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## P R E F A C E

The Report of the National Commission on Agriculture comprises 69 chapters in 15 parts. A complete list of chapters and parts is given in pages (iii) to (v). The Terms of Reference of the Commission and its composition are given in Part I—Chapter 1—Introduction.

This volume, entitled 'Demand and Supply', is Part III of the Report and is divided into the following three chapters :

10. Demand Projections
11. Supply Possibilities
12. Export Possibilities and Import Substitution

Aspects relating to exports of forest products are dealt with in Part IX.



# **REPORT OF THE NATIONAL COMMISSION ON AGRICULTURE**

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## DEMAND PROJECTIONS

### 1 APPROACH

10.1.1 The Indian economy is operating under a system of planning. In each five year plan there is a scheme of investment together with basic policies designed to achieve certain major objectives which include, *inter alia*, achievement of self-sufficiency in foodgrains and increased production of other agricultural commodities to meet the requirements of industry and exports. As such, it becomes important for successful economic planning to have a clear perspective of the time path of demand for different agricultural commodities. This is necessary for setting appropriate production targets and designing development programmes and policies for achieving them.

10.1.2 Long term demand estimates have to be formulated keeping in view the likely trends in several quantitative as well as qualitative factors in the economy as also the long term economic and social objectives. Due to the multi-dimensional nature of the issues involved in projection work, different assumptions have to be made as to the possible trends in the factors influencing demand. It is possible that the actual demand might deviate from the projected level even if the projection models are perfect and co-efficient in respect of the economic determinants of demand reasonably good. Again the actual demand may turn out to be different from the projected level not because of any shortcomings in the underlying assumptions but because of the emergence of new factors in the economy. It may also happen that the actual demand may turn out to be of the same order as projected demand even though the assumptions underlying projected demand do not come true individually but the deviations from projected trends are counter-balancing in nature so that their net collective effect on demand does not change. However, the functional role of the projections may be said to have been fulfilled even if the problem areas are identified.

#### Past Experience

10.1.3 Attempts were made under the successive five year plans

to assess the likely levels of demand for some of the principal agricultural commodities at the end of the respective plan periods, although the methodology used for estimating the requirements changed from plan to plan. Past experience has shown that for various reasons, there have been wide variations between the estimated and the actual levels of demand. These are indicated below with reference to foodgrains.

10.1.4 The total requirements of foodgrains in the last year of the First Five Year Plan (1955-56) were estimated at 60.7 million tons<sup>1</sup> (62 million tonnes) in order to maintain the average consumption at the estimated level of 15.8 oz per day per adult (385 gm per day per capita) in 1950. The actual availability in 1956 was much higher as the actual production of foodgrains in 1955-56 exceeded the target. Foodgrains prices were also lower in 1956.

10.1.5 The Second Plan document<sup>2</sup> had estimated the per capita consumption level in 1960-61 at 446 gm of foodgrains per day (18.3 oz per adult) on the basis of expected changes in per capita income. The actual per capita availability of foodgrains, both from internal production and imports was, however, 469 gm per day in 1961.<sup>3</sup> In this connection it may be pointed out that during the Plan period, the increase in per capita income was less than that planned whereas prices of foodgrains registered a rise.

10.1.6 The gross demand for foodgrains in 1965-66, the terminal year of the Third Five Year Plan, was estimated<sup>4</sup> at 100 million tons (102 million tonnes) at the rate of a normative level of per capita consumption of 18 oz (510 gm) per day, which was considered necessary to meet the calorie requirements; it was expected that the economic demand based on considerations of income elasticity of demand and associated with a 6 per cent increase in per capita income, would be around the estimated normative demand. The last year of the Plan, however, proved to be adverse weatherwise and the country had to pass through a very acute food situation in 1966.

10.1.7 Under the original draft Fourth Five Year Plan, which was drawn up for the period 1966—71, the Working Group of the Ministry of Food and Agriculture on Demand Projections estimated the demand for

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1 1952. First Five Year Plan: p. 158;

2 1956. Second Five Plan : p. 260. New Delhi, Planning Commission, Government of India.

3 1974. Bulletin on Food Statistics (24th issue): p. 183. New Delhi, Directorate of Economics & Statistics, Ministry of Agriculture & Irrigation, Government of India.

4 1960. Approach to Agricultural Development in the Third Five Year Plan. Mimeographed Report, New Delhi, Ministry of Agriculture & Irrigation, Government of India.

human consumption for foodgrains in 1971 at 107.42 million tonnes, after taking into account the prospective growth in population as well as in per capita incomes. The total availability of foodgrains for human consumption including imports at 94.3 million tonnes in 1971 fell short of the estimated demand by a considerable margin. This resulted in almost doubling of wholesale prices of foodgrains during the Plan period.

10.1.8 In the Fourth Five Year Plan (1969—74), it was envisaged that the per capita expenditure would go up by 16 per cent and population by 15.7 per cent during the period 1968-69 to 1974-75. Using an expenditure elasticity of 0.5, the demand for foodgrains in 1974 was estimated at 109.8 million tonnes (net) or 126 million tonnes (gross). The actual availability for consumption in 1974 was of the order of 90.7 million tonnes only, including the supplies from imports. However, during the Fourth Plan period, the increase in per capita income fell short of the Plan target considerably and the lower level of availability of foodgrains led to an unprecedented increase in the prices of foodgrains. The increase in population also turned out to be lower than what was anticipated.

10.1.9 This brief review brings out the extent and nature of variations between the estimated demand for foodgrains and the actual consumption and the resultant price changes. Table 10.1 gives a comparative picture of the changes in total consumption of foodgrains, per capita income, relative wholesale prices of foodgrains and population during the triennia 1960—62 and 1970—72 :

TABLE 10.1  
Changes in Consumption, Per Capita Income, Prices and Population  
during 1960—1962 and 1970—1972

	Total consumption (million tonnes)	Per capita income (Rs at 1960-61 prices)	Relative wholesale price index	Popula- tion (million)
average during 1960 to 1962	74.32	307.7	101.8	442.36
average during 1970 to 1972	93.34	345.9	116.1	550.72
percentage increase	25.60	12.41	14.05	24.50
elasticity of demand	—	(+)0.46 <sup>1</sup>	(-)0.34 <sup>1</sup>	—
impact on demand (per cent)	25.60	(+)5.71	(-)4.78	24.50

1 1962. Long Term Projections of Demand for and Supply of Selected Agricultural Commodities, 1960-61 to 1975-76: p. 80. New Delhi, National Council of Applied Economic Research.

It would be obvious from the above table that total consumption should have gone up by 31.6 per cent on account of the effect of increase in income and population. The actual increase was, however, of the

order of 25.6 per cent. Considering the rise in prices and the fact that price elasticity is negative, the actual increase in consumption appears to be consistent with the estimated consumption levels.

10.1.10 Apart from the aforesaid official projections in respect of the five year plans, several other studies, differing from one another in scope, coverage and assumptions, have provided projections of demand for various agricultural commodities in India. The levels of consumer demand projected by these studies even for the same time points are widely different. We also sponsored a study on 'Projections of Demand for and Supply of Selected Agricultural Commodities, (1975—1991)' by the National Council of Applied Economic Research. The methodology and assumptions made in the different studies have been carefully examined by us with a view to determining the lines on which the demand projections, with an ultimate time perspective of the end of the century, should be formulated. Preliminary estimates of demand were worked out in 1973 by the Working Group on Demand and Supply Projections set up by the Commission. These have been subsequently reviewed and revised in the light of later developments and data availability. The demand estimates which have emerged are basic to the levels of agricultural production indicated by us and the policy recommendations made for achieving them.

#### Scope and Coverage

10.1.11 Agricultural commodities include not only foodgrains and commercial crops but also plantation crops, livestock and poultry products and fish. Projections of demand have, however, been formulated and are presented in this Chapter for the following commodities which are considered basic for the formulation of long term development plan in the agricultural sector :

1. foodgrains
  - (i) rice
  - (ii) wheat
  - (iii) coarse cereals
  - (iv) pulses
2. agricultural raw materials
  - (i) cotton
  - (ii) jute
  - (iii) oilseeds
  - (iv) sugarcane
  - (v) tobacco
3. beverages
  - (i) tea
  - (ii) coffee



4. animal husbandry
  - (i) milk
  - (ii) meat
  - (iii) eggs
5. fish
6. forestry
  - (i) industrial wood
  - (ii) Fuel wood

The projections in respect of the commodities listed above are presented at the all-India level for rural and urban sectors separately. We are of the view that there is need for formulating demand projections at the State level for which it is necessary to build up valid economic indicators. Besides the commodities listed above, projections of demand at the State level should also be built up for commodities which are important in the context of the economy of a particular State. Besides projections of total indigenous demand, it is extremely important to have independent projections of export demand. The importance of formulating projections of export demand in respect of important export oriented commodities in different time perspectives and with reference to important destinations of export has been highlighted in Chapter 12 on Export Possibilities and Import Substitution.

10.1.12 Each commodity has been taken in its totality though ideally projections of demand should be worked out in terms of different qualities/varieties of each commodity. The extent to which spatial or sectoral disaggregation of demand is possible, depends upon the nature of the basic data which are available and the statistical techniques used. We realise that the total demand would be greatly influenced by changes in the spatial and rural-urban distribution of population as also its age-sex structure, and by inter-regional and inter-sectoral differences in tastes and preferences. While it is useful to make projections in terms of sectors and regions, there are problems with regard to (a) breakup of the base level demand by sectors and regions; (b) assumptions about sectoral and regional rates of growth of population and per capita incomes, and (c) estimated values of sectoral and regional demand co-efficients. These problems are much more complicated in the context of regional demand projections than for sectoral projections. For instance, it is difficult in practice to distinguish between the income generated within a region and that accruing to the region. Moreover, alternative assumptions about the pace of growth in relation to the level of development of a region can be plausible and consistent. While it is reasonable to expect low-income regions to develop at a faster rate due to better efforts and greater potentialities, it is equally pertinent to assume that high income regions would develop at a faster rate due to their higher start off levels. It is, however,

possible to estimate the demand for rural and urban sectors separately, while working out the demand projections; there is in fact a strong rationale for treating these two sectors separately since they exhibit distinct patterns of consumption even within same expenditure classes.

10.1.13 In respect of the time points of projections, it may be mentioned that it is possible to forecast the requirements upto 1985 with a reasonable degree of confidence due perhaps to the relative ease with which the time path of the behaviour of the crucial macro-economic variables could be defined. However, assumptions about these variables for a long term perspective extending upto the turn of the century viz. 2000 A.D. would be highly hypothetical. In view of this it is decided to treat the periods upto and beyond 1985 as two distinct periods, for the purpose of working out the projections of demand.

10.1.14 It would be seen that the items for which demand projections are worked out in this Chapter are, with the exception of jute and forestry products, either final products which *per se* find a place in the consumer budget or primary equivalents of final consumption products. While human demand constitutes a significant proportion of the total demand for the final consumption products, it is also important to recognise that there is a component of non-human/industrial consumption demand for some of these commodities (e.g. livestock feed requirement of foodgrains and non-edible uses of oils). The methodology, assumptions and other associated aspects in respect of final consumption goods are detailed in later sections of this Chapter. The aggregate consumer demand for the selected agricultural commodities and the estimated levels of demand for jute, industrial wood and fuel wood have been dealt with in the relevant Sections.

## 2 PROJECTIONS OF CONSUMER DEMAND

### Methodological Issues

10.2.1 While working out the expected levels of economic demand for final consumption products, important decisions have to be taken in respect of methodological issues and appropriate assumptions have to be formulated in regard to the perspective behaviour of basic macro-economic variables. The Commission has made a detailed examination of the several methodological problems relating to (a) selection of the appropriate form of the demand function and projection model; (b) selection of appropriate concept and value of the demand co-efficient; and (c) choice of the base

period and base level demand\*. In sorting out these problems, however, we had to weigh the technical considerations against the nature of availability of data on the relevant variables. After a careful scrutiny of the data base as also on theoretical considerations, the following methodology was adopted with regard to the three sets of issues listed above :

- (i) Demand projections have been derived at constant prices. Alternative functional forms have been used for different commodities (i.e. log-inverse form for rice, wheat and other cereals, semi-log for pulses, milk, vegetable oils, vanaspati, sugar and gur and double-log form for meat, egg, fish, tea, coffee, tobacco and cotton clothing) and demand projections have been worked out in quantitative terms.
- (ii) Demand elasticities based on cross-section family budget data for the different commodities for which projections were to be presented, have been derived separately for the rural and the urban sectors, by fitting the alternative functional forms mentioned above, to the data on consumer expenditure based on the National Sample Survey (NSS) for the year 1970-71<sup>1</sup> (*vide* Appendix 10·2).
- (iii) Per capita net availability of the different commodities in 1971 (which corresponds to the crop year 1970-71 and the expenditure year 1971-72) which is the level of the apparent consumption of the respective commodity, has been taken to be an approximation of consumption. The rural-urban distribution of the all-India levels of total availabilities of the different commodities in the base year has been worked out with the help of the ratio of rural/urban consumption of the particular commodity to the total economy's consumption of that commodity (in quantitative terms) as derived from the NSS data for 1970-71 (the estimates of per capita apparent consumption of agricultural commodities thus derived for the rural/urban sectors for the base year are given in Appendix 10·3).
- (iv) In respect of cotton clothing, however, the actual length of cloth purchased in 1961-62 as given in the NSS report for that year (and not the apparent consumption in any recent year) has been taken as the base line. This is to obviate, indirectly at least, the problem of cotton-synthetic fibre substitution, which has become acute in recent years. Projection of the demand for cloth on the basis of cloth consumption and demand elasticities

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\*A fuller discussion of these problems is given in the Technical Note at Appendix 10.1

1 1975. Revised Report, No. 250, 25th Round, National Sample Survey on Consumer Expenditure : p. 8 and p. 56. New Delhi, National Sample Survey Organisation, Ministry of Planning, Government of India.

in a distant year (i.e. 1961-62) when the man-made fibre demand/production had not yet assumed considerable dimension and when the bulk of cloth demand was met by cotton clothing, would perhaps, yield an estimate of demand for all clothing in general, irrespective of whether it is for cotton or synthetic fibres. Hence the projections presented in this Chapter under the heading "cotton clothing", in fact, represent the total demand for all kinds of clothing. The projections of demand for cotton clothing alone could be derived by deducting from the estimated total demand for all clothing, in general, an estimate of the likely levels of production of man-made fibre in the coming years.

10.2.2 The demand projections worked out by using different functional forms suffer from a major limitation that the sum of expenditure on individual items may not tally with the total expenditure on all items taken together. With other refined statistical techniques, like addi-log engel curves, it is possible to arrive at estimates of expenditure on various items which are additive and, therefore, more helpful in estimating the total expenditure on all items. In this connection, it may be pointed out that our Working Group on Demand and Supply Projections worked out projections of demand upto 1985-86 (in value terms) using (a) constant elasticity engel curve hypothesis and (b) the addi-log engel system. Apart from the fact that considerable differences were observed between the rates of growth of demand estimated for any single item using the aforesaid two hypotheses, it was felt that for the purposes of formulating production policies for the future, demand projections in quantity terms should form the basis. In view of this, it was decided to derive demand projections in quantity terms by using alternative functional forms for different agricultural commodities.

10.2.3 Irrespective of the views that are taken on the theoretical issues relating to the projection models and demand Co-efficients, the broad methodology of projection of economic demand consists in estimating for a certain time perspective, the expected increase in demand by superimposing the income effect on a base level per capita demand/consumption. The aggregate demand for human consumption is then derived by multiplying the projected level of per capita demand by the size of projected population at the time point of projection. It would thus be seen that assumptions regarding the expected rate of growth of the macro-economic variables of population and income are of crucial significance in the projection of demand. More specifically, it is necessary to have realistic estimates for the base year and also for the different time points of projection of (a) rural-urban break up of the population (b) private consumption expenditure at constant prices and (c) rural-urban levels of per capita private consumption expenditure.

## Growth of Population

10.2.4 Growth of population is an important determinant of aggregate demand. In the draft Fifth Five Year Plan document<sup>1</sup>, it has been stated that the total population as on March 1 would increase from 547 million in 1971 to 581 million in 1974, 637 million in 1979 and 705 million in 1986. We, however, feel that these projections represent the situation which will obtain if the targeted birth rate under the family planning programme is actually realised by the optimum utilisation of stipulated inputs. In view of the past performance it is our view that these represent at best the targets to be aimed at but may be difficult of realisation. We, therefore, consider it desirable to work on alternative assumptions of population projections.

10.2.5 Several alternative projections of population are available, worked out by demographers of both this country and abroad. Raghavachari<sup>2</sup> has projected the population on six alternative assumptions of fertility rates and one set of assumptions for future course of mortality. The estimates for 2001 A.D. ranged between 830.6 million and 1,032.1 million. The various alternative estimates for the years 1976, 1981, 1986, 1991, 1996 and 2001 A.D. are given in Appendix 10.4. The projected expectations of birth and death rates on the basis of these alternative assumptions are given in Appendix 10.5.

10.2.6 The background material for making these rough estimates about the likely trend in fertility upto 1981 has been drawn from the available information of the performance of family planning programme. While the low projections are linked with full achievement of the programme targets, the medium sets correspond to the expected performance of the programme. The high sets of projections are associated with the failure of the family planning programme. After 1981 the same trend in fertility level is assumed under different sets of projections. According to Raghavachari, the high and low sets of projections broadly indicate the likely range of population projections in India while the medium sets represent the most plausible course of population growth.

10.2.7 We feel that in the context of the current efforts being made towards family planning, Medium-2 level of population seems to be more plausible. Moreover, in the matter of food and agricultural raw materials it is better to plan for a surplus rather than a deficit. In case the family planning efforts meet with a greater degree of success and the population

1 1973. Draft Fifth Five Year Plan, 1974—1979: Vol. I: p.I. New Delhi, Planning Commission, Government of India.

2 Raghavachari, S., 1974. Population Projections 1976 to 2001 in : Population in India's Development 1947—2000 : Sponsored by Indian Association for Study of Population, July 1974 New Delhi, Vikas Publishing House (P) Ltd.

turns out to be lower than the Medium-2 projections the resulting surpluses in food and raw materials could well find suitable export avenues.

10.2.8 The growth of urban population is dependent on three elements, namely, the natural increase, net migration and net accretion and depletion due to reclassification of area. The first component is the consequence of natural biological process while the other two depend on future developments in the economic activities of the region. In view of the uncertainties in the rural-urban distribution of the population, the past trends in the ratio of urban population to total population have been relied upon. The percentage of urban population to total population is estimated to increase from 19.98 in 1971 to 20.97, 22.28, 23.75 and 29.17 in 1975, 1980, 1985 and 2000 AD respectively.

10.2.9 The projections of population worked out by Raghavachari refer to March 1, of the projected years, Since the projections of demand for agricultural commodities refer to the mid-calendar year points the population estimates have been adjusted as on July 1, of the respective years. The adjusted population projections are presented in the following table :

TABLE 10.2  
Estimates of Population—Rural and Urban

Year	(million)		
	Rural	Urban	Total
1961	362.60	79.61	442.21
1971	440.66	110.04	550.70
1975	472.17	125.26	597.43
1980	512.58	146.96	659.54
1985	552.73	172.18	724.91
2000	662.49	272.86	935.35

#### Private (Final) Consumption Expenditure

10.2.10 An individual's demand for a commodity is a function of the level of income, changes in relative prices, consumption habits, tastes, etc. While projecting consumer demand, it is, therefore, essential to have reliable estimates of expected per capita incomes for the period for which projections are made. More specifically, in so far as expenditure elasticities of demand based on family budget data on consumer expenditure are used for projecting consumer demand, as is proposed in this Chapter, it would be necessary to have projections of private (final) consumption expenditure (PCE) at constant prices.

10.2.11 The following table gives estimates of PCE from 1960-61 to 1970-71 :—

TABLE 10.3

Estimates of Private (Final) Consumption Expenditure at 1960-61 Prices<sup>1</sup>

Year	Private (final) consumption expenditure (Rs. crores)	Per capita PCE (Rs.)	Index number	
			PCE	Per capita PCE
1960-61	12,210	281.3	100.0	100.0
1961-62	12,205	274.9	100.0	97.7
1962-63	12,346	271.9	101.1	96.7
1963-64	12,767	275.2	104.6	97.8
1964-65	13,565	286.2	111.1	101.7
1965-66	13,084	269.8	107.2	95.9
1966-67	13,629	275.3	111.6	97.9
1967-68	15,424	304.8	126.3	108.4
1968-69	14,927	288.2	122.3	102.5
1969-70	15,631	295.5	128.0	105.0
1970-71	16,039	296.5	131.4	105.4

1 1975. National Accounts Statistics, 1960-61 to 1972-73: pp. 2-3. New Delhi, Central Statistical Organisation, Department of Statistics, Ministry of Planning, Government of India.

It is observed that during the decade ending 1970-71, the per capita private (final) consumer expenditure rose by 0.8 per cent per annum\*. The actual per capita private (final) consumption expenditure in 1971-72 (at current prices) is estimated at Rs 598.

10.2.12 Against this trend, the draft Fifth Five Year Plan has envisaged that the aggregate private consumption expenditure would increase at the rates of 5.1 per cent, 5.4 per cent and 5.6 per cent during the Fifth Five Year Plan period, Sixth Five Year Plan period and the period 1983-84 to 1985-86 respectively; the corresponding rates of growth assumed in respect of the net domestic product for these three periods being 5.5 per cent, 6.05 per cent and 6.18 per cent respectively. In absolute terms, the total PCE is projected to increase from Rs 38,334 crores in 1973-74 to Rs 63,815 crores in 1980-81 and Rs 71,153 crores in 1985-86 at 1972-73 prices<sup>1</sup>. These estimates have been adjusted to 1971-72 prices and per capita consumption expenditure estimates have been obtained on the basis of population projections used in this Chapter. Reckoning 1971-72 as the

\*Growth rates used in this chapter are compound rates of growth.

1 1973. Draft Fifth Five Year Plan, 1974-79, Vol. I : p. 7 New Delhi, Planning Commission, Government of India.

base year, the rates of growth in per capita PCE work out to 2.6 per cent and 2.9 per cent per annum for the periods ending 1980-81 and 1985-86 respectively. The projections based on these assumptions could be taken as the 'high' estimates of demand upto 1985-86. In order, however, to have an idea about the possible minimum growth in demand, it would be necessary to work with a rate of growth in per capita PCE which is an approximation of the observed trend in recent years. In view of this it has been assumed that with 1971-72 as the base year, the rate of growth of per capita PCE for the period ending 1985-86 would be 1 per cent per annum. The demand projections based on the latter assumption could be taken as the 'low' estimates.

10.2.13 No estimates of gross domestic product (GDP) for 2000-01 AD are available. However, in the draft Fifth Five Year Plan document, the Planning Commission has furnished the following long term perspective of overall and sectoral rates of growth :

TABLE 10.4  
Projected Sectoral, Rates of Growth, 1974-75 to 1985-86<sup>1</sup>

	(per cent)		
	1978-79 over 1973-74	1982-84 over 1978-79	1985-86 over 1983-84
agriculture . . . . .	3.89	3.50	3.63
mining and manufacturing . . . . .	8.11	8.36	7.86
electricity . . . . .	9.87	9.80	10.46
construction . . . . .	8.70	8.30	8.31
transport . . . . .	5.63	6.36	6.77
services . . . . .	5.65	7.40	7.39
total . . . . .	5.50	6.05	6.18

Keeping in view the above perspective of growth indicated in the draft Fifth Five Year Plan and the likely trends in a few crucial macro-economic variables e.g. rate of capital formation, consumption expenditure, population growth as well as the physical possibilities of growth particularly in the agricultural sector, an exercise was done in this Commission to form an approximate idea of the growth of GDP over the period 1971-72 to 2000-01 AD. For the purpose of demand projection we have assumed an overall

<sup>1</sup> 1973. Draft Fifth Five Year Plan, 1974-79, Vol. I : p. 9, New Delhi, Planning Commission, Government of India.



long term rate of growth of 5 per cent during 1971-72 to 2000-01 AD. The total GDP is projected to increase from Rs 39,179 crores in 1971-72 to Rs 166,400 crores in 2000-01 AD at 1971-72 prices. The estimates of private consumption expenditure in 2000-01 AD are based on the following assumptions :—

- (i) public consumption expenditure after Seventh Five Year Plan would be considerably stepped up; and
- (ii) rate of capital formation in the private and the public sectors will rise sharply for financing investments.

It has also been assumed that the indirect taxation in proportion to GDP at market prices would remain constant. The total private consumption expenditure is, thus, estimated at Rs 99,771 crores in 2000-01 AD implying a compound rate of growth of 3.9 per cent per annum during 1971-72 to 2000-01 AD. Allowing for the expected increase in population, the rate of growth in per capita private consumption expenditure works out to 2.0 per cent per annum during this period. Estimates of demand corresponding to this rate of growth of PCE may be treated as the 'high' estimates. Further, in order to have an idea about the minimum level of demand for agricultural commodities (i.e. 'low' estimates) a long term rate of growth of PCE at 1 per cent per annum has also been used.

10.2.14 Since the estimates have to be formulated separately for rural and urban sectors of the economy, the relative rates of growth in the two sectors have also to be considered. The rural and urban break up of private consumption expenditure as worked out from national income estimates are not available. The only source of information in this regard is the NSS data on consumer expenditure. The following table presents per capita expenditure as observed for the different rounds covering the period 1961-62 to 1968-69 :—

TABLE 10.5

Ratio of Consumption Expenditure Per Person Per 30 days in Rural/  
Urban Sectors

NSS round	Period	Value of consumption (Rs)		Ratio urban/rural
		Rural	Urban	
17th round	1961-62	21.73	30.86	1.42
19th round	1964-65	24.83	34.97	1.36
20th round	1965-66	28.40	36.65	1.29
21st round	1966-67	30.90	41.54	1.34
22nd round	1967-68	33.40	44.82	1.34
23rd round	1968-69	33.28	46.04	1.38

10.2.15 No significant trend in the ratio of urban/rural consumption expenditure is, however, discernible. It is clear that the rate and spread of growth will differ as between urban and rural sectors. While the contribution of agriculture as a proportion of GDP will decrease over time, that of industry will increase. As industry and the corresponding services sector would grow faster, the rate of income growth in the rural sector will be lower than that in the urban sector, which might considerably widen the urban-rural disparities in respect of aggregate incomes. On the other hand, this would perhaps be moderated by the relatively faster rate of growth of population in the urban sector, compared to the rural sector and also due to the effect of policy measures intended to diversify agricultural production and help the small and marginal farmers. While there is some seepage of incomes from the urban sector to rural sector, no study is available about the nature and extent of such seepage. Bearing on the growth of demand, besides quantitative and economic factors, there are several considerations of a behavioural and social welfare nature e.g. changes in consumer taste and preferences, special considerations for small and marginal farmers and weaker sections of the community.

10.2.16 It is of course difficult to precisely indicate the quantitative aspects of the aforesaid tendencies. Taking this factor into account, it has been assumed that (a) the urban rural ratio of per capita PCE was about 1.5 in 1971-72 and (b) the absolute increase in the ratio in the years ahead would be at the rate of about 0.01 per annum, implying a ratio of 1.65 in 1985-86 and 1.80 in 2000-01 AD.

10.2.17 On the basis of the aforesaid assumptions, the projections of per capita PCE for the rural and the urban sectors of the economy are given in the following table :—

TABLE 10.6  
Estimates of Per Capita Private (Final) Consumption Expenditure—Rural  
and Urban—At 1971-72 Prices (Rs)

Year	Rural		Urban	
	Low	High	Low	High
1971-72	543.7	543.7	815.6	815.6
1975-76	558.0	579.6	864.8	898.3
1980-81	576.9	665.5	923.0	1,064.8
1985-86	595.4	776.1	982.4	1,280.5
2000-01	646.9	860.8	1,174.4	1,549.5

#### Consumer Demand

10.2.18 Using the methodology and the assumptions spelt out in the preceding paragraphs, the low and the high estimates of the levels of

demand (aggregate and per capita) for selected agricultural commodities for the two time points 1985 and 2000 AD have been derived and presented in Tables 10.7 and 10.8. The indices of alternative sets of projections of per capita demand and aggregate consumer demand in 1980, 1985 and 2000 AD are presented in Appendices 10.6 and 10.7.

TABLE 10.7

## Aggregate Consumer Demand for Selected Agricultural Commodities

(million tonnes except where otherwise specified)

Commodity	1971	1985		2000 AD	
	Base year*	Low	High	Low	High
rice . . .	38.74	52.40	56.60	68.76	73.98
wheat . . .	20.85	29.60	33.39	41.04	45.89
other cereals . . .	24.40	30.93	30.73	37.79	37.53
total cereals . . .	83.99	112.93	120.72	147.59	157.40
pulses . . .	10.32	14.83	17.73	20.70	24.70
total foodgrains	94.31	127.76	138.45	168.29	182.10
sugar . . .	4.03	6.55	8.62	10.33	13.31
gur . . .	7.44	10.32	12.56	13.64	16.57
vegetable oils . . .	1.82	2.75	3.35	4.09	4.96
vanaspati . . .	0.59	1.03	1.40	1.73	2.30
tea (million kg)	213.00	329.30	445.10	503.97	695.30
coffee (million kg)	37.91	62.53	92.47	103.55	158.83
tobacco (million kg) . . .	255.00	354.76	430.20	478.62	590.19
cotton clothing (million metres)	5,832.40	14,471.46	23,140.17	22,747.26	37,573.61
milk . . .	21.71	33.37	44.17	49.36	64.40
egg (million numbers) . . .	6,040	10,217	15,972	17,419	28,513
meat . . .	0.69	1.05	1.40	1.57	2.11
fish . . .	1.61	2.41	2.99	3.59	4.53

\*In the case of cotton clothing the base year is 1961.

TABLE 10.8  
Per Capita Demand for Selected Agricultural Commodities

Commodity	(kg/year except where otherwise specified)				
	1971	1985		2000 AD	
	Base year*	Low	High	Low	High
rice . . . . .	70.35	72.28	78.08	73.51	79.09
wheat . . . . .	37.86	40.83	46.06	43.88	49.06
other cereals . . . . .	44.30	42.67	42.39	40.40	40.12
total cereals . . . . .	152.51	155.78	166.53	157.79	168.27
pulses . . . . .	18.74	20.46	24.46	22.13	26.41
total foodgrains . . . . .	171.25	176.24	190.99	179.92	194.68
sugar . . . . .	7.32	9.04	1.89	11.04	14.23
gur . . . . .	13.51	14.24	17.33	14.58	17.72
vegetable oils . . . . .	3.30	3.79	4.62	4.37	4.30
vanaspati . . . . .	1.07	1.42	1.93	1.85	2.46
tea . . . . .	0.39	0.45	0.61	0.54	0.74
coffee . . . . .	0.07	0.09	0.13	0.11	0.17
tobacco . . . . .	0.46	0.49	0.59	0.51	0.63
cotton clothing (metres/year) . . . . .	13.19	19.96	31.92	24.32	40.17
milk . . . . .	39.42	46.03	60.93	52.77	68.85
egg (numbers) . . . . .	10.97	14.09	22.03	18.62	30.48
meat . . . . .	1.25	1.45	1.93	1.68	2.26
fish . . . . .	2.92	3.32	4.12	3.84	4.84

\*relates to 1961 for cotton clothing

10.2.19 Tea and coffee : In the case of tea and coffee, it may appear that the projected levels of per capita demand for these commodities in 2000 AD are somewhat unrealistic. Though *a priori* it may be difficult to fix certain saturation levels of consumption of these commodities, one might draw some conclusion from the current levels of per capita demand for these commodities in the developed market economies. The level of per capita per annum consumption during 1969—71 was 3.9 kg in UK for tea and 13.0 kg in Sweden for coffee. In the context of the consumption levels obtaining in the developed economies, the projected levels of per capita demand in the case of India for 2000 AD do not seem to be unrealistically high.

10.2.20 Tobacco : The total demand for tobacco is projected to range between 478.62 and 490.19 million kg in 2000 AD. It has, however, to be remembered that the actual demand for this commodity would depend upon a number of fiscal and social factors. The excise policy of the Government is a major determinant of the order of indigenous demand for tobacco. The medical reports on health hazards due to smoking may also affect the demand for tobacco. The Government of India is already contemplating to take up a multi-media publicity campaign to discourage consumption of tobacco. We are, therefore, of the view that the actual demand for the commodity may not grow according to the levels projected on economic considerations.

10.2.21 Cotton clothing : As already mentioned, the demand for cotton clothing as given in Appendix 10.7 represents the total demand for all kinds of clothing material. It is observed that the production of man-made fibres increased from 3.72 million metres in 1958 to 9.48 million metres in 1971 i.e. at the compound rate of 7.5 per cent per annum. The production of man-made fibre cloth might be projected to grow at this rate till 2000 AD to correspond to the demand for all clothing on assumption of low economic growth. The same ratio of availabilities of man-made fibres and demand for all clothing has been used in deriving the demand for cotton clothing on the assumption of higher increase in per capita PCE. The availability of man-made fibres has been deducted from the estimates of 'demand for clothing' to yield the demand for cotton cloth. Using conversion ratios based on a comparison of the official estimates of production of cotton lint and mill consumption of cotton derived from the official production estimates, the demand for cotton clothing in terms of cotton is indicated in Appendix 10.8.

10.2.22 Food items : Considering the alternative sets of projections for the period upto 1985 (*vide* Table 10.8), it is observed that the per capita demand for superior cereals (rice and wheat) and pulses would have an increasing trend during the projection period, under both the assumptions. In contrast, the per capita demand for coarse grains is likely to register a marginal increase in rural areas, while in urban areas, it might decline as a result of negative expenditure elasticity of demand (*vide* Appendix 10.6). It is further noted that the per capita demand for foodgrains which was substantially higher in rural areas than in urban areas in 1971, would rise at a faster rate in the former sector over the period of study. In the case of gur and vegetable oils, too, the per capita demand is likely to grow faster in rural areas. In aggregate terms, the net demand for foodgrains for human consumption would range between 128 and 138 million tonnes in 1985. There would be a phenomenal rise in the future levels of per capita demand for animal products; more particularly, the demand for eggs is likely to increase by 28 per cent on the low assumption and 101 per cent.

on high assumption because of the very high elasticity of demand for this item. The projections for 2000 AD indicate that compared to foodgrains, the demand for beverages and animal and dairy products would grow much faster. Against an increase of about 78 per cent in the total consumer demand for foodgrains on low assumption of a economic growth, the increase is as much as 137 per cent for tea, 173 per cent for coffee, 127 per cent for milk, 188 per cent for eggs and 123 per cent for fish. In the long term plan of agricultural development, therefore, special emphasis will have to be given to increasing the production of these products.

10.2.23 This exercise shows that the future levels<sup>o</sup> of economic demand for foodgrains in 2000 AD would range between 168 and 182 millions tonnes for human consumption. In regard to this very distant time point we feel that besides working out the low, and the high estimates of economic demand as detailed above, it is also necessary to work out the normative level of food demand which is particularly important in view of the fact that the ultimate objective of long term economic planning is to provide a balanced diet to the citizens. The studies on nutrition have revealed that it is difficult to formulate an average diet on an all-India basis adequate for providing enough calories, proteins, carbohydrates, fats, minerals and vitamins to an average person for maintaining good health. Diet formulations in terms of broad groupings such as cereals, vegetables, fruits, milk and other food articles do not help because the calorie content varies according to the type of cereals, vegetables, fruits etc. More importantly, calorie requirements for an individual depends upon factors such as body weight, age, occupation and ambient temperature. Further, the improved diets recommended for persons in different regions of the country would also have to be guided by the local consumption habits. However, in order to have some idea about the demand for foodgrains to meet the nutritional norms, we might assume that the component of cereals and pulses in the nutritional diet of a person would be 370 gm and 70 gm respectively as referred to in Chapter 9 on Nutrition. Thus, strictly on nutritional considerations, the demand for foodgrains for human consumption in 2000 AD would be 150.2 million tonnes comprising 126.3 million tonnes of cereals and 23.9 million tonnes of pulses. This estimate does not take into account the quantum of table losses of goodgarins or the additional consumption of persons who would continue to have a high intake of foodgrains than what is necessary or adequate. If an allowance of 10 per cent of gross production is made for these uses, the total requirements of foodgrains for human consumption on nutritional consideration would be around 167 million tonnes in 2000 AD. It would be seen that this estimate of normative demand is about the same as the low estimate of economic demand for this year.

### 3 . REQUIREMENTS FOR SEED, FEED, INDUSTRIAL USES AND ALLOWANCE FOR WASTAGE

10.3.1 While human demand constitutes the major proportion of the total demand for agricultural commodities in respect of which demand projections have been formulated, there is a significant component of non-human/industrial demand for some of these commodities, namely, foodgrains; sugarcane and oilseeds. This includes demand for livestock feed, seed, industrial uses. Some allowance is also necessary for wastage including storage losses for items like foodgrains. In respect of these uses, the demand is currently assumed as a certain proportion of the gross production of the relevant agricultural commodities. The absolute quantities that would be needed on account of these uses in the coming years have been derived on the basis of projected levels of supplies, as discussed in the following paragraphs.

#### Foodgrains

10.3.2 It is generally assumed that 12.5 per cent of gross production of foodgrains is being currently used for seed, feed and wastage. Of this, the requirements for seed are being put at 5 per cent of gross production. It is likely that the seed requirements in proportion to gross production may decline with a wider spread of new varieties and new technology. The Commission has estimated the requirements of seeds per unit of area at different points of time in Chapter 47 on Seeds. The requirements for sowing an area of 123 million hectares under different foodgrains in 2000 AD have been worked out on the basis of these estimates and are presented in Appendix 10.9. The following are the requirements of seeds in respect of important food crops in 2000 AD :

		(million tonnes)
Crop		Seed requirements
rice		0.64
wheat		1.32
coarse cereals		0.84
pluses		0.89
	total	3.69 or roughly 4 million tonnes

10.3.3 A proportion of 5 per cent of the gross production of foodgrains is currently being used for livestock feed purposes. In view of the increase in demand for milk and other animal products in the coming years, 5 per cent allowance for feed requirements may not be sufficient. The total requirements of feedgrains for different categories of livestock are estimated at 24 million tonnes in 2000 AD. The detailed basis adopted

for the calculations is discussed in Chapter 34 on Livestock Feeding. In view of the many imponderables in the estimation of the requirements of livestock feed, a range of 20 to 25 million tonnes has been taken as the likely demand for feedgrains in this Chapter.

10.3.4 Although no systematic data regarding the post-harvest losses of foodgrains in the process of threshing, transport and storage are available, the allowance currently being made for the post-harvest losses of foodgrains in the official statistics is 2.5 per cent of gross production only. However, it is considered that in actual practice, these losses are substantially higher. A Committee on Cereal losses appointed by the Government of India in 1966 had in its Interim Report indicated that losses on all accounts such as transport, handling, storage, etc were to the tune of 9.33 per cent of the marketed quantities while some scientists in the country believe that these losses varied between 5 to 25 per cent<sup>1</sup>. The storage loss, due to moisture, insects, rodents etc. alone is said to account for as much as 6 to 8 per cent<sup>2</sup>. Foodgrains in storage are affected by a complex inter-action of physical, chemical and biological conditions. Abnormal physical conditions of temperature, storage structure and methods of storage alongwith biological agents such as insect, rodents and microbes are responsible for deterioration in storage. The Food Corporation of India and the Central Warehousing Corporation which together hold about half of the storage capacity in India have, however, endeavoured to minimise these losses. We might, therefore, safely assume that with the prospective improvements in the post-harvest technology, the wastage proportion may be at a level of 4 per cent of gross production by 2000 AD. It would thus be necessary to make an allowance of about 8 to 9 million tonnes in 2000 AD for wastage.

10.3.5 No explicit allowance is currently being made for industrial uses of foodgrains as the quantities involved are small. For example, corn is being utilised in starch manufacture to an extent of 4 per cent of its production. Ragi is also being used for preparation of malt which is largely consumed as baby food. The possibility of producing a variety of tasteful delicacies like sweet biscuits from ragi has already been established. The use of cluster bean in gum industry is also recognised. Similarly, barley may be increasingly utilised in the preparation of beer. The scope for industrial utilisation of many other grains is bound to expand in course of time. Pulses, barley, oats and various other millet crops have a great

- 
- 1 Aggarwal, N. S., 1970. Storage of Foodgrains—Problems and Prospects; and
  - 2 Bedekar, S. K., 1970. Marketing of Agricultural Commodities, New Delhi, Research papers presented to the National Food Congress, May 1970, sponsored by the Freedom from Hunger Campaign and the Ministry of Food, Agriculture, Community Development and Cooperation, Government of India.



promise in this respect. We might assume that nearly 5 million tonnes of foodgrains will be utilised for industrial purposes by 2000 AD. The total requirement of foodgrains on these considerations for seed and feed, and allowance for wastage and industrial uses might be of the order of 37 to 43 million tonnes in 2000 AD.

10.3.6 Assuming that the gross output of foodgrains in 2000 AD would meet the expected demand in that year, the total requirement for seed, feed and wastage would work out to 19.0 per cent of gross output on the high assumption of growth of per capita PCE. It is further assumed that the current rate of allowance for these purposes at 12.5 per cent would increase to 13.7 and 15.0 per cent in 1980 and 1985 to reach a level of 19.0 per cent in 2000 AD. The total requirements of foodgrains for seed and feed and allowance for wastage and industrial uses is thus estimated at between 22.5 and 24.4 million tonnes in 1985.

10.3.7 In working out the demand for sugar and gur, it has to be noted that in addition to sugarcane, sugarbeet is also being developed as a raw material for manufacture of sugar. As indicated in Chapter 22 on Commercial Crops the sugarbeet production in 2000 AD is likely to be of the order of 20 million tonnes. This is capable of producing 2.0 million tonnes of sugar. Thus, the balance of demand for sugar and gur will have to be met by sugarcane. In the case of sugar and gur, the requirements for purposes of chewing, seed and feed etc. are conventionally put at 12 per cent. Assuming no change in this respect, the total requirement of sugarcane for gur, sugar and chewing purposes in 2000 AD is estimated to range between 25.0 to 31.7 million tonnes (in terms of gur).

#### Oils

10.3.8 In the case of oils, apart from the direct edible use, it is necessary to consider the industrial uses of oils. Thus oils are used for soap making, paints, toileteries, lubricants etc. It has been estimated in the present study that in the base year 1971, out of a total net availability of all oils (major and minor) of 3.17 million tonnes, the demand for edible uses (vegetable oils and vanaspati) constituted 2.44 million tonnes, the balance being accounted for by the demand for use in (a) soaps (0.35 million tonnes), (b) paints (0.08 million tonnes) and (c) toileteries, lubricants and miscellaneous uses (0.30 million tonnes). It has been assumed that the demand for paints would increase by about 5,000 tonnes per year.

10.3.9 The demand for oils used in soap making has been projected by superimposing the income and population effects (as has been done in the case of all other consumer commodities) and using an expenditure elasticity of demand of 1.50<sup>1</sup>. The population and income assumptions

<sup>1</sup> 1966, Sept. Material and Financial Balances : p. 145. New Delhi, Perspective Planning Division, Planning Commission, Government of India.  
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indicated already in regard to the estimation of human demand for different commodities have been adopted for the estimation of demand for oils for soap manufacture also. Further, it has been assumed that the oil-soap ratio would remain constant throughout the projection period. It is, however, likely that due to greater economic utilisation of oils in soap making, the demand for oil by the soap industry would be slightly less than that indicated above. An ad hoc reduction of 5 per cent in 1980 and 1985 and 10 per cent in 2000 AD has, therefore, been effected in the estimated levels of demand for oils for soap making.

10.3.10 As regards the demand for oils for toilet goods, lubricants and miscellaneous uses, the Working Group on Demand Projections for the period 1966-71<sup>1</sup> had indicated an increase of 0.16 million tonnes in a period of five years (1971 to 1975) i.e. at the rate of 0.032 million tonnes per year. On this assumption, the expected levels of demand for oils in making toiletries, lubricants etc. would work out to 0.62 and 0.78 million tonnes in 1980 and 1985 respectively, as against a base level demand of 0.30 million tonnes in 1971. A complete balance sheet in respect of utilisation of oils in the coming years is given in Appendix 10.10.

## Fish

10.3.11 It is estimated that about 0.10 million tonnes of raw fish is currently being used for reduction into fish meal which is an important constituent of livestock and poultry feeds. With the expansion of livestock production programmes, the demand for fish meal is expected to grow several fold in the next 25 years. A number of other industrial products are also prepared from fish. Important fish-based industrial products are fish body oil, shark liver oil, masmin, crab concentrate, turtle meat etc. The demand for fish for production of fish meal and other industrial products is expected to go up from 0.15 million tonnes in 1971 to 0.40 million tonnes in 1985 and 1.0 million tonnes in 2000 AD.\*

10.3.12 Taking into account the estimated levels of demand for human consumption derived in Section 2 and the requirements on account of seed, feed, industrial uses and allowance for wastage estimated in preceding paragraphs, estimates of aggregate gross demand for the different agricultural commodities under the low and high assumptions for 1985 and 2000 AD

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1 Report of the Working Group for Formulation of Fourth Five Year Plan (1966-71), Proposals on Demand Projections: p. 31. New Delhi, Ministry of Food & Agriculture, Government of India.

\* Vide Chapter 40 on Marketing of Fish and Fishery Products

are given below :—

TABLE 10.9

## Aggregate Gross Demand \*\* for Selected Agricultural Commodities

(million tonnes except where otherwise specified)

Items	1971	1985		2000 AD	
		Low	High	Low	High
foodgrains . . .	107.9	130.3	162.9	205.3	225.1
sugar & gur . . .	11.5	16.9	21.2	24.0	29.9
vegetable oils . . .	3.2	5.3	6.6	8.3	10.2
cotton clothing (million bales) (in terms of raw cotton).	5.9	8.1	12.9	10.4	17.2
milk . . .	21.7	33.4	44.2	49.4	64.4
eggs (in million) . . .	6,040	10,217	15,972	17,419	28,513
meat . . .	0.7	1.1	1.4	1.6	2.1
fish . . .	1.8	2.8	3.4	4.6	5.5

\*\* These are exclusive of export demand.

10.3.13 A study of the figures given in the above table would give a broad idea of the nature and magnitude of production effort that is called for in the coming years. Even on the low assumption, the demand for foodgrains is expected to rise by about 42 million tonnes by 1985, and by another 55 million tonnes in 2000 AD. The conservative estimates of increase in demand for sweetening agents (in terms of gur) work out to 5.4 million tonnes in 1985 and about 7 million tonnes in 2000 AD over that in 1985. The future levels of demand for oils are also quite high; they are expected to increase from 3.2 million tonnes in 1971 to 5.3 to 6.6 million tonnes in 1985 and 8.3 to 10.2 million tonnes in 2000 AD. The demand for cotton clothing in terms of raw cotton is expected to expand from 6 million bales in 1971 to at least 8 million bales in 1985 and 10.4 million bales in 2000 AD. The likely rise in the demand for milk, eggs and fish is substantial. From a mere 21.7 million tonnes of milk, 6,040 million numbers of eggs and 1.8 million tonnes of fish in 1971, the respective demands for these products, on the high assumption, would increase respectively to 44.2 million tonnes, 15,972 million numbers and

3.4 million tonnes in 1985 and again to 64.4 million tonnes, 28,513 million numbers and 5.5 million tonnes by the turn of the century.

#### 4 PROJECTIONS OF DOMESTIC DEMAND FOR RAW JUTE AND FOREST RAW MATERIALS

10.4.1 This Section deals with the demand for jute and raw materials of forest origin viz. industrial and fuel woods the demand for which cannot be projected on the basis of methodology used for the other agricultural commodities.

##### Raw Jute

10.4.2 In order to estimate the likely levels of domestic demand for jute, we have adopted the following two methods :—

- (i) the time series data on the internal consumption of jute goods (production of jute goods minus export of jute goods plus/minus changes in stocks) have been analysed and the observed trend rate of growth of internal consumption used for extrapolating the expected levels of demand in future years ; and
- (ii) assuming that the internal consumption of jute goods has a definite relationship with the growth of net national product, a simple relationship has been developed between growth of internal consumption of jute goods and the national product at constant prices. The relationship has then been used to estimate the likely levels of expected demand for jute goods in the years to come, assuming certain possible rates of growth of national product.

10.4.3 An exponential growth function fitted to time series data on the internal consumption of jute goods for the period 1951-52 to 1970-71 has indicated a trend rate of growth of 6.5 per cent per annum. Assuming that internal demand for jute goods would grow at the same rate as in the past, the demand for raw jute and mesta in 1980 and 1985 works out to 4.7 million bales and 6.4 million bales respectively.

