Source : National Economy of the U.S.S.R., Statistical Year Book, 1961. Pp. 300-301.

*Livestock*

Earlier, it was noticed that with a view to solving the problem of animal husbandry, the area under fodder crops rose from a mere 3 per cent in 1913 to 25 per cent in 1961. Development of livestock breeding continued in 1961. Production of meat, milk, wool and eggs showed a sharp rise between 1953 and 1961 (Table IV).

TABLE IV—OUTPUT OF LIVESTOCK PRODUCE

	1953	1961
Meat (slaughter weight) in million tons .. ..	5.8	8.7
Milk (in million tons) .. ..	36.5	62.6
Wool (in thousand tons) .. ..	235	366
Eggs (in thousands of millions) .. ..	16.1	29.3

The increase in the output of livestock products was attained mainly by increasing the herd of productive livestock.

#### *Marketing and State Purchases*

With an increase in production of grains and livestock products during the period 1953-1961, the value of marketed commodity as per cent of total production showed a steady rise. Of the total grain harvest of 8.4 billion poods, as much as 45 per cent was marketed. Similarly, 55 per cent of the livestock products also was marketed in 1961. In this context, it would be worth mentioning the importance of State purchases of agricultural products. During 1961, State purchases amounted to as much as 3.2 billion poods of grain out of 8.4 billion poods of total harvest (Table V).

TABLE V—STATE PURCHASES OF AGRICULTURAL PRODUCTS : FOR ALL CATEGORIES OF FARMERS

	(Million tons)	
	1953	1961
Grain		
in million poods .. ..	1899	3181
in million tons .. ..	31.1	52.1
Raw cotton .. ..	3.9	4.5
Sugar beat .. ..	22.9	47.7
Sun flower .. ..	1.8	2.9
Potatoes .. ..	5.4	7.0
Vegetables .. ..	2.5	5.5
Milk .. ..	10.6	27.5
Eggs (in 1000 millions) .. ..	2.6	7.4

Similarly, State purchases of livestock products such as milk and eggs accounted for 44 per cent and 25 per cent, respectively, of the total production in 1961.

### *Conclusion*

From the foregoing, it is clear that the Soviet agriculture since 1953 witnessed a rapid growth. Total farm output of grains rose from 5.0 billion poods in 1953 to 8.4 billion poods in 1961. Agriculture which had suffered a setback by 1953 was being reoriented. Total area under crops also increased during the period by about 35 per cent. These have to be viewed in the context of various developmental measures such as land reclamation, irrigational facilities, liberalization of restrictions in the disposal of grain harvest of collective farms, etc. The policy change of 1953 also brought in its wake various changes in the Soviet system of planning and agriculture. The marketed grain output also rose considerably since then. Under the stimulus of Soviet Seven-Year Plans, grain harvest is estimated to increase to 230 million tons by 1970.

D. A. JOSHI\*

### **IMPLICATIONS OF TECHNOLOGICAL ADVANCE IN COMMERCIAL CROPS —A CASE STUDY OF PLANTATION CROPS IN INDIA**

Tea and Coffee are the major foreign exchange earners of the country, and the rising per capita incomes have increased the home demand for these essential beverages. An expanding manufacturing industry has highlighted the insufficiency of internal production of rubber. For all these reasons, stepping up the output of plantation crops acquires an urgency which is well expressed by the successively higher targets of output set by the Planning Commission. In this task of raising crop output, producers have utilised the benefits of extensive agricultural research; by introducing better yielding plant material; by increasing the input of commercial fertilizers, pesticides, fungicides and weedicides, as reflected by the intake of fertilizer and chemicals by plantation industries. In a like manner, average daily employment in plantations has increased from 1,236,285 to 1,291,702 or by nearly 50 per cent as between 1950-51 and 1960-61.<sup>1</sup> As a result, tea production has gone up by 39.6 per cent, coffee by 154.8 per cent and rubber by 71.3 per cent as between 1947-49 and 1961-63 (averages). This increase in production has been obtained with relatively very little increase in acreage under these crops. During the post-Independence period, tea acreage has increased by only 6.05 per cent (compound), coffee by 24.4 per cent, both relatively very little as compared to increase in production. In the case of rubber, there has been a marked increase in acreage under the crop, of nearly 100 per cent. Thus, much of the increase in production has to be attributed to higher yields per acre in tea and coffee and to a little lesser extent in the case of rubber.<sup>2</sup> Technical advance in production

\* Bombay.