10.4.4 The trend method has not been, however, used for 2000 AD considering the fact that the point of projection is far remote from the trend period. Alternatively, using the time series data on the internal consumption of jute goods and the net national product at constant (1960-61) prices during the years 1960-61 to 1970-71 (*vide* Appendix 10.11) the estimate of elasticity of demand for jute goods with respect to net national product was observed to be 127. This co-efficient has been used for working out projections of demand for jute goods upto 1985. In a longer perspective, the growth rate of demand might tend to decline with other

competing products entering the market and as such the elasticity of demand for jute goods might be lower. We have kept this factor in view in working out projections of demand for jute goods for 2000 AD. It has also been assumed that the overall growth of economy over the entire period extending from 1971 to 2000 AD on 'low' assumption would broadly correspond with the rates of growth of the economy observed during the decade ending 1970-71. On the high assumption, economic growth has been worked out on the basis of formulations given in the Draft Fifth Five Year Plan upto 1985-86. For the subsequent period upto 2000 AD, estimates of GDP given in paragraph 10.2.13 have been used. On the basis of these assumptions, an alternative set of projections of demand for jute goods has been derived (*vide* Appendix 10.12). It is observed that on the high assumption the domestic demand for raw jute and mesta would increase from 2.4 million bales in 1971 to 5.9 million bales in 1985 and 11.8 million bales\* in 2000 AD.

### Industrial Wood

10.4.5 The raw material requirement of industrial wood is mainly for producing pulp and paper, sawnwood, panel products matchwood and roundwood. The past trends in per capita consumption of different types of pulp and paper and per capita GDP have been discussed in Chapter 42 on Production and Social Forestry. The relationship between these two factors has been utilized to work out the demand for pulp and paper on the basis of the projected rates of growth in per capita GDP and population. In the case of sawnwood, panel products and roundwood income elasticity approach has been followed. The following table gives the projected raw material requirements of industrial wood on account of different uses :

TABLE 10.10

Aggregate Raw Material Requirements of Industrial Wood, 1985 and 2000 AD.

Item	1970	1985		2000	
		Low	High	Low	High
		3	4	5	6
sawnwood	9,561	15,665	18,300	22,940	29,650
panel products	371	805	1,090	1,500	2,355

\*In addition to the demand for raw jute on account of internal consumption of jute goods, there is at present village consumption of raw jute of the order of 200 thousand bales. It has been assumed that this quantity would increase to 250 thousand bales in 1985 and 300 thousand bales in 2000 AD. The estimates of total demand for jute presented in paragraphs 10.4.3 and 10.4.4 take into account the requirements of raw jute for village consumption also.

1	2	3	4	5	6
pulp & paper . . .	746	4,715	6,055	9,680	17,695
matchwood . . .	382*	680	680	1,415	1,415
roundwood . . .	5,232	8,165	9,055	11,645	13,335
total . . . . .	16,292	30,030	35,180	47,180	64,450

\* relates to 1973-74.

### Fuelwood

10.4.6 The consumption of fuelwood in 1970-71 is estimated at 150 million m<sup>3</sup> or 277 m<sup>3</sup> per 1000 persons *vide* Chapter 42 on Production and Social Forestry. We do not visualise any significant diversification from non-commercial to commercial fuels which will have any appreciable effect on the present pattern of fuel consumption by 1985. After 1985, the per capita consumption may marginally go down every year. The consumption per 1,000 persons in 2000 AD would be about 240 m<sup>3</sup>. The total requirement for fuelwood would be, therefore, of the following order in 1985 and 2000 AD.

	(million m <sup>3</sup> )
1970 . . . . .	150
1985 . . . . .	202
2000 AD . . . . .	225

## 5 SUMMARY AND CONCLUSIONS

10.5.1 An important aspect of agricultural planning is the estimation of requirements of various agricultural commodities to cater to the growing population at rising levels of incomes. The projections of economic demand presented in this Chapter are based on our best judgement on the key factors which have a bearing on it. It is possible that some of the assumptions underlying these projections may not turn out to be valid and may thereby vitiate the estimates of demand. For instance, a progressive reduction in income disparities might also change the pattern of demand for the various agricultural commodities.\* Besides, trends in the

\* An illustrative exercise on the impact of changes in income distribution on demand in respect of pulses, sugar, gur, vegetable oils and vanaspati and milk attempted in the Commission showed that projections of demand in 1985 on the assumption of reduced inequalities were only marginally higher than those derived without any such assumption. For purposes of this exercise, a semi-log demand function was adopted and it was assumed that (a) the distribution of income was log-normal and (b) there would be a reduction in inequality of incomes at a rate of 0.5 per cent in the rural sector and at 1 per cent in the urban sector.

age-structure of population and the pace of urbanisation could also have a significant bearing on the pattern of demand. These are some of the postulations and imponderables which will have a bearing on the pattern of demand in the long run. These factors have not been taken into consideration in this Chapter since it is difficult to quantify their effect.

10.5.2 The demand for certain commodities viz., cotton, sugarcane, etc. also depends on the development of alternative products. For instance, the demand for raw cotton would be greatly influenced by the extent of production of synthetic cloth. Similarly, the potentialities of development of sugarbeet as a raw material for the production of sugar would determine the demand for sugarcane. It will be necessary to carefully watch these factors and adjust the demand projections suitably.

10.5.3 The following table indicates the expected increases in the demand for selected agricultural commodities during the period 1971—1985 and 1971—2000 AD. :

TABLE 10-11

## Percentage Increase in Demand for Selected Agricultural Commodities

Items	Increase in 1985 over 1971		Increase in 2000 AD over 1971	
	Low	High	Low	High
foodgrains . . . . .	39.3	51.0	90.3	108.6
sugar & gur . . . . .	47.1	84.7	109.0	160.5
oils . . . . .	67.8	107.6	160.3	220.5
tea . . . . .	54.6	109.0	136.6	226.4
coffee . . . . .	64.9	143.9	173.1	319.0
tobacco . . . . .	39.1	68.7	87.7	131.5
cotton . . . . .	37.3	118.6	76.3	191.5
jute . . . . .	102.1	145.8	257.9	389.6
milk . . . . .	53.9	103.7	127.4	196.8
eggs . . . . .	69.2	164.4	188.4	372.0
meat . . . . .	52.2	102.9	127.5	205.8
fish . . . . .	59.7	92.6	160.8	205.6
industrial wood . . . . .	84.3	115.9	189.6	295.6
Fuelwood . . . . .	34.7	34.7	50.0	50.0

10.5.4 It would be seen that in the years ahead, though the demand for foodgrains would increase, the order of increase would be considerably less than the step-up in non-foodgrain agricultural products. More particularly, the expected demand for oils and animal and dairy products is likely to grow at a phenomenal pace.

10.5.5 As already stated, the increase in demand for agricultural commodities presented in Table 10-11 are derived without taking into account the price effect. The question of providing an appropriate price incentive to stimulate agricultural production has often been raised.

This would involve adoption of policy measures, fiscal and economic, to turn the terms of trade in favour of agriculture. In that event, while increase in the price of agricultural commodities without affecting the overall price level will lower the demand for agricultural commodities, it will tend to push up rural demand resulting from net increase in rural income.

10.5.6 Apart from the crops studied in this Chapter, tuber crops and fruits and vegetables are also important items in the food basket. Particularly the tuber crops viz. potatoes, sweet potatoes and tapioca have a high carbohydrate content and to that extent, would supplement cereal diet. If the levels of production anticipated by the Commission in Chapter 23 on Horticultural Crops are achieved by 2000 AD, the tuber crops would provide a per capita availability of about 15 kg per annum in terms of cereal content or 50 kg per annum in terms of fresh weight of tubers. Since firm estimates of availability of all starchy roots and fruits and vegetables for human consumption in the base year as also the expenditure elasticities of demand are not available, it is not possible to forecast their demand. However, considering the importance of these crops in the food basket, we feel that efforts should be made to collect these data so that reliable long term demand projections could be worked out.

10.5.7 The implications of the alternative sets of demand projections on the average per capita availability of calories and proteins in 1985 and 2000 AD are as under :—

TABLE 10·12  
Availability of Calories and Proteins Per Day in 1971, 1985 and 2000 AD

	Base level	Projected level			
	1971	1985		2000 AD	
		Low	High	Low	High
total calories . . .	2,080	2,200	2,480	2,300	2,600
proteins (gm) . . .					
(i) vegetable . . .	44·1	45·8	50·4	47·1	51·8
(ii) animal . . .	6·1	7·1	9·3	8·2	10·9
total . . .	50·2	52·9	59·7	55·3	62·7
percentage of animal to total protein . . .	12·2	13·4	15·6	14·8	17·4

The above estimates of availability of calories and proteins have been derived on the basis of apparent level of consumption of food items and include table losses. The per capita availability of calories (net of table losses, etc.) would range between 1,980 and 2,230 units in 1985 and between 2,070 and 2,340 units in 2000 AD against 1,870 units in 1971.



Besides, fruits and vegetables, starchy roots and tubers will further supplement the availability of calories with tubers alone contributing an estimated 125 gm in 2000 AD. The per capita availability of proteins will range from 47.6 gm to 53.7 gm in 1985 and 49.8 gm to 56.4 gm in 2000 AD against 45.2 gm in 1971. Proteins of animal origin are expected to comprise 13 to 16 per cent of the total protein in 1985 and 15 to 17 per cent in 2000 AD against 12 per cent in 1971.

## APPENDIX 10.1

(Paragraph 10.2.1)

## Methodological Issues in Projection of Consumer Demand

In projecting the economic demand for a final product, it is necessary to tackle the following methodological issues viz. (i) selection of the appropriate form of the demand function and projection model, (ii) selection of the appropriate concept and value of the demand co-efficient and (iii) choice of the base period and base level demand.

## Form of the Demand Function and Projection Model

2. Projections of economic demand raise some fundamental questions relating to the form of the demand function. The choice of the demand function is crucial particularly when we are considering large increases in income levels and a long time perspective. In most of the available studies on demand projections in India, the double log demand model which implies a constant elasticity throughout the projection period, is used. It is, however, possible that alternative functional forms may be appropriate for different commodities<sup>1</sup> depending upon the stage of economic growth that might correspond to the projection period. Thus the double-log function may be used for such commodities the initial consumption levels of which are rather low, but the perspective demand for which might be expected to remain far below the saturation level. On the other hand, the log-inverse function in which the elasticity co-efficient declines in proportion to the increase in per capita income may be an appropriate form to describe the time path of demand for cereals, the intake of which would saturate at a level determined by physiological criteria. Similarly, the semi-log function where the elasticity co-efficient varies inversely with the quantities consumed, may be a suitable projection model for the non-cereal items in the food basket. As against these, the log-log inverse function provides for an increase in the per capita consumption upto a maximum intake followed by a decline as income increase. There are also other forms (i. e. Tornquist's forms) suggested for necessities, semi-luxuries, and luxuries. Attempts have also been made to explain consumer behaviour with the help of linear expenditure system.<sup>2</sup>

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1. (i) Agricultural Commodity Projections, 1970-1980. Rome Food & Agriculture Organisation.
  - (ii) Sarma, J. S., 1970 : Feeding India's Population in 1980, A Quantitative Assessment Paper presented for the National Food Congress, New Delhi, May, 1970.
  2. (i) Stone J. R. N., 1954. Linear Expenditure Systems and Demand Analysis. An Application to the Pattern of British Demand; The Economic Journal, LXIV.
  - (ii) Bhattacharya N., 1967. An Application of the Linear Expenditure System; Economic and Political Weekly, December 2.
  - (iii) Joseph P., 1968. Application of Linear Expenditure System to NSS Data; Economic and Political Weekly, April 13.

3. The oft-used projection forms such as the double-log model are not additive. Thus for instance, the double-log demand function does not conform with theory because the sum of expenditures on all items is not indentially equal to total expenditure<sup>1</sup>. In this connection, it appears that a system of non-linear Engle curves<sup>2</sup> may be a good model to explain and project consumer demand. The system of addi-log Engle curves which possess the important properties of additivity, non-negativity and simplicity conforms with economic theory and also has close agreement with empirical data.

4. The indirect addi-log Engle curve is expressed in the form.

$$V_i = \frac{A_i V_0^{1+b_i}}{\sum A_r (V_0)^{b_r}}$$

Where  $V_i$  = expenditure on commodity  $i$ , there being  $n$  commodities

$V_0$  = Total expenditure on all commodities

$(A_i, b_i)$ ,  $i=1, 2, \dots, n$  are constants.

5. The indirect addi-log function postulates that the ratios of expenditures on any two commodities are double logarithmic functions of total expenditure, and that therefore the difference between income elasticities is independent of income.<sup>2</sup>

6. While hypothesising about consumer behaviour, it is also necessary to take note of considerations regarding changes in income distribution and the impact thereof. There have been some attempts<sup>3</sup> at formulation of projection Models, on the basis of assumptions about changes in income distribution. In this connection, it may be noted that the log-normal assumption has been found to be more relevant than the Paretoan assumption with regard to the Indian data on distribution of income.

7. In general, demand analysis has been based on a static specification of the demand function. Houthakkar and Taylor have, however, examined a dynamic demand model wherein, the per capita demand for a particular commodity is determined not only by the per capita income and price of the commodity at any point of time, but also by the level.

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1. Iyengar N. S. and H. V. Rao, 1968. Theory of Additive Preferences Statistical Implications for Consumption Projections; Economic & Political Weekly, Special Number.
  2. Iyengar N. S. and L. R. Jain, 1968. Projected levels of Consumption in 1970-71 and 1975-76 (Rural and Urban India) Paper read at the Ninth Indian Econometric Conference; *Ibid.*
  3. (i) Roy J. and R. G. Laha, 1960. Preliminary Estimates of Relevant Increase in Consumer Demand in Rural and Urban India,  $n$ : Gangul A. (ed), Studies in Consumer Behaviour. Bombay, Asia Publishing House.  
 (ii) Roy J. and S. K. Dhar, 1960. A Study of the Pattern of Consumer Expenditure in Rural and Urban India. *Ibid.*  
 (iii) Iyengar N. S., 1960. On a Problem of Estimating Increase in Consumer Demand; Sankhya, 22 : (Parts 3 & 4), p. 379.  
 (iv) Iyengar N. S., October, 1960. On a method of Computing Engle Elasticities from Concentration Curves; *Econometrica* 28. (No. 4), p. 882.

of inventory at that time.<sup>1</sup> Using this model, which is in the form of a first order difference equation, projections may be made.

### Concept and Value of Demand Co-efficients

8. An important issue related to the question of selection of appropriate projection models, refers to the choice of the appropriate concept and value of the demand coefficients. It may be noted that it is conventional to derive demand projections at constant prices. It is true that it would be realistic to assume some possible trends of relative prices in the years to come. But in order to be able to make plausible assumptions about price trends, it is necessary to have a firm idea of the emerging supply-demand balances. Operationally, therefore, it might be useful to work out supply and demand projections at constant prices, identify the gaps therein, predict the price trends, and use the price elasticity of demand for possible adjustments from the demand side. Thus the concept of price elasticity of demand does not seem to have functional significance in demand projections, at least in the first instance.

9. Alternative estimates of demand elasticities have been provided by demand studies. These estimates differ conceptually from the another, e.g., some of those are value elasticities rather than quantity elasticities and income elasticities rather than expenditure elasticities. They also differ from one another in their spatial and sectoral coverage. Further, most of the available estimates are based on an analysis of per capita variates and not on per consumption unit characteristics.

10. Again, there is the question as to whether demand elasticities should be estimated through time-series approach or cross-section approach. Both the approaches involve specific difficulties. Thus the time series approach gives rise to problems of identification and multicollinearity and also obscures the effects of income distribution. On the other hand, when predictions of consumer demand are based on the results derived from cross-section studies, the implicit assumption is that changes in income through time would induce changes in the pattern of consumer expenditure similar to those which would be brought about by changes in income at a point of time. Such a dynamic generalisation of the observations of a purely static study may be invalidated by lagged responses of consumers to changed circumstances. These delayed adjustments themselves may be due to inertia or stocks held by the consumers or the tendency to postpone adaptations in view of expectations of further changes in circumstances. Further, there is the problem of inter-dependence of consumer preferences so that responses could be conditioned by whether all incomes have changed or not. And yet, the cross-section approach has the unique advantages of a controlled situation in which several factors which have a tendency to change with time, remain constant. It is, therefore, customary to use elasticities based on cross-section data.

### Choice of the base Period and Base Level Demand

11. An important aspect of projection work relates to the base period. Though conceptually, there is a distinction between potential demand and actual consumption

- <sup>1</sup> (i) Houthkkar H. S. and Lester D. Taylor, 1966. *Consumer Demand in United States : 1929-1970. Analysis and Projections* Cambridge, Mass., U. S. Harvard University Press.
- (ii) Maji C. C., D. Jha and L. S. Venkataramanan, 1971. (Jan-March). *Dynamic Supply and Demand Models for Better Estimation and Projections. An econometric study for major foodgrains in the Punjab region, Indian Journal of Agricultural Economics.*

in practice, demand in the base year is assumed to have been realised and is taken to be equal to actual consumption. Further, in most of the projection studies in India, availability in the base year which is apparent consumption\* is assumed to be an approximation of consumption. There could, however, be a sizable difference between availability and consumption, particularly, when, in view of non-availability of data, private stocks are not taken into account. Hence it is necessary that the base year besides being a recent year, should be a normal year from the points of view of production and prices.

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\*Apparent consumption is estimated by the commodity-flow method, i.e., with the help of the formula: Final Consumption (Production Imports)—(Intermediate uses+Capital formation+Export+Increase in stocks).

## APPENDIX 10.2

(Paragraph 10.2.1—ii)

Quantity Elasticities of Demand for Selected Agricultural Commodities (1970-71)\*  
on the Basis of Alternative Functional Forms

Name of item	Form adopted	Expenditure elasticity of demand	
		rural	urban
rice	log-inverse	0.4133	0.1770
wheat	"	0.6705	0.3660
other cereals	"	0.0018	(-)-0.4685
pulses	semi-log	0.8517	0.6642
sugar	"	1.6525	1.1118
gur	"	0.9650	0.2315
vegetable oils	"	0.8825	0.9753
vanaspati	"	1.9757	1.4784
tea	double-log	1.1800	1.0600
coffee	"	1.3900	1.5900
tobacco	"	0.7181	0.7923
cotton clothing (mill made)	"	1.8591	1.6424
cotton clothing (handloom)	"	1.5076	1.5328
cotton clothing (khadi)	"	1.9868	1.6977
milk	semi-log	1.4607	1.3015
egg	double-log	1.5473	1.8736
meat	"	1.3263	0.6352
fish	"	0.7994	0.8012

- \* (i) For tea and coffee, the elasticities are based on NSS 10th Round, Dec. 1955—May 1956, vide: Material and Financial Balances: p. 144. Sept. 1966, New Delhi, Planning Commission, Government of India.
- (ii) For meat, egg & fish, cotton clothing and tobacco, the elasticities are based on N.S.S. 16th Round.

## APPENDIX 10.3

(Paragraph 10.2.1—iii)

Per Capita Availability of Agricultural Commodities in the Base year (1971)\*

(kg per year except otherwise specified)

Commodity/item	Rural	Urban
rice	73.17	59.06
wheat	34.53	51.16
other cereals	51.52	15.40
pulses	18.55	19.53
sugar	5.35	15.15
gur	15.45	5.73
vegetable oils	2.81	5.27
vanaspati	0.63	2.82
tea (gm/year)	341.3	568.9
coffee (gm/year)	57.4	114.7
tobacco (gm/year)	514.0	257.0
cotton clothing (mill made) (metres)	11.57	10.15
cotton clothing (handloom) (metres)	1.77	1.56
cotton clothing (khadi) (metres)	0.15	0.13
milk	38.29	43.95
egg (numbers)	9.32	17.56
meat	1.06	2.00
fish	2.49	4.68

\*In respect of cotton clothing, the base year is 1961.

## APPENDIX 10.4

(Paragraph 10.2.5)

Projected Population of India under Six Different Fertility Assumptions—1971-2000 AD<sup>1</sup>

Assump- tions*	Population** (million)						
	1971	1976	1981	1986	1991	1996	2001
high-2	547.0	609.3	677.5	753.6	837.6	930.7	1032.1
high-1	547.0	605.6	668.2	739.6	817.7	903.8	996.3
medium-2	547.0	605.6	668.2	734.0	801.2	872.6	945.4
medium-1	547.0	605.6	663.3	724.5	786.2	853.8	924.3
low-2	547.0	600.3	648.7	699.8	751.3	799.8	846.4
low-1	547.0	600.3	643.9	690.3	736.5	784.1	830.6

\* High, medium and low sets correspond to a birth rate of around 50, 35 and 20 respectively by 2001.

<sup>1</sup> Raghavachari, S. 1974. Population Projections, 1976 to 2001 in: Population in India's Development, 1947-2000, p. 437; sponsored by Indian Association for Study of Population, July 1974. New Delhi, Vikas Publishing House (P) Ltd.

\*\* Relates to March 1, of the respective years.

## APPENDIX 10.5

(Paragraph 10.2.5)

Projected Expectation of Birth Rate and Death Rate for India—1971-2001<sup>1</sup>

Item	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-2001
<b>high-2</b>							
birth rate . . . . .	39.4	37.3	34.2	33.2	32.0	31.2	30.4
death rate . . . . .	16.9	15.5	13.3	11.9	10.9	10.2	9.7
general fertility rate . . . . .	22.5	21.8	20.9	21.3	21.1	21.0	20.7
<b>high-1</b>							
birth rate . . . . .	39.4	35.6	32.9	32.2	30.9	30.2	29.3
death rate . . . . .	16.9	15.2	13.2	11.9	10.9	10.2	9.8
general fertility rate . . . . .	22.5	20.4	19.7	20.3	20.0	20.0	19.5
<b>medium-2</b>							
birth rate . . . . .	39.4	35.6	32.9	30.5	28.1	27.1	25.7
death rate . . . . .	16.9	15.2	13.2	11.7	10.6	10.0	9.7
general fertility rate . . . . .	22.5	20.4	19.7	18.8	17.5	17.1	16.0
<b>medium-1</b>							
birth rate . . . . .	39.4	35.6	31.2	29.2	27.0	26.5	25.7
death rate . . . . .	16.9	15.2	13.0	11.6	10.6	10.1	9.8
general fertility rate . . . . .	22.5	20.4	18.2	17.6	16.4	16.4	15.9
<b>low-2</b>							
birth rate . . . . .	39.4	33.6	28.1	26.5	24.8	22.5	21.1
death rate . . . . .	16.9	15.0	12.6	11.4	10.5	10.0	9.8
general fertility rate . . . . .	22.5	18.6	15.5	15.1	14.2	12.5	11.3
<b>low-1</b>							
birth rate . . . . .	39.4	33.6	26.5	25.1	23.4	22.3	20.9
death rate . . . . .	16.9	15.0	12.5	11.2	10.5	9.8	9.4
general fertility rate . . . . .	22.5	18.6	14.0	13.9	12.9	12.5	11.5

1 Raghavachari, S. 1974. Population Projections, 1976 to 2001 in W: Population in India's Development, 1947-2000, p. 437; sponsored by Indian Association for Study of Population, July 1974. New Delhi, Vikas Publishing House (P) Ltd.



## APPENDIX 10.6

(Paragraphs 10.2.18  
and 10.2.22)

## Indices of Per Capita Demand for Agricultural Commodities

## Statement I : 'Low' Estimates

(base 1971=100\*)

Commodity/item	Rural			Urban		
	1980	1985	2000AD	1980	1985	2000AD
rice	102.40	103.65	106.81	102.08	103.05	105.45
wheat	103.93	106.00	111.29	104.35	106.41	111.59
other cereals	100.01	100.02	100.03	94.69	92.35	86.91
pulses	105.05	107.74	114.80	108.22	112.37	123.65
sugar	109.79	115.02	128.71	113.76	120.70	139.49
gur	105.72	108.77	116.77	102.86	104.31	108.24
vegetable oils	105.23	108.02	155.33	112.07	118.16	134.73
vanaspati	111.70	117.95	134.33	118.30	127.52	152.64
tea	107.24	111.32	122.76	114.02	121.82	145.85
coffee	108.58	113.46	127.32	121.75	134.45	176.14
tobacco	104.35	106.74	113.29	110.30	115.89	132.59
cotton clothing (mill made)	137.39	145.71	169.99	164.24	182.65	241.44
cotton clothing (handloom)	129.38	135.70	153.76	158.89	175.45	227.65
cotton clothing (khadi)	140.42	149.53	176.30	167.01	186.39	248.71
milk	108.65	113.27	125.38	116.11	124.23	146.34
egg	109.60	115.10	130.85	126.10	141.74	194.86
meat	108.18	112.81	125.92	108.18	112.55	125.38
fish	104.85	107.53	114.90	110.42	116.09	133.01

\* In the case of cotton clothing, the base year is 1961.

## APPENDIX 10.6 (Concl.)

## Statement II : 'High' Estimates

Commodity/item	Rural			Urban		
	1980	1985	2000 AD	1980	1985	2000 AD
rice	107.86	113.17	116.45	104.23	106.46	108.75
wheat	113.05	122.22	128.02	108.94	114.21	118.23
other cereals	100.03	100.05	100.07	89.62	84.36	80.10
pulses	117.21	130.31	139.13	117.71	129.97	142.63
sugar	133.40	158.80	175.93	129.64	150.16	171.35
gur	119.50	134.34	144.34	106.17	110.45	114.86
vegetable oils	117.84	131.40	140.55	126.00	144.00	162.59
vanaspati	139.93	170.30	190.78	139.42	166.70	194.88
tea	126.93	152.18	171.97	132.66	161.32	197.44
coffee	132.43	163.99	189.39	152.80	204.89	277.43
tobacco	115.62	129.12	139.09	123.52	142.97	166.28
cotton clothing (mill made)	179.18	238.47	289.13	208.46	282.25	386.03
cotton clothing (handloom)	160.48	202.33	236.54	198.49	263.37	352.75
cotton clothing (khadi)	186.51	253.14	311.01	213.68	292.29	403.99
milk	129.52	151.98	167.11	134.70	158.72	183.53
egg	136.71	173.43	203.59	164.79	232.86	332.82
meat	130.74	160.31	183.93	118.45	133.18	150.33
fish	117.53	132.90	144.38	123.81	143.54	167.23

## APPENDIX 10.7

(Paragraphs 10.2.18  
and 10.2.21)

## Projections of Demand for Agricultural Commodities

## Statement I : 'Low' Estimates

(million tonnes except where  
otherwise specified)

Commodity/item	1971*		
	Rural	Urban	Total
rice . . . . .	32.24	6.50	38.74
wheat . . . . .	15.22	5.63	20.85
other cereals . . . . .	22.70	1.70	24.40
total cereals . . . . .	70.16	13.83	83.99
pulses . . . . .	8.17	2.15	10.32
total foodgrains . . . . .	78.33	15.98	94.38
sugar . . . . .	2.36	1.67	4.03
gur . . . . .	6.81	0.63	7.44
vegetable oils . . . . .	1.24	0.58	1.82
vanaspati . . . . .	0.28	0.31	0.59
tea (million kg) . . . . .	150.40	62.60	213.00
coffee (million kg) . . . . .	25.29	12.62	37.91
tobacco (million kg) . . . . .	227.00	28.00	255.00
cotton clothing (mill made) (million metres)	4193.58	808.03	5001.61
cotton clothing (handloom) (million metres) .	640.57	124.04	764.61
cotton clothing (khadi) (million metres) .	55.70	10.48	66.18
total cotton clothing (million metres) .	4889.85	942.55	5832.40
milk . . . . .	16.87	4.84	21.71
egg (million numbers) . . . . .	4,108	1,932	6,040
meat . . . . .	0.47	0.22	0.69
fish . . . . .	1.10	0.51	1.61

\* In the case of cotton clothing, the estimates relate to 1961.

## APPENDIX 10.7—Statement I (Contd.)

Commodity/item	1980			1985		
	Rural	Urban	Total	Rural	Urban	Total
rice . . . . .	38.41	8.86	47.27	41.92	10.48	52.40
wheat . . . . .	18.40	7.85	26.25	20.23	9.37	29.60
other cereals . . . . .	26.41	2.14	28.55	28.48	2.45	30.93
total cereals . . . . .	83.22	18.85	102.07	90.63	22.30	112.93
pulses . . . . .	9.99	3.11	13.10	11.05	3.78	14.83
total foodgrains . . . . .	93.21	21.96	115.17	101.68	26.08	127.76
sugar . . . . .	3.01	2.53	5.54	3.40	3.15	6.55
gur . . . . .	8.37	0.87	9.24	9.29	1.03	10.32
vegetable oils . . . . .	1.52	0.87	2.39	1.68	1.07	2.75
vanaspati . . . . .	0.36	0.49	0.85	0.41	0.62	1.03
tea (million kg) . . . . .	187.60	95.33	282.93	209.98	119.32	329.30
coffee (million kg) . . . . .	31.93	20.52	52.45	35.98	26.55	62.53
tobacco (million kg) . . . . .	274.74	41.59	316.33	303.45	51.31	354.76
cotton clothing (mill made) (million metres)	8144.69	2449.82	10594.51	9314.50	3191.98	12506.48
cotton clothing (hand- loom) million metres)	1171.56	363.83	1535.39	1325.06	470.69	1795.75
cotton clothing (khadi) (million metres)	110.56	32.33	142.89	126.96	42.27	169.23
total cotton clothing (million metres) . . . . .	9426.81	2845.98	12272.79	10766.52	3704.94	14471.46
milk . . . . .	21.32	7.50	28.82	23.97	9.40	33.37
egg (million numbers) . . . . .	5,239	3,254	8,493	5,931	4,286	10,217
meat . . . . .	0.59	0.32	0.91	0.66	0.39	1.05
fish . . . . .	1.34	0.76	2.10	1.48	0.93	2.41

## APPENDIX 10.7—Statement I (Contd.)

Commodity/item	2000 AD		
	Rural	Urban	Total
rice . . . . .	51.77	16.99	68.76
wheat . . . . .	25.46	15.58	41.04
other cereals . . . . .	24.14	3.65	37.79
total cereals . . . . .	111.37	36.22	147.59
pulses . . . . .	14.11	6.59	20.70
total foodgrains . . . . .	125.48	42.81	168.29
sugar . . . . .	4.56	5.77	10.33
gur . . . . .	11.95	1.69	13.64
vegetable oils . . . . .	2.15	1.94	4.09
vanaspati . . . . .	0.56	1.17	1.73
tea (million kg) . . . . .	277.58	226.39	503.97
coffee (million kg) . . . . .	48.43	55.12	103.55
tobacco (million kg) . . . . .	385.57	93.05	478.62
cotton clothing (mill made) (million metres)	13024.49	6686.63	19711.12
cotton clothing (handloom) (million metres) .	1799.52	967.83	2767.35
cotton clothing (khadi) (million metres) .	179.40	89.39	268.79
total cotton clothing (million metres) . . .	15003.41	7743.85	22747.26
milk . . . . .	31.81	17.55	49.36
egg (million numbers) . . . . .	8,082	9,337	17,419
meat . . . . .	0.88	0.69	1.57
fish . . . . .	1.89	1.70	3.59

## APPENDIX 10.7 (Contd.)

## Statement II : High Estimates

(million tonnes except  
where otherwise specified)

Commodity/item	1971*		
	Rural	Urban	Total
rice	32.24	6.50	38.74
wheat	15.22	5.63	20.85
other cereals	22.70	1.70	24.40
total cereals	70.16	13.83	83.99
pulses	8.17	2.15	10.32
total foodgrains	78.33	15.98	94.31
sugar	2.36	1.67	4.03
gur	6.81	0.63	7.44
vegetable oils	1.24	0.58	1.82
vanaspati	0.28	0.31	0.59
tea (million kg)	150.40	62.60	213.00
coffee (million kg)	25.19	12.62	37.91
tobacco (million kg)	227.00	28.00	255.00
cotton clothing (mill made) (million metres)	4193.58	808.03	5001.61
cotton clothing (handloom) (million metres)	640.47	124.04	764.61
cotton clothing (khadi) (million metres)	55.70	10.48	66.18
total cotton clothing (million metres)	4889.85	942.55	5832.40
milk	16.87	4.84	21.71
egg (million numbers)	4,108	1,932	6,040
meat	0.47	0.22	0.69
fish	1.10	0.51	1.61

\* In the case of cotton clothing, the estimates relate to 1961.

## APPENDIX 10.7—Statement II (Contd.)

Commodity/item	1980			1985		
	Rural	Urban	Total	Rural	Urban	Total
rice . . . . .	40.45	9.05	49.50	45.77	10.83	56.60
wheat . . . . .	20.01	8.19	28.20	23.33	10.06	33.29
other cereals . . . . .	26.42	2.03	28.45	28.49	2.24	30.73
total cereals . . . . .	86.88	19.27	106.15	97.59	23.13	120.72
pulses . . . . .	11.14	3.38	14.52	13.36	4.37	17.73
total foodgrains . . . . .	98.02	22.65	120.67	110.95	27.50	138.45
sugar . . . . .	3.66	2.89	6.55	4.70	3.92	8.62
gur . . . . .	9.46	0.89	10.35	11.47	1.09	12.56
vegetable oils . . . . .	1.70	0.98	2.68	2.04	1.31	3.35
vanaspati . . . . .	0.45	0.58	1.03	0.59	0.81	1.40
tea (million kg) . . . . .	222.05	110.91	332.96	287.09	158.01	445.10
coffee (million kg) . . . . .	38.96	25.76	64.72	52.01	40.46	92.47
tobacco (million kg) . . . . .	304.47	46.59	351.06	367.01	63.19	430.20
cotton clothing (mill made) (million metres) . . . . .	10622.04	3109.42	13731.46	15244.18	4932.58	20176.76
cotton clothing (handloom) (million metres) . . . . .	1453.16	454.50	1907.66	1975.68	706.56	2682.24
cotton clothing (khadi) (million metres) . . . . .	146.85	41.35	188.20	214.90	66.27	281.17
total cotton clothing (million metres) . . . . .	12222.05	3605.27	15827.32	17434.76	5705.41	23140.17
milk . . . . .	25.42	8.70	34.12	32.16	12.01	44.17
egg (million numbers) . . . . .	6,535	4,253	10,788	8,932	7,040	15,972
meat . . . . .	0.71	0.35	1.06	0.94	0.46	1.40
fish . . . . .	1.50	0.85	2.35	1.88	1.16	2.99

## APPENDIX 10.7—Statement II (Concl.)

Commodity/item	2000 AD		
	Rural	Urban	Total
rice	56.45	17.53	73.98
wheat	29.29	16.60	45.89
other cereals	34.16	3.37	37.53
total cereals	119.90	37.50	157.40
pulses	17.10	7.60	24.70
total foodgrains	137.00	45.10	182.10
sugar	6.23	7.08	13.31
gur	14.77	1.80	16.57
vegetable oils	2.62	2.34	4.96
vanaspati	0.80	1.50	2.30
tea (million kg)	388.82	306.48	695.30
coffee (million kg)	72.01	86.82	158.83
tobacco (million kg)	473.68	116.51	590.19
cotton clothing (mill made) (million metres)	22152.87	10691.01	32843.88
cotton clothing (handloom) (million metres)	2768.38	1499.69	4268.07
cotton clothing (khadi) (million metres)	316.47	145.19	461.66
total cotton clothing (million metres)	25237.72	12335.89	37573.61
milk	42.39	22.01	64.40
egg (million numbers)	12,567	15,946	28,513
meat	1.29	0.82	2.11
fish	2.39	2.14	4.53

## APPENDIX 10.8

(Paragraph 10.2.21)

Projections of Consumer Demand for Cotton Clothing. (Adjusted for Production/  
Availability of Man-made Fibres)

(Million metres)

Particulars		1980	1985	2000 AD
demand for all clothing	—low	12,272.8	14,471.5	22,747.3
	—high	15,827.3	23,140.7	37,573.6
production/availability of man-made fibres	—low	1,816.1	2,425.5	7,176.8
	—high	2,342.1	3,878.5	11,854.5
demand for cotton cloth				
(1)—(2)	—low	10,456.7	12,046.0	15,570.5
	—high	13,485.2	19,262.2	25,719.1
demand for cotton cloth in terms of raw cotton (million bales)				
	—low	7.01	8.07	10.43
	—high	9.04	12.90	17.23



## APPENDIX 10.9

(Paragraph 10.3.2)

## Annual Seed Requirements of Foodgrains in 2000 AD.

Crop	Area (Mha)	Seed rate (tonnes per ha)	Total seed requirements (million tonnes)
paddy	32.00	0.030	0.96
wheat	17.55	0.075	1.32
barley	5.50	0.075	0.41
oat	0.50	0.075	0.04
maize	9.00	0.015	0.13
jowar	17.00	0.010	0.17
bajra	12.00	0.006	0.07
ragi	2.50	0.005	0.01
small millets	2.00	0.005	0.01
gram	8.50	0.070	0.59
pigeonpea	3.00	0.012	0.04
peas	1.00	0.070	0.07
other pulses	12.50	0.015	0.19
total	123.05		4.01

## APPENDIX 10.10

(Paragraph 10.3.10)

Projections of Demand for Oils for Edible and Non-edible Uses  
(million tonnes)

Particulars	1971	1980	1985	2000 AD
vegetable oils	—low	2.39	2.75	4.09
	—high	1.82	2.68	3.35
vanaspati (in terms of oil*)	—low	0.89	1.08	1.82
	—high	0.62	1.08	1.47
soaps	—low	0.46	0.54	0.83
	—high	0.35	0.56	0.81
paints	0.08	0.15	0.17	0.25
toilets lubricants and miscellaneous	0.30	0.62	0.78	1.26
total	—low	4.51	5.32	8.25
	—high	3.17	5.09	6.58

\* It has been assumed that 105 kg of oil is required for producing 100 kg of vanaspati.

## APPENDIX 10.11

(Paragraph 10.4.4)

Internal Consumption of Jute Goods and Net National Product  
at Constant (1960-61) Prices

Year	Internal consumption of jute goods ( <sup>'000</sup> tonnes)	Net national product at constant (1960-61) prices (Rs crores)
1960-61	251.8	13,267
1961-62	260.2	13,732
1962-63	307.9	13,994
1963-64	286.9	14,769
1964-65	399.4	15,884
1965-66	386.0	15,081
1966-67	385.5	15,257
1967-68	427.7	16,616
1968-69	349.5	17,180
1969-70	388.0	18,152
1970-71	407.8	19,035

## APPENDIX 10.12

(Paragraph 10.4.4)

## Projection of Domestic Demand for Raw Jute and Mesta

Year	Internal demand (in terms of jute goods  (thousand tonnes)			Internal demand (in terms of raw jute and mesta)  (million bales)			Internal demand (in terms of raw jute & mesta) (including village consumption of raw jute) (million bales)		
	method I	method II		method I	method II		method I	method II	
		low	high		low	high		low	high
1980	765.5	627.0	690.0	4.48	3.67	4.04	4.68	3.37	4.24
1985	1048.8	786.8	965.7	6.14	4.60	5.65	6.44	4.85	5.90
2000 AD		1417.0	1956.5		8.29	11.45		8.59	11.75

## SUPPLY POSSIBILITIES

The trends in and magnitudes of domestic demand for selected agricultural commodities on economic considerations have been studied in Chapter 10 on Demand Projections. The chapters on Crop Production in Part VI of the Report give an idea of the production potential in 2000 AD on the basis of adoption of modern technology with the full backing of production requisites like irrigation, seeds, fertilisers, manures, plant protection chemicals, improved implements and tools, credit etc. more or less under ideal conditions. In this chapter the extent to which the economy of the country would be able to realise the production potential and the levels of supply of different agricultural commodities which would materialise by the turn of the century are examined taking into account the resource endowments, expected advances in technology, organisational capacity and institutional and infrastructural support. Estimates of likely production of selected commodities in 1985 are also given. A balancing of demand projections against supply possibilities will provide an indication of export surpluses, extent of import substitution and import needs in the two time perspectives of 1985 and 2000 AD.

### 1 REVIEW OF SUPPLY PROJECTIONS

11.1.1 Estimates of likely production of agricultural commodities have to be obtained primarily as the product of expected area under and the yield of each crop on the basis of foreseeable modifications in the past trends due to technological advances and the likely improvements in availability of physical inputs and in infrastructure such as creation of marketing and processing facilities and provision of other incentives for production. Although supply and demand are inter-related, they have to be studied independently and then matched for indicating adjustments needed for ensuring the balance between demand and supply.

11.1.2 The country has not yet attained self-sufficiency in respect of a large number of important agricultural commodities. Apart of gap between supply and demand in years of short supply in foodgrains and several commercial crops (like jute, certain varieties of cotton, etc.),

vegetable oils as also certain animal husbandry products (milk powder, raw wool, etc.) is met by imports. To the extent it is not possible to meet the entire demand for a certain agricultural commodity from domestic production and imports, equilibrium between supply and demand comes through price rise. Such increases, being inflationary in nature, are not congenial to overall agricultural development and the growth of economy. It is therefore important that, in the planning process, the course of demand for and supply of various agricultural commodities should be projected as realistically as possible and attempts should be made to match these at different points of time with a view to identify the magnitude of the likely gaps and the measures needed to fill these gaps. Only on the basis of such an exercise it becomes possible to have a clear picture of the areas in which production efforts have to be stepped up and to formulate plans for optimum allocation of resources to the various production programmes.

11.1.3 Agricultural production during the first two five year plans registered impressive growth and outstripped the growth in population. Under the Third Five Year Plan, it was stated that development of agriculture held the key to rapid economic development of the country. It was observed that crop yields were so low that "given adequate irrigation, supplies of fertilisers, improved seeds and implements, education of farmers in using better methods and reform of land tenures and development of agricultural economy along cooperative lines, large increases in levels of production can be achieved over relatively short period."<sup>1</sup> The last year of the Third Plan was marked by adverse weather conditions and supplies of agricultural commodities lagged substantially behind demand estimates and also fell considerably short of the targets of production. The extent to which production was a factor of whether was dramatically highlighted in 1966 when the country had to import cereals to the tune of 10 million tonnes, the highest ever reached in 30 years history of food imports.

11.1.4 The situation of scarcity of foodgrains which developed in the last year of the Third Five Year Plan led to the initiation of the process of improving agricultural productivity through increasing use of science and technology—a process which came to be termed as the "New Strategy for Agricultural Development". The Fourth Five Year Plan set as one of its major objectives, the creation of conditions for a sustained rate of economic growth of five per cent per annum over the decade ending 1979-80. In respect of foodgrains the Plan set a target of 129 million tonnes for 1973-74 as against an assumed production level of 98 million tonnes in the base year (1968-69). The actual production of foodgrains in 1968-69

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1961. Third Five Year Plan—Chapter II, Long-Term Economic Development : p. 22. New Delhi, Planning Commission, Government of India.

fell short of the assumed level by 4 million tonnes and the shortfall in the production target of 1973-74 was as large as 25.4 million tonnes, the actual level of foodgrains production in that year being 103.6 million tonnes only.

11.1.5 During the sixties while the rate of growth of population was higher as compared to the earlier decade, that of agricultural production showed signs of deceleration, leading to situations of critical short supplies in years of bad crops. The demand arising from population and income growth pressed heavily on supplies of agricultural commodities expanding at a comparatively slower pace. Since the scope for extending cultivation to new lands was limited, increasing reliance had to be placed on raising productivity of land in the strategy for agricultural development.

11.1.6 The agricultural development programmes in the Fifth Five Year Plan have been formulated after taking into account the demand and supply factors. It is envisaged that the fulfilment of the Plan targets will make the country self-sufficient in foodgrains and also leave some quantity for building bufferstocks. Similarly, the dimensions of growth in commercial crops during the Fifth Five Year Plan have been stated to be so set as to take care of export demand in addition to meeting the demand of industries.

11.1.7 The five year plans have also attempted to provide a long term view of supply position in respect of major agricultural commodities. A beginning towards formulation of long-term plans of development was first made in the Second Five Year Plan which presented a synoptic view of growth of income and investment over the next 15 years (upto 1970-71). These formulations were revised in the Third Five Year Plan in the light of the experience gained during the Second Plan. The Third Five Year Plan also attempted to assess the possibilities of agricultural growth in the next decade. A tentative target of production of foodgrains at 125 million tons (127 million tonnes) in 1970-71 was visualised in the Third Plan. A fresh effort to evolve a long-term perspective for agricultural development was made by the Ministry of Agriculture and Irrigation at the time of formulation of the Fourth Five Year Plan (1966-71). In the "Approach to Agricultural Development in the Fourth Five Year Plan"<sup>1</sup> submitted to the Planning Commission, it laid down that the broad objective of agricultural development would be to double agricultural production over the period 1961 to 1976 and also to diversify the agricultural economy, with increased emphasis on development of animal husbandry, dairying, fisheries and forestry. The target of production of foodgrains was proposed at 125 million tonnes in 1970-71 and 150 million tonnes in 1975-76. Subsequently, as part of the revised Fourth

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1 1964. Approach to Agricultural Development in the Fourth Five Year Plan : 12. New Delhi, Ministry of Agriculture and Irrigation, Government of India.

Five Year Plan (1969-74) formulations, the Perspective Planning Division of the Planning Commission made a study of the "Perspectives for Agriculture—India: 1968-69 to 1985-86" and, on the basis of a study of the possibilities of increase in areas under the crops, increase in consumption of fertilisers, increase in area under high yielding varieties of cereals, etc. estimated the production of foodgrains in 1985-86 at 192 million tonnes. Estimates of production of important commercial crops were also formulated. The draft Fifth Five Year Plan carried out a more detailed exercise on the perspective growth of economy during 1973-74 to 1985-86 and on the basis of this exercise, revised the estimates of production of foodgrains in 1985-86 to 170 million tonnes, with simultaneous reduction in the estimates of production of commercial crops also.

11.1.8 The process of target setting in crop production has been discussed in Section 7 of Chapter 60 on Planning. The formulation of plan targets takes into account the expected levels of demand at the end of the plan period. Having determined the demand, an appraisal is made of the potentiality for production of agricultural commodities taking into account the existing technical and organisational facilities as well as those which could be developed within the plan period with or without external assistance. Targets are fixed in terms of additional production likely to be achieved during the plan period over the level of production reached at the end of the previous plan period or in terms of total production. The additional production is assessed on the basis of the yardstick approach, which is discussed in that chapter.

11.1.9 Apart from the five year plans, several research organisations and individuals have also worked out supply projections for different periods of time. These studies, however, differed from one another in regard to their time frame, coverage and assumptions. The Commission also sponsored a study entitled "Projections of Demand and Supply of Selected Agricultural Commodities (1975-1991)" by the National Council of Applied Economic Research.

11.1.10 We are of the view that there is need for having more detailed and specific exercises relating to supply projections of various agricultural commodities to facilitate the task of setting realistic targets. Projections of supply of agricultural commodities is a more complicated exercise than those relating to projection of demand. "Even an attempt to predict future supply on the basis of the past trends of the explanatory variables, using regression models, poses theoretical problems and practical difficulties. Among the important factors that influence production of agricultural commodities are the nature of the soil, rainfall and other weather variables, irrigation facilities, variety of seeds used, fertilisers and manures applied, crop protection measures adopted and other know-how in production technology. Some of these variables are

quantifiable while others are not<sup>1</sup>. It might be added that even in regard to the quantifiable variables there is a serious deficiency in the availability of adequate statistical data for making realistic projections. In spite of these limitations it is essential to provide a quantitative idea of the magnitudes of likely availability of various agricultural commodities relative to their demand over the projected period as the basis for the formulation of long-term policies and programme.

11.1.11 It is proposed to present supply possibilities in this Chapter in respect of major field crops viz. rice, wheat, other cereals, pulses, cotton, jute, sugarcane, oilseeds, tobacco and other commodities viz. milk, eggs, meat, fish, industrial wood and fuelwood at two points of time, namely the year 1985 and 2000 AD.

11.1.12 The estimates of supply possibilities have been attempted only at the all-India level. We would, however, like to emphasise the need for disaggregation of these estimates in terms of well defined homogeneous agroclimatic regions wherever possible or at least at the level of districts in view of the inter-regional variations in resource endowments, structural characteristics of agricultural operations and differing climatic patterns. However, for working out such disaggregated estimates it is first necessary to build up an adequate data base. In Chapter 60 on Planning, we have recommended that the district should be the unit of planning. Till the Planning Unit at the district level is organised, this exercise has to be done at the State level, with whatever information is available.

11.1.13 As stated in para 11.1.1 above, basically, the estimate of likely production or supply has to be worked out as the product of the likely area under the crop and the corresponding yield per hectare in the year of projection. Forecasts of area under the crop depend upon the judgements on the scope for expansion of net sown area and the intensities of cropping in irrigated and unirrigated areas and the share of the crop in the total cropped area. Further the area under the crop also depends upon the suitability of a particular area from considerations of soil and climatic conditions and also its profitability to the farmers from the point of view of costs and returns. In view of these factors, the projections cannot be very precise. Broadly speaking it has been assumed in Part VI—Crop Production, Sericulture and Apiculture—of the Report that with the extension of irrigation and changes in cropping patterns, area under foodgrains would decline marginally by 2000 AD compared to the 1969-72 level as it should be possible to grow larger crops from relatively smaller areas, as a result of increase in per hectare yields. Area under crops other than foodgrains would go up with

1. 1972. Projections of Demand for and Supply of Selected Agricultural Commodities (1975-1991): 32. New Delhi, National Council of Applied Economic Research.

the increase in gross cropped area. It has been assumed that area under fruits and vegetables and fodder crops will show substantial increases as compared to the base level. In regard to levels of production of food-grains, we have followed the production potential approach involving the projections of various inputs like irrigation, fertilisers and areas to be benefited by command area development and dry land farming programmes. Apart from these parameters, the skill, ability and willingness of the farmers to adapt themselves to changing conditions of new technology plays an important role. The price mechanism is another factor in bringing about the desired changes in the cropping patterns under certain conditions. Though in the present context, where several commodities are in short supply, this mechanism may not be of much help in the long term perspective, as position of supplies cases, relative prices will have to be relied upon as a potent instrument for bringing about desired shifts in areas under crops. It has, however, to be kept in mind that once a breakthrough is achieved in the case of a particular crop or a group of crops, it might become difficult to reduce or even to limit the area under that crop or group of crops by manipulating relative prices alone. We are, therefore, of the view that it would be necessary to work towards the desired cropping patterns by a judicious combination of price and other measures. In viewing the cropping patterns as they develop towards the end of the century, care has to be taken to match the possible levels of domestic production with the likely levels of demand, both for internal consumption and exports as also for building up buffer stocks of different commodities to meet seasonal fluctuations in the output. This might also call for some adjustments in the levels of supply. If the agricultural situation envisaged by 2000 AD is realised, the problem is likely to be that of keeping a watch on the supply-demand balances and taking steps to adjust the levels of production accordingly so that too large a surplus does not emerge in any particular commodity or area.

11.1.14 Considering the limitations of various assumptions made, the estimates presented in this Chapter for 1985 and 2000 AD are capable of achievement if the input levels envisaged in the subsequent sections are provided and other measures outlined in the different chapters of the Report are undertaken.

## 2 LAND UTILISATION

11.2.1 Land is one of the major natural resources of India. The First Five Year Plan, therefore, rightly recognised that the success of the



whole plan of agricultural development "will vitally depend on the results achieved in making the most advantageous use of land and labour resources engaged in agriculture"<sup>1</sup>. It was further realised in the Second Five Year Plan that a more studied effort to introduce a planned approach in agricultural development should be made, one of the main elements of which should be land use planning. The case for land use planning for India is based on two main factors. Firstly, compared to the increasing demand for the various categories of crops, livestock and forest products in the country, land resources are relatively scarce. Therefore, it is very necessary to ensure that as far as possible each type of land is put to its superior most use. Secondly, since the spread of irrigation facilities and adoption of improved cultivation practices are introducing an element of dynamism in the land use and cropping pattern, it would be expedient to give a direction to the changes which are anyway to follow these development programmes. Land use planning in India received greater attention during the Third Plan period. A Working Group on Land-Use Planning set up in the then Ministry of Food & Agriculture to undertake studies relating to formulation of long term objectives of agricultural planning with particular reference to the Third Plan, examined the prevailing pattern of land use in the country and found that there was considerable scope for improvement in the pattern of land use. The Working Group also observed that there is an urgent need for studying the changes wherever they are occurring. The Working Group recommended the establishment of Land-Use Planning Cells at the Centre and States to take up this work. Some work on demarcation of the country into various regions and collecting information regarding essential criteria for classification of land into different categories was initiated during the Third Plan period; but this did not make much progress.

11.2.2 Thus, in spite of the fact that the importance of land-use planning has been fully realised in the successive five year plans, no concrete efforts have yet been made in this direction. But for the work done during the Third Five Year Plan, no comprehensive studies have been made on the pattern of land utilisation and improvements needed therein. There is also a visual evidence in several areas of the neglect of soil and its rapid deterioration, as referred to in Chapter 17 on Land Reclamation and Development. There are competing claims on land. Forest areas are cleared and allotted to landless people without realising the overall implication of such wanton destruction of forests. Village common lands and pastures are disappearing and cultivation is extending

1 1952. First Five Year Plan : 153. New Delhi, Planning Commission, Government of India.

to these lands. No specific agency of the Government was charged till the end of the Fourth Five Year Plan with the responsibility for the proper use of the land. It was, however, soon realised that such a state of affairs where this most basic resource has no known custodian of its interest, cannot be allowed to continue. Fully realising the urgency of the problem, it has recently been decided that the existing vacuum in policies, organisations and programmes relating to land and soil management should be filled on an urgent basis.<sup>1</sup> The States have been accordingly asked to prepare 25-year perspective plans for the optimum management of their land and soil resources and to establish an order of priorities according to which various soil conservation, land development, drainage, flood control and reclamation programmes should be taken up. The responsibility for ensuring that the State plans are drawn up in a rational manner and what is more important, are executed effectively is to be placed on high powered State land use boards presided over by the Chief Ministers. Eighteen State land-use boards have been set up so far. At the national level it is proposed to have a Central Land-use Commission under the Chairmanship of the Union Minister for Agriculture and Irrigation which will be charged with the overall responsibility for all matters relating to assessment and optimum management of country's land resources. We fully support these measures. We have given several recommendations in various chapters of the Report which have a bearing on land-use. We suggest that these should be culled out and placed before the State land-use boards and the Central Land-use Commission for further follow-up action.

11.2.3 Land utilisation statistics are available for 306 million hectares i.e. for about 93 per cent of the total geographical area of the country (328 Mha). Table 11.1 gives the land use classification of the reporting area at four points of time, namely, 1950-51, 1960-61, 1970-71 and 1971-72.

TABLE 11.1

Pattern of Land Utilisation—1950-51, 1960-61, 1970-71 and 1971-72\*\*

Classification	(thousand hec)			
	1950-51	1960-61	1970-71	1971-72
1. area under forest . . . . .	40,482 (14.2)*	54,052 (18.1)	65,978 (21.6)	65,757 (21.5)

\* Figures in parenthesis indicate the percentage share in total reporting area.

\*\* Directorate of Economics and Statistics, New Delhi, Ministry of Agriculture and Irrigation, Government of India.

1 Vohra, B. B., 1975. Land and Water Management Problems in India. New Delhi, Department of Personnel and Administrative Reforms, Cabinet Secretariat, Government of India.

Classification	1950-51	1960-61	1970-71	1971-72
2. area not available for cultivation	47,517 (16·7)	50,751 (17·0)	45,368 (14·8)	45,757 (15·0)
(i) area under non-agricultural uses	9,358 (3·3)	14,840 (5·0)	16,218 (5·3)	16,419 (5·4)
(ii) barren and unculturable land	38,159 (13·4)	35,911 (12·0)	29,150 (9·5)	29,338 (9·6)
3. other uncultivated land excluding fallow land	49,446 (17·4)	37,637 (12·6)	33,781 (11·1)	33,450 (10·9)
(i) permanent pastures and other grazing land	6,675 (2·3)	13,966 (4·7)	13,314 (4·4)	13,132 (4·3)
(ii) land under misc. tree crops and groves not included in net area sown.	19,828 (7·0)	4,459 (1·5)	4,366 (1·4)	4,369 (1·4)
(iii) culturable waste	22,943 (8·1)	19,212 (6·4)	16,101 (5·3)	15,949 (5·2)
4. Fallow land	28,124 (9·9)	22,819 (7·7)	19,745 (6·5)	21,254 (7·0)
(i) fallow land other than current fallows	17,445 (6·1)	11,180 (3·8)	8,612 (2·8)	8,696 (2·9)
(ii) current fallows	10,679 (3·8)	11,639 (3·9)	11,133 (3·7)	12,558 (4·1)
5. net area sown	118,746 (41·8)	133,199 (44·6)	140,398 (46·0)	139,365 (45·6)
6. total reporting area	284,315 (100·0)	298,458 (100·0)	305,270 (100·0)	305,583 (100·0)
7. non-reporting area	43,733	29,590	22,778	22,465
8. total geographical area	328,048	328,048	328,048	328,048

11.2.4 The coverage of area reporting agricultural statistics went up from 284.3 Mha in 1950-51 to 298.5 Mha in 1960-61 and further to 305.3 Mha in 1970-71 as a result of special efforts made by the Central and State Governments for improving agricultural statistics. This was made possible with the extension of cadastral survey operations to unsurveyed non-reporting areas and institution of requisite reporting agencies in areas where they did not exist. The extent of non-reporting area in 1970-71 was 22.8 Mha of which 17.7 Mha was in Jammu & Kashmir State alone including areas under illegal occupation of Pakistan and China and the remaining area mainly in the States/Union Territories of Arunachal Pradesh (2.71 Mha), Gujarat (1.04 Mha), Himachal Pradesh (0.49 Mha), Nagaland (0.30 Mha), Andhra Pradesh (0.24 Mha), Karnataka (0.23 Mha), Bihar (0.06 Mha), Assam (0.06 Mha), Madhya Pradesh (0.05 Mha) and Andaman and Nicobar Islands (0.04 Mha). It is anticipated that as a result of the various measures for improvement of agricultural statistics recommended in Chapter 61 on Statistics, the reporting area would go up to 318 Mha by 1985.

11.2.5 The total arable land (net area sown plus current and other fallows) in 1970-71 constituted 52.5 per cent of the total reporting area. The extent of land put to non-agricultural uses in the country was of the order of 16.2 Mha (5.3 per cent of the reporting area) and that of barren and unculturable land 2.92 Mha (9.5 per cent of the reporting area). The balance or 32.7 per cent of the reporting area was under the following land use classes :

	Area (Mha)	Percentage of reporting area
forests . . . . .	66.0*	21.6
permanent pastures and other grazing lands . . . . .	13.3	4.4
misc. tree crops . . . . .	4.4	1.4
culturable waste lands . . . . .	16.1	5.3

11.2.6 The figures of areas under different land uses are not strictly comparable over time due to changes in concepts and definitions as also the extension of reporting area. However, certain broad conclusions could be drawn on the basis of the percentage share of various categories of land use in the total reporting area. It would be observed from Table 11.1 that the area under forests, the extent of land under non-agricultural, uses as also under permanent pastures showed increases over the period 1950-51 to 1970-71. The net area sown also went up during this period. On the other hand there was a decline in the extent of barren and unculturable land and land under miscellaneous tree crops and groves. The area under culturable waste lands and fallow lands also showed a decrease. These shifts could be attributed to the extension of area under cultivation under the pressure of increasing demand for agricultural raw materials and foodgrains and the increase in the demand for land for other uses like industries, habitations, etc.

11.2.7 The pressure on land is bound to increase with growth in population not merely from the agricultural sector but also due to the growth of industries and communication systems (roads, railways and waterways) and the increasing rate of urbanisation. Within the agricultural sector there will be competing claims on land for crop production, animal husbandry and forestry which will have to be satisfied by adjustments in the existing land use patterns. With increase in productivity per hectare, smaller areas can give larger output. We have given careful consideration to such adjustments which are likely to take place by 1985 and those which are necessary and feasible by the turn of the century.

\* The area under forests is 75 Mha according to Indian Forest Statistics. The reasons for the discrepancy between the two sets of figures are discussed in Chapter 61 on Statistics.

The broad pattern of land-use envisaged is discussed in the succeeding paragraphs. It has, however, to be borne in mind that in view of the multiplicity of factors involved, the projections of area under various land use classes are indicative of the broad magnitudes and by their very nature, are not precise estimates.

### Projections of Land Use for 1985 and 2000 AD

11.2.8 The present (1970-71) forest cover (66 Mha) is only of the order of 21.6 per cent of the total reporting area. We are of the view that there may not be any significant change in the extent of area under forests except that due to extension of reporting to some of the non-reporting areas in States like Jammu & Kashmir, Himachal Pradesh, Nagaland, Assam and Arunachal Pradesh which largely consist of forests. A reasonable estimate of the area under forests by 2000 AD could be put at 70 Mha or 22 per cent of the total reporting area. It is possible that some of the existing forest areas may be lost to reservoirs or to orchards or small portions thereof put to non-agricultural uses such as land under buildings etc. but it is anticipated that such losses would be made good by bringing some waste lands under forests and by encouraging social forestry programmes.

11.2.9 The area under non-agricultural uses has gone up from 9 Mha in 1950-51 to 16 Mha in 1970-71 (i.e. from 3.3 per cent to 5.3 per cent of the total area). This area might further increase to 26 Mha by the turn of the century when it will constitute 8.2 per cent of the total reporting area.

11.2.10 The area classified as barren and unculturable waste land has declined over time as more and more of such area has come under some use or the other. Further scope for bringing these areas under cultivation is very limited. Some of the hill slopes could be brought under orchards by terracing. Certain ravine lands could be brought under forest cover or developed as grass lands. Some of the uncultivated areas in desert belts could also come under cultivation with the extension of irrigation facilities. Some of the coastal sandy areas could be put under various types of plantations if these are properly reclaimed. However, there may not be any decline in the area under this class from the present level as some of the present non-reporting areas which will come under the reporting fold, comprise of barren and unculturable lands.

11.2.11 Area under permanent pastures and other grazing lands went up sharply from 6.7 Mha in 1950-51 to 14.0 Mha in 1960-61 and declined marginally to 13.3 Mha in 1970-71. A major portion of the increase is on account of increase in reporting area and changes in concepts and definitions. The extent of permanent pastures and

grazing lands might increase to 15 Mha by the turn of the century as some of the fallow lands (other than current fallows) are likely to be reclaimed and put to this use. It would be necessary to manage these lands better since they are in a very bad shape at present. We have discussed this question in some detail in Chapter 25 on Fodder Crops.

11.2.12 The area under miscellaneous tree crops and groves is currently of the order of 4.4 Mha and might go up marginally to 5.0 Mha by 2000 AD.

11.2.13 The increase in net area sown has come about substantially from the reclamation of culturable waste lands the total area under which category declined from 23 Mha in 1950-51 to 16 Mha in 1970-71. If the needed resources are mustered it would be possible to reduce the extent of culturable waste lands to 9 Mha by the turn of the century. It has, however, to be kept in view that these areas are generally of marginal quality from the point of view of agricultural production and consist of saline, alkaline or lateritic red soils with thin soil cover. A large extent of the area is also weed infested. It would, therefore, be necessary to adopt a very cautious approach towards programmes for reclaiming culturable waste lands. These problems are discussed in detail in Chapter 17 on Land Reclamation and Development.

11.2.14 Area under fallow lands has also undergone a substantial decline over time with expanding irrigation facilities. Lands kept fallow for one to five years are categorised as other fallow lands. These lands are kept fallow due to inadequate supply of water and the resultant unremunerative nature of farming on account of low productivity, litigation, prolonged illness of the farmer, etc. With proper irrigation support, supplemented by adequate extension and credit facilities, it should be possible to reduce the extent of such fallow lands. In low rainfall areas it might be more economical to develop these areas as well-managed grass lands. By 2000 AD it is likely that the area under other fallow lands might be of the order of 5.5 Mha as against 8.6 Mha in 1970-71. Cropped areas which are not cultivated during the current year only are classified as 'current fallows'. The reasons for leaving them fallow are recuperation as part of a rotation, illness of the farmer, disputes about its ownership, insecurity of tenure, untimely rains etc. With timely availability of inputs and greater security in land ownership it should be possible to reduce the extent of current fallows from 11 Mha to about 8 Mha by 2000 AD.

11.2.15 The cultivated area (net area sown+current fallows) already constitutes 49.7 per cent of the total reporting area. With the reclamation of culturable waste lands and other fallow lands and reduction in the area under current fallows, it is estimated that the net area sown will go up to 150 Mha in 2000 AD. Together with the area under

current fallows of 8 million hectares, the cultivated area in 2000 AD will, form 52·8 per cent of the reporting area. Some of the new areas to be brought under cultivation would consist of uncultivated areas where irrigation facilities would be provided by the turn of century and hill areas where terracing would be possible with improved technology. It might be stated that projection of net area sown as a function of gross irrigated area and time also suggests that the extent of the net area sown in 2000 AD would be around that level\*. For the year 1985, the estimates of land utilisation are based on a broad continuation of the existing trends but keeping in view the likely developments by the turn of the century and the proposals given in the various chapters. Thus the pattern of land utilisation for 1985 and 2000 AD may be envisaged as in Table 11.2.

TABLE 11.2  
Projected Land Utilisation Patterns—1985 and 2000 AD

Classification	1970-71	1985	2000 AD
1. area under forest . . . . .	66·0	70·0	70·0
2. area not available for cultivation . . . . .	45·4	54·0	56·0
(i) area under non-agricultural uses . . . . .	16·2	21·5	26·0
(ii) barren and unculturable land . . . . .	29·2	32·5	30·0
3. other uncultivated land excluding fallow land . . . . .	33·8	32·5	29·0
(i) permanent pastures and other grazing land . . . . .	13·3	14·0	15·0
(ii) land under misc. tree crops and groves not included in net area sown . . . . .	4·4	5·0	5·0
(iii) culturable waste . . . . .	16·1	13·5	9·0
4. fallow land . . . . .	19·7	16·5	13·0
(i) other than current fallows . . . . .	8·6	7·0	5·0
(ii) current fallows . . . . .	11·1	9·5	8·0
5. net area sown . . . . .	140·4	145·0	150·0
6. total reporting area . . . . .	305·3	318·0	318·0
7. area for which no returns exist . . . . .	22·7	10·0	10·0
8. total geographical area . . . . .	328·0	328·0	328·0

11.2.16 After having projected the pattern of land use, the next step in working out supply projections is to formulate estimates of gross cropped area and net and gross irrigated area for the time perspectives in view, namely, the years 1985 and 2000 AD. Table 11.3 gives the relevant data for the past years.

\* The function fitted to the estimates of net sown area and gross irrigated area during 1951-52 to 1971-72 was :

$$\text{Log } A_n = a + b_1 (\text{Log } A_1) + b_2 \text{Log } t \text{ where}$$

$A_n$  = net sown area,  $A_1$  = gross irrigated area,  $t$  = time in years. The net sown area in 2000 AD on this basis works out to 149 million hectares.

TABLE 11.3

Net Area Sown, Area Sown more than Once, Gross Cropped Area, and Irrigated Area—1950-51 to 1971-72<sup>1</sup>

Classification	(Mha)			
	1950-51	1960-61	1970-71	1971-72
1. net sown area . . . . .	118.7	133.2	140.4	139.4
2. area sown more than once . . . . .	13.2	19.6	24.7	24.6
3. gross cropped area . . . . .	131.9	152.8	165.1	164.0
4. intensity of cropping (i.e. 3 upon 1) . . . . .	1.11	1.15	1.18	1.18
5. net irrigated area . . . . .	20.9	24.7	31.2	31.6
6. area irrigated more than once . . . . .	1.7	3.3	7.3	7.0
7. gross irrigated area . . . . .	22.6	28.0	38.5	38.6
8. intensity of irrigated cropping (i.e. 7 upon 5) . . . . .	1.08	1.13	1.23	1.22
9. double cropped area with no irrigated crop or one irrigated crop (i.e. 2-6) . . . . .	11.5	16.3	17.4	17.6
10. item 9 as percentage of item 2 . . . . .	87.1	83.2	70.4	71.5

<sup>1</sup> Directorate of Economics & Statistics (DES).

It would be seen that area sown more than once which was about 15 per cent in 1960-61 has gone up subsequently due to the evolution of short duration varieties of different crops and increase in irrigation facilities. In 1970-71, 24.7 Mha or 18 per cent of the net area sown was sown more than once. In irrigated areas the intensity of cropping in 1970-71 was 1.23 and in rainfed tracts or areas with just one irrigated crop, it was slightly lower (1.16). Only on 30 per cent of the double cropped area, more than one irrigated crop was raised. Area receiving irrigation in more than one season in 1970-71 was 7.3 Mha or about 23 per cent of the net irrigated area.

### Projections of Cropped and Irrigated Area

11.2.17 A perspective of irrigation development has been given in Section 7 of Chapter 15 on Irrigation. It has been estimated that the gross irrigated area in 2000 AD would be of the order of 84 Mha comprising 51 Mha of surface irrigation and 33 Mha of groundwater irrigation. A study\* of the trends in multiple cropped area as a function of gross irrigated area during the period 1951-52 to 1971-72 indicates that with the increase in the gross irrigated area; the multiple cropped area in 2000 AD might go up to 55 Mha and the gross cropped area to 204 Mha which would imply a cropping intensity of 1.39. The gross cropped area in

\* The function fitted was

$\text{Log } A_n = a + b (\text{Log } A_i)$ , where  $A_n$  = multiple cropped area and  $A_i$  = gross irrigated area.



2000 AD has been estimated at 200 Mha in the Chapters on Crop production in Part VI of this Report on the basis of a study of the rainfall and cropping regions. We have assumed that the cropping intensity would be 1.38 in irrigated area and 1.30 in the rainfed areas or areas with one irrigated crop. The estimates for 1985 have been interpolated on the basis of past trends. On these considerations the estimates of multiple cropped area, gross cropped area and irrigated area in 1985 and 2000 AD work out as in Table 11.4.

TABLE 11.4

Net Sown Area, Area Sown More than Once, Gross Cropped Area and Net and Gross Irrigated Area—1958 and 2000 AD

	(Mha)		
	1970-71	1985	2000 AD
1. net sown area . . . . .	140.4	145.0	150.0
2. area sown more than once . . . . .	24.7	36.0	50.0
3. gross cropped area . . . . .	165.1	181.0	200.0
4. intensity of cropping . . . . . (i.e. 3 upon 1)	1.18	1.25	1.33
5. net irrigated area . . . . .	31.2	46.0	61.0
6. area irrigated more than once . . . . .	7.3	15.0	23.0
7. Gross irrigated area . . . . .	38.5	61.0	84.0
8. intensity of cropping in irrigated land (i.e. 7 upon 5) . . . . .	1.23	1.33	1.38

State-wise details of net area sown, gross area sown, net area irrigated and gross irrigated area for 2000 AD are given in Appendices 15.2 and 15.3 of Chapter 15 on irrigation.

### 3 AREA UNDER CROPS

#### Past Trends

11.3.1 A wide range of factors viz. nature of soil, climatic conditions, size of holdings, availability of various inputs like irrigation, fertilisers, manures and pesticides and processing facilities, comparative economics of alternative crops, etc. have a bearing on the individual farmer's decision to grow a particular crop. These decisions can be influenced and modified to a considerable extent through deliberate policy measures aimed at inducing changes in the physical, economic and institutional environments of agriculture, or offering various incentives by way of input supplies, processing and marketing facilities etc. Various

developmental programmes undertaken during the course of the five year plans have, as a matter of fact, led to certain basic changes in the allocation of area under foodgrain and non-foodgrain crops as also under individual crops within these groups. The following table reflects these changes :

TABLE 11.5  
Index Numbers of Area under Crops<sup>1</sup>

(base : 1959-60 to 1961-62=100)

Year	Foodgrains	Non-foodgrains	All crops
1950-51	83.2 (76.7)*	77.2 (23.3)	82.0 (100.0)
1960-61	99.4 (75.7)	98.4 (24.3)	99.2 (100.0)
1970-71	107.0 (75.4)	108.4 (24.6)	107.3 (100.0)
1971-72	105.5 (74.8)	110.8 (25.2)	106.7 (100.0)
1972-73	102.6	104.2	103.0
1973-74	108.5	109.6	108.8

1 1975. Estimates of Area and Production of Principal Crops in India, 1973-74, New Delhi, Directorate of Economics and Statistics.

\* Figures in parenthesis represent percentage of area under each group to gross cropped area.

11.3.2 The relative share of foodgrains in the gross cropped area has declined marginally from 76.7 per cent in 1950-51 to 75.4 per cent 1970-71. The share of crops other than foodgrains increased from 23.9 per cent to 24.6 per cent during the same period. The annual rate of growth of area under foodgrain crops during 1949-50 to 1973-74 was of the order of 0.98 per cent while in the case of non-foodgrains crops it was 1.50 per cent.

11.3.3 In the case of foodgrains, with the extension of irrigation, there have been perceptible shifts in area from coarse grains to high value crops namely wheat and rice. During the period 1949-50 to 1973-74, wheat showed the highest rate of growth of area (2.78 per cent) followed by maize (2.75 per cent). The area under rice and bajra grew at the rate of about one per cent per annum. The area under barley and gram, on the other hand, showed a decline of 1.10 per cent and 0.19 per cent per annum respectively. Among commercial crops the highest rate of growth in area was recorded by sugarcane (2.32 per cent) followed by oilseeds (1.68 per cent), tobacco (1.20 per cent) and fibres (1.06 per cent). A more detailed analysis of the trends in area under different crops is given in Chapter 3 on Progress of Agricultural Development.

## Diversification in Agriculture

11.3.4 The state of agriculture at the turn of the century would depend upon the extent of the modernisation in the techniques of crop production as also in the fields of animal husbandry, fisheries and forestry. The modernisation of agriculture would necessitate a great deal of diversification in resources utilisation both at the micro and macro levels. Under subsistence farming and traditional methods of cultivation, each farmer tends to grow foodgrains for home consumption, the type of cereals grown depending upon soil conditions, rainfall, environments, etc. With foodgrains, particularly superior grains becoming freely available, the farmers are likely to grow in an increased measure commercial crops for which they might hope to get a better price, and coarse grains for livestock consumption. With increasing extent of assured and perennial irrigation and with greater emphasis on multiple cropping through extension services and inputs, the farmers would tend to intensify farming practices, adopting the best suited pattern of land use both from the economic and agronomic point of view. The small and marginal farmers, encouraged by the availability of necessary facilities as a result of deliberate government policy, would tend to diversify their farming activities by supplementing crop production with subsidiary occupations like milk production, poultry and fisheries.

11.3.5 At the macro level, with extensive cultivation of high yielding varieties of cereals, problems of surpluses of foodgrains, particularly superior cereals of rice and wheat are likely to crop up after the mid-eighties if the present cropping pattern continues. In this situation, lands which are not ideally suited for foodgrains would get diverted to other crops. Increasing cultivation of coarse grains to be used as feedgrains indigenously or for export could also be envisaged provided the price realisation from these crops is attractive enough. With increased irrigation, larger areas could also be devoted to fruits and vegetables.

11.3.6 The demand for subsidiary foods like milk and milk-products, egg, fish, meat, etc. is likely to go up at a much faster rate than that of cereals with rising income levels. Hitherto, a major factor restraining the production of these items was that land could not be diverted to feedgrains and fodder because of the immediate need for growing foodgrains for human consumption. As productivity increases, the requirements of land for producing foodgrains for human consumption is likely to go down. It is estimated that about 61.5 per cent of the total cropped area in 2000 AD would suffice to produce the total requirements of foodgrains as against about 75 per cent in 1970-71 as a direct consequence of the widespread adoption of new technology. Diversification of crop production will also be needed for technical and agronomic reasons. Continuous cultivation of the land with the same crop in successive seasons

is not desirable from the point of disease and pest control. Crop rotations become, therefore, necessary.

### Considerations in Crop Planning

11.3.7 A great deal of diversification in agriculture could thus be both feasible and necessary by the turn of the century. A major problem in crop planning will, therefore, relate to that of defining the principles on which the community should base its preferences in regard to regional cropping patterns for land committed to arable farming. Agro-climatic classification in sufficiently broad detail, based on a joint consideration of rainfall, cropping patterns and soil types would enable choice of appropriate land use and cropping patterns based on potentialities of the different regions. An attempt to delineate regions based on rainfall and cropping patterns has been made in Chapter 14 on Rainfall and Cropping Patterns. The type of crops that can be grown in each of these regions could be ascertained on the basis of research and experimental data. Where irrigation is available, or could be developed, this factor has also to be taken into account in deciding the future cropping pattern. At this stage, the desirable cropping pattern and the likely aggregate yields can be worked out, based purely on considerations of optimum production from the physical point of view, in each region. It is not necessary that for each region only a single cropping rotation should be prescribed. There can be alternative cropping rotations out of which the farmer could make his choice.

11.3.8 It is also necessary to ensure the consistency of the proposed cropping patterns from the economic point of view at the micro-level in terms of net returns to the farmer. The net returns depend on the expected costs and the prevailing or anticipated prices of output. Simultaneously, the projected cropping patterns and the likely yields can be aggregated at the national level and their consistency can be tested in relation to the total demand, both for domestic consumption including requirements for non human consumption and buffer stocks as well as exports. This exercise will indicate the adjustments that are necessary in cropping patterns that are proposed to be adopted. Once a conclusion is arrived at that a particular commodity will be surplus and its production has to be curtailed, the basic data regarding the rainfall and cropping patterns would indicate the most suitable regions to which the particular crop should be confined and the unsuitable areas where its cultivation should be discouraged.

### Projections of Area under Principle Crops

11.3.9 The broad order of magnitude of the likely area under individual crops in 2000 AD and its distribution in various parts of the

country have been given in the respective crop chapters on the basis of agro-climatic considerations. These area estimates have been adopted for the purpose of estimating supply possibilities. With regard to 1985, however, the changes in cropping pattern in the next decade or so, would be guided mainly by the economic and institutional factors, rather than the agro-climatic considerations. Area under individual crops in 1985 has been estimated by linear interpolation supplemented by subjective judgement based on available indicators in respect of relevant development programmes such as extension of irrigation facilities, availability of inputs, scope for double/multiple cropping with the evolution of short duration varieties, etc. Table 11.6 presents the estimates of area under principal crops for 1985 and 2000 AD.

TABLE 11.6  
Estimates of Area under Principal Crops

Crop/group	(Mha)			
	Base Level <sup>1</sup>	1973-74	1985	2000AD <sup>1</sup>
1. rice . . . . .	37.54	38.01	38.00	32.00
2. wheat . . . . .	18.01	19.06	20.00	17.55
3. other cereals . . . . .	45.57	46.18	45.40	48.50
4. total cereals . . . . .	101.12	103.25	103.40	98.05
5. total pulses . . . . .	22.15	22.88	23.50	25.00
6. total foodgrains . . . . .	123.27	126.13	126.90	123.05
7. oilseeds@ . . . . .	16.34	16.22	19.50	25.50
8. sugarbeet . . . . .	—	—	0.25	0.50
9. sugarcane . . . . .	2.59	2.72	3.50	5.00
10. tobacco . . . . .	0.45	0.45	0.50	0.55
11. cotton . . . . .	7.60	7.60	9.00	11.50
12. jute . . . . .	0.78	0.79	0.90	1.00
13. mesta . . . . .	0.32	0.37	0.32	0.32
14. other crops . . . . .	14.48	NA	20.13	32.35
				199.77
total cropped area . . . . .	165.83	NA	181.00	or 200.00

1 Vide Chapters 21 to 25 on Foodgrain Crops, Commercial Crops, Horticultural Crops, Plantation Crops and Fodder Crops.

@ Includes groundnut, sesamum, linseed, castorseed, rapeseed & mustard safflower and nigerseed, in the base period and 1973-74. The projections also include soyabean and sunflower.

11.3.10 It will be observed that significant shifts are anticipated by the turn of the century in the prevailing cropping pattern. Among foodgrains, the areas under rice and wheat in 2000 AD would be lower than the 1973-74 level by over 7 Mha whereas the area under coarse grains and pulses would go up by over 4 Mha. The total area under foodgrains would be around 123 Mha by 2000 AD. The relative share of foodgrains

in the total cropped area is estimated to decline from around a 75 per cent in 1970-71 to 61.5 per cent by 2000 AD.

11.3.11 Among commercial crops, areas under cotton, oilseeds and sugarcane are expected to go up by varying extents, increasing their share in the total cropped area to 21 per cent in 2000 AD as against 16 per cent in 1970-71. Further substantial increase in the area is envisaged under 'Other Crops', which include condiments and spices, fruits and vegetables and fodder crops, and their relative share in the total cropped area is expected to go up from 9 per cent during the base period to 16 per cent by the turn of the century.

### Instruments of Crop Planning

11.3.12 For promoting the desired changes in cropping pattern, a series of measures will have to be taken. The first requisite will be to organise research in agro-technical and economic aspects of crop combinations to be adopted in each area. Based on such research and economic analysis of data, suitable model farm plans covering package of both crops and livestock enterprises and associated farm practices for each area will have to be prepared and communicated to the farmers for their adoption through appropriate extension measures. In fact, the extension workers may also need special training for propagating these new ideas. The Government will also have to step in to provide the necessary economic incentive through assurance of favourable prices or promotional subsidies, besides ensuring availability of inputs and technical services. Necessary storage, processing and other infrastructure will also have to be created before specific programmes for crop diversification are taken up. In some cases, measures such as regulation of irrigation supplies to encourage or discourage desired cropping patterns may also have to be thought of. There may be several other types of measures including legislative controls, in case of tobacco for instance, which will have to be considered. The type of measures needed in each area would require detailed consideration, keeping in view local conditions, administrative arrangements, desired production and demand patterns.

## 4 PERSPECTIVE PRODUCTION LEVELS

### Review of Trends

11.4.1 Crop yields in India are very low compared to those in advanced countries. The programmes of agricultural development in the

successive five year plans, more particularly since the Third Five Year Plan, therefore, laid considerable emphasis on increasing the yield levels. The Intensive Agricultural District Programme, Intensive Agricultural Area Programme and the New Strategy of agricultural development all aimed at increasing productivity by intensive cultivation techniques. Under the New Strategy stress was laid on increasing use of science and technology and with the introduction of fertiliser responsive high yielding varieties and other programmes, the pace of improvement in productivity got accelerated. Year to year fluctuations notwithstanding, the yield per hectare of agricultural commodities maintained an upward trend during the last two decades as would be apparent from Table 11.7.

TABLE 11.7

All-India Index Numbers of Yield of Foodgrains, Non-foodgrains and All-Crops.

(base : triennium ending  
1961-62=100)

Year	Foodgrains	Non- foodgrains	All-crops
1949-50	37.0	97.9	89.8
1950-51	79.1	93.5	83.2
1960-61	102.8	104.2	103.3
1970-71	122.0	110.9	118.0
1971-72	120.1	112.5	117.3
1972-73	113.1	106.5	110.7
1973-74	116.7	114.7	116.0

During the period 1949-50 to 1973-74 the overall yield per hectare of all crops rose at a compound rate of 1.30 per cent per annum. However, there were marked differences in the rates of growth achieved in different States. For study of the State-wise variations, a comparison has been made of the yield levels of important crops grown in each State between the triennia ending 1964-65 and 1973-74; the base triennium representing the peak level of performance of crops before introduction of high yielding varieties of cereals in Indian agriculture. The percentage increase/decrease in the overall yield level in a particular State has been reduced to an annual basis to arrive at the average annual rate of increase. The annual rate of increase in agricultural productivity in different States between the triennia ending 1964-65 and 1973-74 are given in Appendix 3.15 of Chapter 3 on Progress of Agricultural Development. It will be seen that spectacular improvements were achieved in Punjab and Haryana. Wheat provided the main thrust for the improvement in productivity in both the States. On the other

hand States like Maharashtra, Orissa and Nagaland had negative growth rates of agricultural productivity. Adverse weather during the latter triennium was mainly responsible for the decline in productivity showing thereby that agriculture in many parts of the country is still largely dependent on the vagaries of weather. A more detailed analysis of the trends in area and production of different commodities is given in Chapter 3 on Progress of Agricultural Development.

11.4.2 Further, growth in productivity was higher in the case of foodgrains on account of larger resource allocation to these crops. During the period 1949-50 to 1973-74, the yield per hectare of foodgrains went up at a compound rate of 1.52 per cent per annum as against 0.82 per cent per annum in the case of non-foodgrains. There have been marked differences in the rates of growth as between different crops in the foodgrains group. The highest rate of growth was registered by wheat (2.75 per cent) followed by bajra (1.95 per cent), rice (1.60 per cent) and ragi (1.31 per cent). Spectacular performance of wheat was due to the fact that all the major wheat growing States had good irrigation support and high yielding varieties covered about 60 per cent of the area under the crop. Performance of rice was not very impressive as it is grown mostly in wet humid tropics which suffer from problems of drainage, cyclones and floods and have high incidence of pests and diseases. Due mainly to the lack of location specific varieties, the high yielding varieties programme did not make the desired impact on yield levels in different areas. In the case of other coarse grains the rates of growth ranged between 0.8 to 0.9 per cent. Among pulses, although the rate of growth in the case of gram was 0.7 per cent, the overall yield recorded a decline in rate of growth of 0.06 per cent per annum.

11.4.3 Under non-foodgrain crops, the yields of cotton registered impressive rate of growth of 1.78 per cent while those of other crops went up at a lower rates as shown below :

(per cent per annum)

Crop	Annual rate of growth of yield (1949-50 to 1973-74)
sugarcane	1.17
tobacco	1.35
major oilseeds	0.24
jute	0.52



## Targets of Important Physical Programmes and Inputs

11.4.4 Cropped area : We have seen from Section 2 that the cropped area is likely to go up from 165 Mha in 1970-71 to 200 Mha in 2000 AD. Thus the increase in cropped area over a period of 29 years is postulated to be of the order of only 21 per cent or about 0.66 per cent (compound) per annum. Much of this increase would come from multiple cropping, the increase in net area sown being estimated at 0.2 per cent per annum. We envisage considerable change in the cropping pattern. Though the overall cropped area would increase, the area under foodgrains might stabilize around 1973-74 levels in 1985 and decline subsequently, as reliance for increasing agricultural production to meet the demand levels, is being placed on increase in the yield levels, through appropriate development programmes. The major agricultural programmes which directly affect agricultural productivity are provision of increased irrigation facilities, evolution and adoption of high yielding varieties, increased use of fertilisers and manures and adoption of plant protection practices. Besides, there are other programmes which through general development of selected areas, lead to an improvement in productivity levels in these areas. There are also a number of other factors which determine the level of agricultural productivity indirectly, viz.,

- (i) measures for improvement of agricultural efficiency, viz. research extension, farmers' education and training, etc.
- (ii) provision of economic incentives e.g. price support, crop insurance, subsidies, import restriction, etc; and
- (iii) creation of supporting infrastructure viz. land reforms, provision of institutional credit improvement of marketing facilities, development of cooperative service organisations, etc.

However, it is difficult to quantify the effect of these factors on the levels of productivity. In the ultimate analysis, therefore, it is the scale of application of inputs and the development programmes which would contribute directly to the increase in production. The trends in the use of inputs in the recent past and the projected levels for future as also the progress of the development programmes like command area development and dry farming are discussed in the following paragraphs with a view to assess their impact on agricultural production.

11.4.5 Irrigation : The gross irrigated area in the country went up at an average annual rate of 0.67 Mha during the period 1950-51 to 1968-69. However, during the course of the Fourth Five Year Plan the pace of development was much faster, the annual increment to the gross irrigated area being 1.4 Mha. A further step-up in the pace can be reasonably expected and in our view the gross irrigated area in

2000 AD would be 84 Mha of which 51 Mha would be irrigated from surface water sources and 33 Mha by groundwater<sup>1</sup>. It is envisaged that the share of irrigated area in the gross area sown would improve from 23 per cent in 1970-71 to 42 per cent in 2000 AD and the present inter-state differences in this regard would tend to decline.

11.4.6 As regards the extent of irrigated area under various crops at the turn of the century, it is estimated that about 75 per cent of the area under rice and 85 per cent under wheat would receive irrigation. The irrigated area under millets and pulses would also expand and will constitute 14.4 per cent and 21.5 per cent of the gross area sown to these crops. In the case of commercial crops, the present narrow irrigation base will need considerable expansion. Table 11.8 gives the projected estimates of irrigated area under important crops in 1985 and 2000 AD as compared to the position obtaining in 1970-71.

TABLE 11.8

## Irrigated Area under Principal Crops—All-India

(Mha)

Crops	1970-71	1985	2000 AD
rice . . . . .	14.93	21.50	24.00
wheat . . . . .	9.84	14.00	14.90
other cereals . . . . .	3.80	5.76	6.99
total cereals . . . . .	28.57	41.26	45.89
pulses . . . . .	1.99	4.30	5.37
total food-grains . . . . .	30.56	45.56	51.26
oilseeds . . . . .	1.02	2.80	5.10
cotton . . . . .	1.29	4.00	7.50
sugarcane . . . . .	1.90	3.25	5.00
tobacco . . . . .	0.10	0.25	0.40
other crops . . . . .	3.63	5.14	14.74
total non-foodgrains . . . . .	7.94	15.44	32.74
total irrigated area . . . . .	38.50	61.00	84.00

11.4.7 The likely shifts in cropping in irrigated areas in different States over the next five decades have been discussed in Section 8 of

<sup>1</sup> Vide Chapter 15 on Irrigation.

Chapter 15 on Irrigation. Appendix 15.4 of that chapter gives the break-up of the irrigated area at the State level according to different crops in 1970-71 and as projected for the year 2000 AD. The pattern of cropwise irrigated area is likely to undergo substantial shifts. For instance, in Andhra Pradesh, the extent of irrigated area under rice would decline marginally but that under millets, pulses and commercial crops would go up. Additional irrigation facilities to be created in Uttar Pradesh, Bihar, Madhya Pradesh and West Bengal would be utilised mostly for the foodgrain crops. Whereas, in Karnataka, in newly irrigated areas, emphasis will be laid on cotton, millets, sugarcane and oilseeds, in Rajasthan it would be on millets, pulses, oilseeds and fodder crops. In the case of States like Gujarat, Maharashtra and Kerala benefits of additional irrigation facilities would flow more to commercial crops.

11.4.8 Command area development : For improving utilisation of irrigation potential and also increasing agricultural production in the command area of irrigation projects, a number of policies and measures have been proposed<sup>1</sup> under the Fifth Five Year Plan, both in the realm of irrigation engineering and agricultural development. During the Fifth Five Year Plan, it is proposed to set up development agencies for integrated development in areas covering the command of 50 major projects with a total culturable commanded area of about 15 million hectares. A perspective of command area development has been presented in Section 5 of Chapter 16. It is estimated (vide Table 16.1 of that chapter) that the land preparation work under the major and medium irrigation projects would be completed over 8 Mha by 1985 and 29 Mha by 2000 AD. Net sown area benefited under the programme is estimated at 7.5 Mha in 1985 and 26 Mha in 2000 AD. Assuming an intensity of cropping of 1.33 in 1985 and 1.38 in 2000 AD., the gross cropped area benefited by command area development programme is estimated at 10 Mha in 1985 and 36 Mha in 2000 AD. It is further estimated that nearly 70 per cent and 62 per cent of the gross cropped area would be sown under foodgrains in 1985 and 2000 AD respectively. On this basis, the area under foodgrains likely to be benefited by command area development is estimated at 7 Mha in 1985 and 22 Mha in 2000 AD.

11.4.9 Dry land farming : Significant features of agriculture in rain-fed areas are low yields and high degree of instability in production levels from year to year. It is, therefore, necessary to concentrate attention on improving the technology of cultivation so as to stabilise and

1 1974. Draft Fifth Five Year Plan, Vol. II : 111. New Delhi, Planning Commission, Government of India.

elevate the yield levels in these areas. With this objective in view, 24 dryland research centres were established during the Fourth Plan period in dryland areas of the various agro-climatic zones by the Indian Council of Agricultural Research (ICAR) for undertaking research focussed on solutions to field problems that could yield results for use in the next 5 or 10 years and also a long term research programme which would strengthen the programme recommended presently and in the near future. In close proximity of the research centres, 24 pilot projects have also been taken up in 12 States as a Centrally sponsored programme. Areas of research and development being tried out in these pilot projects are scientific and technical improvements in crop husbandry including evolving new drought resistant, short duration and high yielding varieties of crops, new techniques of fertilisation, adoption of plant protection measures and other package of practices.

11.4.10 A set of practices have to be developed to deal with the different weather conditions in the various arid regions of the country. This will open up a vast potential for agricultural development. Broadly, the strategy should be to get the maximum yields on the basis of alternative action programmes devised for normal/good or aberrant weather. Besides crop husbandry, programmes of animal husbandry including supply of milch cattle, sheep, poultry and piggery development have also to be taken up in these areas to provide sources of supplementary income to the farmers.

11.4.11 About 66,000 hectares were covered under the dry farming programme during the Fourth Plan period. The existing 24 projects are being continued during the Fifth Plan period. It is expected that each project will cover an additional area of 800 hectares during each year of its implementation. Thus, by the end of the Fifth Five Year Plan, the programme is expected to cover 162,000 hectares. Some of the State Governments have decided to take up this programme under the State sector. In our view, it should be possible to take up a large-scale programme during the Sixth and subsequent plan periods. On the basis of experience gained in the implementation of the programme and research advances in the matter of agricultural techniques and agronomic practices in these areas. The net sown area covered under the programme in 1985 and 2000 AD is likely to be of the order of 10 Mha and 50 Mha respectively. Assuming an intensity of cropping of 1.2 in 1985 and 1.3 in 2000 AD, the gross cropped area benefited under the programme would work out to 12 Mha in 1985 and 65 Mha in 2000 AD. Nearly 70 per cent of the gross cropped area in 1985 and 62 per cent in 2000 AD is estimated to be covered under foodgrains. On this basis the gross area under foodgrains benefited by dry farming projects would be 8 Mha in 1985 and 40 Mha in 2000 AD.

11.4.12 Area under high yielding varieties (HYV) : Cultivation of HYV of cereals was the principal ingredient of the New Strategy of agricultural development adopted from 1966-67. The achievement of the targets of production of foodgrains was primarily linked with the coverage under the HYV and extension of irrigation facilities. The area under HYV of cereals rose from 1.89 Mha in 1966-67 to 25.85 Mha in 1973-74, representing 27.6 per cent of the total area under these crops. Though the overall progress in coverage of area under HYV has been satisfactory, it has not been uniform for all crops. In the case of wheat and bajra, progress has been good. The progress of area under HYV of rice has also been satisfactory. However, due to various bottlenecks, HYV programme did not hitherto make any tangible impact on the over-all production of rice. The weaknesses in the rice programme have already been identified and a large number of new varieties have been evolved to suit different agro-climatic zones/regions. As a result, the programme for extension of area under HYV of rice is likely to get accelerated. In the case of maize and jowar, the programme of HYV programme during the Fourth Plan has been much below the targets. Even in the case of these crops, new varieties have been developed to suit various regions and their progress is expected to be accelerated.

11.4.13 Table 11.9 gives the coverage under the HYV of cereals in 1973-74 along with the targets for 1978-79.

TABLE 11.9

Area under HYV of Cereals, 1973-74 and 1978-79<sup>1</sup>

Crop	1973-74			1978-79 (targets)		
	Total area	Area under HYV	Percentage of area under HYV on total area	Total area	Area under HYV	Percentage of area under HYV on total area
1	2	3	4	5	6	7
wheat . . .	19.06	10.91	57.2	22.0	15.0	68.2
rice . . .	38.01	9.72	25.6	40.0	16.5	41.3
maize . . .	6.02	0.78	13.0	6.5	1.0	15.4

<sup>1</sup> Union Ministry of Agriculture & Irrigation (Crops Division).

1	2	3	4	5	6	7
jowar . . .	16.96	1.16	6.8	18.0	2.5	13.9
bajra . . .	13.65	3.28	24.0	13.5	5.0	37.0
total . . . (five crops)	93.70	25.85	27.6	100.0	40.0	40.0

Thus, the Fifth Five Year Plan aims at stepping up substantially the coverage under HYV of paddy, wheat and bajra. In the case of the remaining, two crops viz. jowar and maize, the coverage of HYV is not expected to improve significantly by the end of the Fifth Plan period.

11.4.14 If the tempo of expansion of area under HYV built up during the Fifth Plan is maintained, it could be reasonably expected that the entire irrigated area under rice would be covered under the programme by 1985. Further, some area in the assured rainfall region, would also come under HYV, thus bringing about 60 per cent of the total area under rice under the programme. In the case of wheat, it is estimated that about 90 per cent of the total area would be saturated with the new varieties in the course of the next decade. It should also be possible to bring 60 per cent of the total area under bajra under improved varieties by 1985. The increase in area under HYV of maize would, however, be marginal, while in the case of jowar, about 20 per cent of the area is expected to be under HYV by that year. On the above basis, the possibilities of bringing additional areas under HYV by 1985 are indicated in Table 11.10.

TABLE 11.10

Projections of Area under HYV of Cereals—1985

Crop	(Mha)		
	Total cropped area	Irrigated area	Area under HYV
wheat . . . . .	20.0	14.0	18.0
rice . . . . .	38.0	21.5	22.8
Maize . . . . .	7.3	1.5	1.2
jowar . . . . .	17.0	1.5	3.4
bajra . . . . .	12.5	0.5	7.5
total . . . . .	94.8	39.0	52.9

It may further be reasonably assumed that in a long term perspective upto the end of the century, the entire area under these five crops would have been brought under high yielding varieties. In fact, HYV are likely to be evolved also in the case of other cereals and pulses.