1. See the Indian Labour Statistics 1963. These figures leave out the employment of a considerable number of casual workers during the harvesting and other peak-work seasons. Since most of the plantations do not maintain records of numbers employed on daily cash payments but only the amounts so paid, either for piece-work or on day wages.

2. Though the figures show that area under rubber has increased by 100 per cent during the past 16 years, and production by only 71 per cent, yield per acre today is higher than what it was in 1947-48. Rubber, once planted takes nearly 10 years to give the first crop and nearly 40 per cent of acreage out of the 3 lakh and more acres under rubber today is less than 10 years old, being planted after 1952-53.



has been successful in raising per acre yields in plantation crops. However, this is only one side of the picture. Though it is generally believed that higher yields per acre reduce unit costs of production, in many of the cases, these efforts to raise yields may themselves lead to higher expenditure per acre, and if the gains in per acre yields are limited, unit costs will go up. This is more likely to be true in the initial stages of development of an economy. A number of small producers supplying a commodity may not be able to make effective use of new methods and materials, either due to tradition, lack of capital or the absence of a well-developed extension advisory service. On the whole, advances in techniques will be limited to particular aspects of crop production and the production organization as a whole may remain unchanged, as was witnessed in the case of a number of commercial crops in Latin America.<sup>3</sup>

Analytically unit costs will depend upon (a) the price of farm inputs, (b) size and combination of inputs, and (c) productivity of these inputs or the productivity of the whole organization. Of the three variables, prices of farm inputs are generally on the upswing in the process of development. The size and combination of inputs in farming will depend upon the relative levels of opportunity costs for the individual factor inputs on the one hand, and the choice of production techniques on the other. However, the techniques of production are also determined by the opportunity costs for factor inputs at any point of time. Thus, when labour is relatively more abundant than capital, a labour-intensive technique is bound to be used in production and *vice versa*.

#### *Technical Advance and Factor Proportions in Crop Production*

Even though all the innovations contribute to a change in input-output relations, given the scale of operations, some are basically of an output increasing nature, and others contribute to a reduction in farming costs. For a given size of farm, technical advance in the shape of better fertilizers, seeds and plants, irrigation facilities, more efficient safeguards against pests and diseases—all these will raise yield per acre. At the same time, expenditure per acre will increase due to these additional inputs. Application of larger doses of fertilizers of better quality, greater care and protection of plants and irrigation, increase labour inputs per acre and transport charges.<sup>4</sup> As against this, improvements in production organization and mechanisation lead to a saving in labour inputs and other service charges leading to a reduction in production costs. But these innovations will generally be introduced at very late stages of development.

Mere introduction of output increasing type of innovations may not lead to higher productivity in agriculture in the initial stages of development. A major factor leading to higher productivity is the complementarity among the various factor inputs in farming as was witnessed in the case of Japan during the later stages of development of that country.<sup>5</sup> Application of larger doses of fertilizers may

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3. J. O. Morales, in a paper read at the Ninth International Conference of Agricultural Economists, Helsinki 1956. See for report, *The Indian Journal of Agricultural Economics*, Vol. XI, No. 3, 1956, pp. 70-99.

4. *Vide* Capital Formation in Japan 1868-1940, The Free Press of Glencoe, New York, p. 61.

5. B. F. Johnston and J. W. Mellor: "The Role of Agriculture in Economic Development," *American Economic Review*, Vol. LI, No. 4, September 1961, p. 571.

require adequacy in irrigational facilities and better knowledge of plants and processes on the part of workers and management. Greater reliance on purchased input will call for improvements in methods of farm management and accounting. These prerequisites for higher productivity are a function of dissemination of knowledge, education and institutional changes in farming apart from direct investments in tangible capital. Provision of these prerequisites is the most difficult problem a developing country has to grapple with, and they are slow in the coming.<sup>6</sup>

The foregoing discussion provides the hypothesis that crop production may be increased at higher marginal costs in the early stages of development. This cannot be attributed to the operation of diminishing returns in production, since that concept assumes no change in production techniques. Rising marginal costs in the situation under discussion is the result of a lag in technical advance, where, the cost of introducing innovations is higher than the gains thereby. The type of innovations introduced, while raising the expenditure per acre may not increase yield to the level sufficient to reduce unit cost of production. It is true that the full impact of these innovations will be felt only in the long period. But in commercial crop production, the innovations in production will have to be tuned to the trends in prices and the market situation. Prices of tea and coffee have been declining steadily from 1956 onwards in the international markets and a number of studies predict a continuance of this trend into the future.<sup>7</sup> Natural rubber consumption is limited by the availability of low-priced synthetic substitutes. Under such a situation, profitability of the plantation industries as well as future expansion in the consumption of plantation products will depend upon the capacity of producers to reduce unit costs of production.