11.4.15 Fertilisers : Fertilisers constitute a key input in the programme for stepping up agricultural production. The consumption of chemical fertilisers which had been increasing under the successive five year plans got a further filling with the adoption of the New Strategy in 1966-67. The total consumption of NPK rose from 0.34 million tonnes in 1961-62 to 2.84 million tonnes in 1973-74<sup>1</sup>.

11.4.16 On the basis of a study of the past trends in fertilisers consumption in the country, the likely consumption of fertilisers in 1985 has been estimated at 6 million tonnes, in Chapter 48 on Fertilisers and Manures. However, as will be seen from paragraph 11.4.25 even on the basis of the low income growth assumption, achievements of the required level of foodgrains production would necessitate a consumption level of fertilisers of about 7 million tonnes in 1985. This would involve a net increase in the availability and absorption in 1985 of about 4.7 million tonnes of fertilisers over the base period.

11.4.17 Fertiliser consumption would have to be pushed up by another two million tonnes to attain foodgrain production levels for meeting the 'high' estimates of demand. Thus, it is estimated that the total consumption of fertilisers would have to be 8.8 million tonnes or of the order of 9 million tonnes in 1985, inclusive of the higher requirements for foodgrains as well as commercial crops. This might seem difficult of attainment viewed in the context of the past trends in consumption. We, however, feel that there is no alternative but to plan for this order of fertiliser consumption in order to meet the demand for foodgrains on high income growth assumption. Creation of necessary conditions for absorption of about 9 million tonnes of fertilisers is imperative. In our Interim Report on Fertiliser Distribution, November, 1971, we have already recommended that the Union Ministry of Agriculture and Irrigation should take up fertiliser promotion work with the cooperation of State Governments in selected areas. Suitable modifications in the retail distribution margins have also been recommended with a view to promote fertiliser consumption. We would reiterate that these recommendations may be implemented while simultaneously planning for increasing the indigenous manufacture of fertilisers so that supply does not act as a constraint on consumption. Till such time that there is a gap between the desired consumption levels and indigenous production, provision would be necessary for importing fertilisers.

11.4.18 Table 11-11 gives the levels of fertiliser consumption in 1970-71, 1985 and 2000 AD on these consideration, separately for foodgrains and non-foodgrain crops. It has been assumed that nearly

1 Vide Appendix 48.7 of Chapter 48 on Fertilisers and Manures.

three-fourths of the total fertiliser consumption is accounted for by food-grain crops only.

TABLE 11.11

## Consumption of Fertilisers in 1970-71, 1985 and 2000 AD

(million tonnes of nutrients)

	Foodgrain crops	Non- foodgrains crops	Total
1970-71	1.7	0.6	2.3
1985 trend estimate	4.5	1.5	6.0
lower target	5.2	1.8	7.0
higher target	6.6	2.2	8.8
2000AD response ratio of 1:10 for foodgrains	12.0	4.0	16.0
response ratio of 1:12.5 for foodgrains	10.0	4.0	14.0

It will be seen that the consumption of fertilizers in 2000 AD should be of the order of 14 to 16 million tonnes of which 10 to 12 million tonnes would be required for foodgrains crops.

## Additional Production of foodgrains—1985 and 2000 AD

11.4.19 An attempt has been made to assess the possible response of these programmes in terms of additional output of foodgrains assuming a simple linear relationship between the levels of application of each input and increase in output and that the benefits from the different programmes are additive. Further, this exercise has been done for foodgrains as a group owing to non-availability of such response rates in respect of individual crops. The production of foodgrains during the triennium 1969-70 to 1971-72 has been used as the base level output.

11.4.20 The Ministry of Agriculture and Irrigation estimates the additional output of foodgrains due to Irrigation at 0.5 tonne per hectare. On this basis the increase in production of foodgrains from the additional irrigated area under foodgrains (15 Mha in 1985 and 20.7 Mha in 2000 AD over 1970-71) might be put at 7.5 million tonnes in 1985 and 10.4 million tonnes in 2000 AD.

11.4.21 Command area development programme has also an important bearing on the growth of productivity. No estimates of additional production of foodgrains likely to be achieved as a result of taking



up these programmes in the command areas are available. We feel that on an average additional production of foodgrains from the command area development alone without taking into account the additional production from the application of water and use of fertilisers. Which have been considered separately, could be 0.3 tonne per hectare. The additional production of foodgrains from the command area development on the basis of this yardstick work out to 2.1 million tonnes in 1985 and 6.6 million tonnes in 2000 AD.

11.4.22 A large number of demonstrations laid out on farmers' fields have indicated that by following the improved dryland farming techniques, the increased agricultural production is generally 50 to 100 per cent more than by growing crops with traditional methods. The increased yield of foodgrains through adoption of various dry farming techniques in the development projects is estimated to be at least 350 kg per hectare on an average. We, however, feel that once the programme is taken up on a large scale, the additional production of foodgrains per unit of area as a result of the programme in the farmers' fields, may be about half of this figure. This excludes the additional production in these areas on account of fertilisers, which have been considered separately. The additional production of foodgrains through improved dryland farming techniques is estimated to be of the order of 1.4 million tonnes in 1985 and 7.0 million tonnes in 2000 AD.

11.4.23 As regards output response to fertiliser application, analysis of a large mass of data from fertiliser trials on farmers' fields suggests an average of 8 kg. of grains per kg. of nutrients for traditional varieties<sup>1</sup>. In the case of high yielding varieties, a number of studies based on the data thrown up by experiments at research stations like IARI suggest a response of 13 kg per kg of nutrients<sup>2</sup>. Against these estimates, the Ministry of Agriculture and Irrigation assumes 1.4 tonnes of additional output per hectare in respect of high yielding varieties in response to the recommended level of fertilisation along with other management practices including plant protection. In Chapter 48 on Fertilisers and Manures, we have used a response rate of 13 kg. of foodgrains per kg of nutrient application. This response is, however, not due to fertilisers

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- 1 Panse, V. G., Abraham, T. P., Leelavathi, C. R., 1964. Yardsticks of Additional Production of Certain Foodgrains, Commercial and Oilseeds crops. New Delhi, Institute of Agricultural Research Statistics.
  - 2 (i) Fertiliser Response of new varieties and hybrids, Indian Agricultural Research Institute, reprinted from Journal of Post Graduate School Vol. 5, No. 1, June, 1967.  
(ii) Cummings, R. W., Hardt, R. W. and Ray, S. K. "New Agricultural Strategy Revisited". Economic and Political Weekly, Oct. 26, 1968.

alone but also to other inputs such as irrigation, improved seeds, plant protection, etc. that are concomitant with higher fertiliser application. We are of the view that taking all relevant factors into consideration, the yardstick of 10 kg. of additional production of foodgrains per kg of nutrients would reasonably represent the average performance of both high yielding and traditional varieties of cereals and pulses under actual field conditions. It might be possible to improve the average fertilizer response rate to 1:12.5 by the turn of the century through technological and varietal research on crops. The estimates of additional production of foodgrains in 1984-85 and 2000 AD from the use of additional fertilisers are given in Table 11.12.

11.4.24 Several other developmental factors like plant protection, nature and intensity of use of power in agriculture, better agronomic practices and improvement in the quality of management, could result in significant yield increases particularly in the areas not covered by the command area development and dryland farming programmes. Plant protection can add to production by reducing losses of the crop on account of pests and diseases which form a considerable proportion of the crop. Increased plant protection and proper weed control can make an appreciable differences in the yields. While this appears plausible, any confident assessment of possibilities requires far more information based on properly conducted experiments and demonstrations than is currently available. An analysis of the relative contribution of different elements to growth of production of foodgrains during 1950-51 to 1968-69 by the planning Commission, however, gave inconclusive results as to the extent of contribution of such factors to growth in productivity. Between 1950-51 to 1964-65 the identified inputs viz. area, irrigation and fertilisers accounted for only 65 per cent of the observed increase in foodgrains production suggesting that contribution of residual inputs was significant. But during the subsequent four years the estimated contribution of the identified inputs exceeded the actual additions to output suggesting that the residual inputs did not add much, if anything to production. For purposes of the present exercise, we have assumed that the residual benefits are included in the benefits under the command area development and dry land farming programmes.

11.4.25 Table 11.12 summarises the contribution of different programmes to the total estimated production of foodgrains in 1985 and 2000 AD.\*

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\* The impact of expansion of area under high yielding varieties of cereals has not been taken into account separately in these calculations because the yardsticks assumed for the identified programmes are on overall basis.

TABLE 11.12  
Additional Production of Foodgrains, 1985 and 2000 AD

Programme	(million tonnes)	
	Additional Production of foodgrains expected over the base period	
	1985	2000AD
1. irrigation . . . . .	7.5	10.4
2. command area development . . . . .	2.1	6.6
3. dry farming programme . . . . .	1.4	7.0
4. fertilisers . . . . .	A 28.0 B 35.0 C 49.0	102.0
total . . . . .	A 39.0 B 46.0 C 60.0	126.0

A = On the assumption of total consumption of fertilisers of 6.0 million tonnes on the basis of past trends.

B = On the assumption of total consumption of fertilisers of 7.0 million tonnes.

C = On the assumption of total consumption of fertilisers of 8.8 million tonnes.

Fertilisers alone are expected to contribute between three-fourth and fourth-fifth of the additional production of food-grains in 1985. It will be seen that with the consumption level of 6.0 million tonnes in 1985, the likely production of food-grains would be 143 million tonnes.\* However, on the basis of the low income growth assumption, the demand for foodgrains is estimated at 150 million tonnes. The consumption of fertilisers would need to be stepped up to 7 million tonnes to achieve this level of foodgrains production. This would mean an increase in the level of fertiliser consumption in 1985 over 1971 of about 4.7 million tonnes. For achieving this level, tremendous efforts would be needed by way of organising an effective distribution machinery and instituting an infrastructure which would extend necessary credit and extension support to cultivators to enable them to absorb the additional quantities of fertilisers especially in certain regions of the country like Eastern and Central India where the present consumption levels are very low. Thus the critical factor would be response of the farmers to be stimulated by extension and appropriate land policy. It may not be out of place to mention here that with the evolution of location specific high yielding varieties of paddy, fertiliser consumption would get a boost.

\* In Chapter 48 on Fertilisers and Manures, it has been mentioned that for an output of 150.3 million tonnes of foodgrains in 1985, on the basis of nutrient removal method, a consumption of 6 million tonnes of fertilisers would be adequate.

11.4.26 The demand for foodgrains on the assumption of high income growth has been estimated at 163 million tonnes in 1985 in the preceding chapter. In case the demand for foodgrains of this order materialises, it would be necessary to increase foodgrains production to about that level. It will be seen from Table 11.12 that consumption of fertilisers would have to be pushed up to about 9 million tonnes. It is recognised that it would be difficult to reach a production of 164 million tonnes unless fertiliser consumption is increased to that level. Naturally, this increased level of fertiliser consumption would require tremendous efforts already outlined in paragraph 11.4.17.

11.4.27 The other significant input requiring special efforts is to bring 7.5 Mha of net sown area under command area development and 10 Mha under dry farming programme. We should like to emphasise that the food problem would remain with us in 1985 if the targeted inputs are not properly planned in advance and commensurate efforts made for their effective utilisation. The attainment of the higher target of 164 million tonnes of foodgrains would involve substantially larger effort to reach the target of about 9 million tonnes of fertiliser consumption by 1985. As regards the supply possibilities for 2000 AD, both the targets of fertiliser and irrigation are equally challenging. The efforts which are to be organised for achieving the targets in 1985 would have to be kept up to achieve these targets. Unless this is done, the goal of self sufficiency in foodgrains by the turn of the century may still remain unrealised. Therefore, the projected balance between the demand and supply possibilities of agricultural commodities, particularly foodgrains, in the next 25 years would depend on the extent to which it would be possible to provide the inputs on the scale envisaged and to mount the necessary extension and infrastructural support for their effective utilisation.

11.4.28 The levels of domestic production of foodgrains in 1985 and 2000 AD on the basis of assumptions stated in the foregoing paragraphs are indicated in the Table 11.13.

TABLE 11.13  
Levels of Productions of Foodgrains—1985 and 2000 A.D.

	1985		2000
	(million tonnes)		(million tonnes)
base level . . . . .	104		
additional production over the base period . . . . .	high	low	
	60	46	126
total production . . . . .	164	150	230

high—On the assumption of total fertiliser consumption of 8.8 million tonnes.

low—On the assumption of total fertiliser consumption of 7 million tonnes.

## Production of Tubers—1985 and 2000 AD

11.4.29 Potato, sweet potato and tapioca are important tuber crops. Being rich in carbohydrates, the tuber crops can substitute cereals to a great extent and are already used by the people as a cereal substitute. For example, tapioca is used as a supplement to rice and even replaces it completely in Kerala in years of shortfall in rice production. The use of tapioca is also common in parts of Karnataka and Tamil Nadu. Use of potato and sweet potato in baked or boiled form is quite common throughout the country. As mentioned in Chapter 23 on Horticultural Crops, there are vast potentialities for increasing the production of these crops in the country. A number of new high yielding varieties have already been evolved and introduced. Potentialities exist for trebling the area and doubling the yield of potato by 2000 AD. In the case of sweet potato also a few hybrids have been developed. There is large scope for increasing the yield level of the crop. In the case of tapioca, Kerala is the major producing State accounting for 90 per cent of the country's production. There is scope for increasing the area under tapioca in other States also and raising its yield level. The following table gives the production possibilities of tuber crops in 1985 and 2000 AD.

TABLE 11.14  
Production Possibilities of Tuber Crops<sup>1</sup>

		area production yield	— Mha —million tonnes —tonnes/ha	1969-70 to 1971-72	1985	2000AD
Potato	area	.	.	0.49	1.00	1.50
	yield	.	.	9.00	14.00	20.00
	production	.	.	4.50	14.00	30.00
sweet potato	area	.	.	0.23	0.31	0.50
	yield	.	.	8.00	14.00	20.00
	production	.	.	1.80	4.30	10.00
tapioca	area	.	.	0.35	0.65	1.00
	yield	.	.	15.50	28.00	40.00
	production	.	.	5.30	18.20	40.00

<sup>1</sup> Chapter 23 on Horticultural Crops.

It will be seen that production levels of tubers viz. potato, sweet potato and tapioca may be of the order of 36.5 million tonnes in 1985 and 80 million tonnes in 2000 AD against the present level of about 11.6 million tonnes, thus giving an additional production of about 25 million tonnes in 1985 over the base period. The availability of tubers for human consumption is estimated at about 6 million tonnes in 1985 and 14 million tonnes in 2000 AD as against the base level of about 2 million tonnes (in terms of carbohydrate content). The additional contribution

of tuber crops to carbohydrate supplies by the turn of the century will be to the tune of about 12 million tonnes over the base level.

### Feasibility of Increasing the Yield Levels

11.4.30 As pointed out in the Introduction to Part VI, the Crop Chapters give the levels of yield of different crops on the assumption that the crops would be grown in the most appropriate places at appropriate time and with the full backing of inputs like irrigation, seeds, fertilisers and manures, plant protection chemicals and that they will be grown on lands with proper tilth and interculture of the soils made possible by use of ideal implements and tools. Though these levels are within the realm of technological possibilities there may be several constraints in the availability of inputs, and development of infrastructure which may result in shortfalls in the yield levels. In considering the demand-supply balances, we feel that it would be appropriate to take note of these constraints and accordingly assess the levels that would be feasible by 2000 AD. For example, even under optimal conditions it might not be possible by the turn of the century to restrict the cultivation of various crops to the regions most suitable from the point of view of soil and climatic conditions. This might be particularly true in respect of foodgrains under conditions of subsistence farming. The feasibility of realising the potential yield levels in respect of different crops is examined in the following paragraphs.

11.4.31 Rice : In 1973-74 about 26 per cent of the total area under rice was sown under high yielding varieties. Further, most of the high yielding varieties of rice evolved so far, have shown greater susceptibility to pests and diseases. Some of them are also not suitable to ill drained soils of the East Coast. In areas/seasons where these problems do not exist, as in the case of summer rice, the yields are relatively high. There is a wide gap between actual yield at the all-India level (which was 1.1 tonnes per hectare during the triennium ending 1971-72) and the yield levels of the new dwarf rice varieties at the all-India coordinated rice improvement project centres. Keeping in view the results of the recent trials, the potential level of yields is indicated at 3 tonnes per hectare in Chapter 21 on Foodgrain Crops. The yield levels for different States given in that Chapter are based on the assumption that by 2000 AD rice would be cultivated in areas ideally suited for its cultivation and it would be so distributed that the water needs would be met in full either by rainfall itself or through resort to irrigation or by combination of both. It has, however, to be noted that due to (a) the problems of water control and drainage in the Sub-Himalayan West Bengal and the North Eastern States and (b) the continued cultivation of

paddy in areas not ideally suited for the crop under conditions of subsistence farming, the feasible yield and production levels of rice may be slightly lower than the potential levels indicated in Chapter 21 on Food-grain Crops. On the basis of a careful analysis of the possibilities of realising the potential levels of yield in different regions of the country, we feel that it would be possible to achieve a yield of 2.5 tonnes per ha in 2000 AD compared to the present level of 1.1 tonnes.

11.4.32 Wheat : The spread of high yielding varieties of wheat has led to a breakthrough in the yield of this crop which has registered an impressive growth of 10 per cent per annum during 1966-67 to 1973-74. The area under high yielding varieties of wheat was estimated at 57 per cent of the total wheat area in 1973-74. It is estimated that about 90 per cent of the wheat area would be saturated with high yielding varieties in the course of next 10 years or so. The total irrigated area under wheat is projected to increase from 54 per cent in 1970-71 to 85 per cent in 2000 AD. The spread of high yielding varieties of wheat together with varietal, agronomic and technological improvements are expected to elevate the yield levels considerably by the turn of the century. The potential level of the yield of wheat in 2000 AD is estimated at 3.64 tonnes per hectare in Chapter 21 on Foodgrain Crops. This estimate is, however, based on the assumption that the crop would be cultivated in areas suitable for its cultivation, and that proper agronomy in terms of water conservation, correct methods of sowing, seed rate adjustments, fertiliser application and control measures against pests and diseases would be adopted. In actual practice farmers in some areas like Eastern Uttar Pradesh and Bihar may not be able to attain yield levels comparable to those obtaining in progressive areas like Punjab, Haryana and Western Uttar Pradesh despite provision of the necessary physical and financial resources. It is also possible that although a substantial increase in irrigated area under the crop is envisaged in Rajasthan, Uttar Pradesh, Bihar and Madhya Pradesh, the farmers in these States may not be able for lack of sufficient experience, to utilise the additional water with as much efficiency as the farmers in Punjab or Western Uttar Pradesh, where the crop is grown mostly under irrigated conditions. Thus, in spite of the concerted extension efforts, the yields in these areas might be lower than the yield levels which might obtain in the agriculturally advanced areas. Keeping these considerations in view, the all-India yield per ha of wheat in 2000 AD is estimated at 2.9 tonnes against the present level of 1.3 tonnes.

11.4.33 Coarse cereals : These include barley, maize, jowar, bajra, ragi, small millets and oats. As already stated, nearly 92 per cent of the total area under coarse grains is rainfed. The scope for reducing this proportion is limited even by the turn of the century. Among

the various coarse grain crops, maize, jowar and bajra have received more attention in research and development and it is expected that nearly 16, 20 and 60 per cent of the total area under these crops respectively would be covered under high yielding varieties upto 1985. In regard to other crops, there is no varietal breakthrough yet. The expansion in area under the maize crop would primarily be in the States of Uttar Pradesh, Madhya Pradesh and Bihar where yields are relatively low. Jowar and barley are two crops which can exist in a wide range of rainfall and as such there is very limited scope for making adjustment in the area under them. It is envisaged that Maharashtra and Rajasthan which have lower yields per hectare than the all-India average would continue to be the major growing States for jowar and bajra till the turn of the century. Thus, even though there might exist potential for increasing the yield of these crops to about  $2\frac{1}{2}$  times if high yielding varieties resistant to pests and diseases and suited to different regions/seasons are developed and are followed by due agronomic methods, including dry sowing and transplanting, the actual realisation, by 2000 AD may be much lower considering the narrow irrigation base and the current stage of technological advance.

11.4.34 Barely is grown in the rabi season. Its present yields are very low. Area under the crop is likely to be doubled over the next 25 years. Here again, additional areas are likely to come under the crop mainly in the States of Uttar Pradesh, Bihar and Madhya Pradesh. Although there is some experimental evidence that the semi-dwarf varieties grown under irrigated conditions have a yield level of as much as 4.5 to 5.5 tonnes per hectare, the present yields under irrigated conditions are very low. Further, in the newly irrigated areas brought under the crop, the yield level is expected to be lower than those in the existing irrigated areas. On these considerations, the yield per ha of coarse cereals as a whole is expected to go up from 0.6 tonnes in the base period to 1.3 tonnes by 2000 AD.

11.4.35 Pulses : The most widely grown pulses in the country are gram and tur which account for nearly half of the total area under pulses. As already mentioned, although the rate of growth of yield in the case of gram was 0.7 per cent per annum during 1949-50 to 1973-74, the overall yield of pulses recorded in decline of 0.06 per cent per annum. In the case of kharif pulses other than tur, yield performance is the poorest *i.e.*, about 0.25 tonnes per hectare. Pests and diseases take a heavy toll of many of the pulses. The research and development aspects have received little attention in regard to these crops. The potential for growth of individual pulses on the basis of experimental yields has been analysed in Chapter 21 on Foodgrain Crops. However, as in the case of coarse cereals, the likely yield of pulses in 2000 AD is



expected to be less than the potential levels considering such factors as the irrigation base and the possibilities of technological and varietal breakthrough. On these considerations of yield per hectare in 2000 AD is likely to be 1.4 tonnes as compared to 0.5 tonne in the base period.

11.4.36 Commercial Crops : The potential for growth of different commercial crops has been reviewed in Chapter 22 on Commercial Crops. The growth in yield of different crops other than cotton and sugarcane envisaged in that chapter seems to be fully capable of realisation provided adequate measures are taken on the lines suggested. These yield rates have been adopted for working out the estimated production levels in 2000 AD.

11.4.37 The yield of cotton has been studied at the district level in relation to rainfall and availability of irrigation facilities in Chapter 21 on Commercial Crops. The present yield of cotton (lint) in the country is poor at 0.12 tonnes per ha primarily because in and around the Deccan area the yield is very low—just about 60 kg/ha. With the improvement in water management techniques and crop diversification in Deccan areas, cotton yields in the country are expected to register a faster rate of growth. Among the various development programmes envisaged for cotton, the expansion of irrigated area under the crop from 16.9 per cent in 1970-71 to 43.3 per cent in 1985 and further to 65.2 per cent in 2000 AD would contribute significantly to the increase in yield levels. A few high yielding hybrids of cotton have already been released for commercial cultivation and it is hoped that these would gain popularity during the next decade. Considering these factors, and the likely availability of inputs, it is expected that the yield per hectare of cotton might increase to 0.23 tonnes in 1985 and 0.38 tonnes in 2000 AD which corresponds to the lower estimates of yield levels for different regions viz. 500 kg/ha for Punjab and Haryana, 400 kg/ha for other irrigated areas and 300 kg/ha for the rainfed crop, envisaged in Chapter 22 on Commercial Crops. With increased fertiliser available, it should be possible to raise production of cotton further.

11.4.38 In regard to sugarcane, the potential level of yield (in terms of gur) under optimum agronomic conditions with full input support has been indicated at 8.2 tonnes per hectare in 2000 AD against the present level of 5 tonnes per hectare. If, however, the availability of inputs, particularly fertilisers does not grow adequately, it might be difficult to achieve a yield level of more than 6.5 tonnes per hectare by the turn of the century.

11.4.39 On the basis of the envisaged levels of input use and development measures on the one hand and the extent to which it would be feasible to realise the potential for productivity on the other, the levels

of yield that could be reasonably expected in 1985 and 2000 AD are given in Table 11.15. The levels of yield envisaged in respect of foodgrains in 1985 correspond to the higher level of fertilisers consumption in that year *i.e.* 8.8 or 9 million tonnes. If the consumption of fertilisers in 1985 remains at the lower level of 7 million tonnes, the yield levels would naturally be somewhat lower.

TABLE 11.15

Projections of Yield Per Hectare of Important Crops—1985 and 2000 AD

Crops	(tonnes/ha)		
	1969-70 to 1971-72 (actuals)	1985	2000 AD
rice . . . . .	1.1	1.6	2.5
wheat . . . . .	1.3	2.1	2.9
coarse cereals . . . . .	0.6	0.9	1.3
pulses . . . . .	0.5	0.9	1.4
oilseeds . . . . .	0.54	0.78	1.02
cotton (Lint) . . . . .	0.12	(a) 0.25 (b) 0.23	0.46 0.38
jute . . . . .	1.27	1.70	2.60
mesta . . . . .	0.66	0.75	1.25
sugarcane (gur) . . . . .	4.96	6.00	(a) 8.2 (b) 6.5
tobacco . . . . .	0.83	1.10	1.50

(a) high estimate

(b) low estimate

### Supply Possibilities of Field Crops

11.4.40 It is necessary to intensify efforts for increasing agricultural production during the next decade with a view to wipe out the current deficits in respect of several crops. The yield levels envisaged imply a break from the past rates of growth in respect of both foodgrain and non-foodgrain crops. We envisage that yields would go up at a faster rate in the case of foodgrain crops than those of others. Among commercial

crops, a high rate of growth is envisaged in respect of cotton to achieve levels of production commensurate with the rise in demand both on indigenous and export counts.

11.4.41 Table 11.16 gives the estimates of production of important crops on the basis of the estimates of area given in Table 11.16 and yield levels envisaged in Table 11.15.

TABLE 11.16

Estimated Production of Important Crops—  
1985 and 2000 AD

(million tonnes)

Crops	1969-70 to 1971-72	1985	2000 AD
rice	41.9	61.0	80.0
wheat	23.5	41.0	50.0
coarse grains	27.5	40.0	65.0
total cereals	92.9	142.0	195.0
pulses	11.5	22.0	35.0
total foodgrains	104.4	164.0	230.0
oilseeds@	8.8	15.2	26.0
cotton seed	2.0	4.1	a) 10.5 b) 8.6
cotton (lint)*	5.4	a)12.5 b)11.5	a) 29.3 b) 24.0
jute*	5.4	8.5	14.5
mesta*	1.2	1.3	2.2
sugarcane (gur)	12.8	21.0	a) 41.0 b) 32.5
tobacco	0.37	0.6	0.8

\* In million bales of 180 kg each

@ Includes groundnut, sesamum, linseed, castorseed, rapeseed & mustard, safflower and nigerseed in the base period. The projections also include soyabean and sunflower.

a) high estimate.

b) low estimate.

11.4.42 Thus, the production of foodgrains is expected to increase from an annual average of 104 million tonnes during the triennium ending 1971-72 to 164 million tonnes in 1985 (on the assumption of higher consumption of fertilizers) and 230 million tonnes in 2000 AD. This implies an increase of 58 per cent till 1985 and 121 per cent by the turn of the century. Among foodgrains, wheat would record the highest increase at both points of time. Coarse cereals are expected to register a

lower rate of growth than the superior grains (*viz.* rice and wheat) till 1985. However, once the demand for superior grains is met in full, production of coarse cereals is expected to gain momentum which would be necessary to meet the increasing demand for livestock, feed purposes and also for exports.

11.4.43 In the past, production of foodgrains registered a faster rate of growth compared to commercial crops. This trend would get reversed during the next decade. The production of cotton and oilseeds is expected to increase by 113 per cent and 84 per cent respectively by 1985. The production of oilseeds crops is estimated to increase three-fold by the turn of the century. The increase in the production of cotton, is expected to be even larger. In the case of other crops, the increase in production envisaged is of the order of more than 165 per cent for jute 80 per cent for mesta and 115 per cent for tobacco. The production of sugarcane is expected to go up by at least 150 per cent during this period.

11.4.44 The supply possibilities for the agricultural products other than the field crops, have been discussed in the respective chapters. A brief resume of the supply possibilities in respect of these commodities is given in the succeeding paragraphs.

### Supply Possibilities of Livestock Products

11.4.45 Milk : In India, milk is derived mainly from three sources, *viz.* cattle, buffaloes and goats; contribution of other milch animals like sheep and yak being negligible. In 1971-72, the total production of milk was estimated at 22.50<sup>1</sup> million tonnes. During the last two decades, the production of milk increased by about 36 per cent. However, the per capita availability declined from 133 gm per day during the quinquennium ending 1952 to 110 gm per day during 1972. The present level of consumption is much below the nutritional requirements. Thus, efforts are needed to push up the level of milk production in the country.

11.4.46 The programmes for development of cattle and buffaloes for augmenting milk production have been discussed in Chapter 28 on Cattle and buffaloes. In accordance with the general policy, the productivity of cattle and buffaloes is proposed to be increased with progressive reduction in their number by 2000 AD. In regard to cattle, the major stress is proposed to be laid on cross breeding with superior exotic dairy breeds. A large proportion of the existing number of low producing cattle is proposed to be replaced by cross-bred and improved indigenous cattle. In regard to buffaloes it is envisaged that their productivity would be improved through selective breeding and grading up

1 1974. Agriculture in Brief, 13th Edition : New Delhi, Directorate of Economics  
\* Statistics, Ministry of Agriculture and Irrigation.

non-descript ones with improved milch breeds like Murrah, Surti etc. Efforts will also be made to provide necessary inputs such as better feeds, adequate health cover and proper marketing facilities. Further, in order to improve the overall supply of milk, we have recommended in Chapter 30 on Sheep and Goats that cross-breeding of goats with exotic dairy breeds may be undertaken and milk capabilities of better indigenous breeds like Jamnapari, Barbari and Beetal should be improved by selective breeding. On the basis of these programmes, it is anticipated that the production of milk would increase to 44.2 million tonnes in 1985 and 64.4 million tonnes in 2000 AD.

11.4.47 Eggs : The base level (1971) production of eggs is estimated at 6,040 million or 10.97 eggs per capita per year. This is far below the requirements based on nutritional standards. We have, therefore, suggested suitable programmes for pushing up the production of eggs. The number of poultry birds is expected to rise from 137 million in 1972 to 372 million in 2000 AD. Further, it has been estimated in Chapter 31 on Poultry that the numbers of layers would increase to 117.5 million in 1985 and further to 179.4 million in 2000 AD. The likely supplies of eggs are given in Table 11.17.

TABLE 11.17

## Supply Possibilities of Eggs — 1985 and 2000 AD

Type of poultry	1985			2000 AD		
	No. of layers	No. of eggs per bird per year	Total production	No. of layers	No. of eggs per bird per year	Total production
	(million)	(million eggs)	(million)	(million)	(million eggs)	(million eggs)
improved fowl	77.5	170	13,175	136.4	180	24,552
desi fowl	35.0	60	2,100	35.0	70	2,450
ducks	5.0	100	500	8.0	110	880
total	117.5		15,775	179.4		27,882

Thus, the likely supply of eggs would be around 16,000 million in 1985 and 28,000 million in 2000 AD. In per capita terms, this would imply that the supply is likely to improve to 22 eggs per annum in 1985 and to 30 eggs per annum by the turn of the century as against the base (1971) level consumption of 11 eggs per annum.

11.4.48 Meat : The present level (1971) of meat production in the country is around 688 thousand tonnes. About 54 per cent of meat is contributed by sheep and goats, 26 per cent by buffaloes and cattle, 7 per cent by pigs and 13 per cent by other animals including poultry. The quantity of meat produced is far below the requirements. Programmes for developing suitable meat breeds and provision of necessary inputs like feed, health cover, credit and marketing have been outlined in Part VII of the Report. If these programmes are implemented effectively, the production of meat from sheep, goats, buffaloes, cattle, pigs and poultry is likely to increase to 1.19 million tonnes in 1985 and to 2.10 million tonnes in 2000 AD. The supply possibilities of meat of different categories are discussed below :

- (i) Mutton : Alongwith goat meat, mutton is the chief source of meat supply in the country. According to the Livestock Census, 1972, the total population of sheep in 1972 was 40.4 million. It is envisaged by us that with the launching of the sheep development programmes recommended in Chapter 30 on Sheep and Goats, adoption of modern techniques of breeding, improvement in the feed and fodder resources and provision of an efficient health cover, the sheep population would increase to about 45 million by 1985 and to 60 million by 2000 AD. Besides, planning for increase in the number of sheep there is good scope for effecting genetic improvement for increasing the average level of mutton production. Since mutton production characteristic is moderately to highly heritable and the generation interval in sheep is short, selection within the indigenous breeds will bring about considerable improvement in mutton production. Cross breeding of indigenous sheep with exotic mutton breeds is also envisaged. As a result of these programmes it is anticipated that the total production of mutton would increase to around 0.22 million tonnes in 1985 and 0.39 million tonnes in 2000 AD.
- (ii) Goat meat : Goats are raised mainly for meat. The number of goats increased steadily from 47 million in 1951 to 68 million in 1972. It may not be possible to arrest their normal growth upto 1980. With increased slaughter of goats for meat purposes it is possible to reduce the population to a level of 67 million by 1985 and about 40 million by 2000 AD. The surplus stock of goats is likely to be available for slaughter. Hardly any serious development programme for improving meat production of goats has so far been undertaken in the country. Further, no exotic germplasm is available for increasing the yield of meat since superior goat breeds found in foreign countries are essentially

dairy breeds. For raising meat production from goats the approach envisaged is selective breeding among taller and medium sized breeds and outcrossing the non-descript types with selected meaty type bucks. In addition, proper management, fattening rations and better health cover are considered necessary. The total availability of goat meat on the basis of these programmes is likely to be 0.38 million tonnes in 1985 and 0.72 million tonnes in 2000 AD.

- (iii) Buffalo meat and beef : The population of cattle and buffaloes is expected to decline from 178.9 million and 57.9 million in 1972 to 167.8 million and 56.8 million respectively by the turn of the century. We have recommended that urgent steps should be taken to improve the meat characteristics of the buffalo. It is further envisaged that unwanted male buffalo calves which are at present allowed to die prematurely, should be fattened quickly by giving them cheap feeds with supplements of molasses and urea. Meat from such animals will find a very good foreign market. With the improvement in the meat characteristics of buffalo and the overall improvement in cattle, production of buffalo meat and beef is expected to increase to about 0.35 million tonnes in 1985 and 0.52 million tonnes in 2000 AD.
- (iv) Pork and pork products : Of the meat producing livestock species, pig is the only litter bearing animal having the shortest generation interval and high feed conversion efficiency. To meet the increasing requirements of pork and pork products it is proposed to intensify the breeding programmes and efforts to provide other necessary inputs like feed, health cover, credit and marketing. Suitable programmes in this regard have been suggested in Chapter 32 on Other Livestock. The production of pork in 1985 and 2000 AD on the basis of these programmes is estimated at 0.09 million tonnes and 0.17 million tonnes respectively.
- (v) Poultry meat : The number of broilers likely to be produced in 1985 is 17.2 million and in 2000 AD 71.8 million. The egg production farms also sell away the hens at the end of the laying period or to make the poultry houses ready for receiving new flocks of birds. Besides, a large number of male birds and ducks are likely to become available for table purposes. The total supply of poultry meat in 1985 is likely to be 0.15 million tonnes and in 2000 AD 0.30 million tonnes.

11.4.49 Table 11.18 gives a summary of the supply possibilities of meat of different categories :

TABLE 11.18

Supply Possibilities of Meat—  
1985 and 2000 AD

	(million tonnes)		
	1971	1985	2000 AD
mutton . . . . .		0.22	0.39
goat meat } . . . . .	0.37	0.38	0.72
pork and pork products . . . . .	0.05	0.09	0.17
buffalo meat and beef . . . . .	0.18	0.35	0.52
poultry meat . . . . .	0.09	0.15	0.30
total . . . . .	0.69	1.19	2.10

## Supply Possibilities of Fish

11.4.50 In view of the abundant and easily exploitable fisheries resources, both inland and marine, and the high demand for this low cost protein food there is need to develop fisheries as a priority industry. India has a coastline of 5,600 km with varying extent of continental shelf, Inland fisheries resources extend over 9.6 Mha covering both fresh and brackish waters. There is, however, no precise estimate of potential resources of marine, inland and estuarine fisheries.

11.4.51 The country's marine fishery production increased from 0.58 million tonnes in 1960 to 1.10 million tonnes in 1971 i.e. at an average annual growth rate of about 5 per cent. It will be seen from Chapter 38 on Marine Fisheries that the continental shelf of India has a potential of 2.4 million tonnes comprising 0.7 million tonnes from demersal and 1.7 million tonnes from pelagic fisheries. Besides, there is considerable potential for increasing production from the under-exploited molluscan resources in the continental shelf particularly the oysters, mussels and clams. The extensive resources beyond the shelf hold additional potential for increasing production from conventional and non-conventional types of fisheries comprising high sea tuna, deep sea fishes, etc. In view of these possibilities, we feel that the annual supply of marine fish, can be increased from the present level of 1.1 million tonnes to at least 3.5 million tonnes by the turn of the century. The estimated supply of marine fish by 1985 might be put at 2.06 million tonnes.

11.4.52 Inland fish has comparatively reasonable price advantage and is in great demand. Augmenting its production, particularly from culturable resources with the application of latest aquaculture technology, therefore, acquires considerable importance. The inland fish production in



India increased from 0.2 million tonnes in 1951 to 0.3 million tonnes in 1961. In the next decade, production went up at a much more faster pace to 0.7 million tonnes in 1971 i.e. at the rate of 14.9 per cent per annum.

11.4.53 India has vast inland water resources spread throughout the country. A detailed analysis of the production potential in the various inland waters of the country (e.g. fresh water and brackish water resources, riverine, reservoir and estuarine fisheries etc.) has been made in Chapter 37 on Inland Fisheries and Aquaculture. Our analysis reveals that it should be possible to realise a supply possibility of 3.5 million tonnes of inland fish by the turn of the century. It would also be possible to supplement this by another one million tonnes from mari-culture. By 1985 the production from inland fisheries (including mari-culture) could be stepped up to 2.22 million tonnes.

11.4.54 Total likely production of fish and its estimated availability for human consumption during 1985 and 2000 AD are given in Table 11.19.

TABLE 11.19

Estimated Production of Fish and Availability for Human Consumption

		(million tonnes)		
		1971	1985	2000 AD
fish catches	inland	0.73	2.22*	4.56*
	marine	1.10	2.06	3.50
	total	1.80	4.28	8.00
estimated exports		0.04	0.10	0.25
fishmeal and other industrial products		0.15	0.40	1.00
balance for human consumption		1.61	3.78	6.75

\* Including mari-culture.

Assuming that the most and fish eating population of the country constitutes 70 per cent of total population, the availability for human consumption would work out to 7.4 kg/ annum per capita in 1985 and 10.3 kg/ annum per capita in 2000 AD as against the base level (1971) per capita availability of 4.2 kg/annum. It will be seen from Appendix 9.2 of Chapter 9 on Nutrition that a balanced diet for meat eating adult should include 30 gm of fish and meat per day. Of this, it might be assumed that 15.20 gm would come from fish. On this basis per adult requirement of whole fish after allowing for 40 per cent clearing losses works out to 12.2 kg/annum. The per capita requirement of fish would work out to about 10 kg/annum.

### Supply Possibilities of Industrial Wood and Fuelwood

11.4.55 The recorded production of industrial wood in the base period (1970) was 8.9 million m<sup>3</sup> (r) comprising 7.6 million m<sup>3</sup> (r) of hard wood and 1.3 million m<sup>3</sup>(r) of soft wood. Recorded production of fuelwood during 1970 was of the order of 13 million m<sup>3</sup>. Unrecorded production of industrial wood and fuelwood is roughly estimated at 7.0 million m<sup>3</sup>(r) and 162 million m<sup>3</sup> respectively. Based on the available statistics it has been estimated in Chapter 42 on Production and Social Forestry that the average annual removal of industrial wood per hectare from forests under the control of State forest departments during the period 1965-66 to 1969-70 was 0.13 m<sup>3</sup>(r). The possibilities of stepping up the rate of industrial wood removal in different States in the context of past trends have been discussed in Chapter 42 on Production and Social Forestry. It is expected that if the programmes of man-made forests and natural regeneration could be taken up over 0.6 Mha annually, it would be possible to increase the production of industrial wood to about 33 million m<sup>3</sup>(r) in 1985. Additional production of about 6 million m<sup>3</sup>(r) of industrial wood will be available from social forestry programmes. The supply of industrial wood in 2000 AD is expected to increase to about 53 million m<sup>3</sup>(r) comprising 8.9 million m<sup>3</sup>(r) of coniferous wood, 34-35 million m<sup>3</sup>(r) of hard wood from 0.8 Mha of artificial and natural regeneration areas and another 10 million m<sup>3</sup>(r) of hard wood from short rotation plantations. Additional production of about 18 million m<sup>3</sup>(r) of industrial wood will be available from social forestry programmes.

11.4.56 In regard to fuelwood it is anticipated that it should be possible to obtain about 35-40 million m<sup>3</sup> as by-product of production forestry in the form of lops and tops or residues of forest based industries in 1985 and 60-70 million m<sup>3</sup> in 2000 AD. In addition, woody and shrubby growth on uncultivated waste lands, fallow lands, bunds of agricultural fields, road sides, canal banks, etc. would also be available for use as fuel, especially in the rural areas. Further, a very substantial programme of social forestry should be taken up to meet the demand for fuelwood.

## 5 SUPPLY-DEMAND BALANCES

11.5.1 In the previous section, we have dealt with the likely levels of production of agricultural commodities. In this section we propose to match these levels for 1985 and 2000 AD against the levels of domestic demand discussed in the preceding chapter. To provide a background to these balances, the situation as prevalent in 1973-74 for important agricultural commodities is also indicated in the succeeding paragraphs.

## Agricultural Situation 1973-74

11.5.2 During the year 1974, imports of 4.87 million tonnes of foodgrains were necessary to meet the domestic demand. In the case of oils, both edible and non-edible, also the demand outstripped domestic supplies which had to be supplemented by imports in view of the worsening supply position reflected in rising prices. Although India exported 631 million metres of textile piece goods and 11.9 thousand tonnes of yarn in 1973; as also small quantities of cotton lint, cottons of long and extra long staple lengths were imported into the country to meet the internal demand. A welcome development in recent years is the increasing proportion of long and superior staples in indigenous production of cotton. Consequently, the imports of extra long and long staple cottons into the country declined from 0.91 million bales in 1969-70 to 0.17 million bales in 1973-74. If this trend continues, the country would no longer depend on the imports of superior varieties. However, there may be continuing need for importing medium staples for a few years. The Government will therefore have to give greater attention to the cultivation of cotton, particularly of medium staples, in the country in the years to come. In the matter of short staple cottons, the country has been meeting its full requirements and also exporting 0.2 to 0.3 million bales annually.

11.5.3 The supply position of jute and mesta in 1973-74 was rather comfortable because of a good jute crop in the country. The 1973-74 sugarcane crop was also good and India was able to take advantage of the export possibilities that existed in respect of crystal sugar because of world shortage and favourable prices prevailing in international markets. The position regarding tobacco crop of 1973-74 was satisfactory and the country was able to meet both the domestic requirements and export demand. Thus in 1973-74, deficits occurred in foodgrains, oils and superior varieties of cotton.

11.5.4 In the case of milk, eggs and meat almost the entire domestic production is utilised for internal consumption leaving little exportable surpluses. On the other hand, it becomes necessary to effect imports of certain items e.g. skimmed milk powder. In the case of fish, the total production of inland and marine fish was estimated at 1.96 million tonnes in 1973 of which about 0.05 million tonnes were exported and the balance utilised for domestic consumption.

## Supply-Demand Balances in 1985

11.5.5 Table 11.20 gives the supply-demand balances envisaged in 1985.

TABLE 11.20  
Supply-Demand Balances—1985

Item	Unit	Supply possibility		Domestic demand	
		high	low	high	low
foodgrains . . . . .	(million tonnes)	164	150	163	150
oils . . . . .	"	5.9		6.6	5.3
sugar & gur . . . . .	"	21.0		21.2	16.9
cotton . . . . .	(million bales)	12.5	11.5	12.9	8.1
jute & mesta . . . . .	"	9.8		5.9	4.9
tobacco (dry weight) . . . . .	(thousand tonnes)	500		430	355
milk . . . . .	(million tonnes)	44.2		44.2	33.4
eggs . . . . .	(million numbers)	15,775		15,972	10,217
meat . . . . .	(million tonnes)	1.19		1.40	1.05
fish . . . . .	"	4.28		3.4	2.8
industrial wood . . . . .	(million m <sup>3</sup> r)	39		35	30

11.5.6 The realisation of the targets of income growth envisaged in the draft Fifth Five Year Plan would generate a demand for foodgrains of the order of 163 million tonnes. Therefore, the production programme should be organised on the basis of fertiliser consumption of 9 million tonnes. Increase in fertiliser consumption of this order would call for tremendous effort, and particularly response of the farmers through extension and appropriate land policy. The production target can be attained under normal weather conditions.

11.5.7 If, however, the fertiliser consumption reaches only 7 million tonnes, the production of foodgrains would be of the order of 150 million tonnes. The production of other crops would also be somewhat lower. The lower growth rate in agricultural production would result in a shortfall in the overall growth rate, income and demand for foodgrains and other agricultural commodities.

11.5.8 On the whole, we feel, that the food problem may persist unless the input targets envisaged in this Chapter are properly planned in advance and commensurate efforts made for their effective utilization. It is also expected that the cereal consumption in 1985 would be supplemented by tuber crops to the extent of about 6 million tonnes in terms of carbohydrate content in 1985 against 2 million tonnes in 1971. If the higher level of production in 1985 is achieved, small surpluses of foodgrains might emerge from 1985 onwards. It is hoped that it would be possible to utilise part of the surpluses for building up buffer stocks and for augmenting livestock feed. Further, judged from the recent trends in the international markets for cereals, it should not be difficult to export

whatever surpluses emerge in 1985 over and above the buffer stock and livestock feed requirements. In the supply-demand balances presented in Table 11.20, a surplus of 1 million tonnes has been shown as the export availability and it should be possible to export the quantity if the level of production of 164 million tonnes is actually attained. Export possibilities do exist for basmati rice, and perhaps for some coarse cereals if prices are competitive.

11.5.9 The internal demand for cotton is estimated to increase at a very rapid rate during the coming years. Demand for exports is also likely to expand. With the higher fertiliser consumption, production would also increase. Even then, with the achievement of the high rate of income growth envisaged in the draft Fifth Plan, it may perhaps be necessary to exercise some restraint on domestic consumption to meet the export obligations.

11.5.10 The supply position in respect of oils may continue to present some difficulty in the years to come. The availability of oils in 1985 may be about 3.8 million tonnes from field crops (other than cotton seed) and 2.1 million tonnes from other sources i.e. exploitation of cottonseed, rice bran, maize, bajra, coconut, oil palm etc. Thus, the total availability of all oils from indigenous sources may not exceed 5.9 million tonnes in 1985. As this level, it would be possible to meet the domestic demand on the assumption of low income growth. With the achievement of the higher order of demand for oils (i.e. 6.6 million tonnes) the country would be faced with a shortage of about 0.7 million tonnes. It will, therefore, be necessary to make every effort to step up the utilization of tallow and other animal fats.

11.5.11 The country is expected to be surplus in the production of sugar & gur and jute & mesta. It is expected that by 1985, sugarbeet would also begin to be used for manufacture of sugar. There would thus be some margin for increasing exports of crystal sugar. In the case of jute and mesta, too, there would be enough supplies to meet the domestic demand even on the assumption of high income growth and the possible export demand.

11.5.12 Production of tobacco in 1985 is expected to be around 500 thousand tonnes in terms of dry weight as against the internal demand of 355 to 430 thousand tonnes. The exportable surplus would thus be between 70 and 145 thousand tonnes as against the 1973-74 export level of 78 thousand tonnes.

11.5.13 The country is expected to be self-sufficient in regard to milk and eggs by 1985. The supply of meat in 1985 would be sufficient to meet the low estimates of demand. Since the supply of fish is expected to exceed the demand, a continuing watch would have to be kept over the supply-demand balances with a view to stepping up exports by suitable

incentives. It might further be necessary to encourage the reduction of fish into fish meal, as also the use of fish meal for livestock feed. To some extent it may be possible to step up the demand of fish for human consumption to make up for any shortfall in the supply of meat through suitable pricing policy.

11.5.14 It would be possible to meet the demand for industrial wood in 1985 on the basis of the programmes of man-made forests, natural regeneration and social forestry envisaged in Chapter 42 on Production and Social Forestry. The supply of 35—40 million m<sup>3</sup> of fuelwood from production forestry in 1985 would, to some extent, be supplemented by woody and shrubby growth in rural areas. We envisage a substantial programme of social forestry in order to meet the demand for fuelwood at 202 million m<sup>3</sup> in 1985.

#### Supply Demand Balances in 2000 AD

11.5.15 Table 11.21 presents the supply-demand balances for 2000 AD.

TABLE 11.21  
Supply-Demand Balances—2000 AD

Item	Unit	Supply possibilities		Domestic demand	
		high	low	high	low
1	2	3	4	5	6
foodgrains . . . . .	(million tonnes)		230	225	205
oils . . . . .	(million tonnes)		9.7	10.2	8.3
sugar & gur . . . . .	(million tonnes)	41.0	32.5	29.9	24.0
cotton . . . . .	(million bales)	29.3	24.0	17.2	10.4
jute and mesta . . . . .	"		16.7	11.8	8.6
tobacco (dry weight) . . . . .	(thousand tonnes)		692	590	479
milk . . . . .	(million tonnes)		64.4	64.4	49.4
eggs . . . . .	(million numbers)		27,882	28,513	17,419
meat . . . . .	(million tonnes)		2.10	2.11	1.57
fish . . . . .	(million tonnes)		8.0	5.5	4.6
industrial wood . . . . .	(million m <sup>3</sup> r)		71	64	47

11.5.16 It will be seen that the country would be able to meet the entire domestic demand even on the assumption of high income growth and the possible export demand in respect of all the important agricultural

commodities considered above except oils. However, the realisation of the estimated supplies would depend on the extent to which it would be possible to provide the inputs on the envisaged scale and to mount the extension and infrastructural support for their effective utilisation. If the production level of 230 million tonnes of foodgrains in 2000 AD is reached there would be a surplus of about 5 million tonnes, after meeting the high demand estimate for human consumption and 20 to 25 million tonnes of grains for livestock feed. Special efforts will therefore have to be made in the nineties to develop foreign markets to absorb the emerging exportable surpluses of foodgrains. The supply position in respect of sugar, gur and cotton is expected to improve substantially by 2000 AD. Even the low estimate of sugarcane production would be adequate to meet the high estimates of domestic demand and still leave a surplus of about 2.6 million tonnes of sugar and gur for exports. In the case of cotton also, production is likely to outstrip demand.

11.5.17 The overall supply position of oils on the other hand would continue to be somewhat difficult. The demand for oils is expected to increase to 10.2 million tonnes in 2000 AD on the assumption of high income growth. Against this, the expected availability of oils from the level of production of oilseeds (other than cotton seed) envisaged in this Chapter comes to 6.4 million tonnes in 2000 AD. Besides, it is expected that 3.3 million tonnes of oils would be available from exploitation of cotton seed, rice bran, maize, bajra, coconut, oilpalm and nature grown plants (vide Chapter 22 on Commercial Crops). Thus, the total availability of oils, may not exceed 9.7 million tonnes in 2000 AD indicating a deficit of about 0.5 million tonnes. To some extent it would be possible to bridge this gap by utilising animal fats from slaughter houses. However, no precise estimates of supply of animal fats for 2000 AD are available. We recommend that the following measures should be taken to meet the continuing shortages of oils :

- (i) Availability of vegetable oils for edible use should be stepped up by encouraging the use of fats from animal sources.
- (ii) Research and development effort should be stepped up to improve the yields of oilseeds as also their oil content.
- (iii) It should be possible to divert some areas from crops like sugarcane and cotton to oilseeds.

11.5.18 Our analysis in Chapter 12 on Export Possibilities and Import Substitution shows that the world demand for jute goods is stagnating because of emergence of synthetic substitutes. Yet the possibility of some favourable developments like new packaging uses for jute and new consumer uses, such as furnishing fabrics, etc. cannot be ruled out. The demand for jute goods is not likely to be affected by synthetics in the lesser developed countries of South Europe, Japan and Africa. The analysis

of supply possibilities for jute and mesta in the long term perspective indicates the need for a continuing watch on the export demand so that internal production could be suitably adjusted to meet the possible levels of demand for raw jute and jute goods in the foreign markets.

11.5.19 The anticipated level of tobacco production in 2000 AD is 692 thousand tonnes. Estimates of internal demand vary from 479 to 590 thousand tonnes leaving an exportable surplus of 102 to 213 thousand tonnes. It is very difficult to assess the export demand for tobacco in the year 2000 AD, but keeping in view the current level of net exports of tobacco, the disposal of surpluses of this order should not present a problem.

11.5.20 In regard to livestock products, the situation of self-sufficiency achieved in 1985 would continue till the close of the century and it might also be possible to have marginal exportable surplus. However, the country is expected to be faced with the problem of significant surpluses of more than 2 million tonnes of fish in 2000 AD. Special efforts will, therefore, have to be made in the nineties to develop foreign markets for fish and fish preparations. The use of fresh fish for reduction to fish meal and other industrial products will also have to be encouraged.

11.5.21 The supply of industrial wood at 71 million m<sup>3</sup> (r) on the basis of the programmes of artificial and natural regeneration and social forestry suggested in Chapter 42 on Production and Social Forestry would meet the internal demand and export target of industrial wood. We envisage a substantial programme of social forestry to meet the demand for wood.

11.5.22 In regard to tea and coffee, our study in Chapter 10 on Demand Projections shows that the internal demand for tea would range between 500 and 700 million kg in 2000 AD against 213 million kg in 1971. The internal demand for coffee is estimated to range between 100 and 160 million kg in 2000 AD against 38 million kg in 1971. The growth of internal demand will have to be watched so that if necessary, steps may be initiated to step up production commensurately. We have also mentioned in Chapter 12 on Export Possibilities and Import Substitution that there is considerable scope for increasing the exports of tea and coffee in the coming years. Efforts would have to be made to increase production levels of these two plantation crops so that supply does not act as a constraint on the growth of both internal and export demand.

11.5.23 The supply demand balances presented by us are subject to many imponderables. A constant watch has, therefore, to be maintained on the trends in supply and demand for taking timely action to ensure that the supplies match the domestic and export demand as they develop. In regard to field crops this could be done through changes in land-use and cropping patterns. The measures and mechanism required to make these changes have been referred to in paragraph 11.3.12.



## EXPORT POSSIBILITIES AND IMPORT SUBSTITUTION

Increased earnings of foreign exchange through export promotion and savings of foreign exchange through import substitution are as crucial for economic development of the country as the mobilisation of domestic resources. Various measures necessary for stepping up the present export levels of agricultural commodities and agro-based products and diversifying the export trade both in terms of commodities and the destinations are examined in this chapter. Measures necessary to reduce the country's dependence on imports of various agricultural commodities and requisites have also been discussed. The chapters dealing with individual agricultural commodities and inputs also examine the relevant aspects of export potential of the respective items or the scope for import substitution.

### 1 ROLE OF AGRICULTURAL EXPORTS AND IMPORT SUBSTITUTION IN THE INDIAN ECONOMY

12.1.1 In the efforts of developing countries to raise external resources the programmes relating to import substitution are as important as export expansion. In fact in the development process the former comes first to enable a developing economy to build a sound base for export promotion.

12.1.2 A significant goal in Indian economic development is to make the economy self-reliant. It is visualised under the draft Fifth Plan formulations that by 1985-86 the country would be in a position to meet the maximum amount of her foreign exchange requirements from her own resources, obviating the need for any substantial flow of concessional aid. There would, however, be still room for inflow of foreign resources on normal commercial terms.<sup>1</sup> The attainment of this objective would depend *inter alia* upon the extent to which the country succeeds in :

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1 1973. Draft Fifth Five Year Plan: Volume 1 : p. 4 New Delhi. Planning Commission, Government of India.

- (i) keeping a restraint on imports, that directly or indirectly, contribute to inessential or elitist consumption while reasonably satisfying the import requirements for investment and current production purposes of priority sectors as also essential lines in small-scale sector;
- (ii) increasing the output of foodgrains, oilseeds, raw cotton, raw jute, tea, coffee, tobacco, raw cashew and rubber commensurate with the country's requirements for domestic consumption and exports ;
- (iii) managing efficiently the food economy so as to avoid large-scale food imports;
- (iv) increasing adequately the output of traditional industries like cotton and jute textiles which continue to figure prominently in exports;
- (v) mounting vigorous efforts to develop the production and export of non-traditional items like coffee, oilcakes, fish and fish preparations, woollens, leather and leather manufactures; and
- (vi) devising appropriate export policy frame for encouraging production for export, diversion of output from domestic consumption to exports and raising the competitive capability of our exports.

12.1.3 Agricultural exports have [always constituted a sizable portion of total visible exports from the country. Export promotion in agricultural goods is, therefore, one of the important facets of planning in India. Agricultural exports may be classified into two broad groups, namely : (a) agricultural commodities including raw materials; and (b) agro-based products. Exports of agricultural commodities increased from Rs 308.5 crores in 1961-62 to Rs 963.4 crores in 1973-74 or at a compound rate of 8.4 per cent per annum while those of agro-based products went up from Rs 258.4 crores to Rs 878.9 crores i.e. at the rate of 9.9 per cent per annum.

12.1.4 Agricultural commodities would continue to dominate the export scene for quite some time. According to the Study Group of the Export Sector Committee of the Board of Trade on Agricultural Commodities and Agriculture-based Industries (February, 1965), in the next 10 to 15 years, till the manufactures and semi-manufactures are able to establish external markets, agricultural commodities will continue to play a pivotal role in the export trade of India. The extent to which agricultural exports are able to play this role will be considerably influenced by the annual production levels and the growing demands of consumption within the country.

12.1.5 Developing countries usually depend on exports of a limited range of primary products. Uganda cotton, Ethiopian coffee, Sri Lanka

tea, Malaysian rubber and tin and Thai rice can be cited as examples. In the case of India, agricultural commodities like tea, coffee, spices, cashew-nuts and jute and processed items like jute manufactures, cotton textiles, leather and leather goods form the mainstay of agricultural exports. Export performance in the case of these commodities is, however, closely connected with the performance on the production front of the respective commodities. Export of jute manufactures, for instance, is primarily linked with adequate availability of raw jute of suitable quality. In years of short production, the raw material has to be imported from Bangladesh and Thailand. The volume of export of tea rises or falls with the rise and fall in its production. In the case of cotton, low and fluctuating yields lead to high and unstable prices of cotton textiles which act as a great constraint in highly competitive world market. In regard to commodities like raw cotton, oilcake and sugar, exports represent only the residual production after the domestic demands are met. The domestic demand for these commodities is going up and production is not showing a corresponding increase. Since performance of agricultural exports is linked with the varying levels of production and domestic consumption, the magnitude of exports is subject to wide fluctuations from year to year. Modernisation of agricultural techniques and the widespread use of improved seed material are opening up prospects for higher and more stable yield levels of the various export-oriented crops. This may lead to the evening out of the order of fluctuations. The draft Fifth Five Year Plan projections for exports envisage a rate of growth of 7.6 per cent per annum during the Fifth and Sixth Plans and 7 per cent thereafter. Vigorous and sustained effort in the agricultural sector is crucial to the realisation of this objective.

12.1.6 As already stated, development of import substitution programmes is as important as stepping up the export effort in any scheme for balancing the foreign exchange budget. Import substitution involves not merely the direct replacement of import resulting from an increase in domestic production but also the substitution of available local materials for scarce imported materials, development of new processes or new products at home or finding new uses for products that will help replace imports. The needed improvements in the balance of payments, require that all opportunities for economical import substitution must be availed of by developing selectively and in a phased manner the domestic production of relevant items. Efforts at import substitution in the agricultural sector in the earlier plans had limited success due largely to the growing demands of increasing population and instability in production because of variations in weather. The production programmes oriented to the objective of import substitution proposed to be implemented during the Fifth Plan will yield their full benefits in the Sixth Plan period. It

is envisaged<sup>1</sup> that on this account, it would be possible to contain in the Sixth Plan the rate of growth of imports to 3.4 per cent per annum as against 7.6 per cent per annum for non-food imports in the Fifth Plan. For the period up to 1985-86, the rate of growth of imports over the base level is estimated at 4.4 per cent.

12.1.7 With the increasing pressure on the country's limited foreign exchange resources, especially during the last decade or so, import substitution through domestic production has been an important policy measure under the five year plans. In the agricultural sector, the main effort in the field of import avoidance lies in stepping up production of foodgrains to the self-sufficiency levels as quickly as possible with the widespread adoption of high yielding varieties, increased use of inputs including fertilisers and pesticides and measures for stepping up yields in rainfed areas.

12.1.8 The varied resource endowment of the country and the size of the internal market make it possible to produce economically a large number of items which were being imported. By developing domestic production it has already become possible to avoid or cut down substantially the imports of cotton fabrics, dairy products, agricultural machinery and dairy & poultry equipment etc. This effort has to be continued so that it becomes possible to reduce the imports of various agricultural items to the minimum level, necessary from the point of view of maintaining trade relations with other countries.

12.1.9 In the draft Fifth Five Year Plan, imports of fertilisers and fertiliser raw materials have been projected<sup>2</sup> to grow from Rs 270 crores in 1978-79 to Rs 330 crores in 1983-84 and Rs 380 crores in 1985-86. The increase is accounted for by growing imports of potassic fertilisers and sulphur and rock phosphate for production of phosphatic fertilisers. No imports of finished nitrogenous and phosphatic fertilisers have been contemplated in 1983-84 and 1985-86.

12.1.10 In the field of pesticides, the expansion schemes envisaged for DDT and BHC would go a long way in cutting down imports. There is great degree of selectivity in the use of pesticides and it should be possible to develop indigenous industry to effectively cater to the needs of the agricultural sector. Copper, mercury and zinc required for production of some of the pesticides will have to be imported in greater quantity with the increasing production levels. The import of these prime metals, however, would be relatively much cheaper.

12.1.11 However, in the drive for import avoidance full consideration

1 1973. Draft Fifth Five Year Plan : Volume I : pp 5-6. New Delhi, Planning Commission, Government of India.

2 1973. Draft Fifth Five Year Plan : Volume I : p. 6. New Delhi, Planning Commission, Government of India.

should be given to the import requirements for unimpeded development of certain agro-based industries. Mention particularly might be made of the annual maintenance imports of the leather and tanning industry which are estimated at around Rs. 10 crores comprising Rs 4.5 crores on account of vegetable tanning materials and other tanning agents and Rs 5.5 crores on account of machinery, spares, chemicals and auxiliaries. The development of this industry and modernisation of slaughter houses can help us not only in stepping up export realisation but may also result in substantial import substitution if the byproducts and the wastes of the livestock product industry are properly utilised. For instance, by utilising the glands of slaughtered animals for the preparation of various hormones and glandular products and the small intestines of sheep and goats for making absorbable types of surgical sutures, imports of these articles could be avoided.

12.1.12 Among the other agricultural imports, the most important item is raw cashewnuts. These have to be imported to feed our exports of cashew kernels. The Planning Commission assumes<sup>1</sup> that by 1983-84 the country would have achieved near self-sufficiency in newsprint and pulp. In regard to raw cotton and vegetable oils near self-sufficiency has been assumed. We would like to emphasise the need for stepping up import substitution efforts in items like dairy products, milk powder, animal fats, raw cashewnuts, raw wool, wool tops and wood pulp. The country is well on the way towards self-sufficiency in raw cotton (except in respect of medium staples) and the outlook is fairly optimistic in case of natural rubber.

12.1.13 We would like to emphasise that a well-thoughtout and effective programme of import substitution is essential for achieving the long-term targets envisaged in the draft Fifth Five Year Plan. It is necessary to clearly demarcate areas where :

- (i) total import substitution is immediately possible;
- (ii) total substitution could be envisaged within a short period; and
- (iii) the present resources will not permit import substitution in the near future and hence imports must continue for meeting the essential requirements.

Immediate attention should be directed towards substitution of items particularly of agricultural production requisites imported at present in large volume and at high cost. The main objective is to promote full utilisation of capacity, expansion, diversification and establishment of new lines of manufacture, utilising the local raw materials and technological know-how.

1 1973. Draft Fifth Five Year Plan : Volume I : p. 6. New Delhi, Planning Commission, Government of India.

## 2 STRUCTURE AND DIRECTION OF AGRICULTURAL EXPORTS

12.2.1 During the triennium ending 1973-74 agricultural commodities accounted for 51.1 per cent of total agricultural exports and the balance was accounted for by agro-based products. The export trade of the country is built around a limited range of agricultural commodities. Tea is the leading item accounting for on an average 19.7 per cent of exports of total agricultural commodities. Another four items, namely, oilcakes, cashew kernels, fish & fish preparations and unmanufactured tobacco account for another 37 per cent. The following table gives an idea of the percentage share of selected agricultural commodities in the total Agricultural exports during the triennium ending 1973-74 :

TABLE 12.1

Average Annual Exports of Major Agricultural Commodities during the Triennium 1971-72 to 1973-74

Commodity	Value of exports (Rs crores)	Per cent of total agricultural commodities exports
1. tea	149.9	19.7
2. oilcakes	95.2	12.5
3. cashew kernels	68.2	9.0
4. fish and fish preparations	61.1	8.0
5. tobacco (unmanufactured)	57.2	7.5
6. crude vegetable materials	45.2	6.0
7. cereals and dried leguminous vegetables & flour and miscellaneous food preparations	44.6	5.9
8. spices	40.1	5.3
9. coffee	33.7	4.4
10. sugar, sugar preparations and honey	29.5	3.9
11. cotton	26.6	3.5
12. fixed vegetable oils and fats	21.6	2.9
13. oilseeds, nuts and kernels	16.9	2.2
14. others	69.9	9.2
all agricultural commodities	759.7	100.0

12.2.2 The leading items in the second group, namely, agro-based products, are jute manufactures and cotton textiles, yarn & fabrics, each of which accounted for about one-third of average annual exports of agro-based products during the triennium ending 1973-74. Leather, leather manufactures and dressed fur skins accounted for another one-fifth. The

following table gives an idea of the important agro-based products which figure in the country's export trade :

TABLE 12.2  
Average Annual Exports of Major Agro-based Commodities during the Triennium  
1971-72 to 1973-74

Commodity	Value of exports (Rs. crores)	Per cent of total agrobased products exports
1. jute manufactures	245.4	33.8
2. cotton textile yarns, fabrics and [made-up] articles and related products including synthetics	239.1	32.9
3. leather, leather manufactures and dressed fur skins	145.8	20.
4. clothings	64.4	8.9
5. others	32.0	4.3
all agro-based products	726.7	100.0

12.2.3 A characteristic feature of the direction of agricultural commodities exports from the country is their concentration in a few countries like UK, USA, USSR and Japan. This would be evident from the following table :

TABLE 12.3  
Some Major Importers of Agricultural Commodities from India

Commodity	Major importing countries	Share in total exports of the commodity from India in 1973-74 (per cent)
1. tea	UK, Afghanistan and USSR	69
2. cashew kernels	USA, USSR	73
3. oilcakes	Japan, Netherlands, Poland and UK	50
4. unmanufactured tobacco	UK, USSR and Japan.	66
5. fish and fish products	Japan and USA	82
6. raw wool	USSR and UK	90
7. walnuts	UK and Czechoslovakia	59
8. animal casings	Japan Germany (FR) and Spain	72
9. cotton yarns	UK, Czechoslovakia and Hong Kong	48
10. mill-made fabrics	UK and USA	59
11. jute manufactures	USA, Japan and Canada.	52

12.2.4 Some important changes in destination-wise exports are reported to have taken place in the late sixties. The United Kingdom (UK) which used to be the foremost market for Indian goods for quite some time after Independence, has been relegated to a lower position. Among the developed market economy countries, the share of the USA and Japan in India's exports is much higher than the UK's. An important development which gave an impetus to the changes in the direction of trade was the rupee trade arrangement with the East European countries. As a result, trade with these countries has considerably increased. USSR has now emerged as India's foremost trading partner in respect of some of the commodities, followed by USA and Japan.

### 3 TRENDS IN EXPORTS

12.3.1 India's exports were virtually stagnant during the decade 1951-60. Total exports averaged Rs 606 crores a year during the First Plan and Rs 609 crores a year during the Second Plan period. In contrast with this stagnation, exports showed a striking expansion during the first three years of the Third Plan. There was, however, a slowing down in the growth of exports in the fourth year and a small fall in the last year of the Third Plan due mainly to bad harvests and Pakistan-India hostilities. The level of exports rose at an annual compound rate of 4.0 per cent from Rs 660 crores in 1960-61 to Rs 802 crores in 1965-66. Apart from the increase in the volume of exports during the Third Plan period, there was a significant change in the commodity composition as also the directional pattern of exports. The share of three principal traditional commodities, namely, tea, cotton textiles and jute manufactures, declined from 48 per cent to 44 per cent over this period which was compensated by a substantial growth in a number of other export commodities including oilcakes, fruits and vegetables and sugar. From the directional point of view exports to East European countries and USSR went up considerably and there was also a sizable increase in exports to USA. Exports to West European countries recorded a small decline owing to reduction in the exports to UK.

12.3.2 In the Fourth Plan period, there was a setback during the years 1966-67 and 1967-68 after the devaluation. Subsequently there has been a recovery. The aggregate exports over the Fourth Plan worked out to Rs. 9,019 crores as against the original projection of Rs 8,300 crores exceeding the Fourth Plan projections by over Rs 719 crores. The commodities which have made important contribution to the increased exports include a number of agricultural and agro-based commodities such



as leather and leather products, fish and fish preparations, jute manufactures, unmanufactured tobacco, oilcakes and coffee. Over the Fourth Plan period as a whole the compound rate of growth works out to 12.6 per cent per annum which is quite impressive when judged against the unusual strains experienced by the economy during this period. However, an important contributory factor for the success in recent years has been inflation in the world economy and also certain non-recurring factors like exports of foodgrains to Bangladesh in 1972-73. If a setback on the export front is to be avoided there has to be sustained effort at export promotion.

### Share of Agricultural Exports

12.3.3 Table 12.4 gives an idea of the trends in the value of agricultural exports and their share in total exports during the years 1961-62 to 1973-74 :

TABLE 12.4

Value of Agricultural Exports—Yearwise 1961-62 to 1973-74\*

Year	All items	Agricultural commodities**	Agro-based products**	(Rs crores)
				Total agricultural exports (col.3 + 4)
1	2	3	4	5
1961-62 . . . . .	655.2	308.5 (47.1)@	258.4 (39.4)@	566.9 (86.5)@
1962-63 . . . . .	678.1	336.6 (49.6)	264.5 (39.0)	601.1 (88.6)
1963-64 . . . . .	789.3	362.3 (45.9)	302.0 (38.3)	664.3 (84.2)
1964-65 . . . . .	813.2	362.1 (44.5)	306.4 (37.7)	668.5 (82.2)
1965-66 . . . . .	801.6	327.7 (41.0)	322.5 (40.3)	650.2 (81.3)

\* Based on data from Monthly Statistics of Foreign Trade of India, Department of Commercial Intelligence and Statistics, Calcutta. Figures for the years upto 1965-66 are not strictly comparable with those of the latter years due to devaluation of the Rupee in June, 1966.

\*\* Figures in column 3 relate to the commodities listed in Appendix 12.1—Statement I and those in column 4 to commodities listed in Appendix 12.1—Statement II.

@ Figures in brackets give percentage share in the total export trade during the year.

1	2	3	4	5
1966-67 . . . . .	1,152.9	475.2 (41.2)	451.1 (39.1)	926.3 (80.3)
1967-68 . . . . .	1,192.8	480.9 (40.3)	429.4 (36.0)	910.3 (76.3)
1968-69 . . . . .	1,334.2	494.3 (36.5)	463.9 (34.3)	958.2 (70.8)
1969-70 . . . . .	1,408.7	478.9 (34.0)	486.2 (34.5)	965.1 (68.5)
1970-71 . . . . .	1,524.4	542.0 (35.5)	481.4 (31.6)	1,023.4 (67.1)
1971-72 . . . . .	1,603.2	588.5 (36.7)	584.8 (36.5)	1,173.3 (73.2)
1972-73 . . . . .	1,964.4	727.2 (37.0)	716.4 (36.5)	1,443.6 (73.5)
1973-74 . . . . .	2,518.3	963.4 (38.3)	878.9* (34.9)	1,842.3 (73.2)

\* The agriculture content of important exported manufacturers viz. jute yarn and manufacturers, cotton yarn and manufacturers, coir yarn and manufacturers, leather and leather manufacturers, tobacco manufacturers and woollen yarn and manufacturers in 1973-74 and their proportion to total exports is given in Section 2 of Chapter 5 on Agriculture in Economic Development.

12.3.4 Agricultural exports have expanded at the rate of 9.1 per cent per annum during the period 1961-62 to 1973-74, the rate of growth being higher for agro-based products at 9.9 per cent and lower for agricultural commodities at 8.4 per cent. The growth in agricultural exports was more rapid from 1970-71 as would become evident from the following table :

TABLE 12.5

Annual Rate of Compound Growth of Value of Exports (per cent)

	1961-62 to 1973-74	1970-71 to 1973-74
1. agricultural commodities . . . . .	8.4	21.4
2. agro-based products . . . . .	9.9	22.3
3. all agricultural exports . . . . .	9.1	21.8
4. non-agricultural exports . . . . .	20.0	11.5
5. overall exports . . . . .	11.3	18.6

The share of agricultural commodities in the overall exports declined from 47.1 per cent in 1961-62 to 38.3 per cent in 1973-74 and that of agro-based products from 39.4 per cent to 34.9 per cent.

12.3.5 Exports of agricultural commodities have shown sizable fluctuations from year to year. Appendix 12.3 gives the order of increase

or decrease in exports in each year over the preceding year during the period 1967-68 to 1973-74. An idea of the maximum extent of such fluctuations in respect of selected items during this period can be had from the following summary table :

TABLE 12.6

## Maximum Annual Fluctuations in Exports of Selected Agricultural Commodities

Commodity	Year	Percentage increase(+) or decrease (—) over the preceding year
1. oilseeds, nuts kernels . . . . .	1967-68	(+)450.0
	1970-71	(—) 30.8
2. vegetable oils . . . . .	1968-69	(+)188.2
	1969-70	(—) 53.1
3. tobacco (unmanufactured) . . . . .	1968-69	(—) 3.6
	1972-73	(+) 64.9
4. sugar . . . . .	1970-71	(+)319.3
	1972-73	(—) 67.7
5. walnut . . . . .	1968-69 & 1972-73	(+) 66.7
	1967-68 & 1969-70	(—) 40.0
6. banana . . . . .	1968-69	(+)150.0
	1967-68 & 1971-72	(—) 50.0
7. potato . . . . .	1971-72	(+)200.0
	1970-71	(—) 66.7
8. meat and meat preparations . . . . .	1970-71	(+)145.5
	1971-72	(—) 35.9

## Review of Exports

12.3.6 Appendix 12.1—Statement I gives the yearwise value of exports of agricultural commodities during the period 1961-62 to 1973-74. Similar data on exports of agro-based products are presented in Appendix 12.1—Statement II. A fivefold classification of export items has been adopted in presenting these data, namely :

- (i) products of field crops;
- (ii) horticultural products;
- (iii) animal products;

(iv) marine products; and

(v) forest products.

The data on volume of exports of agricultural commodities are presented in Appendix 12.2. It would be observed that exports of some of the agricultural raw materials as also a few agro-based products from India have shown a marked decline over time. These include jute and jute goods, essential oils, raw wool, lac, bananas, cashewnut shell oil and hides and skins. This is evident from the following table which gives the exports of these commodities at different points of time :

TABLE 12.7

Exports of Agricultural Raw Materials and Agro-based Products from India

Commodity	1961-62	1966-67	1971-72	1972-73	1973-74
jute goods (‘000 tonnes)	829	618	666	575	558
essential oils (tonnes)	1,054	523	461	456	554
raw hides and skins (Rs lakhs)	879	1,647	66	87	148
raw wools (‘000 tonnes)	15	9	5	7	5
lac (‘000 tonnes)	21	16	14	8	6
bristles (tonnes)	439	144	102	142	110
bananas (‘000 tonnes)	7	8	4	4	Neg.
cashewnut shell oil (‘000 tonnes)	6	12	6	5	4

We should like to make certain observations, based on the trends of exports in respect of individual items, in the following paragraphs.

12.3.7 Products of field crops : Exports of tea reached a record level of Rs 180 crores in 1967-68, although in quantitative terms the exports in 1971-72 were higher than those in 1967-68. In the case of oil-cakes there has been a ten fold increase from Rs 17.3 crores in 1961-62 to Rs 170.6 crores in 1973-74. The peak level of exports of cashew kernels at Rs 74.4 crores was attained in 1973-74. In case of unmanufactured tobacco 1973-74 was the year of maximum exports (Rs 68.4 crores). Spices constitute another important export item which showed a mixed trend over the last decade. Pepper is the principal commodity in this group and was exported to the tune of Rs 30 crores in 1973-74, the highest on record.

12.3.8 Exports of cotton textiles showed a steady upward trend from 1966-67 to 1973-74 rising from Rs 94.8 crores in 1965-66 to Rs 342.0 crores in 1973-74. On the other hand jute manufactures showed an

erratic trend during this period. Exports in 1966-67 went up to Rs 249.0 crores from Rs 181.6 crores in the preceding year. There was steady decline thereafter till 1970-71 when exports reached a low point of Rs 189.2 crores. This decline took place primarily due to keen competition from synthetic substitutes and supplies from Bangladesh. The Jute Corporation was set up in 1971 to stabilise prices of raw jute at remunerative levels and to market jute goods abroad. In 1971-72 there was a substantial improvement and an all time record of Rs 263.3 crores of exports was touched in that year. In the subsequent years the order of exports was only slightly lower being Rs 247.2 crores in 1972-73 and Rs 225.7 crores in 1973-74. Exports of silk have shown a mixed trend over the years and have varied between Rs. 34 lakhs and Rs 86 lakhs during the period 1961-62 to 1972-73, maximum exports (Rs 86 lakhs) having been reached in 1966-67. However, in the year 1973-74, exports touched an all time record level of Rs 242 lakhs.

12.3.9 India is one of the major exporting countries of oilcakes in the world. Exports of oilcakes from India have increased steadily from 822 thousand tonnes in 1966-67 to 1,224 thousand tonnes in 1973-74. India mainly exports defatted groundnut oilcake and cotton seed oilcake which together account for about 90 per cent of the total exports of oilcakes.

12.3.10 Exports of spices from India have shown a mixed trend over the years. During the early sixties there was a decline and exports went down from 68 thousand tonnes in 1961-62 to 42 thousand tonnes in 1969-70. The subsequent two years witnessed an improvement and in 1971-72 exports almost regained the level attained in 1961-62 (namely 65 thousand tonnes). This was followed by a marked fall to 44 thousand tonnes in 1972-73. In 1973-74 again, the exports of spices increased to 61 thousand tonnes.

12.3.11 Horticultural products : Cashew kernel is the single largest item in this group. Its exports have gone up several fold since the year 1961-62. From a level of Rs 18.2 crores in 1961-62 there was a steady improvement to Rs 60.9 crores by 1968-69. There was a slight recession in the subsequent two years but export performance had again picked up from the year 1971-72. The average annual exports during the triennium ending 1973-74 amounted to Rs 68.2 crores which constituted 9 per cent of all agricultural commodities. Apart from cashewnuts and walnuts, other fruits, vegetables and their products constitute another significant group of commodities exported from the country. Exports of these items declined from Rs 11.5 crores in 1970-71 to Rs 7.5 crores in 1971-72. In the next two years, however, there was an improvement and the value of exports in 1973-74 amounted to Rs 12.0 crores.

12.3.12 From a near monopoly position in the case of cashewnut

shell oil (CNSL) in the world market in the early sixties, India's share came down to about 20 per cent in 1972-73. The world imports of CNSL increased from 20,090 tonnes in 1969 to 23,669 tonnes in 1973, i.e. by 16 per cent. In view of the shortage of international availability of petroleum-based phenols, the consumption of major importing countries is expected to rise substantially in the coming years. However, exports of CNSL from India have fallen from 12,000 tonnes in 1966-67 to 4,000 tonnes in 1973-74 due to competition from the other CNSL producing countries. Another significant item of export is crude rubber. Exports of crude rubber went up from almost a scratch in 1961-62 to Rs 1.35 crores in 1973-74.

12.3.13 Animal products : Exports of hides, skins and furskins (undressed) declined from Rs 16.5 crores in 1966-67 to Rs 1.5 crores in 1973-74 due to the policy of the government to restrict their exports.<sup>1</sup> An important item which has been emerging in a significant manner in Indian exports has been leather and leather manufactures. The average annual exports of this item improved from Rs 62.8 crores in the triennium ending 1968-69 to over Rs 145.8 crores during the triennium ending 1973-74 with the peak having been reached in 1972-73 when exports amounted to Rs 174.5 crores. The leather industry now ranks fifth among the country's foreign exchange earners.

12.3.14 In regard to raw wool, exports are mainly of medium quality used for carpet making. India is importing superior quality wool to meet the requirements of the woollen textile industry. Exports of raw wool have declined from a level of 20,000 tonnes in 1959-60 and 9,000 tonnes in 1968-69 to 5,000 tonnes in 1973-74. Though the export of raw wool has declined, the export of woollen goods has gone up considerably from Rs 17.4 crores in 1969-70 to Rs 45.2 crores in 1973-74.

12.3.15 Marine products : Marine products constitute a significant item of export and also hold out a good promise of expansion in export trade. Exports went up from 17,297 tonnes in 1961 to 48,785 tonnes in 1973. In terms of value, the exports increased from Rs 4.13 crores in 1961 to Rs 79.58 crores in 1973. Frozen shrimps constitute the single largest item accounting for about 80 per cent of the total exports of marine products in terms of value. Major buyers of frozen shrimps are the USA and Japan. These two countries together share more than 90 per cent of the total exports of this item from India. As far as frozen lobster tails are concerned, almost the entire exports were made to the USA. In case of frozen froglegs, USA accounts for nearly 72 per cent of the total quantity followed by Belgium and France. In case of canned shrimps, UK, France, USA and Canada are the major markets.

<sup>1</sup> also *vide* para 12-5-54.

12.3.16 Forest products : The major items in this group are wood, lumber and cork, lac, essential oils and crude vegetable materials. Exports of the first item went up steadily over the years from Rs 2.83 crores in 1961-62 to Rs 17.23 crores in 1973-74. India's export trade in lac used to be around 26 to 29 thousand tonnes during the years 1954-55 to 1960-61 and the present level of exports is around 6 to 8 thousand tonnes.

12.3.17 Exports of essential oils from India have been steadily falling. From a peak level of 1,570 tonnes attained in 1957-58, exports had declined to 941 tonnes in 1963-64 and further to 554 tonnes in 1973-74. Lemongrass oil is the leading item in this group. The exports of this item declined even more sharply from 1,378 tonnes in 1957-58 to a record low of 130 tonnes in 1968-69 due to growing competition from other producing countries and development of synthetic citral in the USA. Subsequently, however, there has been some improvement and exports during 1973-74 amounted to 367 tonnes. In terms of value, exports of essential oils went up from Rs 3.89 crores in 1971-72 and to Rs 6.10 crores in 1973-74.

#### 4 EXPORT PLANNING

12.4.1 Export planning was taken up only in the Third Plan. In the first two Plans estimates of exports were more in the nature of expected earnings rather than achievements of targets set for the Plan. To achieve the targets appropriate policy and programmes were not formulated. In consequence, India's export earnings remained more or less stagnant. It was realised that a significant lacuna in export development was that export promotion did not constitute an integral part of the country's development effort under the five year plans. Under the Third Plan export targets were fixed on the basis of special studies on export prospects of selected commodities. It was recognised that exports would depend upon a number of factors such as exportable surpluses, productivity, cost, profitability, diversification of exports and cooperation of industry. Also important are such factors as fiscal incentives, trading arrangements with other countries, tariffs, quotas and other commercial policies of importing countries. No coherent policy was spelt out nor was a provision made for built-in devices in the plan for creation of exportable surpluses. Further, no emphasis was placed on the measures needed for cost reduction or on export incentives through fiscal and other policies.

12.4.2 The Government of India adopted the Export Policy Resolution in 1970 which stipulated the need for accelerating the rate of growth of export earnings for achieving national self-reliance and reducing dependence on external assistance. The compound rate of growth of exports in the Fourth Plan period was 7 per cent per annum. As already referred

to earlier exports have been projected to grow at the rate of 7.6 per cent per annum during the Fifth and the Sixth Plans and at 7 per cent thereafter. The draft Fifth Plan mentions that important agricultural commodities which possess export potential and possibilities are fish and fish preparations, leather and leather manufactures, cotton textiles (mill-made and handloom), raw cotton, essential oils and sugar. In regard to the traditional items like tea, coffee, jute manufactures, tobacco, cashew kernels and spices, as also oilcakes<sup>1</sup> there is possibility of marginal or modest rates of growth.

12.4.3 The draft Fifth Plan gives export estimates for 1973-74 and projections for 1978-79, 1983-84 and 1985-86, in terms of value, for selected commodities. The Indian Institute of Foreign Trade (IIFT) has also made an independent assessment of the export possibilities of these commodities for the year 1978-79, on the basis of their export performance in recent years namely 1968-69 to 1972-73.<sup>2</sup> As will be seen from Appendix 12.4, the targets envisaged by the Institute are invariably higher than the targets indicated in the draft Fifth Five Year Plan, except in the case of a few commodities like fish and fish preparations.

12.4.4 The IIFT's exercise is based on certain national considerations in the context of Government's policy of export promotion. These are :

- (i) restraint on or regulation of domestic consumption in respect of items including sugar, rice and tea;
- (ii) restrictions on or regulation of exports in respect of items like beef, hides and skins and oilcakes;
- (iii) fuller utilisation of existing capacity in respect of agro-based industrial products; and
- (iv) expansion of capacity or creation of new capacities specially in case of new items entering the trade.

Besides these considerations, there are a few international factors which have been taken into account by the IIFT in making an assessment of the export possibilities of different commodities. These factors, *inter alia*, are:

- (i) price trends of selected basic commodities;
- (ii) India's share in world exports and the countrywise significance of basic commodities in world trade;
- (iii) impact of international quotas or otherwise in respect of specific items like coffee, sugar and textiles; and
- (iv) bilateral trade agreements in case of East European and other countries.

1 1973. Draft Fifth Five Year Plan : Volume I : pp. 4—5. New Delhi. Planning Commission, Government of India.

2 1974. Export Targets during Fifth Five Year Plan, New Delhi. Indian Institute of Foreign Trade.



There are other factors like trends of production and imports of major buying countries and market characteristics thereof, extent of concessions through generalised system of preferences (GSP) and related schemes of preferences, tariff and non-tariff barriers, domestic adaptation to world trends and pattern and potential of overseas demand in respect of commodities where specific overseas market surveys have been conducted.

12.4.5 The following are the important behavioural changes in the contribution of quantitative increase and higher unit value in the expanded exports in 1978-79 over 1972-73, as compared with 1973-74 over 1972-73 in respect of selected items as revealed by the IIFT's study :<sup>1</sup>

- (i) cotton piece goods—mill-made : The quantity effect will account for 40 per cent of the expanded exports in 1978-79 as compared to 51.0 per cent in 1973-74, the share of unit value effect being marginally more in 1978-79.
- (ii) jute manufactures: Unit value effect in 1978-79 will be marginally negative to the otherwise increased accrual of export earnings, solely conditioned by quantitative expansion.
- (iii) sugar : The quantity effect is to account for 41.8 per cent of the growth of exports in 1978-79 as against the relatively larger share of 65.6 per cent in 1973-74, the effect of unit value being marginally more in 1978-79.
- (iv) oilcakes : The unit value effect is to contribute 43 per cent of enlarged exports in 1978-79 as compared to 75 per cent in 1973-74.
- (v) finished leather : The effect of higher unit value realisation is to be modest at 13.3 per cent in 1978-79 as compared to 30.9 per cent in 1973-74.
- (vi) leather footwear : The unit value effect is to contribute only 1 per cent to the expanded exports in 1978-79 as compared to 8.2 per cent in 1973-74. As against this, 23.5 per cent of the enlarged export earnings in 1972-73 over 1968-69 is attributed to higher unit value realisation.
- (vii) frozen prawns : Quantitative increases are to contribute 78 per cent to the rise in exports in 1978-79 as compared to 51 per cent in 1973-74; the effect of unit value being moderate at 13 per cent in 1978-79 as compared to 40 per cent in 1973-74. The average unit value effect in the case of fish and fish preparations as a whole appears to be lower in 1978-79. This can be attributed to the bulk of exports being of relatively much lower unit value.

1 1974. Export Targets during the Fifth Five Year Plan, pp. 11—13. New Delhi. Indian Institute of Foreign Trade.  
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(viii) tea : An increase of 93.5 per cent in exports in 1978-79 is to be effected by increased quantum of exports, as against 68.1 per cent in 1973-74.

12.4.6 It has been envisaged that mill made cotton textiles will occupy the second position in the total exports from the country in 1978-79, next to engineering goods, with a share of 10.1 per cent and reflect an increase of 2 percentage points over 1972-73. Jute manufactures which constituted the largest export item in 1972-73 with a share of 12.7 per cent will grow at an annual rate of 6.0 per cent but will now occupy third rank in 1978-79 with a share of 7.9 per cent. The share of leather and leather manufactures would be more than 7.5 per cent. Other products arranged in order of their relative share in 1978-79, which are likely to grow at an annual rate of more than 10 per cent each include oilcakes (13.1 %), raw cotton (14.5%), fish and fish preparations (15.7%), handicrafts (17.5%), cotton textiles—handloom (19.3%), woollen textiles (21.5%), silk, rayon and synthetic textiles (30.3%), sugar (33.4%), and rice (53.2%).

## 5 EXPORT POTENTIAL AND POSSIBILITIES

12.5.1 In the bid for stepping up agricultural exports there is need for diversification both in respect of items and the destinations of exports. We are of the view that such diversification would depend on the assessment of export potential and identification of the measures to realise it by disaggregating the export items into following categories :

- (i) traditional items of exports with declining trends;
- (ii) items with growth potential;
- (iii) commodities with little pull of the domestic market, export surpluses of which could be geared easily;
- (iv) commodities which need further processing before exports; and
- (v) commodities on which research work is still necessary before their production could be developed for the export markets.

Such an attempt has been made in the following paragraphs in respect of a limited range of selected commodities. It might be mentioned that some analysis was done in our Interim Report<sup>1</sup> to assess the export potential and identify measures necessary to realise it in respect of the selected commodities viz. tea, coffee, tobacco, pepper and cardamom. Considering the importance of these commodities in the Indian economy our important findings and recommendations have been recapitulated

1 1974. Certain Important Aspects of Selected Export Oriented Agricultural Commodities, Interim Report, National Commission on Agriculture, Ministry of Agriculture, New Delhi, Government of India.

at appropriate places in this chapter.

### Traditional Items of Exports with Declining Trends

12.5.2 Jute goods : The world demand for jute goods is stagnating because of emergence of substitute synthetics. Recent studies by Food and Agriculture Organisation (FAO)<sup>1</sup> of the United Nations have concluded that the oil crisis had not led to any permanent improvement in the competitive position of jute goods vis-a-vis the synthetics, either in USA or West European markets with varying degree of protection or free markets. Jute's displacement by synthetics has greatly accelerated in the USA and jute has lost ground in the primary and secondary carpet backing markets. Synthetics have also begun to make inroads into the market for cotton bale covers which was hitherto a preserve of jute. In Western Europe, excess capacity developed in the polypropylene carpet backing sector, following a slackening of demand for carpets. Prices of polypropylene products, particularly carpet backing, therefore, came under pressure, and their price advantage over jute goods increased. In the United Kingdom, polypropylene carpet backing was currently some 35 per cent cheaper than jute primary backing, and polypropylene packaging cloth was some 27 per cent to 30 per cent cheaper than comparable jute hessian. Only jute weft yarns for woven carpets were still marginally cheaper than twisted polypropylene weft yarns, but jute's price advantage was rapidly diminishing. As a result, virtually all the primary backing market in the European Economic Community (EEC) went to synthetics, and inroads into other jute markets accelerated, so that demand for jute goods continued to shrink.

12.5.3 Competition from synthetics halted expansion in demand for jute goods in a number of East European countries, notably Poland and Hungary. Although packaging requirements in these countries increased considerably in recent years, all the growth took place in polypropylene because of the deterioration in the price competitiveness of jute. It would thus be obvious that the competition from synthetic products remained extremely stiff and was likely to intensify even further so that every relative increase in the price of jute could mean a further loss of markets. The

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<sup>1</sup> FAO prepared two documents on the impact of synthetics on markets for jute goods in developed countries after exchange of views with representatives of trade and industry including petrochemical firms. On (CCP : JU 74/8) presented a general assessment of the likely impact of the oil crisis on the competitive position of the main agricultural raw materials and the other (CCP : JU 74/7) revised and updated the information for major consuming countries contained in a previous paper on demand for jute goods in the EEC, vide 1974 Report of the Ninth Session of the Inter-Governmental Group on Jute, Kenaf and Allied Fibres—p. 2 Rome, Food and Agriculture Organisation, Document on No. CCP : 74/22 (CCP : JU 74/11).

possibility of some favourable developments like new packaging uses for jute (e.g. Wrappings for plants in transit), new consumer uses such as in furnishing fabrics and backing for tufted carpets cannot, however, be ruled out. In some of the less developed countries of South Europe, where industrialisation is relatively recent, the demand for jute packing material may not begin to be affected by synthetics for some more years. This could also be true of consumption trends in Japan and South African countries.

12.5.4 The FAO Inter-Governmental Group on Jute, Kenaf and Allied Fibres has been recommending indicative target prices. However, the Group in its Ninth Session held in October 1974 observed that "no indicative price range, both remunerative to growers and at the same time competitive with synthetics, could at present be recommended" and expressed the hope that "the situation at the time of the 10th Session would be such as to enable agreed indicative prices for jute and kenaf to be recommended once again."<sup>1</sup> An extremely critical situation is currently facing the world jute economy due to growers' demand for a substantially higher price to maintain jute cultivation in the face of intense competition from rice and other agricultural products.

12.5.5 In India there is need for safeguarding the comparative price advantage in jute and allied goods. Measures necessary to achieve a breakthrough in its productivity by stepping up research and extension effort have been spelt out in Chapter 22 on Commercial Crops. These measures include more extensive cultivation of jute under irrigated conditions, more vigorous extension of improved seed varieties and agronomic practices and adequate supply of inputs for the crop for increasing supply at reduced but remunerative cost for meeting the internal and external demand. In order that the farmer and the industry could get the benefit of increase in productivity, substantial improvement in marketing is needed. Further, the export policy of the Government of India for jute must take into account the sale policy and exchange advantage of Bangladesh due to devaluation of the Taka. Research in new uses of jute in the fields of textiles, floorings, construction materials, woollenised goods etc. have to be intensified in the context of the competitive situation between jute and its synthetic substitutes in the various consumer markets. In particular, there is need for a continuing examination of developments in the competitive situation of jute vis-a-vis its synthetic substitutes in consumer markets. According to a United Nation's Study<sup>2</sup> both India and Bangla-

1 1974. Report of the Ninth Session of the Inter-Governmental Group on Jute, Kenaf and Allied Fibres, p. 4 Rome. FAO Document No. CCP : 74/22 (CCP : JU 74/11).

2 1971. Report of Jute Fact Finding Mission, Vol. I : p. 20, United Nations Development Programme.

desh face "problems of increased investment required to switch manufacturing of jute into carpet backing or other non-traditional products ranges at prices competitive with synthetics."

12.5.6 Wool and woollen goods : India ranks low in world production of wool but high among the exporters of carpet wool. Other wool items exported are : raw wool, wool wastes, worsted goods, woollen blankets, shawls, carpets, druggets, woollen hosiery etc. In order to meet the internal demand of textile mills and cottage industries considerable quantities of superior quality wool and wool tops are imported. Imports have, however, been steadily declining from 20 million kg in 1963-64 to around 9 million kg in 1973-74. On the whole, there was a positive trade balance in the matter of wool and woollen goods which amounted to as much as Rs. 32 crores in 1973-74. We feel that to boost the export trade in wool and woollens the small scale industries departments in the States should provide necessary facilities. Exports of raw fine wool should be progressively restricted and export of manufactured woollen goods should be encouraged instead. Development of exotic breeds of sheep needs to be further stepped up for obtaining indigenously increasing quantities of fine quality fleeces so that the country could enter international markets in woollen garments and carpets. Fine quality fleeces may be allowed to be imported till such time as indigenous production has sufficiently improved and the country is able to meet fully the demand of the domestic woollen industry. We support the recent revision in the import policy under which the exporting units can import wool. There is also need for simplification of the procedure of payment of drawback on export duty to the wool exporting units.

12.5.7 Essential oils : The extensive plantation of lemongrass in Guatemala, Haiti, Madagascar, Belgium and Congo during the post Second World War period has considerably hit India's export trade in lemongrass oil. Synthetic citral is yet another possible competitor but its use is economical only if the price of India's oil rises above a certain point. In view of the growing competition from Guatemala and the production of synthetic citral in the USA, it may not be possible to increase the exports of lemongrass oil to any significant extent. Efforts could, however, be made to maintain the exports at the level prevailing in the early sixties.