With a view to studying the relationship between yields per acre and unit costs of production, data on per acre yields and per acre expenditures for 113 plantation companies in India, producing coffee, tea and rubber were analysed for 14 years (1949—1962). A more than proportionate increase in per acre expenditures as against the rise in per acre yields will show rising unit costs of production. These 113 companies selected at random account for 109,494 acres under coffee, tea and rubber in India distributed as follows :

				Number of Units Selected	Area in Acres
Tea	..	..	..	47	42,956
Coffee	..	..	..	37	34,068
Rubber	..	..	..	29	32,470
Total	..	..		113	109,494

6. "It does take ingenuity, time and effort to correct such institutional bottlenecks and to create appropriate new ones, and this may involve investments in both tangible and intangible capital... but unless the necessary institutional changes are studied and attacked as specific problems, the result will not follow despite the amounts of overall investment." Mordecai Ezekiel, "Productivity, Real Wages and Economic Growth: A comment," *Quarterly Journal of Economics*, Vol. LXXV, No. 2, May 1961, p. 318.

7. See F. A. O. Agricultural Commodities Projections 1970 for prospects for individual commodities.

Since the corporate sector forms the more progressive element in the plantation industries, and the holdings in this sector are generally large-sized, innovations in production techniques are more easily introduced in this sector than in holdings under individual ownership, the latter being mostly small holdings.<sup>8</sup> Thus, a study of the corporate sector will provide a measure of maximum benefit that can be and has been actually obtained through technical advance.

Latest estimate of acreage under plantation companies in India is available for the year 1953-54 only and they are as follows :

AREA UNDER COMPANY-OWNED ESTATES IN INDIA<sup>9</sup>

						Acres
Tea	..	..	..	..	..	644,626
Coffee	..	..	..	..	..	43,521
Rubber	..	..	..	..	..	73,354

The sampled units represent 12 per cent of the acreage under the corporate sector in tea, coffee and rubber. In terms of individual crops, coffee estates selected represent 62 per cent of the acreage under company-owned estates, and rubber estates, 41 per cent of the total under the corporate sector. Only in the case of tea, 6 per cent of the total acreage under the corporate sector is available. Figures of acreage, production and total estate expenditure in the case of plantation companies were taken out from the official year books of the Madras Stock Exchange.<sup>10</sup>

*Definition of Terms : 'Yield per acre', 'Expenditure per acre'*

(i) In the case of each of the crops, total output by the producing units every year is divided by the area actually bearing crop and not by the total area owned by these units. Thus, the yield per acre refers to average yield per acre actually yielding crop, but expenditure per acre for the year refers to the total area owned on which cultivation or other work was done but a part of which may not yield any crop. This has led to a slight bias, whereby figures of yield per acre are inflated and figures of expenditure per acre are deflated. (ii) Apart from coffee, tea and rubber, the selected companies also grow some subsidiary crops like pepper and cardamom, and expenditure per acre includes expenditure on these crops also. While selecting the units, only those companies which possess less than 20 acres under these subsidiary crops were selected, and mostly these crops are grown in between tea, coffee and rubber plants, and separate areas are not allotted to them. The existence of these subsidiary crops inflates the figure of expenditure per acre every year which will neutralise the deflation in expenditure estimates due to the

8. See the Plantation Inquiry Commission Report 1956, Parts I, II and III, Manager of Publications, New Delhi. (Chapter III of each Part).

9. Annexure XIII, Part I, Annexure II, Part II, and Annexure III, Part III, Report of the Plantation Inquiry Commission.

10. The Madras Stock Exchange Official Year Books 1958-59 and 1961-62.

inclusion of total area rather than bearing area into the calculation as explained under (i) above.