12.5.8 Apart from lemongrass oil, Indian sandalwood oil is known all over the world and has practically no competitor. In Chapter 43 on Minor Forest Produce and Chapter 46 on Forest Planning, Research and Education, we have discussed the steps to be taken to control the spike disease which is affecting the sandalwood plantations. A product named "Sandela GD" has been put into the market which is sold at half the price of the genuine sandalwood oil. It is, therefore, essential to maintain the

prices of Indian sandalwood oil within reasonable limits so that the buyers may continue to buy the natural product. There is the prospect of a big market arising for essential oils due to a sharp escalation in international prices. It is reported that prices went up by 300 per cent during the year 1973-74. India should be in a position to cater to a substantial part of the rising world demand for these oils.

12.5.9 Hides and skins : The decline in exports is mainly due to the Government's policy to restrict the export of raw and semi-processed hides and skins and to add more value by converting these into tanned leather and leather goods and earn more foreign exchange. Also it is being planned that the export of semi-processed leather should go down and exports of finished leather and leather manufactures should reach the target of around Rs 185 crores during the Fifth Plan period. Also, the methods adopted for the preparation of hides and skins for the market by way of flaying, curing and drying are defective. In consequence, hides and skins of India not only fetch less price in the international market but a large quantity has also to be imported. This loss in foreign exchange can be averted if proper measures are taken to improve the quality of hides and skins. A major step taken by the Government towards this objective has been the setting up of a model training-cum-production centre at Bakshi-katalab near Lucknow. This is meant for imparting training to technicians in hide flaying, curing, carcass, utilisation, tanning of leather and footwear manufacture. More such regional training centres are being set up. Modernisation and improvement of slaughter houses will help in stepping up the production of quality hides and skins.

12.5.10 Live sheep and lambs : Export trade in live sheep and lambs has been on the decline since 1954-55 and the annual export in 1973-74 was around 17,000 heads valued at Rs 6 lakhs for mutton purposes to countries like Abu Dhabi, Dubai, Japan and Saudi Arabia. While it may be neither feasible nor desirable to spare large number of animals for export in the near future due to pressing internal demand, a limited number of lambs can continue to be exported to earn much needed foreign exchange and retain contacts with foreign markets. There is scope for capturing India's earlier markets of Sri Lanka, Burma and Malaysia provided stud animals properly protected against foot-and-mouth disease are exported. The export policy under which export of sheep is banned since 1967, along with that of cattle, needs to be reviewed.

12.5.11 Lac : Lac is facing a number of problems on production, marketing and remunerative prices to the growers. Exports have been decreasing in quantitative terms year after year. The value of foreign exchange earned from exports is, however, not going down due to the realisation of higher prices as would be evident from the following figures :

Year	Quantity exported ( <sup>'000</sup> tonnes)	Foreign exchange earned (Rs crores)
1969-70 . . . . .	16.7	4.78
1970-71 . . . . .	13.3	5.00
1971-72 . . . . .	13.7	6.59
1972-73 . . . . .	7.6	6.19
1973-74 . . . . .	5.6	14.40

Emphasis has been given in the various meetings of the Indian Lac Development Council to boost production by introducing improved methods of lac cultivation and channelising its trade through cooperative societies and State marketing federations.

12.5.12 The Government of India set up a Standing Advisory Committee on Shellac Industry in December 1974 to review periodically the state of shellac trade, the minimum export prices for this commodity and the ways and means of improving the earnings of stick-lac gatherers. The Standing Advisory Committee is composed of the Secretaries in-charge of the subject in the State Governments of Bihar, Madhya Pradesh and West Bengal, Chairman of the Shellac Export Promotion Council, Director, Indian Lac Research Institute, Ranchi, Director, Directorate of Lac Development, Ranchi and Deputy Secretary in-charge of Export Promotion, Agriculture Division in the Ministry of Commerce, who acts as the Convener. The functions of this Committee include; submitting reports on the state of the shellac trade to the Government before the end of April and September each year; recommending minimum export prices for various types of shellac for each season having regard to crop prospects, stocks available out of the previous crops, international demand, prices of synthetic substitutes and other relevant factors. We feel that there is need for setting up a suitable agency charged with the responsibility for coordinating the activities of the various organisations handling shellac. In the past, India held a virtual monopoly in the lac trade but during the recent years Thailand has emerged as a keen competitor accounting for 40 to 45 per cent of the total lac trade in the world. Since Thailand is the lone competitor, efforts have to be made to avoid direct competition with it and evolve a consortium approach to step up exports.

12.5.13 There are bright export prospects for shellac and significant increase in lac production has become imperative. This would be possible if the exporters could sustain the interest of stick lac growers and gatherers by ensuring attractive prices. The Standing Advisory Committee on Shellac Industry has to devise a scheme under which growers can be ensured fair prices. For effecting improvements in cultivation and collection practices efforts have to be made to organise lac growers by forming

cooperative societies. Since the foreign buyers are now interested mainly in importing bleached lac, there is need for developing the capacity of the lac bleaching industry in India.

12.5.14 Fruits and vegetables : Bananas, mangoes and citrus fruits are the important items among fresh fruits which are exported, and onions and potatoes are the leading items among vegetables. Onions alone accounted for 35 per cent of the total value of exports of fruits and vegetables (other than cashewnuts and walnuts) during the triennium ending 1973-74. Exports of fresh fruits and vegetables, however, constitute less than 1 per cent of the country's production. Moreover, exports of fresh fruits are not directed to the major importing countries. Exports of bananas are confined mainly to Kuwait and Bahrain Islands whereas major importing countries are USA, Japan, Germany (FR), France, Spain, UK and Italy. Similarly, in the case of oranges the major importers, namely, Belgium, France, Germany (FR), UK, Netherlands and Sweden do not import from India. With regard to apples major importers like Belgium, Luxembourg, Czechoslovakia, Germany (FR), Brazil, Netherlands and USSR also do not import from India. The inhibiting factors in the drive for stepping up exports of fresh fruits are : (a) lack of production of varieties and qualities in demand in the major importing countries; (b) inadequate arrangements for transport in a fresh form; and (c) level of export prices being lower than the domestic prices. In the case of grapes, because India's harvest season falls in December to May, there might be good opportunity to develop exports to European markets. At present, however, there is hardly any production of established seedless varieties which are in demand.

12.5.15 Among fresh fruits, banana is a major item entering into the world trade. The major exporting countries are Brazil, Ecuador, Venezuela, Honduras. In 1960-61, 13,000 tonnes of bananas were exported from India. Exports declined to 8,000 tonnes in 1966-67 and in recent years since 1971-72 these stood at 4,000 tonnes. India is only a marginal exporter with hardly 0.1 to 0.3 per cent of production entering the export trade. The main reason is that bananas are not grown on large farms as in the main exporting countries. Therefore, it is difficult to guarantee the quantity and quality for large shipments. However, re-opening of Suez Canal would reduce both the time taken and the cost incurred in transportation and may facilitate the recapturing of markets in USSR and East European countries. This possibility may have to be examined carefully.

12.5.16 Onions and potatoes : The export trade in potatoes is dominated by the European countries in the form of intra-European trade and India does not export to any of these countries. There might,



however, be scope for exporting disease-free potato seed in view of the fact that major producers, particularly European countries, look for seed potatoes around January and India can meet this requirement. There are also indications that Bangladesh, Singapore and Malaysia could be developed as potential markets for Indian potatoes. These markets prefer 'Bintje' potatoes because of their yellowish colour of flesh and fewer number of eyes. Potatoes grown in South Indian hills could meet the needs of Sri Lanka. There are several countries in South East Asia, Middle East and Africa which are not ideally suited for potato production and India could supply seed as well as table potatoes to such countries. A promising line of export is dehydrated potatoes and dehydrated onions. So far efforts to enter the world trade in dehydrated onions have not been successful because of high cost of production, lack of standardisation and non-availability of requisite varieties of onions. Such varieties should be developed which while giving maximum outturn on dehydration also possess other qualities like colour, size and pungency. In the case of fresh onions, the main destination was Sri Lanka which is now developing its own production. The export demand from this country is, therefore, likely to fall off. As a matter of fact no exports to Sri Lanka were made during 1973-74. It may be added that because of balance of payment problems Sri Lanka's import demand for many agricultural commodities is likely to fall off. The scope for increasing export of onions to countries like Sri Lanka, Malaysia and Singapore is also little because these countries get their supplies from China. Considerable scope, however, exists in the European markets during the off-season months around January when imports are completely liberalised by them to meet their internal demand. These markets prefer the light-golden and mild flavoured medium bulbs which India does not produce in abundance as yet. Efforts can also be made to develop exports to African countries which get their supplies from UAR at present.

12.5.17 The IIFT after a survey of 22 countries of the world in 1968 to assess India's export potential of fruits and vegetables, reported excellent market opportunities in Europe, West Asia and South East Asia for the export of vegetables like cauliflower, cabbage, French beans, garden peas, capsicum, ladyfingers, brinjal, tinda, parwal, bitter gourd and yam. There is also scope for exporting quality tomato and tomato products. According to this survey the country had the requisite resources to reach the export level of 16.5 thousand tonnes of fresh vegetables and 10 thousand tonnes of processed vegetables by 1975-76. Though these targets might not be realised in the near future they indicate that there is ample scope for developing exports of these items. The re-opening of Suez Canal would facilitate such exports. The country should be able to evolve the right kind of varieties for export with regard to colour, shape, size, taste and quality of different vegetables. It is necessary to organise the

production of vegetables for export purposes in compact areas on scientific lines, preferably under the aegis of a public sector or a cooperative agency. Marketing infrastructure for export also needs to be developed so that quick transit is possible from the producing areas to the export points. About 80 per cent of the country's production of dried mushroom is also being exported to the European countries and the USA. There is need for exploring further the export potential of this item.

12.5.18 We also feel it necessary to examine the export potential of cut flowers and bulbs for the development of floriculture in the country. Germany (FR) is the largest importer of flower bulbs, cut flowers and live plants. Other important importing countries are UK and Sweden for flower bulbs; Sweden, UK, Switzerland, France, Holland and Italy for live plants. The demand of USA for ornamental plants is at present being met by Holland, Italy and Southern France. Israel also competes in this trade. In Asia, Thailand and Malaysia are important exporters of cut flowers particularly orchids and gerbera. India has good potential for entering this trade. Detailed recommendations in this regard are made in Chapter 23 on Horticultural Crops.

12.5.19 Cashewnut shell oil : The main reason for India's poor performance in the exports of cashewnut shell liquid (CNSL) is its high cost of production compared to other CNSL producing countries, making it incompetent in the world markets. In order to reduce the cost, research on conditioning of nuts, heat control, oil bath machinery etc. should be intensified.

12.5.20 Efforts have recently been made by some Indian firms to export finished or semi-finished products of CNSL such as cardanol, CNSL resins, etc. However, it is reported that the major importers in UK, Japan and USA prefer to import CNSL in raw form and manufacture CNSL products themselves, depending upon their requirements for various end-uses. The endeavour should be to tap non-traditional markets e.g. Australia, Taiwan, Republic of Korea, Czechoslovakia, Yugoslavia and Romania where importers prefer resins as such rather than CNSL because their requirements are small. There is need to assess the quality and specifications of various resins that are currently being used by various end users, requirements of such resins, price advantages etc. in these markets.

#### Items with Growth Potential

12.5.21 Cotton textiles : Exports of cotton textiles (mill-made), yarn and fabrics, have expanded steadily since 1966-67 and touched an all-time record in 1972 as the industry entered an era of ideal working conditions after passing through a period of labour unrest and near raw material famine. Exports touched a new record level of Rs 226.35 crores

in 1973. There was a sharp increase of Rs 76.26 crores over the earlier record performance of 1972. India had an edge over competing producers of textiles in the matter of raw material prices due to two successive good years of cotton crop. India's traditional competitors, namely, Hong Kong and Japan, the free ports in Malaysia and Singapore alongwith the sophisticated markets of Europe, America and Oceania had to effect imports. Special ad hoc quotas were granted by Germany (FR) and USA while Iran relaxed import restrictions on certain varieties of cotton textiles with a view to satiate the enormous internal demand and to arrest rising prices. Export of cotton piece goods rose sharply from 430.6 million square metres valued at Rs 81.1 crores during 1972 to 631.0 million square metres valued at Rs 137.6 crores in 1973. The unit realisation recorded substantial improvement from Rs 1.88 in 1972 to Rs 2.18 per square metre in 1973. The higher unit realisation was possible on account of better prices obtained in countries like UK, USA, Japan, Australia, New Zealand and EEC. The export performance in the field of cotton yarn and cotton apparel was equally encouraging. The performance during 1972 and 1973 indicates the export potentialities in the textile markets given adequate supplies of raw material at right prices.

12.5.22 The major constraint on developing exports of cotton textiles and yarn has been the rise in prices of raw material. Rising internal demand has also been coming in the way of higher exports of the cotton textiles. Bearing on the problem of supply there has been the high rate of under utilisation of installed capacity. On an average about 78 per cent of total spindles in 1970 worked in the first and second shifts and 68 per cent in the third shift. Under ideal conditions the optimum capacity utilisation should be 95 per cent in all the three shifts after making allowance for idleness of machinery during maintenance. The main factor responsible for under utilisation of capacity was the shortage of raw material. Domestic cotton production failed to keep pace with the industry's needs and it was not possible to import adequate quantities due to foreign exchange limitations.

12.5.23 A welcome feature in the raw material situation in recent years is the increasing proportion of the long and superior long staples in indigenous production. If this trend persists the country may no longer depend on imports of superior cottons. However, there may be a continuing need for medium staples for a few years due to the commitment of the mills to produce standard varieties of cloth for mass consumption. In Chapter 22 on Commercial Crops we have discussed in detail the policy regarding the proportion to be maintained in the production of the different varieties of cotton. We would also like to reiterate the recommendations made in our Interim Report on Certain Important Aspects of Marketing and Prices of Cotton, Jute, Groundnut and Tobacco for improving

marketing facilities for the crop, particularly that the Cotton Corporation of India should be able to purchase all quantities of cotton offered at minimum prices during a year of bumper production and act as a holding agency for such stocks.

12.5.24 The pattern of international trade in cotton manufactures has undergone significant changes in recent years. The less developed markets of Africa and Asia, where India enjoyed substantial trade in the past, have developed their own textile industry and have also raised tariff walls to protect their industry. If India is to make any headway in these markets, it will have to be largely in blended fabrics and sophisticated piece goods. On the other hand, the growth of demand for pure cottons has been no less important than in the field of blended fabrics in the developed markets of Europe, America, Australia and New Zealand. The growth has been significant over the years but the quality and the variety of fabrics in demand are such as the country's pattern of production cannot meet. This explains our inability to fulfil quotas or targets in developed markets in all categories. If our export effort in the field of cotton textiles is to show any promise for the future, the production base for cotton piece goods and cotton blended fabrics in the mill sector has to be vastly improved. The present capacity of the industry is largely suited to low density fabrics and standards which do not compare favourably with those of many other supplier countries. The production base, therefore, needs to be considerably improved for the manufacture of high density fabrics and heavy qualities like ducks, denims and corduroys, apart from a wide range of sophisticated fabrics. To enable the mill industry to meet the prospective demand, a dynamic system of modernisation and restructuring of the export sector of the industry is of paramount importance. Demand for these items in the markets of USA, UK and EEC provide vast opportunities, which can be met only if the production base is geared to the needs of these markets. Exports from India to East European countries, Sudan and UAR where there are bilateral agreements, have increased substantially and there are bright prospects ahead, particularly in the field of finished fabrics and manufactures with high unit realisation. Canada, Australia and New Zealand provide good scope, but the limited range of India's production and high cost hamper full exploitation of these markets. Markets in the developing countries, particularly Burma, Sri Lanka and Indonesia can provide big openings if only India has bilateral agreements with them.

12.5.25 Handlooms and silk : Handlooms are developing as an important export item. From a modest figure of Rs 10.1 crores in 1962, exports went up to Rs 47.55 crores in 1973. Silk exports have gone up to as much as Rs 15.5 crores in 1969-70 and the expectations are that this is a sector which can develop. Indian handlooms appear to have estab-

lished their position in the world both in the traditional and non-traditional markets and constitute a definite "port of call for most merchandising people in the fashion piece goods and garments trade. It is necessary to cash in on this situation."<sup>1</sup> We reiterate the recommendations made by the High-Powered Study Team on the Problems of Handloom Industry for tapping the export potential in this sector, particularly the suggestion for setting up 50 export oriented pilot production units in important handloom centres in the country, contributing to the export market and having highly qualified weavers. India's export of mulberry silk fabrics is only one-eighth of the internal production and is almost insignificant in world supply. Whatever is exported from the country is not because of quality considerations but because of artistry of the finished products. Low productivity and poor quality cut at the very root of the silk industry. There is scope for expanding sericulture to new areas within the country and this alone can increase production to such levels as can make the industry self-sustaining. Steps have also to be taken to modernise production techniques and exercise greater quality control. Detailed suggestions in this regard have been made in Chapter 26 on Sericulture.

12.5.26 Tea : Exports of tea from India on an average amounted to 28 per cent of the total world imports. India's share in the total imports of tea by United Kingdom declined from 47 per cent in 1967 to 31 per cent in 1972. In the case of USSR, India accounted for on an average 91 per cent of the total imports during 1967-72. In 1971, India met almost the entire imports effected by that country. Though USSR has stepped up its production of tea considerably, the per capita consumption in that country is rising steadily. Therefore, imports of Indian tea may continue to increase. Another favourable factor is that Sri Lanka is not a competitor in this market. India is also meeting between 14 and 20 per cent of the requirements of leading importing countries like Netherlands, Australia, Canada and Iraq. Besides these major markets, India accounts for a nominal share in the total imports effected by countries like Morocco, Japan and Chile. The pattern of exports of tea from India suggests that there is need for making a continuing countrywise assessment of export possibilities of tea not only to traditional buyers but also to the new markets particularly in the Middle East.

12.5.27 We are of the view that there are good prospects of expanding export of tea in the long run provided a bold export promotion programme backed by high level of production is taken up. It is not correct to estimate the future export demand on the basis of observed trends in exports in any particular period. The export possibilities should be

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1 1974. Report of High Powered Study Team on Problems of Handloom Industry, mimeographed, p. 71, New Delhi, Ministry of Commerce, Government of India.

assessed after due consideration of the potential demand both in traditional and non-traditional markets.

12.5.28 Coffee : Exports of coffee from India amount on an average to only one per cent of the total world imports. Though India is exporting coffee to a large number of countries, her exports had been of a significant order in the case of only a few countries, namely, USSR, USA, Yugoslavia and Germany (DR). Further, India's share in the total imports effected by major importing countries like USA, Germany (FR), France, Italy, Sweden and UK has been only marginal. In view of this situation it is felt that, given the proper export promotion measures, it might be possible for India to improve its performance vis-a-vis these countries. Besides, the peak level of export reached in 1972 in respect of these countries was substantially higher than the order of average annual exports of these countries during the period 1966 to 1972. Whereas exports to quota countries are to be effected within the framework of International Coffee Agreement, there is no such restriction in the case of non-quota countries. Therefore, the possibilities for stepping up exports to non-quota countries (for example USSR, Poland, Hungary and Romania) should receive special attention. Another country which is stepping up imports both of raw and soluble coffee is Japan. Japan's consumption is mainly of robusta coffee though of late arabica variety (both washed and unwashed) account for an increasing share of her total imports. The major suppliers to Japan are Brazil, Ivory Coast and Columbia and there have been no significant exports of either raw or soluble coffee from India to Japan. Since India produces both the varieties there is good scope for exporting coffee to Japan.

12.5.29 India has to aim at a growth rate of 5 per cent or more of production of coffee in order to meet the domestic demand. In our view the approach in assessing export possibilities of Indian coffee should be first to estimate the broad order of the likely increase in demand on a countrywise basis (in terms of different types of coffee) over the next 10 years followed by an assessment of the share in such demand which India can meet.

12.5.30 Spices : The major export items in this commodity group are pepper and cardamom. The export prospects of both have been discussed in the Commission's Interim Report on Certain Important Aspects of Selected Export Oriented Agricultural Commodities. India accounted for 20 per cent of the annual average world imports of pepper during the period 1966 to 1972. Though India exports pepper to a large number of countries, the offtake of only a few of them viz. USSR, Poland, Czechoslovakia, UAR, Italy, Canada and USA is significant in the context of their total imports. India accounted for the entire imports of pepper by USSR, Poland and Czechoslovakia as also UAR in certain years. In

the case of Italy and Canada, India has been catering to a substantial part of their requirements. There is a group of countries, (viz., Singapore, Germany (FR), France, UK, Morocco, Japan, Australia and Netherlands) which though major importers of pepper, lift only a very nominal quantity from India. In the long-term export strategy in this commodity, therefore, special attention needs to be paid to improve exports to these countries.

12.5.31 India's competitors in pepper trade are : Indonesia, Sarawak and Brazil. Wide fluctuations in the international prices of pepper lead to severe competition among the producing countries and impart an element of instability to the volume of trade in the commodity. An Asian Pepper Community comprising Indonesia, Malaysia and India, which together account for more than 80 per cent of the world output of pepper, has been constituted recently. This forum will consider the problems of production, research and marketing with special reference to the need for stabilisation of prices to ensure adequate returns to the growers.

12.5.32 There is need for formulating a long-term pepper development plan to meet the rising demand both for export and internal consumption. Such a plan should concentrate on evolving those varieties of pepper which are in demand in foreign markets. It is essential to identify the factors which have been responsible for causing a decline in the production levels of pepper during the last decade. Research and development work which has been done on this commodity has mainly focussed on the selection and evolution of new strains. The highlight of this effort has been the emergence of the Panniyur I variety which is reported to have fourfold yields compared to the existing varieties. It is unfortunate, however, that the programme for popularisation of this variety received an initial setback on account of certain doubts expressed about the acceptability of its pungency characteristics in foreign markets. The variety, however, stood the quality tests according to the Commonwealth Standards and the Central Food Technological Research Institute, Mysore reached the conclusion after stringent quality analysis that this hybrid was of very good quality and in several respects compared favourably with other popular varieties being exported from the country. Now that the acceptability of this variety in foreign markets has been established, programmes for popularisation have to be given high priority for augmenting its exports.

12.5.33 There is need for evolving and testing other high yielding varieties apart from Panniyur I. We would recommend that, to start with, a few foreign hybrids of pepper should be selected for field trials in consultation with the Ministry of Commerce. In this process, apart from the yield rates and cost of cultivation, their quality acceptability in export markets should be kept in view. There is need for taking some

urgent measures for augmenting the production of pepper like evolving a suitable plan of action for eradication of wilt disease, encouraging cultivation of pepper mixed with other plantation crops like coffee, coconut, arecanut, etc.

12.5.34 The export performance in the case of pepper has been suffering on account of lack of export market intelligence. If exports of pepper are to be increased, more information would have to be collected on a systematic basis about the qualities popular in the various importing markets and their sources of supply as also the price advantage which these alternative sources provide vis-a-vis India. Advantage should be taken of the services of the Asian Pepper Community. We feel that the Ministry of Commerce has to ensure in the interest of pepper exports that Indian Embassies and High Commissions evolve a better system of reporting on prices of this commodity and identify the countries where Indian pepper can find a ready or competing market. On the basis of such information it would be possible to assess the extent to which the demand in export markets could be catered to and due weight given to foreign specifications in the Indian grading system so that production of pepper of lower pungency is encouraged in the country. The main considerations which have to be kept in view are the yield level, the per unit cost of production and the quality acceptability for bulk of the export markets.

12.5.35 India is the largest single exporter of cardamom followed by Guatemala and Sri Lanka. Though exports are directed to a large number of countries, five of these (namely Kuwait, Saudi Arabia, USSR, Japan and Bahrain Islands) account for 75 per cent of total exports from India. Kuwait alone accounts for 34 per cent of total exports from India followed by Saudi Arabia which accounts for another 27 per cent. Exports of cardamom to several countries have been declining over the years. Among these, particular mention may be made of Sweden, USA, Germany (FR), Afghanistan, Finland, Denmark and Belgium. Some of these markets are being lost to Guatemala. Sri Lanka is emerging as a serious competitor in the Saudi Arabia and Jordan markets. In our view USA and USSR offer good scope for Indian cardamom and the State Trading Corporation (STC) should be entrusted with the task of exploring these markets. Possibly, Australia will also be able to provide good market for Indian cardamom. A study made in this Commission has estimated that exports of cardamom from India might rise to 3.2 million kg in 1980-81 and 3.7 million kg in 1984-85, on the assumption that the world consumption of cardamom would increase by 4 per cent per annum during the Fifth Plan period and that India's share in the world trade would remain constant.

12.5.36 No serious attempts have yet been made for the development of cardamom in India. According to the Cardamom Board it is not



difficult to obtain an average yield of about 125 kg per hectare with improved cultural practices against the present average yield of about 45 kg per hectare. The primary task in any programme of development of this crop is the undertaking of a survey of the existing plants so as to assess the area affected with Katte disease and to develop a programme for a gradual control over this disease with a view to eradicating it in the next 10 to 15 years. Effort for increasing the production of cardamom has to be mainly in the direction of growing it as a mixed crop with arecanut and pepper in protected valley locations which have adequate soil moisture. State Forest Departments could also examine the feasibility of growing cardamom as a catch crop in areas under departmental silvicultural schemes.

12.5.37 There is good scope for increasing exports to the Middle East, West European countries and the USA and the main strategy should be of meeting successfully the competition from Guatemala by giving extensive publicity to the special quality characteristics of the Indian varieties. In the Arab countries cardamom is used for preparation of cardamom coffee. Recent trend has, however, been to reduce the content of cardamom from 50 per cent to below 10 per cent. The demand for cardamom is, therefore, likely to go down. Since these countries provide a potential market for Indian cardamom it would be necessary to undertake a massive publicity programme to popularise new uses of cardamom as flavouring material. It is also essential to evolve denser varieties of cardamom for export to Scandinavian countries. Cardamom oil is another item which offers scope for developing exports specially to France. However, before entering this new line of export it would have to be ensured that cardamom oil of the required specifications could be produced at competitive prices.

12.5.38 Ginger is another item which has a good export potential. Exports after having reached a peak level of 10,000 tonnes in 1957 have continued to remain low. Higher prices of Indian ginger have severely eroded her share in the important markets of the West like USA and UK. Even India's guaranteed markets in the Middle East have been affected by higher prices. There is need to concentrate on evolving fibreless varieties with high yielding capacity to recapture these markets. The market in ginger is highly speculative and measures are, therefore, necessary to improve the marketing facilities for this item for curbing speculative tendencies and ensuring availability for export on a regular basis. Coriander in fruit form is also exported from the country. Exports have, however, declined from 8,000 tonnes in 1961-62 and now range from 100 to 500 tonnes. It is necessary to have some stabilised level of export in this commodity and for this purpose a study of the reasons of fluctuations in exports will have to be made in depth. Such a study should also include turmeric,

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exports of which have been declining.

12.5.39 Minor spices produced in India are reported to be intrinsically superior to those grown in other countries. Other countries producing minor spices like Morocco, Turkey, Yugoslavia, Romania, Iran, China, Bulgaria and Cyprus have large exportable surpluses and are able to quote very low prices in the international market. Due to high level of domestic consumption in India, prices within the country remain out of parity with the international prices. India's competitiveness in the world market is also affected by the quality of some of the minor spices. Improper cleaning, sieving and sorting and at times deliberate admixture of extraneous matter adversely affect Indian exports. Minor spices from India are exported mainly to the East Asian and Middle East countries, most of which have not laid down any maximum limits of impurities. The long run prospects of export of minor spices from India would greatly depend on a package of policies—increasing export surpluses by maintaining the level of production higher than that of domestic consumption, controlling speculative trading and subjecting minor spices meant for export to compulsory grading and pre-shipment inspection under 'Ag-mark'. The present packaging for export also needs to be improved.

12.5.40 Tobacco : Exports of tobacco (unmanufactured) on an average accounted for 5 per cent of the total world imports during the years 1966—72. India exported tobacco in a significant measure to about 24 countries but exports to only half a dozen countries amounted to more than a million kg per year. The leading importer of Indian tobacco was UK. India met 15 per cent of the total import requirements of that country. Next leading buyer was USSR and exports from India to that country went up sharply in 1971 and 1972. In 1972, 36 per cent of USSR's import requirements were met by India against the average of 17 per cent in the years studied viz., 1966 to 1972. Japan got on an average 8 per cent of her total import requirements from India though this share was higher at 12 per cent in 1968. In the case of UAR the share of tobacco from India declined from 48 per cent in 1967 to one per cent in 1972.

12.5.41 Germany (FR) which ranks first among the tobacco importing countries of the world hardly imports any tobacco from India. The same is true of other leading tobacco importing countries like USA, France, Netherlands and Spain. As against this some countries which rank very low as importers of tobacco (like Ireland, Hungary and Singapore) import significant quantities from India. Only a few countries lift a significant part of their requirements from India. However, a small group of countries, even though they are not leading importers, obtain a sizable share of their total import requirements from India.

12.5.42 Processed fruit and vegetable products : During the three years ending 1973-74, "fruits preserved and fruit preparations" and "vege-

tables, roots and tubers, preserved or prepared etc. not elsewhere specified" constituted 42 per cent of the total exports of fruits and vegetables, fresh and processed. The following table gives an idea of the relative contribution of various groups of items during the triennium ending 1973-74 :

TABLE 12.7

Average Annual Exports of Fruits and Vegetables and their Products from India during the Years 1971-72 to 1973-74

Item	(Rs lakhs)
fresh fruits	81(8.3)*
dried fruits	35(3.6)
fruits preserved and fruit preparations	235(24.3)
vegetables fresh, frozen or simply preserved, roots, tubers, etc.	447(46.3)
vegetables, roots & tubers preserved or prepared etc.	169(17.5)
total	967(100.0)

\*Figures in brackets show percentage share in total annual exports of fruits and vegetables.

12.5.43 In the export strategy, emphasis will have to be given to increasing export availability of these items. There is considerable scope for expansion of exports of citrus products mainly juices and mandarin orange segments. There are also possibilities of export of preserved peeled banana fingers. The important mango products which are popular in UK, Western Europe and USA are pulp juices, chutney and mango pickles. It would, therefore, be desirable to establish processing factories in mango growing regions so that the local produce could be utilised profitably for export.

12.5.44 It is reported that there is a great demand for dried bananas and banana powder in European countries. India, however, does not export these items in any significant quantity even though considerable work has already been done in this sphere by the Central Food Technological Research Institute, Mysore. There is need for setting up adequate capacity in the country for producing banana powder for export to the European countries. Efforts should also be made to produce more dehydrated vegetables and to explore the export possibilities of new items of fruit and vegetable products. Some of the items which could be introduced for export are tomato paste, pineapple products, fruit juice powder, dehydrated onions, mango cereal, flakes, papain and pectin, neera, mango juice, preserved litchi bulbs, guava, raspberry and other fruit pulps.

12.5.45 India exports about 10 tonnes of garlic powder (equivalent to 50 tonnes of fresh weight) to countries like UK, USA, Sweden and Singapore. Necessary know-how about the process of the manufacturing garlic powder is available in the country and substantial installed capacity in already established dehydration units, is also available. The production

of garlic powder for export, therefore, seems to be a useful channel for the utilisation of undersized but healthy bulbs which otherwise fetch low prices in the indigenous markets. There is also an increasing demand for garlic in food preparations in several Middle East, South East and African countries which can be exploited by India.

12.5.46 Marine products : Bulk of exports of marine products are directed to two important markets, namely, Japan and the USA. There is considerable scope for diversification both in countries and products. Canada and European countries, for instance, could be potential markets for frozen prawns and lobsters. Fish like tuna, polynemids, sardine, mackerels, etc. could also be exported in different processed forms to these countries with proper organisation and promotional measures. There are possibilities for export of fresh fish to nearby countries such as Philippines, Malaysia, Burma, Sri Lanka etc.

12.5.47 In regard to cured fish, India may be able to export considerable quantities to Asian and African countries by taking necessary steps in the direction of improving the quality, reducing the cost to competitive levels and taking necessary publicity measures. To improve the quality of drying, curers could be encouraged to form cooperatives and financially assisted for purchase of equipment and construction of processing tanks & proper storage capacity. The curers may be trained in new and improved techniques. Proper standards have to be laid down for processing.

12.5.48 For the rapid growth of exports of marine products in general, it would be necessary to maintain strict quality standards. A comprehensive legislation viz., "The Export (Quality Control and Inspection) Act, 1963" came into force on January 1, 1964, and simultaneously Export Inspection Council was set up to advise the Government of India regarding the measures to be taken for implementing the compulsory quality control measures in the country. The Act empowers the Government of India to notify the products which should be subject to compulsory quality control and preshipment inspection prior to export.

12.5.49 Apart from quality control, facilities for proper grading and packaging are needed to increase exports and realise higher unit value. Consumers in sophisticated markets are very exacting. The quality aspect is particularly important in marine products like frozen prawns, frog legs, lobster tails, etc.

12.5.50 Sugar : Exports of Sugar from India have fluctuated widely in the last decade depending upon the availability of surplus for export and the level of international prices etc. The total exports of sugar in 1973-74 were 250 thousand tonnes. The draft Fifth Plan envisages an increase in production of sugar from 4.3 to 5.7 million tonnes which is, however, lower than the levels obtaining in the past. It is necessary to take more active steps for the creation of additional sugar capacity,

simplification of licensing procedures for the installation of additional capacity and closer adherence to the economics of industrial locations without ignoring the overall objective for a wider dispersal of the industry. It is also necessary to divert a significant proportion of increase in sugar production for export, as market intelligence suggests that the world demand for sugar would continue to rise in the foreseeable future. There is room for improving refining and packaging to conserve and increase the sugar content of white and crystal sugar.

12.5.51 Minor forest products : The minor forest products other than lac that enter export trade may be classified into the following groups :

Group	Principal commodities
(i) plants for use in dyeing and tanning.	henna leaves and powder, myrobalan
(ii) natural gums, resins and balsams (excluding lac)	gum karaya
(iii) vegetable materials used for plaiting.	bamboo, cane
(iv) plants and seeds used for pharmacy and perfumery	kuth, psyllium husk and seed, sandalwood chips and dust, senna leaves and pods.
(v) bidi leaves	bidi leaves
(vi) essential oils	eucalyptus oil, lemongrass oil, palmarosa oil, sandalwood oil, vetiver oil.

The total value of exports of these commodities has gone up from Rs 12.14 crores in 1961-62 to Rs 22.64 crores in 1973-74. Nearly two-thirds of these earnings come from myrobalan, gum karaya, psyllium husk, bidi leaves and sandalwood oil. Considerable scope exists for expanding the exports of minor forest products, particularly gums, resins and essential oils. The measures necessary for development of production, collection, marketing, transport and processing of these products to promote their exports in larger quantities are discussed more fully in Chapter 43 on Minor Forest Produce.

#### Items with Little Pull of the Domestic Market

12.5.52 Meat and meat products : The available data on export of meat and meat products indicate that the quantity exported went up from 110 thousand kg in 1969-70 to 2,011 thousand kg in 1973-74. The rise in terms of value was sharper (i.e. from Rs 4.47 lakhs in 1969-70 to Rs 108.32 lakhs in 1973-74). This increase has occurred mainly on

account of the functioning of the modern *abattoir* complex in Deonar and the high prices of meat in the international markets. Actual increase in exports was perhaps of a higher order. The Commission understands that there is gross underinvoicing in the export trade of meat from Bombay. To prevent this it is necessary to channelise exports through an organised public sector agency like the State Trading Corporation. This is also necessary from the point of view of quality control. The indigenous demand for certain types of meat like beef and buffalo meat is not likely to rise to any great extent. There is, however, considerable scope for producing these meats for export particularly to Middle East countries. The present daily rate of exports to these countries is around 15-20 tonnes of buffalo meat. Special steps should be taken to improve the meat characteristics of the buffalo. Unwanted male buffalo calves which at present are allowed to die prematurely should be fattened by feeding them supplements of molasses and urea. Meat from these animals will find a good foreign market. It is also suggested that unproductive buffaloes should be slaughtered and processed for export. There is a mistaken notion that the poor condition of such animals renders the meat unacceptable. There is a great demand in several markets for lean meat for soup manufacture. We would like to reiterate the recommendation of the National Development Council made as early as 1968 that modern slaughterhouses should be set up as commercial corporation.

12.5.53 Mutton products have considerable export potential in view of the fact that Indian preparations are not only well known in the Western industrialised countries but also in the Middle East and the Far East. Meat products (cooked and ready to serve) would fetch higher unit value and thus earn larger amount of foreign exchange for the same amount of exports provided health regulations in the importing countries can be satisfied, strict quality control observed and preshipment inspection undertaken. It may be worthwhile considering adoption of arrangements which some of the West Asian countries have made for setting up Sheep Breeding Farms for export of mutton to Persian Gulf Area.

12.5.54 Hides and skins : Hides and skins (raw or semi-processed) enter into India's foreign trade in a significant manner. The exports of raw hides and skins have been declining due to the policy of the Government to restrict their exports and instead encourage exports of tanned leather and leather goods. The quality of hides produced in the country is generally poor since a major portion is obtained from fallen animals. The total annual production of hides is low being 23 million pieces or 10 per cent of the total cattle population. India is the largest producer of skins accounting for more than 25 per cent of the world's production, the annual order of production being 36 million pieces of goat skins and 16 million pieces of sheep skins. The international market of hides and skins is highly

competitive and quality conscious. India cannot capitalise all its hide production unless stress is laid on quality right from the primary stage of production. Measures necessary for improving the quality of the indigenous hides and skins have been outlined in Chapter 36 on Meat Production and Animal By-products. Exports of tanned products have been rising in recent years. It is, however, observed that there is a gradual decline in the exports of tanned hides while tanned skins have been showing an upward trend. The gradual decline in the exports of tanned skins may primarily be due to the production of finished leather which is reflected in the export of footwear and other leather manufactures. There is a very good demand for East India tanned hides and skins in the foreign markets owing to the presence of lesser fat and wool or hair. Indian tanned hides and skins have consequently an edge over others.

12.5.55 *Animal casings* : Another animal product for which there is a great demand in foreign countries is casings. It is true that there was a sharp decline in the export of this item from Rs 231 lakhs in 1969-70 to Rs 88 lakhs in 1972-73 although, in 1973-74, exports improved again to Rs 135 lakhs. Some countries like UK and USA have banned the import of Indian animal casings since the norms of hygienic conditions in Indian slaughterhouses do not meet the minimum requirements prescribed by these countries. Provisions under the "Meat and Food Products Control Order" should be enforced to make it obligatory on butchers to remove the guts within the prescribed time. There should be a by-products wing in each slaughterhouse with the necessary equipment, *inter alia*, for processing of guts.

12.5.56 *Bristles* : During the year 1973-74, exports of bristles amounted to 110 thousand kg valued at Rs 125 lakhs. India produces the best bristles in the world obtained mostly from indigenous domesticated pigs. Small quantities are also obtained from wild and semi-wild boars. There is, therefore, need to educate the pig rearers and the bristles merchants regarding the export possibilities of this item. Steps should be taken to encourage the collection and dressing of bristles for export. The Indian brush industry should also be encouraged to utilise bristles of higher lengths and turn out brushes of the standard and finish required by the developed countries.

12.5.57 *Leather, leather manufactures and footwear* : Exports of leather and leather manufactures have risen very sharply in recent years mainly due to rise in world prices. From just Rs 72 crores in 1970-71 the exports rose to Rs 172 crores in 1973-74. The total export value has been projected to grow to Rs 185 crores in 1978-79, Rs 235 crores in 1983-84 and Rs 270 crores in 1985-86 in the draft Fifth Five Year Plan<sup>1</sup>. With

1 1973. Draft Fifth Five Year Plan : Volume I : p. 14. New Delhi. Planning Commission, Government of India.

the exports having touched the figure of Rs 172 crores in 1973-74 itself, the projected levels in the draft Plan need to be revised. There is also a large potential for export of footwear for which also a slowly rising trend has been projected in the draft Fifth Plan. The total value of exports has been estimated to grow from Rs 15 crores in 1973-74 to Rs 26 crores in 1978-79, Rs 40 crores in 1983-84 and Rs 50 crores in 1985-86. There is a great demand for leather and leather manufactures in the international markets arising out of aversion in sophisticated countries to work in tanneries on account of the pollution problem. Footwear manufacturing industry cannot afford rise in wages that has taken place in western countries as a result of which developed countries are increasingly relying on imports from Eastern Europe and developing countries. India can meet this demand in view of low wage rates and abundant raw material supplies. The unit return of finished leather has also been steadily rising. Nearly 80 per cent of the leather exported by India is being used for the manufacture of shoe uppers and shoe linings in advanced countries. If India herself could produce these by importing the necessary machines and entering into collaboration arrangements with foreign manufacturers, leather exports could emerge as a leading foreign exchange earner. Many countries in the West might discontinue the production of shoe uppers and the like because of the rising labour costs. However, a breakthrough in finished leather goods is possible only if the leather industry as a whole is geared to high quality production. This would require the establishment of facilities for training of tannery personnel and testing of products as also assistance to the industry for generally improving its performance. To realise the envisaged levels of exports and tap the export potential in the leather industry, it is necessary to develop infrastructure for exports. It is understood that a Leather Development Corporation is being set up under the aegis of the Ministry of Industrial Development and Civil Supplies. Some of the States have already formed leather development corporations under the Indian Companies Act. This will enable the corporations to get money not only from the plan allocations but also from institutional sources like commercial banks and State financial institutions. The Leather Export Promotion Council has also identified 50 units for intensive assistance. These units will take care of about 12 million pieces. If the target of converting 75 per cent of exports from India (i.e. 48 million pieces) into finished leather over a period of five years is achieved, more such units will have to be identified and encouraged for entering export business in leather. The Commission would suggest that necessary funds might be earmarked for setting up common facility centres on cooperative basis with the cooperation of the State leather corporations and the proposed Leather Development Corporation at the Centre. Till the Corporation is set up by the Government of India no steps should be taken



which adversely affect or retard the progressive increase in export of leather and leather goods from the country.

12.5.58 Inelastic production of hides and skins combined with the growing demand for leather manufactures all over the world offers good potential for developing exports both in respect of footwear and leather goods including leather garments. It is observed that European buyers prefer finished leather garments to leather. The fashion emphasis in West has shown very great preference for suedes. India is admirably suited to enter into production of these items and fully exploit the current swing in the fashion usages. It may also be mentioned that the Indian raw material being of poor substance has ideal weight for leather garments rather than for footwear manufacture. The country's own requirements of these goods are negligible because of the tropical climate. These items (especially leather garments) have to be developed as purely export items. The United Kingdom and some other Commonwealth countries remained the traditional markets of Indian leather goods for a long time. The pattern has now completely changed and India has been able to develop several export markets in recent years. Important importing countries of Indian shoes, leather goods and garments at present are USSR, USA, Germany (FR), Poland, Czechoslovakia, Bulgaria and Tanzania.

12.5.59 The inadequate infrastructure development for finished leather and footwear branches of the indigenous industry is acting as a constraint on the export drive. The Central Leather Research Institute, in collaboration with the Gokhale Institute of Politics and Economics, Poona and under the auspices of United States Agency for International Development (USAID), carried out a survey of export potential of Indian leather and leather goods industry in 1970 and recommended that an expenditure of Rs 38 crores, with a foreign exchange component of Rs 9 crores, was immediately required for building up the required infrastructure by way of provision of adequate finances, common facility centres, design centres, market intelligence etc. We would recommend that adequate investment should be made for development of infrastructure.

#### Items to be Processed before Exports

12.5.60 Oilcakes : UK has been the traditional market for Indian oilcakes, although in recent years the trade with East European countries has been expanding. In the case of the major importing countries of oilcakes, viz., Belgium, Luxembourg, Canada, Denmark, France, Italy, Netherlands, Sweden, etc., India's share has been negligible. There is need to explore the possibilities for expanding India's exports of oilcakes to these countries.

12.5.61 Indian oilcakes are reported to be of low quality. In the case of cotton seed oilcakes, for example, a fairly large proportion of cotton seeds are still crushed without adequate dehulling with the result that nearly half of the cottonseed oilcake produced in the country is not exportable. Apart from the low quality, the technical characteristics of Indian oilcakes often vary according to different lots. It is essential that quality specifications as prescribed in the export contracts are rigidly adhered to. In order to ensure its strict adherence by all exporters, compulsory preshipment inspection should be introduced. This work could be entrusted to the Export Promotion Council. In the long run, however, in order to achieve improvements in quality and consistency, it would be necessary to replace the existing small and uneconomic expeller units by large sized crushing-cum-solvent extraction units, capable of processing country's entire output of oilseeds. High freight rates act as another major constraint on exports. Continuous increase in freight rates has adversely affected India's exports to UK and other West European countries. Freight charges on almost all oilcakes are far in excess of the commodity's capacity to bear and space is generally not provided promptly and according to shipment schedule. It is, therefore, necessary to improve the shipping service, both in regard to capacity allocated, priority and freight rates in accordance with the commodity's capacity to bear. Perhaps re-opening of Suez Canal might reduce some of these constraints.

12.5.62 Spices : Spices like pepper, coriander and cardamom are not added as a direct ingredient but are used as a flavouring material in Western dishes. For this purpose a spice is often converted into tincture, essential oil or an oleoresin. In view of the expanding demand from certain countries for these flavouring materials the economics of manufacturing and possibility of exporting these items should be examined.

#### Commodities Requiring Research for Export Development

12.5.63 We attach a great deal of importance to identifying new commodities which can enter export trade. Research is needed both on marketing and product development aspects in respect of such commodities. The first task, however, is to identify the items which can enter into India's export trade. One criterion could be the share of exports from India in total world exports in respect of some of the commodities which are being exported but only in nominal quantities from the country. Mention might be made of items like rice, coconut, oilseed cakes and meals, silk and meat. The share of these commodities in the total world trade during the triennium 1970—72 was of the following order :

TABLE 12·8  
Annual Average Exports of Selected Agricultural Commodities from India  
during the Triennium 1970 to 1972<sup>1</sup>

(thousand tonnes)

Commodity	Total world exports	Export from India	Percentage of India's exports to world exports
rice . . . . .	7,861	19	0·2
coconuts including coconuts in shell & coconuts desiccated . . . . .	34	0·3	8·8
oilseed cakes & meals . . . . .	11,642	810	7·0
silk . . . . .	17	0·6	3·5
meat-fresh, chilled or frozen . . . . .	4,871	2	Neg.

1. 1972. Trade Year Book, Rome, Food and Agriculture Organisation of the United Nations.

We would recommend that an assessment should be made of the export possibilities of each of these commodities by enlisting the consumption patterns in the major importing countries and the extent to which it would be possible to produce the qualities and varieties which are in demand in various world markets. In the case of meat and meat preparations, there are certain new lines of export which need special examination. Tinned meat for pet foods might be quoted as an example.

12.5.64 The possibilities of exporting a number of minor oilcakes after subjecting them to the extraction process also need to be explored. Notable among these are : kardicake, sesamum cake, nigerseed cake and tobacco cake.

12.5.65 Efforts should also be made to export sophisticated dairy products to affluent countries. Many of these countries are shying away from dairying due to the labour intensive nature of the industry. Market development in these countries will be comparatively easy as milk products are already greatly valued. India's market development efforts should be directed particularly to the oil exporting countries to meet the need for foreign exchange for imports of petroleum products. High priced items like chocolate, toffees, infant and invalid foods, cheese, indigenous milk sweets have a good export potential. It will be of interest to develop cake dressings and other milk confectionery containing milk and pulp of tropical fruits like banana and mango, with Indian flavours and sugar ingredients. There is also a good market for ghee in the neighbouring countries which have a sizable population of Indian origin.

12.5.66 Animal feeds occupy an important place in the exports of the country. The traditional items of export are oilcakes and brans as also small quantities of fish meal. The country is at present importing large quantities of dairy products like skimmed milk powder, butter oil etc. to meet the indigenous demand for these items. Programmes for

augmenting the production of these items have, therefore, a high priority from the point of view of import substitution. It is, therefore, essential that the animal feed resources of the country should be utilised indigenously to provide better feed to the milch animals so as to augment their milk production. However, it is also necessary to keep up the export of traditional items of animal feed to the extent feasible. Further, it may help the development of the indigenous livestock feed industry if exports of items like compound livestock feeds, feed concentrates and calf starters are permitted to certain countries like Poland, Yugoslavia, Dubai and U.K. We, therefore, feel that it might not be necessary to stop exports of cattle feed since these are earning us much valuable foreign exchange. The Commission would, however, urge that at least that quantity of cattle feed which when judiciously fed to our milch cattle will produce the equivalent of milk products now being imported, should be prohibited for export purposes. Alternatively the extra milk thus produced should be utilised to manufacture milk products. After meeting home demand the excess products should be exported to earn foreign exchange.

12.5.67 After identifying the potential destinations of developing exports, it would be necessary to study the reasons for poor performance of Indian commodities. This would include examination of factors like Indian export prices vis-a-vis those of competing countries, trade restrictions, quality characteristics in demand, etc. Such studies should specially focus on the nature of the processing of various agricultural commodities required, to enhance their acceptability to various markets, to improve their price competitiveness and to realise higher profits per unit of export.

12.5.68 Development of synthetics and substitute materials poses serious problems for many developing countries exporting natural products. This competition has to be met by measures directed towards improving competitiveness of natural products vis-a-vis the synthetics and discovering new uses for natural materials. This is an important aspect of export effort in the case of items like jute goods, essential oils etc.

#### Other Aspects of Exports Promotion

12.5.69 It has been observed that though India is in a position to meet the demand of the major importing countries in respect of several agricultural commodities, imports are effected by them from alternative sources. An important factor to be kept in view, therefore, is the identification of such alternative sources of supply of individual commodities to the major importing countries. There are certain international markets (like Singapore, Hong Kong and Kuwait) which have specialised in importing agricultural raw material from producing countries with a view to

repackage/process them for re-distribution to a large number of importing countries not having direct trade relations with the producing countries. In order to widen the destination-wise pattern of agricultural exports from India it is extremely important to study the type of repackaging/processing done by the re-exporting countries so that these techniques could be indigenously developed or duplicated.

12.5.70 It is recognised that the prospects of exports from developing to developed countries depend not only on the exportable surplus but to a large extent on the international environment and the commercial policies adopted by the developed countries. We would like to emphasise that the domestic policies of the developing countries are equally important. Export promotion is not merely an isolated functions involving the exchange of goods and services but has to be viewed as a vital function in the context of the overall development of the agricultural economy. Such an effort has to encompass measures for (a) pinpointing areas of demand for various agricultural commodities in raw, semi-finished or finished forms, the production of which can be developed indigenously; (b) undertaking development programmes for producing these items at competitive prices; and (c) developing the infrastructure for processing the agricultural commodities into exportable form and moving them to ports of export. Such a comprehensive effort would obviously necessitate deliberate investment in (a) building export production infrastructure by way of agricultural production, irrigation, forestry and fisheries; (b) promotion of a network of small rural based agro-industries; (c) expansion of transport and communication systems from the producing areas to the ports of export; (d) marketing and sales promotion; and (e) organisational setup necessary to sustain export effort.

12.5.71 Only programmes of well-coordinated production-cum-export efforts would ensure the achievement of the contemplated targets of exports. There is need for earmarking investible funds for development schemes which have a bias in favour of export promotion or import substitution. These investment should be made on integrated projects for production, processing and export of suitably identified varieties of agricultural products in actual demand in different importing countries. The investment in production of export-oriented commodities has so far been broadly on schemes catering to the production aspects only without ensuring actual export outlets. In such circumstances, it becomes difficult to evaluate the return on the investment made in terms of the realisation of certain export targets. It is, therefore, felt that the investment in the agricultural sector for export oriented commodities should be made in terms of composite projects to cover all aspects from production through processing, packing to actual exports. It is also necessary that the export targets should be laid down not only in overall terms but also according

to the important destinations after a careful identification of the countries which hold out a definite promise for importing Indian commodities.

## 6 NEW USES

12.6.1 There is an urgent need for concerted measures to develop new uses of the agricultural raw materials and to stabilise their prices while improving their quality. Such action has to be assisted by promotional measures directed towards improving the competitiveness of natural products vis-a-vis their synthetic and other substitutes. Research and development programmes for each of the natural products concerned are thus of major importance for the improvement of their technical characteristics and the efficiency of production as also for the expansion or development of new end-uses. The resolution adopted by the Third United Nations Conference on Trade and Development on the competitiveness of natural products called for increased research and development efforts to improve production techniques and to increase consumption and trade in these products. It also pointed out that the latter objective should be sought through the development of alternative or new uses of natural raw materials. The diversification of production and exports played an important part in accelerating the export performance of developing countries.

12.6.2 Diversification could be of two kinds—horizontal and vertical. Whereas horizontal diversification involves increasing the range of output of the primary commodities including a reduction of production or the rate of its growth of commodities facing adverse demand conditions in international markets, vertical diversification consists of developing new uses and new processing industries in respect of the commodities in production. From the viewpoint of economic development, vertical diversification is of greater interest than horizontal diversification as it goes beyond the commodity field. In India the process of vertical diversification needs to be carried forward by increasing the infrastructure for processing of the export-oriented agricultural commodities so that there is a tendency to export processed or semi-processed commodities rather than the natural products as such. Intensification of research effort is necessary for discovering new modes of processing products suitable for adoption on the cottage or small-scale industry basis. Processing techniques have to be so developed that the endproducts are of required quality standards in the various international markets. Where India is able to discover new uses for some of its traditional items, specially spices, it would be necessary to give adequate publicity in potential foreign markets to build up a demand for them before production could be started on a commercial basis.

Some of the important alternative uses for the established export-oriented agricultural commodities, deserving serious attention for research and development effort, are discussed in the following paragraphs.

12.6.3 Tea : In our Interim Report on Certain Important Aspects of Selected Export-Oriented Agricultural Commodities, we observed that in view of the vast potential for production which existed in the country, there was a case for pursuing an active export promotion policy for tea. Development of new technology, specially manufacture of instant tea, etc. could boost up India's export to some of the developed countries. For example, the USA though it is the second most important importer of tea in the world, lifts only about 8 million kg or nearly 12 per cent of its import requirements of tea from India. In USA, the use of instant tea in iced mixtures with fruit flavourings has increased tremendously over the past quinquennium. The development of new forms of iced tea mixed in such "ready to drink" categories as liquid canned or frozen concentrate or prepared in carton containers would ensure growing sales of this product in future. In other countries sales of tea mixes have been negligible to date; yet it has good prospects in the high income countries with long hot summers such as Australia, Japan, France and Italy.

12.6.4 Spices : India's exports of spices have been sagging over time. India's market development approach for spices has to be re-oriented to meet the product requirements of the major importing countries. Particular attention should, therefore, be paid to the development of powder and ground spices of the quality required in USA and European countries. Stringent measures will be needed to ensure that there is no adulteration in the export consignments. It is, therefore, suggested that either export should be canalised through a public sector agency or strict quality standards should be laid down and enforced through stringent preshipment inspections. Possibilities of exporting pepper in the form of pepsin could be explored. Efforts should be made to develop new products like oleoresin from pepper. The Central Food Technological Research Institute, Mysore, should undertake research for evolving new products from spices and for processing chillies in forms acceptable to foreign buyers. Efforts need to be made to export cumin, coriander, fennel and fenugreek seeds in powder form in polythene bags and to manufacture oil from these seeds and from tejpat (*Cinnamomum cassia*) for export to industrially advanced countries where it can find a ready market for use in food industries and for pharmaceutical purposes.

12.6.5 Spices are used in the form of curry paste and powder in most of the developed countries. The spices milling industry in India is not as advanced as in other countries and hence the spice powder is not up to the quality standards desired by the importing countries. This aspect deserves further attention.

12.6.6 There is great continental preference for white pepper. At present only Sarawak and Indonesia produce both black and white peppers. India could also come into the export trade. The Pepper Research Station at Talipramba and the Directorate of Arecanut and Spices Development should concentrate on evolving new methods for producing white pepper for export purposes. The assistance from the Asian Pepper Community may be useful.

12.6.7 There is a good demand for volatile oil of cardamom from countries like France provided regular supplies at predetermined prices are ensured. Nearly half of the 600,000 kg of Indian cardamom, which finds its way to Europe, is distilled for oil. If distillation to required specifications is done at the Indian plantations, there could be a good scope for developing export of cardamom oil from India. Before entering this new line of export, it would be essential to find out the actual specifications of the oil which are in demand in the foreign markets. Apart from volatile oil, there are possibilities of processing cardamom into flavouring material. As already mentioned, spices are not used as a direct ingredient but in the form of flavouring material in western dishes. If the economics of manufacturing processed products of cardamom is favourable, the countries to which these products could be exported should be identified.

12.6.8 India's traditional exports of ginger are in the form of dried, bleached and unbleached ginger. Efforts should be made to explore the possibilities of exporting ginger in other forms, viz., fresh fibreless ginger or ground ginger, oil and oleoresin from ginger, pickling of ginger, sugar preserve of ginger, etc.

12.6.9 Cashewnut shell liquid : India's exports of this item have shown a decline in the past decade. It is feared that with the increasing production of synthetic resins, the consumption of cashewnut shell oil in the importing countries may further go down. There is, therefore, need to undertake research on new uses of this oil. There is also scope for extracting liquor from cashew apples.

12.6.10 Sugar : As mentioned in Section 5 of this chapter there are very good prospects for increasing exports of sugar for which there are prospects of a rapid growth in world demand in the foreseeable future. India will be able to export any surpluses which might become available from indigenous production. Apart from this, there is good scope for increasing the output of byproducts of the sugar industry. The main byproducts of the industry are bagasse, molasses and press mud. Bagasse has considerable industrial potential but for variety of reasons, it is continued to be used as fuel for furnaces. As far back as 1963, while commenting on the industrial uses of bagasse, the Planning Commission observed that the khandsari and gur units were so widely scattered that the collection of



bagasse in sizable quantities even in concentrated areas would be very costly. Moreover as bagasse was used as fuel in these units, it would be necessary to substitute coal or firewood in its place which would no doubt present practical difficulties. However, keeping in view the current acute shortage of paper the whole question now needs a de-novo examination. As discussed in paragraph 12.6.14, apart from paper, bagasse, when industrially processed, can give us a host of chemicals (like furfural and methanol) which form the raw material for polymers, plastics and even viscose yarn and nylon. Molasses can be used for animal feed and in the manufacture of acetic acid, lactic acid, citric acid, baker's yeast, oxalic acid, aconitic acid, itaconic acid, etc. There is a possibility of exporting cattle feed prepared from molasses. In foreign countries, where raw sugar is produced, the resulting molasses (black strap) are largely used as cattle feed in admixture with bagasse and other silage. In India also, it is possible to build up a sizable cattle feed industry using molasses, deoiled cake and wild grasses. It is understood that the molasses imported by Japan and Republic of Korea from India are converted into rum and gin for the South East Asian countries. The annual value of such products amounts to a few crores of rupees. The non-traditional uses of press mud for cane wax (by sulphitation) and the commercial exploitation of pulp obtained as a byproduct from sugar industry should also be examined. The possibilities of manufacturing and exporting fodder yeast and sugarcane wax could also be explored.

12.6.11 Fruits and vegetables : On rough estimates the annual production of fruits and vegetables in the country is 20 million tonnes, hardly one per cent of which is utilised by fruit and vegetable preservation industry. It is estimated that about 25 to 30 per cent of the production of these perishables goes waste during various stages of picking, packing, transporting and marketing. The main constraint in utilising the production potential in fruits and vegetables, both for internal consumption and export, is that of developing facilities for semi-processing, dehydrating or preserving large quantities of fruits and vegetables which become available at the harvest time. The processing industry has to be developed keeping in view the seasonal flow of fruits and vegetables. There has also to be a coordinated development of cold storage and the processing industries so that the load on the processing industry could be staggered by regulating the supply of raw material to this industry through the cold storage facilities. Perhaps the advantage would lie in locating the processing industry at the production points and building up an adequate infrastructure from these processing units to the consuming centres and ports of exit.

12.6.12 The growing importance of dehydrating vegetables and use of the waste of various fruits needs special attention from the export angle. Of the latter, particular mention might be made of developing the uses of

mango stones in extraction of protein and starch and of mango bark in resins and gums and leather tanning. Similarly, banana *Pseudostem* (for cushioning material) and apple byproducts (like *Pomace* for pectin and seed for oil) have enough potentialities for commercial exploitation. Papaya is another fruit which can be put to various new uses both medicinal and industrial. Waste products of grape could also be put to many uses including stems (for cream of tartar), pomace (for extraction of edible oil and jelly), and grape marc (for preparation of pectin).

12.6.13 Coir and coir-based products : Intensive efforts have to be made for evolving new products and uses of coir. Research in this respect has necessarily to be based on exploiting the positive characteristics of coir such as durability, resiliency, resistance to rot and dampness and the acoustic and thermal insulation properties. Some directions in which such effort could be made are :

- (i) use of coir as reinforcing material for plastics ;
- (ii) possibility of manufacture of plastic sheets reinforced with coir fibre ;
- (iii) lamination of needled pads with glass fibre tissue or perforated plastic sheets ;
- (iv) use of coconut pith with suitable adhesive combinations for application on hessian to decrease porosity ;
- (v) use of coir fibre for manufacture of high stretch paper for laminating hessians ;
- (vi) use of coconut pith as a filler in the manufacture of linoleum products ;
- (vii) possibility of developing "coir fibre toles" in combination with jute and rubber latex ;
- (viii) use of coconut pith for manufacture of natural and synthetic rubber-based gaskets ;
- (ix) softened coir for use as insulation material in chemical plants ;
- (x) rubberised coir or coir in combination with flexible or semi-urthane foam for use as filter medium ;
- (xi) use of coir fibrous dust as filter tips for cigarettes ;
- (xii) spinning of single strand yarn from softened coir fibres ; and
- (xiii) use of coir matting as protective reinforcements in the mines.

12.6.14 Other agricultural byproducts : Utilisation of indigenously available organic resources for meeting the shortages of raw materials in industry and inputs for agriculture and for export is an important aspect of the national economy. The main problems in the utilisation of agricultural and animal wastes and byproducts are :

- (i) their scattered and bulky nature resulting in collection and transportation problems ;
- (ii) local uneconomic alternative uses ; and ;

- (iii) lack of appropriate technology and consultancy services for the entrepreneurs and agencies who are involved or wish to be involved in the implementation of such programmes.

Studies made by industrial consultants indicate that over the next few years proper utilisation of agricultural byproducts and wastes could give us processed goods of the value of Rs 2,000 crores. Such processing could lead to substantial import substitution and enhanced export earnings. The agricultural byproducts in view are rice and wheat straws, bagasse, rice husk, stems of legumes, pulses and other vegetation. With concerted efforts at the utilisation of these byproducts the total value of processed goods which can be obtained after 2 or 3 years has been estimated at Rs 200 crores. Of these Rs 25 crores could form part of import substitution and Rs 15 crores worth of goods could be exported, the balance being utilised within the country. It is understood that nearly 50 million tonnes of bagasse and another 50 million tonnes of pulse based byproducts which are mostly being burnt at present could be utilised for manufacture of pulp and paper and also furfural, methanol, glue and a host of other chemicals, which could form raw materials for polymers, plastics and even viscose yarn or nylon. It may be pointed out that most of the sugar factories in the country are not self-sufficient in bagasse so far as their fuel requirement is concerned and they have to use extra fuel such as firewood, coal or furnace oil. If alternative arrangements could be made for economic coal and fuel supplies to the sugar factories, the pulping of bagasse for paper making could be encouraged. Dried bagasse consists essentially of fibre and pith. The fibre content which is about 65 per cent of dry weight is suitable for the manufacture of paper of good quality. The pith on the other hand has no value as a paper making material. It is, therefore, necessary to separate the pith from the fibre for the manufacture of paper. This should be undertaken in the sugar factories in order to reduce the baling, storage and transport charges of bagasse meant for paper production. Pith can continue to be used as fuel in the sugar factories. Rice husk can be used to manufacture water filters, specialised cement or molecular sieves used as catalysts in the oil refining industry. Realising the importance of the problem of utilising agricultural by products and wastes and the complex nature of its various aspects the National Committee on Science and Technology constituted a Planning Group on the Utilisation of Agricultural and Animal Wastes in 1973. The main object of this Group was to review the present state of their utilisation and the potential scope for their exploitation. We hope that the recommendations of this Group would help in the identification of exportable items derived from agricultural wastes and byproducts.

12.6.15 A High Powered Committee on Processed Agricultural and Food Products under the Ministry of Agriculture & Irrigation is

functioning and this Committee is charged with the following functions :

- (i) to make periodical reviews of the situation regarding production of the various commodities for which processing and marketing facilities are to be provided on a short-term and long-term basis;
- (ii) to suggest appropriate measures for creating the necessary processing facilities in the private/public sector and for adaptation of the products to market requirements ; and
- (iii) to determine the targets of production of the processed products for marketing in the country and abroad based on market development research.

It is provided that representatives of State Trading Corporation, Trade Development Authority and such other bodies would be associated with the Committee as and when considered necessary. Since there is a large export potential in the agro-based byproducts, we would suggest that the Committee should undertake investigative study on economic aspects, particularly costs and returns of alternative uses of byproducts which would help the development of export-oriented byproducts.

## 7 EXPORT STRATEGY

12.7.1 Notwithstanding efforts in foreign exchange saving, the nature and pace of economic advancement on which India has embarked would involve increasing import requirements. It is necessary to step up earnings of foreign exchange through exports to meet the total import bill. The alternative would be to seek more and more external assistance which is neither desirable nor can be relied upon for growth of the country's economy on a continuing basis. Every effort has also to be made at import substitution so that the total import bill is the bare minimum essential for economic development. Self-reliance has been indicated as a major objective of the Fifth Five Year Plan. It is in this context that the export strategy particularly of agricultural and agro-based products has to be considered.

12.7.2 Certain recent international developments are likely to be helpful to India in her overall export drive. The reopening of the Suez Canal will reduce the shipping costs and transit time between the Indian and European ports. The prospects of better trade relations with the Gulf countries and the Organisation of Petroleum Exporting Countries (OPEC) both through bilateral agreements and on commercial account are encouraging. It should be possible to step up the exports of traditional items and enter new lines of export in this context.

12.7.3 India has a comparative advantage vis-a-vis developed countries

in the production of labour intensive crops. For instance, hybrid cotton seed production involves lot of manual labour and export markets for this seed could be developed by planned effort. With increasing affluence, leisure loving labour in European and American countries are shying away from certain types of odd chores like tending cattle or milking at odd hours. There is also a tendency in certain developed countries to move away from production of basic agricultural commodities to more remunerative (per unit of labour) industrial production and to import the agricultural commodities they were producing. For instance, Netherlands and Sweden are importing increasing quantities of milk products and the Scandinavian countries of timber. These developments could favour exports of agricultural commodities and semi-processed agricultural goods from India. An important task is, therefore, the identification of products in the agricultural and allied sectors with long-term potential for export to the developed countries by a careful examination of the pattern of imports of these countries. It is thus essential to note the changes taking place in internal economies of various developed countries so as to forecast their long-term demand for agricultural raw materials and agro-based products.

### Agricultural Adjustments

12.7.4 At the international level, there is need for agricultural adjustment to help in the long-term development of agricultural exports from developing countries. The FAO undertook recently a study of "the national agricultural adjustments under way in both developed and developing countries, which if synchronized within an agreed international framework, could converge to permit an expansion of trade".<sup>1</sup> This study emphasised that it was necessary in the interest of agriculture based economies that developed countries should draw up plans in respect of specified agricultural commodities which are designed to assure that over time an increasing share of their domestic consumption is supplied by imports from developing countries. The FAO study emphasised the need for giving special attention towards promoting exports of farm products from less developed countries. According to the study, farm products could be broadly classified into two categories, namely : (a) competing products which include cereals, meats, dairy products, eggs, sugar, citrus fruits, fats and oils, tobacco, wool and cotton; and (b) non-competing products i.e. those grown in both more developed and less developed countries like coffee, cocoa, tea, banana, rubber, jute and hard fibres. Almost 80 per cent of the world agricultural trade was accounted for by the competing

1 1972. Agricultural Adjustment in Developed Countries. Rome. Food and Agriculture Organisation (FAO) of the United Nations.

products. The scope for expansion of world trade in these products depends primarily on three principal factors, namely : (a) trends in consumer demand; (b) competition from substitutes in case of rubber and fabrics; (c) the policies of governments in terms of taxes and other controls on foreign trade. However, the more developed countries obtained over two-thirds of their imports of these products from other more developed countries. In case of non-competing products almost 50 per cent of world exports originated from less developed countries and flowed to the more developed countries.

12.7.5 A major thrust in the long-term agricultural development plans of this country, as those of other developing countries, is for achieving self-sufficiency in foodgrains. As production of foodgrains went up and the actual costs and prices of food staples declined there will be downward shifts in the cost structure of traditional export items like rubber, copra, plywood and other tropical products and the prospects of their export to developed countries would improve. This development is likely to be partially counteracted by competition from synthetics and temperate zone products. The extent to which increased possibilities for exports emerge would depend upon the degree of efficiency in allocation for agricultural research. The competitive position of traditional export crops should be maintained and re-enforced by continuous improvement in technology.

12.7.6 The need for exploring the possibility of increasing trade with other developing countries is equally important. A number of suggestions and recommendations with a view to promoting a steady and increasing expansion and liberalisation of world trade with special reference to food products, in particular those of developing countries, have been made by the FAO on various occasions. It has *inter alia*, urged governments to work for the progressive reduction or abolition of obstacles to trade and of discriminatory practices and to take measures aimed at securing additional benefits for the international trade of developing countries. Particular emphasis has been laid on the urgent need for food-deficit developing countries to obtain food imports at stable and reasonable prices. The Asian Rice Trade Fund, which has now been established, aims at promoting intra-regional trade in rice among developing countries by providing financing and/or refinancing facilities on a deferred payment basis. It might be possible to introduce similar schemes of regional cooperation in respect of other commodities when members are ready in due course. It is understood that further necessary follow-up action for the early implementation of the Asian Rice Trade Fund scheme, including studies and preparation of the operational plan and related activities will be carried out by Economic and Social Commission for Asia and the Pacific

(ESCAP) until such time as the Fund is in a position to have its own staff. The Expert Group on Regional Cooperation in the production of coarse grains and pluses of the ESCAP has gone into the problem of promotion and stabilisation of intra-regional trade in coarse grains and pulses and has emphasised the necessity and importance of carrying out demand and supply studies of coarse grains and pulses on medium and long-term basis for various developing and developed countries in the region. The Commission would suggest that a similar integrated approach to the problems facing other commodities should be adopted and formation of commodity communities or producers' associations encouraged to deal with these problems. The communities should try to secure prices remunerative to the producers and fair to the consumers and take up research, development and improvement of marketing/distribution system with regard to these.

12.7.7 The ESCAP at its thirty-first session held in February-March 1975 observed that "the food and agricultural situation is quite acute in several developing countries in the region which in varying degrees are suffering from shortages of food stuffs and agricultural requisites and the balance of payment problem etc...." It is essential that efforts undertaken at the global level should be supplemented by additional and more intensive efforts at the regional level in order to deal with the situation resulting from the prevailing shortages of foodgrains and key inputs and the wide year to year variations in production. We would also like to emphasise that international action in the field of agricultural adjustments is of crucial importance for expansion of the country's trade in agricultural commodities and processed goods vis-a-vis both developed and the developing countries. Due importance should, therefore, be given to this aspect in the export strategy of the country.

12.7.8 India is in a position to develop the production of export of a wide range of agro-based commodities, including several medicinal and aromatic plants, due to the wide variation in its soil and climatic conditions and richness of its plant life. Though at present cereals are in short supply and this shortage may continue for some more time, with modernisation and development of agriculture, surpluses are bound to develop, particularly in coarse grains for which there is considerable demand as cattle feed in several world markets. The export strategy should include provision for producing superior varieties of agricultural commodities for which there is demand in foreign markets and importing cheaper varieties for internal consumption. Export of basmati rice to Europe and meeting the internal demand by importing coarse rice from Thailand is an instance of such strategy.

12.7.9 Development of new export markets alongwith diversification

of exports should be viewed as part of a wider effort to enlarge the country's foreign trade and expand commercial and economic relations with other countries. In the coming years special attention has to be given to the development of closer economic relations with other developing regions notably Middle East, South and South East Asia, Africa, South America and West Indies. These countries need a large complex of raw materials and processed goods for their economic development and possibilities of developing mutual trade with them should be vigorously explored. Exports to European Common Market countries also need special attention since high proportion of India's trade deficit is with them. India has enjoyed long and close trading ties with UK, which have to be further strengthened in view of the growth of India's own productive capacity and changing economic structure. Trade with USSR and countries in Eastern Europe is on a balancing basis and should increase significantly over the next few years. The high living standards in developed countries also offer large possibilities for the development of exports of labour intensive items.

12.7.10 Insofar as the agricultural sector is concerned the primary question is of generating exportable surpluses and ensuring price competitiveness of Indian commodities in the international markets. It would be necessary to ensure that agricultural exports record a quantitative increase during the next 10 to 15 years commensurate with the increase in targets of production which are being envisaged for the various export oriented commodities. To achieve this objective it will be necessary to strengthen the production base of these commodities by consistent research and development efforts aimed both at increasing productivity levels and reducing cost of production. With the evolution of new high yielding varieties, a breakthrough in foodgrains production is already in sight. Research and development efforts of a similar order are needed to intensify the evolution of high yielding varieties of commercial crops.

12.7.11 In developing countries, exportable surplus is generally what they can spare after meeting their domestic demand, and is greatly influenced by the impact of that demand. A more basic problem in countries like India is, thus, of increasing the exportable surplus. In this context, one of the important prerequisites is an expansion of total export availability. The total output has to increase at a higher rate than the internal requirement which is continuously rising as a result of growth in population and improvement in purchasing power of the people. Furthermore, with greater total output, internal and external prices have to be maintained at appropriate levels before desired exportable surplus can be achieved.

12.7.12 The problem of generating exportable surplus is all the more important in case of items like cashew kernels, oilseeds, raw cotton,



raw jute, spices, tobacco and sugar which have hitherto remained practically untouched by the recent developments in agricultural technology. Whatever little increase has taken place in the output of these crops is more due to extension of area rather than any significant improvement in per hectare productivity. A rise in productivity is essential so that there is enough output of these agricultural commodities which could satisfy both domestic and international demands. The related problems of quality improvement and methods of processing them to realise higher exchange value per unit of output are equally important.

12.7.13 In horticulture, the problem is one of inadequate production of fruits and vegetables. These crops also face problems of processing and transportation from export angle. In floriculture, cultivation of flowers of different varieties, especially for export is essential. The demand for fresh roses in Western Europe, for instance, can be met by tending whole gardens of roses of the type required by European customers. As for forestry, the problem is the absence of sufficient exploitation of forest resources for export. A more systematic and scientific processing of forest produce will enable increased export of processed timber/wood in addition to export of shellac, gums and resins and other minor forest produce. In sea foods, the problem is of insufficient catch. Related problems turn on the inadequate deep sea fishing fleet and lack of facilities for processing catch.

12.7.14 In the textile sector, based on cotton, wool, jute, coir, silk and synthetics, there is need for diversification of production, modernisation of industry and for product development. Selective modernisation of exporting or export oriented units, by equipping them with modern machinery is essential to streamline the production for export of this sector. In jute goods, carpet backing and decorative fabrics have a good potential for increased exports and therefore expansion of their production requires special attention. Fiscal measures like reduction or removal of export duty are also necessary. Expenditure on research and development to adapt traditional fibres to changing consumer preference needs to be increased and special encouragement given to the organisation and expansion of production in the product lines or which overseas demand is expected to increase.

12.7.15 It is necessary to raise productivity, reduce production costs and improve the quality of products to enhance the competitive position of Indian products. Although efforts are being made in these directions, yet the basic fact remains that no export plan of agricultural products can be successful unless sustained efforts are made to step up their production. The Government of India has, in recent years, initiated centrally sponsored programmes for maximising production of export oriented crops in different States, under which emphasis is laid on intensive measures for stepping up

per hectare yield of such crops. All possible efforts are being made to supply essential inputs as also credit and marketing facilities. At the same time, care is being taken to ensure that the assistance made available for these programmes is used for securing increased production of various commodities, either for export promotion or for import substitution. The object is to establish a functional relationship between the investment made and the increase of exports or reduction of imports of the concerned commodities. In these programmes, however, there is lack of focus on actual export development. Programmes of development of export oriented agricultural commodities should be jointly organised by the Government of India and State Governments. The question of sharing of costs and specific definition of activities should be decided mutually and an integrated programme of development taken up for promoting the development of export oriented agricultural commodities.

12.7.16 The decision to export involves in many cases a choice between export and home consumption. In most of the developing countries, the need for continued supplies to the exporters is neglected when there is pressure from the home market for retention of production for local consumption. Producers show little interest in export when they enjoy sheltered market at home. Export incentives have a significant role in this context. It has, however, to be kept in mind that fiscal and other incentives can only be used as catalytic tools for boosting exports in the short run.

12.7.17. Restraint on domestic consumption of certain commodities by increase in their prices is one of the methods adopted for promoting exports. It is, therefore, essential to examine the types of consumer controls to be exercised on the internal market for exportable goods where the overall production has to be apportioned. This is an important field of study, the need of which is being keenly felt in the context of present inflationary situation in the country. The ultimate solution, undoubtedly, lies in raising production of export oriented agricultural commodities. An appropriate link between production, productivity and export of export oriented agricultural commodities has to be established in the long run.

### Price Stability

12.7.18 While formulating the foreign trade policy, an important consideration that needs to be kept in mind is that inflation and expansion of exports do not go together. Price stability is one of the indispensable prerequisites for a dynamic expansion of export. It may be mentioned that India's poor performance in exports even of traditional items like cotton textiles and tea in the decade ending 1970 was largely on account of the fact that prices of Indian products tended to be higher than those of the competing countries. Whereas India's share in the total world exports

rose from 14.5 per cent to 14.8 per cent during this decade in case of cotton textiles, that of Hong Kong went up from 6.2 to 16.3 per cent. In case of tea, whereas Indian share declined from 50.4 per cent to 38.4 per cent, that of the East African countries, increased from 3.4 per cent to 15.1 per cent.

12.7.19 There are ways and means of subsidising export prices and keeping them at stable levels at the cost of higher domestic prices to compensate for the loss in exports. Other measures like import entitlements, bonus vouchers, fiscal and cash incentives can also lead to expansion of exports. However, all these facilities are of secondary importance in the long run, and ultimately it is the clear and direct price advantage alone that counts. This emphasises the importance of reducing per unit costs of production and processing of agricultural commodities through increases in productivity levels and economies of scale. The Commission would, therefore, urge that measures to correct the disparity between the export prices of India and competing countries in respect of the major agricultural commodities, which have been inhibiting India's exports of these commodities, may be devised on high priority basis. The possibility of locational advantages of agro-based industries to cater to the export markets and questions relating to provision of suitable incentives to handle competition in certain commodities have also to be studied.

### Packing and Packaging

12.7.20 In the matter of production for export, an important aspect which has been neglected is packing and packaging. Developed countries give special attention to packing in terms of consumer appeal, cost and safety. Export trade of India has also to be made conscious of the importance of quality packing and packaging. The establishment of an organisation on the lines of the International Cargo Handling Coordination Association in USA, to make exporters alert in this regard might be of help. The Indian Institute of Packaging may be entrusted with the task of getting the latest package designs from selected markets regularly and exhibiting them in a systematic manner to the manufacturers and exporters.

### Export Marketing

12.7.21 International marketing is a complicated operation. Trading conditions as well as government policy affect the marketing strategy in the export trade. In the sphere of traditional goods like tea, jute, cotton textiles and spices, the problem of marketing was rarely felt because the trade was handled through a well established channel of brokers and branches of foreign firms in India. As India is now poised for the

expansion and diversification of exports, the problem of export marketing assumes importance. Some important aspects of this problem worth consideration are identification of markets, information, intelligence and statistics on foreign markets, publicity, channels of overseas selling and distribution arrangements.

12.7.22 The first stage in marketing operations is to identify markets to facilitate decisions on what to produce, how to produce and to what specifications and designs. This involves market surveys, sending study teams and trade delegations to find out export prospects. Market research for export has to be developed in its various facets, namely, product research, user market research, operational research, communication research etc. If India has to develop exports of new products and of traditional products to new markets, marketing research and identification of markets are important aspects of export marketing which need added attention.

12.7.23 For successful completion of market surveys and for having a continuous knowledge of ever changing situations in foreign markets, uninterrupted flow of information, intelligence and statistics on a meaningful basis would be required. Trade representatives of India are only available in a limited number of countries and even in these countries for several reasons the flow of market information is not always satisfactory for business use. With improvements in the present reporting system, Indian exporters might be better informed of the possibilities of actual sales. The expert services available in international organisations could also be availed of. The trade documentation services of the ESCAP and Trade Promotion Centre (TPC) have been engaged in preparing inventories and catalogues of publications in the light of information needs of the ESCAP countries. Developing countries like Afghanistan, Indonesia and Sri Lanka have already taken advantage of the trade advisory services of the ESCAP in strengthening their national export promotion efforts or in obtaining general and specific information on various export products. The UNCTAD/GATT International Trade Centre also conducts several professional development programmes and training courses on export promotion and international marketing. It is important that these facilities are availed of to the maximum possible extent.

#### Role of Export Promotion Councils

12.7.24 A number of export promotion councils have been recently established to assist in the promotion of exports of specific commodities. But these councils generally function as forums for ventilating grievances instead of playing an active part in increasing and diversifying the country's exports. The Ministry of Commerce does not always take these councils into confidence either in reviewing or entering into trade agreements with

foreign countries. Prompt action is not taken on their recommendations. There is no attempt to bring out proper coordination among the different export promotion councils. Though the Federation of Indian Export Promotion Councils is supposed to do this job it has not been doing much in this direction and there is not enough coordination in such vital matters, as sending trade delegations and study teams, conducting market surveys and taking follow-up action on the recommendations of the trade missions. These councils have to be provided with adequate resources so that they could properly organise their export marketing functions through planning and promotion, market surveys and collection & dissemination of market intelligence. To be effective, these councils should be suitably strengthened and given some measure of autonomy in conducting market surveys at short notice and provide support to exporters in market intelligence.

12.7.25 The Commission sought the views of selected export promotion councils on the role which they could play in keeping a continuing watch on the developing demand situations in the various traditional and non-traditional markets for agricultural commodities so that it is possible to tap to the full extent the export potential which these commodities have in the various foreign markets. The Cashew Export Promotion Council is of the view that as per the existing setup, individual councils do not appear to be having the expertise for taking up market surveys all by themselves. The Marine Products Export Development Authority is of the view that the export promotion bodies can play a vital role in the field of market surveys and market research because of their close association with exporters, foreign buyers and the prevailing market situations, price movement, demand and supply position, extent of competition etc. There is, however, considerable delay in the clearance of such projects by the Ministry of Commerce and Indian Institute of Foreign Trade etc. whose consent is essential. Further, unlike the export promotion councils, the IIFT or the Commercial Attaches stationed abroad, whose consent has to be obtained in undertaking market surveys, deal in general with many items and their continuous association with marketing of a particular product is almost non-existent. Their views are, therefore, not based on full understanding of the situation. On the other hand, the export promotion bodies are specialised agencies dealing with specific products and they are always closely in touch with the products and the markets.

12.7.26 Replies received from the other export promotion councils bear out the views of the two Councils in general. In view of this situation the Commission would suggest that :

- (i) the export promotion bodies should be authorised to determine and undertake market surveys and research in different export markets as and when required without any loss of time ;
- (ii) they should be provided with adequate finance (including foreign

- exchange) for conducting such studies;
- (iii) the survey team should include at least one member from the concerned export promotion body as this will facilitate the development of adequate expertise within the organisation itself ; and
  - (iv) experts, consultants etc. in the field may be included in the survey team at the discretion of the export promotion council.

### Export Corporation

12.7.27 The Commission is of the view that export drive in respect of several items like rice bran, compound animal feeds, certain forestry and horticulture products is suffering on account of lack of proper promotion and coordination work. The feasibility of establishing a corporation to handle such export-oriented agricultural commodities needs to be looked into. This corporation should lay special stress on export development of non-traditional items like fruits, vegetables, mushrooms, onions, flowers and basmati rice. Export of certain cash crops like castor, pepper, some types of pulses, starch, meat and meat products might also be handled by the corporation. This corporation may be designated as the sole import-export agency for these commodities with the responsibility for planning and developing production, processing and marketing of agricultural products in an integrated manner.

### Infrastructural Development

12.7.28 Provision of adequate and timely finance is indispensable for export production and export marketing. There exists a gap in the existing institutional structure of the export credit system. We would suggest that to bridge this gap the establishment of an export-import bank might be considered to provide medium and long-term export credit and also to meet the short-term credit requirements of the exporters both at the pre-shipment and post-shipment stages. Such a bank could be set up as a subsidiary of the Reserve Bank of India. It also needs to be mentioned that for meeting the varying requirements of different categories of exporters an element of flexibility needs to be introduced into the export financing procedures and facilities so that exporters can switch from one source of finance to the other in accordance with their specific requirements. This need cannot be met by the commercial banks which are at present rendering financing facilities for exports. The possibility of developing factor houses could be examined.\*

\*The 'factor' is an American form of financing business and provides "package facilities" combining in itself the activities presently handled by a number of institutions and intermediaries in the trade leaving the exporter to concentrate his attention to the more important tasks of exporting viz. production and marketing.

12.7.29 Adequate and timely availability of shipping facilities at a reasonable cost is essential in case of agricultural items which are low value bulk commodities. This is particularly important in case of marketing of items like frozen marine products and certain lines of fruit and vegetable products. They require special facility of reefer space.

12.7.30 We would like to emphasise the need for rationalising the freight structure for eliminating uncertainties regarding rates and unilateral changes in rates through voluntary arrangements under the aegis of an international body like the UNCTAD. There is need for a co-operative endeavour between trade and shipping interests in assessing the supply position of reefer space in relation to the requirements, periodically, through a joint machinery of shipping agents, freight brokers and trade representatives.

12.7.31 In the stepping up of exports of perishables (specially fruits and vegetables), the exorbitant airfreight is a major bottleneck. Excessive airfreights makes Indian products un-competitive in the world markets. The development of export business in these perishables could be facilitated by the provision of package rates by the Indian Airlines Corporation. An air subsidy of 20 per cent of f.o.b. value or 50 per cent airfreight (whichever is less) which is currently provided by Air India should be allowed on all airlines and for all distances.

12.7.32 To streamline the transport arrangements for perishables with a view to realising the export potential in them, we recommend that the following measures should be taken :

- (i) liberalisation of permits for road operators and the opening of new routes;
- (ii) removal of restrictions on movement of perishables and cutting down the time of detention at transshipment points, road barriers and inter-State check-posts and providing large covered sheds at these points to keep the consignments;
- (iii) laying down standards for packaging and crating of perishable fruits and vegetables to reduce spoilage in handling by different modes of transport;
- (iv) evolution of special type of road vehicles for quick transit of these items for export;
- (v) strengthening and streamlining of arrangements for rail transport for long journeys and provision of special type wagons (such as ventilated and refrigerated wagons, etc.) for this traffic;
- (vi) ensuring adequate supply of wagons at important export points for specific destinations during the peak season in respect of potatoes (of U.P., Punjab and Himachal Pradesh), onions (of Nasik) and bananas (of Jalgaon). Sometimes traders in these areas are obliged to move the produce to distant rail points to

- secure open booking;
- (vii) reducing transit time by accelerating the speed of service and eliminating enroute detentions; and
  - (viii) rationalisation of freight structure for fresh fruits and vegetables. This is necessary specially, in case of fruits where the present markets are highly localised on account of existing freight structure which denies these fruits remunerative outlets.

12.7.33 The Government of India has, in recent years, initiated Centrally sponsored programmes for maximising production of export oriented crops in different States, under which emphasis is laid on intensive measures for stepping up yields of these crops. However, experience shows that these programmes are not proving to be a great success because there is lack of focus on the real problem of augmenting exports and, in consequence, a dissipation of resources. It is necessary to conceive these as integrated programmes for development of export-oriented agricultural commodities and the investment on each programme should be evaluated periodically in terms of actual exports achieved.

12.7.34 Simultaneously effort has to be made in respect of improving facilities and providing incentives for augmenting exports. Such measures are needed in areas like designing and packaging, publicity, studies of foreign markets on a continuous basis, assured supplies for export markets at reasonable prices, adjustment of export duties identifying new uses and new low cost processing techniques, etc. Exports need to be planned in a systematic manner on the basis of market surveys for acquiring continuous knowledge of ever changing situations in foreign markets. In this context, it is essential to undertake study of the world markets which are leading importers of agricultural raw materials and processed and semi-processed goods from countries other than India even though these goods are available for export from India. We have made such a study in respect of limited range of items to identify potential importers of these commodities. Such studies should be made for a wider range of commodities on the basis of more refined data drawn from a single source to ensure comparability of exports from India and other competing countries.

12.7.35 Export promotion councils have a significant role in export marketing, planning and promotion through market surveys and collection and dissemination of market intelligence. There is a strong case to energise and strengthen these councils on the lines of the recommendations of the Review Committee on Export Promotion Councils set up as early as May 1965 so that they could play their role effectively on the export effort. The Commission would also recommend that a farm products export corporation may be set up to handle various problems of



export marketing and assistance, provide guidance to various export promotion councils and export houses and conduct studies on long-term export prospects for various agricultural commodities as also semi-processed and processed goods produced in the country.

## 8 IMPORTS AND IMPORT SUBSTITUTION

12.8.1 Programmes of economic development of developing countries involve a substantial level of imports. In the case of India also total imports increased from Rs. 1,090 crores in 1961-62 to Rs 2,955 crores (including re-exports) in 1973-74. Imports of agricultural commodities went up more than three fold during this period (i.e. from Rs 282.8 crores to Rs 923.4 crores). Their share in total imports reached the peak level of 47.5 per cent in 1966-67 as against 25.9 per cent in 1961-62. Since 1966-67, however, the share of agricultural imports in total imports declined steadily and was lowest at 23.7 per cent in 1972-73. A major factor responsible for this decline was the reduction in cereal imports which was rendered possible by a substantial rise in domestic production of foodgrains. In 1973-74, however, the share of agricultural imports again went up to 31.2 per cent due to sharp increase in the imports of cereals and cereal products and fertilisers and fertiliser materials. The imports of agro-based products fluctuated within a comparatively lower range (i.e. Rs 61.6 crores in 1971-72 and Rs 33.6 crores in 1965-66) and constituted between 2.4 per cent and 3.4 per cent of total imports into the country.

### Products of Field Crops

12.8.2 The data on value of imports since 1961-62 by principal agricultural commodities are given in Appendix 12.5—Statement I and those of agro-based products in Appendix 12.5—Statement II. The major group among agricultural commodities is that of products of field crops comprising 59.4 per cent of total imports of agricultural commodities in 1973-74. The leading item in this group is "cereal and cereal preparations" which was being imported largely under PL-480 Programme. The imports of this item went up from Rs 116.9 crores in 1961-62 to Rs 651.0 crores in 1966-67. There was a decline from 1967-68 to a low point of Rs 80.8 crores in 1972-73 due to increasing indigenous production. However, due to successive shortfalls in the production of foodgrains during 1971-72 and 1972-73, about 4.4 million tonnes of foodgrains valued at Rs 473.2 crores had to be imported in 1973-74. Foodgrain imports accounted for over 16 per cent of the total imports in

1973-74 as compared to 4.3 per cent in 1972-73. Higher imports were necessary due to difficult food position in the country as a result of the failure of monsoon, constraint in power supply, reduced water level in the irrigation system and inadequate availability of inputs such as seeds and fertilisers. The sources of supply of wheat were USA (Rs 195 crores), USSR (Rs 109 crores) and Canada (Rs 42 crores).

12.8.3 Imports of foodgrains are effected to close the gap between demand and the indigenous supply and become inescapable in years of short production. In the draft Fifth Plan no provision has been made for the import of foodgrains and it has been assumed that the envisaged increase in their output together with efficient management of the food economy will make it possible to avoid large-scale food imports. Self-sufficiency in foodgrains and reduction in the order of fluctuations in production from year to year are important for conserving scarce foreign exchange resources of the country and have, therefore, to be one of the key objectives of Indian planning.

12.8.4 The other principal agricultural commodities which are being imported are : raw cotton, rubber, copra and cashewnuts. It may be mentioned that the imports of these items (except cashewnuts) declined considerably over the years as would be apparent from the following figures :

	(Rs crores)	
	1960-61	1973-74
Raw Cotton . . . . .	81.8	52.0
Crude Rubber . . . . .	10.8	4.1
Copra . . . . .	11.6	neg.

Imports of cashewnuts, however, went up from Rs 6.7 crores in 1961-62 to Rs 31.8 crores in 1972-73. There was a marginal decline in 1973-74 to Rs 28.8 crores. India also imports raw jute in years of short supply. The peak level of imports, took place in 1973-74 at Rs 12.2 crores as against Rs 1.1 crores in the preceding year.

12.8.5 The order of imports of the various agricultural commodities depends upon the level of indigenous production in a particular year. It may be mentioned that in respect of both the major fibre crops, namely cotton and jute, the country is planning for self-sufficiency. Imports of cotton declined from Rs. 91 crores in 1972-73 to Rs 52 crores in 1973-74 with the quantity imported showing a decline of 50 per cent. The country is already self-sufficient in the matter of long staple cottons and only selected medium staples are being imported at present. In view of the intensive programmes for production in hand, these imports

are also likely to taper off. In case of raw jute, imports are primarily effected from Bangladesh under bilateral trade agreements.

12.8.6 The Commission would like to emphasise the need for growing indigenously the varieties of cashewnuts which are being imported at present. This is important since the competing producing countries like Tanzania are fast developing their own processing industry and the import availabilities are likely to go down rapidly in the coming years. This development would have an adverse impact on the cashewnut processing industry and the realisation from exports of processed cashewnuts.

### Animal and Marine Products

12.8.7 There was a substantial increase in the import of animal oils and fats. Imports of this item went up from Rs 0.8 crores in 1961-62 to Rs 17.9 crores in 1971-72. This was followed by a sharp decline to Rs 9.0 crores in 1972-73 and Rs 7.2 crores in 1973-74. There is apparently a need for a sizable import substitution effort in this item which should receive priority attention. We would like to reiterate the need for augmenting the indigenous availability of vegetable oils by tapping sources like minor oilseeds, cotton seed, rice bran, etc. There is also considerable wastage of animal fats in the country due to their non-collection or delayed collection. Full and rational utilisation of animal fats which are available in large quantities from fallen and slaughtered animals is highly important to help saving foreign exchange worth crores of rupees incurred on import of animal fats. Sixty-one million kg of animal fat were imported in 1972-73. We recommend that all big slaughterhouses which are being modernised or are being set up should have a byproducts plant within its precincts or in close proximity so that all available fats from slaughtered stock could be processed. Efforts should also be made for efficient and quick recovery of fats from the dead animals. A chain of carcass utilisation centres needs to be established in areas of concentrated bovine population since the proportion of fallen stock is much higher in case of bovine.

12.8.8 Annual imports of milk and milk products which averaged Rs 14.0 crores during the five years 1964-65 to 1968-69 increased to Rs 16.7 crores during the period 1969-70 to 1973-74. The peak level was achieved in 1972-73 and imports fell by 16 per cent in the next year. Imports of milk (solids) have increased considerably during recent years for use in the urban milk supply schemes as part of the Operation Flood Project. It has been decided that imports of skimmed milk powder should be restricted to meeting the demand of milk schemes in public sector, cooperative sector, defence establishments and the manufacture

of baby foods and malted milk foods. The Indian Dairy Corporation has been named as the canalising agent.

12.8.9 We are of the view that imports of dairy products like butter, cheese, baby foods, chocolate, whole milk powder and skimmed milk powder (SMP) for manufacture of products of local consumption would gradually taper off with increasing output of the indigenous dairy industry. Efforts to increase the production of milk in the country have to be stepped up by multiplying high yielding animals and feeding them better and protecting them from disease. In this context it becomes important that available animal feed resources in the country should be utilised optimally for increasing milk yields. For some years to come, however, imports of SMP might have to be permitted for meeting essential shortages in the milk supply schemes of the country or for manufacture for export of baby foods, chocolate, cheese and other high cost milk products. As regards dairy equipment the country is almost self-sufficient except in the matter of some highly sophisticated control instruments, electronic gadgets, homogenizers, high capacity separators, clarifiers and some types of stainless steel for dairy equipment which might be allowed to be imported. Import quotas of these items should be more freely available for meeting requirements of new dairy plants and for replacements.

12.8.10 Imports of animal products like hides and skins and fish products effected into the country are only of a nominal order. An idea of the magnitude of these imports will be provided by the following :

Item			(Rs lakhs)
	annual imports 1961-63	1972-74	percentage decrease
hides, skins and fur skins undressed	250	90	64.0
fish and fish products	500	142	71.6

It would be seen that imports of these items have declined substantially in recent years. Import of fish (fresh and preparations) were primarily effected from Bangladesh in 1973-74 under a bilateral agreement. We are of the view that imports of animal and fishery items which are even now of a marginal order can be done away with completely.

#### Agricultural Requisites

12.8.11 Among agricultural requisites the most significant item was fertilisers (crude and manufactured), the imports of which rose consistently from Rs 23.4 crores in 1960-61 to Rs 151.8 crores in 1968-69. The order of imports during the next three years was lower. Imports

during 1972-73 amounted to Rs 107.5 crores and during 1973-74 to Rs 184.1 crores. More than four-fifths of the increase in the value of imports in 1973-74 was on account of the higher per unit value of imported fertilisers. The quantity of fertiliser and fertiliser raw material imported during 1973-74 amounted to 3.83 million tonnes which was only 7 per cent higher than the preceding year. In terms of value, however, imports had escalated by 55 per cent. The combined unit value of fertiliser and fertiliser raw materials rose from Rs 407 per tonne in 1972-73 to Rs 591 per tonne in 1973-74. It may be added that value of fertiliser imports has gone up further by 148.7 per cent during the period April 1974 to September 1974 as against the corresponding period during the preceding year.