(iii) Total estate expenditure by the 113 companies every year is divided by the total area owned by these companies in each of the years. Total estate expenditure refers to all the expenses incurred in crop production excepting opening stock, depreciation and taxation. Since we are measuring changes in costs and yields over time, as a result of introducing innovations in techniques of production, and by changing the quantity of factor inputs; changes in cost due to changes in accounting practices and fiscal levies by the Government will have to be excluded. This method will give us a measure of changes in resource input per unit of output over time.

#### *Weighted Expenditure per Acre*

Expenditure per acre varies from crop to crop. Normally expenditure per acre on tea is much more than that on coffee or rubber. Thus, a simple division of total expenditure by the total acreage under three crops put together, may lead to some inaccuracy due to the changing composition of total area every year as to the area under each of the three crops. For this reason, total expenditure for every year is weighted by giving weights to each of the crops on the basis of acreage under each of the crops in 1949. Roughly, the total area under three crops (among selected units) during the base year, *i.e.*, 1949 is made up of area under tea, coffee and rubber in the proportion of 2.6, 2.2 and 2.4 respectively.

#### *Moving Averages*

Indices of per acre yields in the case of each of the three crops and average weighted expenditure per acre for 14 years were calculated taking 1949 as the base year (1949=100). In perennial tree crops, a good crop year is generally followed by a lean year, and year to year fluctuations are common in plantation crops. This not only leads to a two-year cycle in yields but the estate expenditure will also vary from year to year due to the heavy weightage of crop harvesting expenses in total expenditure. To eliminate this year-to-year fluctuations in yields and expenditures, the indices are converted into two-year moving averages.

#### *Comparison*

A comparison of yields and expenditures is made difficult due to the presence of three different series of yields for the three crops. An arithmetic average of the three series (one each for tea, coffee and rubber) will not give due weight to the differences in the magnitude of change in yields over time in the case of each of the three crops. "Geometric mean gives index numbers which are reversible as far as the time factor is concerned."<sup>11</sup> Thus, the geometric mean of index numbers of yields in tea, coffee and rubber for every year is calculated and compared with expenditure per acre for the same year as shown in Table I. The coefficient of correlation between yield per acre and expenditure per acre works out to 0.98, thus showing a positive relationship between yield and expenditure. As the table shows, expenditure per acre has increased by 113 points as between 1949 and 1962, whereas yield per acre has risen by only 73 points—resulting in higher unit costs of production in plantation crops.

11. D. N. Elhance : Fundamentals of Statistics, Kitab Mahal, Allahabad, 1960, p. 262.

TABLE I—RELATIONSHIP BETWEEN YIELD PER ACRE AND EXPENDITURE PER ACRE IN PLANTATION CROP IN INDIA

Year	Index Number of Yield per Acre*	Index Number of Expenditure per Acre†	Deflated Index of Expenditure per Acre‡
1949 .. .. .	100	100	—
1950 .. .. .	100	101	117
1951 .. .. .	100	110	111
1952 .. .. .	98	125	—
1953 .. .. .	106	138	—
1954 .. .. .	122	153	—
1955 .. .. .	124	170	170
1956 .. .. .	127	184	191
1957 .. .. .	142	201	201
1958 .. .. .	151	214	203
1959 .. .. .	151	233	218
1960 .. .. .	166	239	221
1961 .. .. .	182	248	220
1962 .. .. .	173	213	182

\*Geometric mean of yield relatives for tea, coffee and rubber.

†Weighted on the basis of acreage under tea, coffee and rubber in 1949 (Weights : tea 2.6, coffee 2.2, rubber 2.4).

‡Deflated by the index number of wholesale prices of (i) chemicals and (ii) machinery and transport equipment (average).

#### *Distinction between Changing Prices of Inputs and the Physical Quantity of Inputs*

The rise in expenditure per acre is (a) either due to the higher prices of factor inputs in production, or (b) due to the increase in physical quantity of inputs. Time series of prices of all the inputs into a plantation are not available and such series will always be incomplete. However, the two major items of input into a plantation, of which prices have gone up of late, are chemicals and machinery. The wholesale price index numbers prepared by the office of the Economic Adviser to the Government of India provide index of prices of these two items. By deflating the index of expenditure per acre by the price index for these two categories of inputs into a plantation, the deflated index of expenditure per acre will represent increase or decrease in expenditure due to the changing size of inputs into a plantation.

By relating the index of yield per acre and deflated index of expenditure per acre (Table I), Figure I is obtained. The graph shows the more than proportionate rise in expenditure per acre for each of the years plotted.

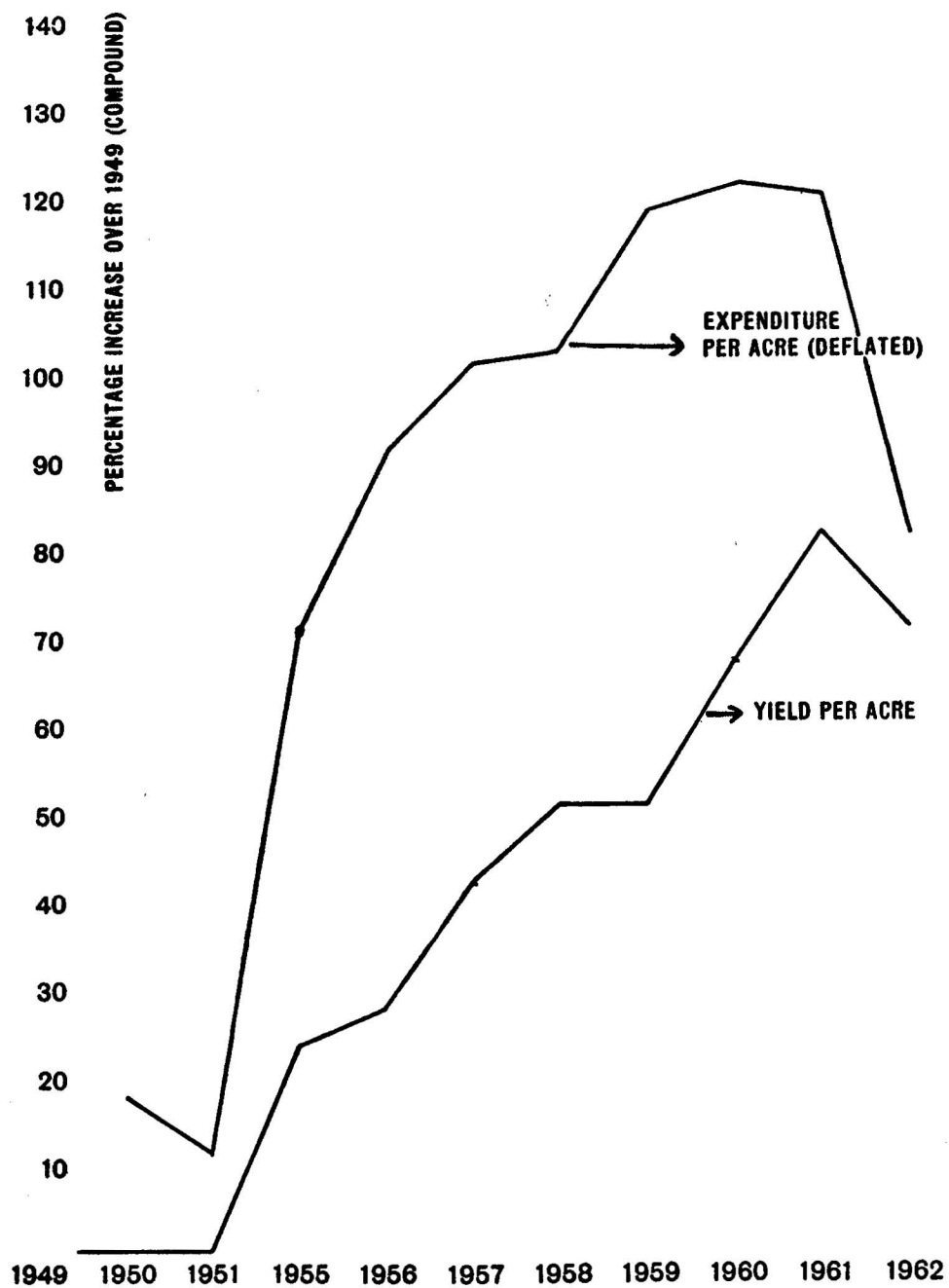


FIGURE I

*Conclusion*

Despite some gains in yield per acre of coffee, tea and rubber during the past 14 years, cost per unit of output has increased. This increase is to be accounted for by the rise in price of inputs to some extent. The major reason for higher unit costs has been the increase in physical quantity of inputs put into a plantation to obtain these higher yields. Technological change in production has increased the resource input per unit of output rather than bringing about a reduction in such inputs.

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