12.8.12 In a vital sector like fertilisers, the shortfall in indigenous production should be reduced to the minimum as in this field the country's technological capability is of no mean order. To reduce the dependence on foreign countries we have suggested in Chapter 48 on Fertilisers and Manures, the avoidance as far as possible of sulphur in the manufacture of phosphatic fertilisers. In phosphatic fertilisers indigenous availability of raw materials is meagre. Geological explorations should, therefore, be intensified on an extensive scale in search of new sources. It may also be mentioned that India's first coal-based fertiliser plant being set up at Talcher (Orissa) will begin production of nitrogenous fertilisers by the end of 1976. The second coal-based plant being set up at Ramagundam in Andhra Pradesh is expected to be commissioned in 1977 and the third plan at Korba (Madhya Pradesh) in 1978-79. In view of increasing demand of nitrogenous fertilisers and rising cost of imports, it is considered necessary that use of green manures, compost, cow-dung and other form of organic manures for the purpose should be extended. It is expected that efforts in these directions would reduce considerably the import bill.

12.8.13 Among other agricultural requisites, mention might be made of plant protection chemicals. According to the estimates framed in this Commission, of the total requirements of technical materials amounting to 105.8 thousand tonnes in 1978-79 and 140 thousand tonnes in 1985-86, the import component would amount to 32.2 thousand tonnes, and these chemicals would have to be imported.

12.8.14 The annual maintenance imports of the leather and tanning industry are estimated at around Rs 10 crores, comprising Rs 4.5 crores on account of vegetable tanning materials and other tanning agents and Rs 5.5 crores on account of machinery, spares, chemicals and auxiliary. These should be treated as essential imports. The development of this industry can not only help in stepping up export realisation but may also

result in substantial import substitution if byproducts and the wastes of the industry are properly utilised. For instance, we are not at present salvaging the glands from our slaughtered animals for the preparation of various hormones and glandular products nor are we utilising the small intestines of sheep and goats for making absorbable types of surgical sutures, both of which are being imported at present.

12.8.15 Under agricultural machinery, major items of import have been power machines namely, tractors, power tillers and combines. In respect of other items of power machinery like electric motors and diesel engines, indigenous production has generally been adequate to meet the demand. Tractors are included in the core industry sector and there is already a ban on import of completely built units. The magnitude of the future demand of various items of agricultural machinery has been indicated in Chapter 50 on Farm Power and Chapter 51 on Implements & Machinery. As mentioned in the Chapter on Implements & Machinery both the Planning Commission and the Panel on Agricultural Implements (1967) suggested import of machinery for developing prototypes or of sample machines for trials and development. We are, however, not in favour of too much dependence on foreign machinery. It is essential to develop an expertise which is capable of designing and fabricating machinery typical to our needs. As regards power machines in the transitional phase a liberal import policy will be necessary for certain items. For replacement of some of the fast moving and wearing parts like piston rings & liners, thin ball-bearing, fuel injection components etc. imports will be needed to ensure maximum utilisation of existing equipment. However, instead of pursuing a policy of allowing actual users to import, accredited distributors should be allowed to import critical ancillaries and parts on a "as per list" basis. Precision tools which are required for the manufacturing industry within the country should also be allowed to be imported on a liberal basis.

#### Agro-based Items

12.8.16 Among agro-based products there is a continuing dependence on imports in respect of pulp, paper and paper board. Import of pulp and waste paper ranged between Rs 9 and Rs 12 crores during the Fourth Plan period. In case of paper, paper board and news print, import went up from Rs 23.7 crores in 1969-70 to Rs 31.4 crores in 1972-73. In 1973-74, however, there was a significant decline and imports amounted to Rs 29.2 crores only. Share of imports in the total estimated supplies has gone down significantly from 26.9 per cent in 1955-56 to 7.4 per cent in 1960-61 and 2.3 per cent in 1973-74. The commission hopes that with the present forestry and industrial development programmes the

share of imports will go down further in the coming years in respect of these items.

## 9 SUMMARY OF RECOMMENDATIONS

12.9.1 A summary of the main recommendations is given below :

1. A well thoughtout and effective programme of import substitution is essential. In such a programme there should be a clear demarcation of areas where :

- (i) total import substitution is immediately possible;
- (ii) total substitution could be envisaged within a short-term period; and
- (iii) the present resources will not permit import substitution in the near future because of which imports must continue for meeting the essential requirements.

Import substitution efforts in the first two areas should receive high priority. In particular production of milk powder, animal fats, raw cashew-nuts, raw wool, wool tops, wood pulp and vegetable oilseeds should be stepped up as quickly as possible.

(Paragraph 12.1.13)

2. Research in developing new uses of jute should be intensified in the context of the competitive situation between jute and its synthetic substitutes in the various consumer markets. The competitive situation should be kept under continuing review.

(Paragraph 12.5.5)

3. Exports of fine raw wool should be progressively restricted and those of manufactured woollen goods should be encouraged instead. Programmes for developing fine quality fleeces should be given high priority.

(Paragraph 12.5.6)

4. Efforts have to be made to maintain the export levels of lemongrass oil already achieved in the early sixties and increase the volume of exports of other essential oils, like sandalwood oil, so that the country could have a share of the rising world demand for essential oils.

(Paragraphs 12.5.7  
and 12.5.8)

5. Modernisation and improvement of slaughter houses and facilities for processing hides, skins and animal byproducts will help in stepping up the production of quality hides, skins and other animal products like casings for export.

(Paragraphs 12.5.9, 12.5.54  
and 12.5.55)

6. There is need for setting up a suitable agency charged with the responsibility for coordinating the activities of the various organisations handling export of lac. The capacity of the lac bleaching industry in India needs to be developed to meet the rising export demand of this item. Efforts should be made to develop a consortium approach towards exports of lac.

(Paragraphs 12.5.12  
and 12.5.13)

7. The possibility of re-capturing the markets of USSR and East European countries in banana with the re-opening of the Suez Canal has to be carefully examined.

(Paragraph 12.5.15)

8. There is scope for exporting disease free seed potato particularly to European countries during off-season months around January. The export possibilities in dehydrated potatoes and onions need a careful study.

(Paragraph 12.5.16)

9. Production of vegetables for export purposes should be organised in compact areas on scientific lines. This could preferably be done by a public sector or a cooperative agency. Marketing infrastructure for export needs to be developed so that quick transit is possible from the producing areas to the export points.

(Paragraph 12.5.17)

10. The cost of indigenous production of cashewnut shell oil has to be reduced in order to compete with the world markets. Research on conditioning of nuts, heat control, oil bath machinery, etc. needs to be intensified.

(Paragraph 12.5.19)

11. Selective modernisation of exporting or export oriented cotton textile units is essential to streamline the production for export. The production base needs to be improved for the manufacture of high density fabrics apart from a wide range of sophisticated fabrics.

(Paragraphs 12.5.24  
and 12.7.14)

12. Fifty export-oriented pilot production units should be set up in important handloom centres in the country. Sericulture should be extended to new areas to make the industry self sustaining. Silk production techniques should be modernised and greater care exercised as regards quality control.

(Paragraph 12.5.25)

13. A continuing countrywise assessment of export possibilities of tea to traditional buyers and to the new markets should be made. There are good prospects of expansion of exports of tea in the long run



provided a bold export promotion programme, backed by a high level of production, is taken up.

(Paragraphs 12.5.26  
and 12.5.27)

14. An assessment of the export possibilities of Indian coffee should be made on the basis of an estimation of the likely increase in the demand on a countrywise basis according to different types of coffee and of the share which India can meet of such demand. Given the proper export promotion measures, it should be possible for India to improve its exports of coffee to major importing countries like USA, Germany (FR) and France. The possibilities for stepping up exports to 'non-quota' countries should receive special attention. The scope for increasing exports to Japan should be particularly investigated.

(Paragraphs 12.5.28  
and 12.5.29)

15. Work on evolving and testing high-yielding varieties of pepper other than Panniyur-I has to be undertaken. In selecting the varieties, the yield rate, cost of cultivation and the quality acceptability in export markets, should be kept in view.

(Paragraph 12.5.33)

16. USA and USSR offer good scope for Indian cardamom and the STC should be entrusted with the task of exploring these markets. Possibly Australia will provide a good market for Indian cardamom.

(Paragraph 12.5.35)

17. Efforts should be made to evolve fibreless and high yielding varieties of ginger to recapture India's export markets of the West. Stability in prices is essential for ensuring steady exports. A study of the reasons of fluctuations in exports of spices like coriander (in fruit form) and turmeric may be made.

(Paragraph 12.5.38)

18. Measures needed to improve the long term export prospects of minor spices, viz. maintaining production at levels higher than domestic consumption, controlling speculative trading, subjecting minor spices meant for export to compulsory grading and pre-shipment inspection under agmark and improving packaging; should be undertaken.

(Paragraph 12.5.39)

19. Particular emphasis should be laid on increasing export availability of processed fruits and vegetables as there is considerable scope for expansion of exports of citrus and mango products and orange segments.

(Paragraph 12.5.43)

20. Adequate capacity should be created in the country for producing banana powder for export to European countries. Efforts should be made to produce larger quantities of dehydrated vegetables. The possibilities of exporting new items of fruit and vegetable products should be explored.

(Paragraphs 12.5.44  
and 12.6.12)

21. Production of garlic powder for export should be encouraged as there is an increasing demand for this item for food preparations in several Middle East, South East and African countries.

(Paragraph 12.5.45)

22. In the case of marine products, there is scope for exploring diversification of products as well as markets. For rapid growth of exports, there is, however, need to maintain strict quality standards and develop facilities for proper grading and packing.

(Paragraphs 12.5.46  
and 12.5.48)

23. A significant proportion of increase in sugar production should be diverted for export. Improvements in refining and packing sugar are also needed.

(Paragraph 12.5.50)

24. Exports of meat may be canalised through a public sector agency like the STC. There is considerable scope for producing certain types of meat for export for which there is little pull from the domestic market. Special steps should be taken to improve the meat characteristic of buffaloes and utilize unwanted male buffaloes for the export market.

(Paragraph 12.5.52)

25. Pig rearers and bristle merchants should be educated in regard to export possibilities of bristles. The Indian brush industry should also be encouraged to utilise bristles of higher lengths and turnout brushes of the standard and finish required by developed countries.

(Paragraph 12.5.56)

26. Finished leather garments and other leather manufactures have to be developed as export items and adequate infrastructure development for finished leather and footwear branches of indigenous industry should be ensured.

(Paragraphs 12.5.57  
and 12.5.58)

27. The possibilities for expanding India's exports of oilcakes to countries like Belgium, Luxembourg, Canada etc. should be explored. Compulsory preshipment inspection may be introduced to ensure that quality specifications, as prescribed in the export contracts, are rigidly adhered to. The existing small and uneconomic expeller units should be

replaced by large sized composite crushing-cum-solvent extraction units.  
(Paragraphs 12.5.60  
and 12.5.61).

28. Assessment should be made of the export possibilities of items (like rice, coconut, silk, meat etc.) where India's exports constitute a very nominal share in the total world trade. In the case of oilcakes derived from minor oilseeds the possibility of exporting after subjecting them to the extraction process has to be explored.

(Paragraphs 12.5.63  
and 12.5.64).

29. Efforts should be made to export sophisticated dairy products to affluent countries. Market development in these countries will be comparatively easy as milk products are already greatly valued. There is also a good market for ghee in the neighbouring countries which have a sizable population of Indian origin.

(Paragraph 12.5.65).

30. Animal feed resources of the country should be utilised optimally within the country to provide better feed to milch animals, so as to augment their milk production. The economics of exporting animal feed items vis-a-vis importing dairy products should be carefully studied and to the extent that imports of dairy products could be reduced, there could be corresponding reduction in the export of cattle feed. A balanced view has to be taken keeping in mind the various aspects of the animal feed situation in the country.

(Paragraph 12.5.66).

31. The type of repackaging/processing done by certain countries (like Singapore, Hongkong and Kuwait), which have specialised in importing agricultural raw materials for re-export, should be studied so that these techniques could be indigenously developed or duplicated.

(Paragraph 12.5.69).

32. Export promotion effort should encompass measures for (a) pin-pointing areas of demand for various agricultural commodities in raw, semi-finished or finished form, the production of which can be developed indigenously; (b) undertaking development programme for producing these items at competitive prices; and (c) developing the infrastructure for processing agricultural commodities into exportable form and moving them to ports of exit. The necessary investment should be made for building up export production infrastructure.

(Paragraph 12.5.70).

33. Funds should be earmarked for development schemes which have a bias in favour of export promotion or import substitution. Such investment should be made on integrated projects for production, processing and export of suitably identified varieties of agricultural products.

in actual demand in different importing countries.

(Paragraph 12.5.71)

34. Some areas which require serious attention in research and development effort, from the point of view of stepping up exports are : (a) preparation of instant tea in ready-to-drink form; (b) processing of spices and derived spice products in forms acceptable to foreign buyers (care would have to be taken to prevent adulteration in export consignments of these items); (c) distillation of cardamom oil to specifications required in foreign markets; (d) preparation of ginger oil and oleoresin from ginger, ginger pickle and sugar preserves etc.; (e) developing new uses of cashewnut shell oil; (f) exploring possibilities of producing cattle feed, rum and gin from molasses; (g) developing non-traditional uses of press-mud and commercial exploitation of pulp obtained as a byproduct from sugarcane/beet industry and (h) identifying new uses of coir.

(Paragraphs 12.6.3 to 12.6.10  
and 12.6.13)

35. The fruit and vegetable processing industry has to be developed keeping in view the seasonal flow of fruits and vegetables. There has to be a parallel coordinated development of cold storage facilities so that the load on the processing industry could be staggered by regulating supplies of raw material.

(Paragraph 12.6.11)

36. Export strategy should take into consideration the advantage which India has in producing labour intensive crops. The strategy should also include provision for producing for export superior varieties of agricultural commodities and importing instead cheaper varieties for internal consumption.

(Paragraphs 12.7.3  
and 12.7.8)

37. The need for exploring the possibility of increasing trade with other developing countries is important. An integrated approach to the problems facing intra-regional trade in rice has been adopted by the ESCAP. Similar approach to the problems facing other commodities needs to be adopted and formation of commodity communities or producers' associations encouraged.

(Paragraph 12.7.6)

38. Increase in productivity is essential to generate exportable surplus in case of items like cashew kernels, oilseeds, raw cotton, raw jute, spices, tobacco and sugarcane which have hitherto remained practically untouched by the recent advances in agricultural technology.

(Paragraph 12.7.12)

39. Scientific processing of forest produce should be taken up on a more systematic basis to augment exports of processed timber/wood,

shellac, gums and resins. Problems of insufficient catch, inadequate deep sea fishing fleet and lack of processing facilities should be attended to for augmenting exports of sea foods.

(Paragraph 12.7.13)

40. The types of consumer controls to be exercised on the internal market for exportable goods where the overall production has to be apportioned between domestic consumption and exports should be examined. A suitable link between production, export and domestic consumption of such commodities has to be established in the long run.

(Paragraph 12.7.17)

41. Measures should be taken to correct the disequilibrium between the export prices in India and the competing countries in respect of major agricultural commodities, which are inhibiting the expansion of the export capacity.

(Paragraph 12.7.19)

42. Quality packing and packaging are important considerations in export trade. The establishment of an organisation on the lines of the International Cargo Handling Coordination Association in USA might be of help.

(Paragraph 12.7.20)

43. Work has to be initiated on some important aspects of export marketing e.g. identification of markets, collection of information, intelligence and statistics on foreign markets, publicity, etc.

(Paragraph 12.7.21)

44. With improvements in the present reporting system through trade representatives of India in a limited number of countries. Indian exporters might be better informed of possibilities of actual sales. The expert services available in International Trade Centre and ESCAP Trade Promotion Centre could be availed of.

(Paragraph 12.7.23)

45. Export promotion councils need more autonomy and facilities in the matter of undertaking marketing surveys and research. These councils may be suitably strengthened for playing their due role in the export effort.

(Paragraphs 12.7.24 and 12.7.26)

46. An export corporation to handle certain export oriented agricultural commodities like rice bran, compound animal feeds, castor, pepper, some types of pulses, starch, meat and meat products, forestry and horticultural items may be set up. The corporation should be the sole import-export agency for agricultural commodities charged with the responsibility for planning and developing their production, processing and marketing in an integrated manner.

(Paragraph 12.7.27)

47. As subsidiary of the Reserve Bank, to provide medium and long term export credit and also meet the short term credit requirements of exporters both at the pre-shipment and post-shipment stages, the establishment of an Export Import Bank may be considered.

(Paragraph 12.7.28)

48. An element of flexibility should be introduced in export financing procedures by developing institutions like factor houses.

(Paragraph 12.7.28)

49. The freight structure needs rationalisation for eliminating uncertainties regarding rates. Unilateral changes in rates should be eliminated through voluntary arrangements under the aegis of an international body like the UNCTAD. A cooperative endeavour between trade and shipping interests in assessing the supply position of reefer space in relation to the requirements, periodically, through a joint machinery of shipping agents, freight brokers and trade representatives, is necessary.

(Paragraph 12.7.30)

50. The development of export business in perishables, specially fruits and vegetables, would be facilitated by the provision of package-rates by Indian Airlines.

(Paragraph 12.7.31)

51. Following measures to streamline the transport arrangements for perishables with a view to realising the export potential in them should be taken :

- (i) liberalisation of permits for road operators and opening of new roads;
- (ii) removal of restrictions on movement of perishables and cutting down time of detention at transshipment points, road barriers and inter-state check-posts and provision of large covered sheds at these points;
- (iii) laying down standards for packaging and crating to reduce spoilage in handling by different modes of transport;
- (iv) evolution of special type of road vehicles for quick transit for export;
- (v) strengthening and streamlining of arrangements for rail transport for long journeys and provision of special type of wagons;
- (vi) ensuring adequate supply of wagons at important export points for specific destinations during peak seasons;
- (vii) reducing transit time by accelerating the speed of services and eliminating en-route detentions; and
- (viii) rationalisation of freight structure for fresh fruits and vegetables.

(Paragraph 12.7.32)

52. Cultivation of varieties of cashewnuts which are being imported

at present should be encouraged since the competing producing countries are developing their own processing industry and the import availabilities are likely to go down rapidly in the coming years.

(Paragraph 12.8.6)

53. The indigenous availability of vegetable oils should be augmented by tapping sources like minor oilseeds, cotton seeds, rice bran etc. to reduce imports of animal and vegetable oils and fats. Full and rational utilisation of animal fats which are available in large quantities from fallen and slaughtered animals is also important.

(Paragraph 12.8.7)

54. For some years to come, imports of SMP might have to be permitted for meeting essential shortages in milk supply schemes or for manufacture, for export, of dairy items. Import quotas in respect of sophisticated dairy equipment should be made freely available for meeting requirements of new dairy plants and for replacements.

(Paragraph 12.8.9)

55. The use of sulphur in the manufacture of phosphatic fertilisers should be avoided as far as possible. Geological explorations should also be intensified in search of new sources of raw materials for manufacture of fertilisers.

(Paragraph 12.8.12)

56. The annual maintenance imports of leather and tanning industries should be treated as essential imports, since their development is important both from the point of view of export promotion and import substitution.

(Paragraph 12.8.14)

57. In view of the development programmes in respect of forestry products, the dependence on imports in respect of items like pulp, paper and paperboard should get reduced.

(Paragraph 12.8.16)

## APPENDIX 12.1

(Paragraph 12.3.6)

Agricultural Export from India—Value Statement I—Agricultural Commodities<sup>1</sup>

Item	(Rs. lakhs)													
	1961 -62	1962 -63	1963 -64	1964 -65	1965 -66	1966 -67*	1967 -68	1968 -69	1969 -70	1970 -71	1971 -72	1972 -73	1973 -74	
I	2	3	4	5	6	7	8	9	10	11	12	13	14	
<b>I. Products of Field crops :</b>														
1. oil seeds, nuts and kernels	452	432	430	201	233	36	180	731	824	596	672	682	3,725	
2. fixed vegetable oils and fats (non-essential)	582	1,310	1,993	705	408	283	396	1,171	495	703	757	2,548	3,165	
3. oilcakes	1,732	3,179	3,537	3,851	3,464	5,053	4,547	4,947	4,148	5,542	4,015	7,477	17,060	
4. tobacco (unmanufactured)	1,406	1,800	2,109	2,438	1,958	2,152	3,485	3,316	3,271	3,140	4,225	6,107	6,841	
5. spices	1,751	1,379	1,602	1,673	2,309	2,914	2,724	2,514	3,449	3,881	3,618	2,913	5,507	
6. cotton	2,035	1,704	1,684	1,422	1,309	1,752	1,940	1,574	1,777	1,641	1,831	2,466	3,672	
7. jute	5	127	294	370	308	907	272	255	422	429	1,303	489	442	
8. silk	54	61	37	34	41	86	72	49	78	60	42	79	242	
9. vegetable fibres except cotton and jute	251	277	278	117	62	107	67	58	40	48	24	21	22	
10. waste materials from textile fabric	40	55	62	90	41	50	38	48	43	40	46	37	30	
11. sugar, sugar preparation and honey	1,534	1,794	2,722	2,146	1,127	1,824	1,651	1,062	894	2,945	3,113	1,390	4,346	
12. feeding stuff for animals (excluding oilcakes)	139	151	119	82	133	183	143	190	175	354	382	430	961	
13. coffee	902	761	832	1,342	1,294	1,584	1,817	1,796	1,962	2,511	2,207	3,293	4,601	
14. cocoa	1	5	8	6	4	16	15	15	8	8	8	11	3	
15. chocolate and other food preparations	neg	2	2	4	9	12	22	28	38	41	39	47	95	
16. tea	12,226	12,882	12,338	12,465	11,484	15,841	18,022	15,651	12,450	14,825	15,631	14,729	14,603	



17. cereals and dried leguminous vegetables and flour and miscellaneous food preparation	19	36	70	149	201	515	216	673	1,168	1,288	3,178	8,814	1,386
II. Horticultural products:													
1. cashew kernels	1,817	1,937	2,142	2,906	2,660	4,598	4,303	6,093	5,742	5,207	6,133	6,882	7,443
2. walnuts	150	128	149	137	121	186	150	284	173	147	151	284	375
3. other fruits and vegetables	584	625	679	642	551	752	707	873	1,114	1,148	751	950	1,202
4. crude rubber (including synthetic and reclaimed).	neg	1	neg	neg	2	1	1	2	4	4	9	15	135
III. Animal Products:													
1. meat and meat preparations	118	168	162	21	42	99	77	60	144	305	138	347	695
2. wool and other animal hair	919	660	742	888	731	796	647	579	496	509	427	699	853
3. hides, skins and furskins undressed	879	1,089	1,011	911	985	1,647	757	532	843	379	66	87	153
4. dairy products and eggs	26	6	1	2	2	4	10	5	6	9	21	45	20
5. live animals (chiefly for food)	10	9	8	16	13	17	17	9	1	3	3	9	10
6. crude animal materials	479	525	437	693	639	1,317	1,223	1,563	1,244	913	950	998	1,627
7. animal oils and fats	1	1	neg	3	1	1	1	3	2	2	22	57	4
8. animals, n.e.s.	80	63	55	44	43	72	78	81	96	91	107	125	134
IV. Marine products :													
1. fish and fish preparations	388	401	571	651	659	1,725	1,795	2,217	3,083	3,054	4,139	5,379	8,810
V. Forest products													
1. wood, lumber and cork	283	327	270	228	191	330	434	450	690	597	696	951	1,723
2. essential oils	451	427	287	322	228	371	370	432	428	370	389	408	610
3. crude vegetable materials, n.e.s.	1,536	1,342	1,599	1,705	1,678	2,287	1,914	2,166	2,576	3,402	3,762	3,95	5,844
TOTAL	30,850	33,664	36,229	36,210	32,775	47,518	48,091	49,427	47,886	54,198	58,855	72,725	96,339

Appendix 12.1 (Contd.)  
Statement II—Agro-Based Products

Item	1961 -62	1962 -63	1963 -64	1964 -65	1965 -66	1966 -67*	1967 68-	1968 69-	1969 -70	1970 -71	1971 -72	1972 -73	1973 -74
I	2	3	4	5	6	7	8	9	10	11	12	13	14
I. Products of Field crops :													
1. beverages . . . . .	neg	neg	3	7	54	12	1	4	1	1	3	18	5
2. tobacco manufactures . . . . .	91	87	140	133	157	100	74	60	65	116	283	280	250
3. cotton textile yarns, fabrics and made up articles and related products including synthetic . . . . .	@	@	@	9,802	9,482	11,688	11,691	13,876	15,653	16,124	16,553	20,986	34,199
4. clothing . . . . .	73	108	456	463	640	688	882	1,473	2,161	3,020	3,767	5,602	9,959
5. jute manufactures excluding twist and yarn . . . . .	22,652	23,478	26,319	16,723	18,162	24,900	23,353	21,694	20,497	18,917	26,329	24,720	22,573
II. Borticultural products :													
1. rubber manufactures, n.e.s. . . . .	44	72	90	168	219	346	303	463	468	686	766	634	912
III. Animal products :													
1. leather, leather manu- factures and dressed furkins . . . . .	2,545	2,263	2,638	2,735	2,846	6,213	5,345	7,267	8,154	7,218	9,077	17,451	17,219
2. footwear . . . . .	240	268	361	418	525	878	916	918	923	1,144	1,176	1,286	1,353
3. animal and Vegetable oils and fats-processed and waxes of animals and vegetables origins	66	55	68	30	45	21	18	21	10	6	11	26	43

## IV. Forest products

1. pulp and waste paper	11	1	neg	1	3	neg	neg	1	52	101	21	2	2
2. wood and cork manu- factures (excl. furniture)	7	10	20	19	10	22	27	45	94	165	119	127	500
3. paper, paperboard and manufacturers thereof	75	78	73	107	120	193	284	514	488	541	294	416	691
4. furniture	27	21	22	20	27	28	31	43	45	65	67	72	172

## V. Others :

1. dyeing and tanning ex- tracts and synthetic tanning material	13	9	7	11	12	21	10	14	13	35	13	19	15
(i) total agrobased products	25,844	26,450	30,197	30,637	32,249	45,110	42,935	46,393	48,624	48,193	58,479	71,639	87,893
(ii) total (agricultural commodities)	30,850	33,664	36,229	36,210	32,775	47,518	48,091	49,427	47,886	54,198	58,855	72,725	96,339
Grand total (i) + (ii)	56,694	60,114	66,426	66,847	65,024	92,628	91,026	95,820	96,510	1,02,337	1,17,334	1,44,364	1,84,232

## Agricultural Inputs and Machinery:

1. fertiliser crude	22	13	6	1	4	neg	1	—	—	—	—	—	neg
2. fertiliser manufactured	neg	neg	1	neg	2	neg	neg	1	neg	neg	189	67	1
3. agricultural machinery and implements	3	neg	2	3	6	14	26	45	50	51	37	60	128

\* Figures for April and May, 1966 are in term of devalued rupees.

@ included in item No. 5.

neg.— negligible

1. Monthly Statistics of the Foreign Trade of India, Vol. I, March of 1962 to 1974 and May, 1966, Department of Commercial Intelligence and Statistics, Government of India, Calcutta.

## APPENDIX 12.2

(Paragraph 12.3.6)

Exports of Selected Agricultural Commodities from India—Quantity<sup>1</sup>

Commodity	Unit	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
		3	4	5	6	7	8	9	10
tea	'000 tonnes	190	203	201	174	199	209	193	190
oil seeds, nuts and kernels :	"	2	11	39	39	27	29	29	87
HPS groundnuts	"	neg	8	37	36	26	27	21	83
others	"	2	3	2	3	1	2	8	4
vegetable oils (non-essential) :	"	14	17	49	23	23	24	53	40
castor oil	"	neg	7	37	14	16	18	46	35
cashew-shell oil	"	12	9	10	9	7	6	5	4
others	"	2	1	2	neg	neg	neg	2	1
oil cakes :	"	822	746	832	705	879	742	1001	1224
defatted groundnut meal	"	644	587	682	510	675	604	735	796
cottonseed cake	"	124	136	112	94	97	69	160	227
copra cake	"	19	6	6	9	8	3	5	2
others	"	35	17	32	92	99	66	101	199
tobacco unmanufactured :	"	37	55	53	54	48	57	94	78
FCV tobacco	"	29	47	41	41	39	49	83	71
others	"	8	8	12	13	9	8	11	7
spices :	"	52	52	49	42	47	66	44	61
chillies	"	6	7	9	2	2	5	1	1
pepper	"	22	25	19	22	18	19	20	32
Cardamom	"	2	2	1	1	2	2	1	2
ginger	"	5	4	2	1	3	7	6	5
turmeric	"	9	6	6	7	11	14	7	8
others	"	8	8	12	9	11	18	9	13

raw cotton (excluding linters)	'000 bales of 180 kg each	185	248	158	200	178	178	211	305
raw jute	"	222	69	57	95	97	253	93	86
sugar (excluding molasses)	'000 tonnes	354	228	99	83	348	316	102	250
cashew kernels	"	50	51	64	61	50	60	66	52
walnuts	"	5	3	5	3	3	3	5	4
fruits and vegetables:									
bananas	"	8	4	10	7	8	4	4	neg
mangoes	"	1	1	1	1	1	1	2	2
potatoes	"	1	1	2	3	1	3	3	4
onions	"	92	103	103	130	155	55	52	64
pickles and chutneys	"	2	1	2	2	2	2	2	2
rice and pulses :	"	34	8	33	56	63	34	38	23
rice	"	3	4	7	15	33	12	23	15
pulses and flour thereof	"	31	4	26	41	30	22	15	8
gums and resins :	"	6	7	7	7	10	11	9	9
gum karaya	"	5	5	5	5	6	6	4	6
others	"	1	2	2	2	4	5	5	3
lac :	"	16	15	18	17	13	14	8	6
shellac	"	11	10	11	11	9	9	6	4
others	"	5	5	7	6	4	5	2	2
wood and timber :									
rose wood	'000 cubic meters	14	14	14	22	16	20	27	30
sandal wood	tonnes	369	294	354	440	417	451	381	399
teak wood	"	81	979	2,582	867	857	262	185	858
essential oils :	"	523	509	346	396	383	461	456	554

## APPENDIX 12.2 (Concl'd.)

Commodity	Unit	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
1	2	3	4	5	6	7	8	9	10
sandal wood oil	"	104	99	123	108	104	118	120	93
lemongrass oil	"	337	343	130	226	190	262	265	367
others	"	82	67	98	62	89	81	71	94
meat and meat preparations	"	870	724	546	1063	2610	1700	3611	4945
animal casings	"	439	474	378	438	305	306	290	321
raw wool	'000 tonnes	9	9	9	7	7	5	7	5
bristles	tonnes	144	136	120	99	68	102	142	110
crushed bones	'000 tonnes	68	75	66	66	67	66	72	84
fish and fish preparations	"	20	20	25	29	32	33	34	47

1. Department of Commercial Intelligence and Statistics, Calcutta.

Neg. = Negligible.

## APPENDIX 12.3

(Paragraph 12.3.5)

Annual Fluctuations in the Volume of the Exports of Selected Agricultural Commodities—1967-68 to 1973-74<sup>1</sup>

Commodity	(per cent <sup>2</sup> )							
	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	
1	2	3	4	5	6	7	8	
tea	(+) 6.8	(-) 1.0	(-) 13.4	(+) 14.4	(+) 5.0	(-) 7.7	(-) 1.6	
oilseeds, nuts and kernels	(+) 450.0	(+) 254.5	—	(-) 30.8	(+) 7.4	—	(+) 200.0	
HPS groundnut	@	(+) 362.5	(-) 2.7	(-) 27.8	(+) 3.8	(-) 22.2	(+) 295.2	
others	(+) 50.0	(-) 33.3	(+) 50.0	(-) 66.7	(+) 100.0	(+) 300.0	(-) 37.5	
vegetable oils (non-essential)	(+) 21.4	(+) 188.2	(-) 53.1	—	(+) 4.3	(+) 120.8	(-) 24.5	
castor oil	—	(+) 428.6	(-) 62.2	(+) 14.3	(+) 12.5	(+) 155.6	(-) 23.9	
cashew-shell oil	(-) 25.0	(+) 11.1	(-) 10.0	(-) 22.2	(-) 14.3	(-) 16.7	(-) 20.0	
others	(-) 50.0	(+) 100.0	—	—	—	@	(-) 50.0	
oilcakes :	(-) 9.3	(+) 11.5	(-) 15.3	(+) 24.7	(-) 15.6	(+) 34.9	(+) 22.3	
defatted groundnut	(-) 8.9	(+) 16.2	(-) 25.2	(+) 32.4	(-) 10.5	(+) 21.7	(+) 8.3	
cottonseed cake	(+) 9.7	(-) 17.7	(-) 16.1	(+) 3.2	(-) 28.9	(+) 131.9	(+) 41.9	
copra cake	(-) 68.4	—	(+) 50.0	(-) 11.1	(-) 62.5	(+) 66.6	(-) 60.0	
others (oilcakes)	(-) 51.4	(+) 88.2	(+) 187.5	(+) 7.6	(-) 33.3	(+) 53.0	(+) 97.0	
tobacco (unmanufactured) :	(+) 48.6	(-) 3.6	(+) 1.9	(-) 11.1	(+) 18.8	(+) 64.9	(-) 17.0	
FCV tobacco	(+) 62.1	(-) 12.8	—	(-) 4.9	(+) 25.6	(+) 69.4	(-) 14.5	
others	—	(+) 50.0	(+) 8.3	(-) 30.8	(-) 11.1	(+) 37.5	(-) 36.4	
spices :	—	(-) 5.8	(-) 14.3	(+) 11.9	(+) 38.3	(-) 32.3	(+) 38.6	
chillies	(+) 16.7	(+) 28.6	(-) 77.8	—	(+) 150.0	(-) 80.0	—	

## APPENDIX 12.3 (Concl'd.)

Commodity	Year							
	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	
<b>I</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	
pepper . . . . .	(+) 13.6	(-) 24.0	(+) 15.8	(-) 18.2	(+) 5.6	(+) 5.3	(+) 60.0	
cardamom . . . . .	—	(-) 50.0	—	(+) 100.0	—	(-) 50.0	(+) 100.0	
ginger . . . . .	(-) 20.0	(-) 50.0	(-) 50.0	(-) 200.0	(+) 133.3	(-) 14.3	(-) 16.7	
turmeric . . . . .	(-) 33.3	—	(+) 16.7	(+) 57.1	(+) 27.3	(-) 50.0	(+) 14.3	
others . . . . .	—	(+) 50.0	(-) 25.0	(+) 22.2	(+) 63.6	(-) 50.0	(+) 44.4	
raw cotton (excluding linters) . . . . .	(+) 34.1	(-) 36.3	(+) 26.6	(-) 11.0	—	(+) 18.5	(+) 44.5	
raw jute . . . . .	(+) 68.9	(-) 17.4	(+) 66.7	(+) 2.1	(+) 160.8	(-) 63.2	(-) 7.5	
sugar (excluding molasses) . . . . .	(-) 35.6	(-) 56.6	(-) 16.2	(+) 319.3	(-) 9.2	(-) 67.7	(+) 145.1	
cashew kernels . . . . .	(+) 2.0	(+) 25.5	(-) 4.7	(+) 18.0	(+) 20.0	(+) 10.0	(-) 21.2	
walnuts . . . . .	(-) 40.0	(+) 66.7	(-) 40.0	—	—	(+) 66.7	(-) 20.0	
<b>fruit and vegetables :</b>								
bananas . . . . .	(-) 50.0	(+) 150.0	(-) 30.0	(+) 14.3	(-) 50.0	—	@@	
mangoes . . . . .	—	—	—	—	—	(+) 100.0	—	
potatoes . . . . .	—	(+) 100.0	(+) 50.0	(-) 66.7	(+) 200.0	—	(+) 33.3	
onions . . . . .	(+) 12.0	—	(+) 26.2	(+) 19.2	(-) 64.5	(-) 5.5	(+) 23.1	
pickles and chutneys . . . . .	(-) 50.0	(+) 100.0	—	—	—	—	—	
rice and pulses :								
rice . . . . .	(-) 76.5	(+) 312.5	(+) 69.7	(+) 12.5	(-) 46.0	(+) 11.8	(-) 39.5	
pulses . . . . .	(+) 33.3	(+) 75.0	(+) 114.3	(+) 120.0	(-) 63.6	(+) 91.7	(-) 34.8	
gums and resins :								
gums and resins . . . . .	(-) 87.1	(+) 550.0	(+) 57.7	(-) 26.8	(-) 26.7	(-) 31.8	(-) 46.7	
	(+) 16.7	—	—	(+) 42.9	(+) 10.0	(-) 18.2	—	



gum karaya	.	.	.	.	.	(+) 20.0	—	(-) 33.3	(+) 50.0
others	.	.	.	.	.	(+)100.0	(+) 25.0	—	(-) 40.0
lac :									
shellac	.	.	.	.	(+) 20.0	(-) 23.5	(+) 7.7	(-) 42.9	(-) 25.0
others	.	.	.	.	(+) 10.0	(-) 18.2	—	(-) 33.3	(-) 33.3
	.	.	.	.	(+) 40.0	(-) 33.3	(+) 25.0	(-) 60.0	—
wood and timber :									
rose wood	.	.	.	.	—	(-) 27.3	(-) 25.0	(+) 35.0	(+) 11.1
sandal wood	.	.	.	.	(-) 20.3	(-) 5.2	(+) 8.2	(-) 15.5	(+) 4.7
teak wood	.	.	.	.	(+) 20.0	(-) 1.2	(-) 69.4	(-) 29.4	(+)363.8
essential oils :									
sandalwood oil	.	.	.	.	(-) 2.7	(-) 3.3	(+) 20.4	(-) 1.1	(+) 21.5
lemongrass oil	.	.	.	.	(-) 4.8	(-) 3.7	(+) 13.5	(-) 1.7	(-) 22.5
others	.	.	.	.	(+) 1.8	(-) 14.9	(+) 37.9	(+) 1.1	(+) 38.5
meat and meat preparations	.	.	.	.	(-) 18.3	(+) 43.5	(+) 2.2	(-) 22.0	(+) 32.4
animal casings	.	.	.	.	(-) 16.8	(+)145.5	(-) 35.9	(+)112.4	(+) 36.9
raw wool	.	.	.	.	(+) 8.0	(-) 30.6	(+) 0.3	(-) 5.2	(+) 10.7
bristles	.	.	.	.	—	—	(-) 28.6	(+) 40.0	(-) 28.6
crushed bones	.	.	.	.	(-) 5.6	(-) 31.3	(+) 50.0	(+) 39.2	(-) 22.5
fish and fish preparations	.	.	.	.	(+) 10.3	(+) 1.5	(-) 1.5	(+) 9.1	(+) 16.7
	.	.	.	.	—	(+) 10.3	(+) 3.1	(+) 3.0	(+) 38.2

\* (+) percent increase over the previous year and (-) percent decrease over the previous year.

@ Exports during the preceding year negligible.

@@ Exports negligible during the year.

— nil or negligible variation.

1 Calculated on the basis of data given in Appendix 12.2.

## APPENDIX 12.4

(Paragraph 12.4.3)

Projections for Exports of Agricultural Commodities—1978-79<sup>1</sup>

(Rs crores)

Item	Draft Fifth Five Year Plan	as worked out by IIFT
1. tea . . . . .	174.00	198.40
2. coffee . . . . .	40.00	48.80
3. tobacco, unmanufactured . . . . .	71.00	89.80
4. cashew kernels . . . . .	85.00	88.00
5. oilcakes . . . . .	73.00	156.40
6. guar gum (including guar meal) . . . . .	—	20.00
7. walnuts . . . . .	—	7.50
8. canned and bottled fruits and vegetables . . . . .	—	10.00
9. spices . . . . .	36.00	60.35
10. sugar—raw and refined . . . . .	25.00	75.00
11. fish and fish preparations . . . . .	150.00	143.50
12. rice . . . . .	—	48.75
13. oilseeds and nuts . . . . .	—	8.00
14. essential oils . . . . .	—	6.50
15. non-essential oils . . . . .	—	37.00
16. meat and meat preparations including fresh, frozen and canned. . . . .	—	10.00
17. shellac . . . . .	—	20.00
18. raw jute . . . . .	—	20.00
19. raw cotton . . . . .	25.00	48.75
20. raw wool . . . . .	—	4.50
21. jute manufactures . . . . .	240.00	354.50
22. cotton textiles—millmade . . . . .	225.00	450.00
23. cotton textiles—handloom (including silk and other products) . . . . .		140.00
24. silk, rayon and synthetic textiles . . . . .		50.00
25. woollen textiles . . . . .	—	135.00
26. coir yarn and manufactures . . . . .	20.00	20.00
27. leather and leather manufactures . . . . .		335.00
total (1 to 27) . . . . .	1,395.00	2,585.75
all exports . . . . .	2,890.00	4,470.00

<sup>1</sup> 1974. Export Targets during Fifth Five year Plan. pp 17-20. New Delhi Institute of Foreign Trade.

## APPENDIX 12.5

(Paragraph 12.8.2)

## Agricultural Imports into India—Value¹

## Statement I—Agricultural Commodities

Item	(Rs lakhs)												
	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67*	1967-68	1968-69	1970-71	1971-72	1972-73	1973-74	
<b>I. Products of Field Crops :</b>													
<b>1. Cereals and cereal preparation and dried leguminous vegetables and flour thereof (grain, pulse and flour preparation thereof) . . . . .</b>													
(a) wheat (including spelt and meslin unmitled) . . . . .	11,690	14,426	17,960	28,214@	32,200	65,098	51,820	33,662	26,098	21,301	13,121	8,079	47,315
(b) rice . . . . .	9,387	11,309	13,484	24,192	26,474	22,304	37,847	25,949	18,433	17,337	10,260	4,816	34,610
(c) pulses and flour thereof . . . . .	1,873	2,701	3,750	4,017	4,190	8,164	5,476	5,747	5,825	2,982	1,807	1,071	645
2. miscellaneous food preparations . . . . .	—	—	—	4	50	31	49	32	24	39	30	40	57
3. coffee, tea cocoa and spices and manufactures thereof . . . . .	25	17	7	15	35	16	400	207	190	311	300	82	71
4. fixed vegetable oils and fats . . . . .	185	197	93	64	74	55	236	111	111	94	127	137	183
5. sugar, sugar preparations and honey . . . . .	542	396	420	480	711	1,127	1,655	968	1,723	2,308	2,817	1,550	5,694
6. unmanufactured tobacco . . . . .	1	neg	neg	23	29	50	55	135	41	52	223	78	102
	114	137	83	39	4	24	144	44	51	neg	2	9	3

APPENDIX 12.5—Statement I (Contd.)

Item	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67*	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
7. oilseeds, oilnuts and oil kernels . . . . .	943	1,001	916	704	881	472	522	351	345	336	1,053	1,232	737
8. feeding stuff for animals not including unmilled cereals . . . . .	neg	neg	10	15	35	21	42	32	32	24	27	53	53
9. textile fibre (not manufactured into yarn, thread or fabrics and their waste) (excluding wool and synthetics) . . . . .	7,081	6,205	5,314	6,742	6,942	11,570	9,182	10,943	9,235	10,344	11,938	9,812	6,936
II. Horticultural products :													
1. fruits and vegetables . . . . .	1,460	1,805	1,880	2,562	2,271	3,019	3,925	4,640	4,365	4,320	3,784	5,330	4,848
(a) cashewnut . . . . .	670	912	1,093	1,644	1,506	2,294	2,820	3,138	2,760	2,941	2,791	3,181	2,880
2. crude rubber (including synthetic and reclaimed) . . . . .	1,010	1,023	975	543	490	1,167	442	489	962	385	360	369	407
III. Animal products :													
1. animal oils and fats . . . . .	83	69	53	68	584	313	1,758	942	1,201	1,512	1,792	903	719
2. live animals . . . . .	2	2	1	6	10	10	18	19	18	11	14	8	51
3. meat and meat preparations . . . . .	1	1	1	1	1	1	neg	4	1	3	neg	neg	2
4. dairy products and eggs . . . . .	995	880	939	1,037	756	2,265	1,423	1,494	1,210	1,063	2,081	2,133	1,873
5. hides, skins and furskins undressed . . . . .	224	227	336	314	237	180	131	174	171	158	135	102	77

6. animal, n.e.s.	101**	19**	56**	3	1	1	1	1	1	neg	2	3	6	9	2
7. crude animal materials, n.e.s.	50	43	34	23	26	22	14	30	27	22	24	23	24	23	17
8. wool and other animal hair (except human hair)	1,218	1,215	1,572	965	512	1,178	1,182	1,123	1,724	1,607	1,423	1,188	2,095	2,095	
IV. Forest Products :															
1. wood, lumber and cork	252	297	227	183	182	149	167	144	88	92	78	108	162	162	
2. essential oils, perfume and flavour materials	119	89	77	95	96	126	167	186	189	163	222	274	310	310	
3. crude vegetable materials n.e.s.	212	184	164	231	227	261	238	252	207	221	224	209	354	354	
V. Fish Products															
fish and fish preparations	387	613	548	336	18	neg	1	2	2	1	6	74	209	209	
VI. Agricultural Inputs															
1. fertiliser manufactured	1,222	2,673	3,452	2,896	3,897	8,970	13,902	13,922	7,707	6,120	8,120	9,626	16,284	16,284	
2. crude fertiliser	274	298	312	390	592	1,326	981	1,260	874	1,228	1,057	1,119	2,130	2,130	
3. agricultural machinery and implements	86	108	146	554	1,002	1,293	1,369	1,356	2,167	2,785	2,560	1,714	1,703	1,703	
grand total (I to VI)	28,277	31,975	36,669	48,147	51,813	98,714	89,774	72,490	58,741	54,764	51,504	44,221	92,337	92,337	

APPENDIX 12.5 (Concl'd.)  
Statement II—Agro-based Products

Item	(Rs lakhs)												
	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67*	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
<b>I. Products of Field Crops :</b>													
1. tobacco manufactured	13	2	1	1	17	2	2	1	3	2	2	neg	1
2. textile yarn fabrics, made up articles and related products	1,610	1,531	1,339	1,587	993	986	754	779	678	786	1,001	625	596
3. clothing	8	4	3	3	3	6	14	19	67	14	11	8	12
<b>II. Horticultural Products :</b>													
1. rubber manufactures, n.e.s.	351	180	198	140	113	125	177	298	373	256	304	381	580
<b>III. Animal Products :</b>													
1. leather, leather manufactures n.e.s. and dressed furskins	19	11	6	7	7	7	11	6	5	7	12	11	12
2. footwear	1	neg	neg	1	neg	neg	neg	neg	1	—	neg	neg	—
3. oils and fats processed and waxes of animal or vegetable origin	237	98	13	14	68	35	30	20	33	30	40	39	75
<b>IV. Forest Products :</b>													
1. pulp and waste paper	669	951	965	797	588	974	1,031	1,043	1,247	1,227	959	1,015	925

2. paper, paperboard & manufactures thereof	1,595	1,364	1,255	1,315	1,348	2,167	1,765	1,831	2,374	2,507	3,492	3,136	2,924
3. wood and cork manufactures (excluding furniture)	55	52	53	79	53	42	28	23	8	9	21	14	21
V. Others :													
1. dyeing and tanning extracts and synthetic tanning materials	144	175	157	275	170	319	224	342	317	366	314	466	407
grand total	4,702	4,368	3,990	4,219	3,360	4,663	4,036	4,362	5,106	5,204	6,156	5,695	5,504

\* Figures for April-May 1966 are in terms of devalued rupee.

@ Includes value of 10,400 tonnes lost ex SS smith voyager which sank on the high seas.

\*\* Relates to live animals not for food.

1 Department of Commercial Intelligence and Statistics, Calcutta.

**PART III—DEMAND AND SUPPLY**  
**ERRATA**

Page	Paragraph/Table/ Appendix No.	Line	As printed	As desired
1	2	3	4	5
ix	Section 5	2	94	95
10	10-2-9	2	years,	years.
14	Table 10-6	Row 5, Col. 4	1174-4	1164-4
16	Table 10-8	Row 7, Col. 4	1-89	11-89
16	Do.	Row 9, Col. 6	4-30	5-30
17	10-2-20	2	490-19	590-19
18	10-2-23	16	improved	improved
18	10-2-23	26	goodgarins	foodgrains
21	10-3-9	1	spop	soap
23	Table 10-9	Row 1, Col. 3	130-3	150-3
24	10-4-2 (ii)	4	product	product
24	10-4-4	7	127	1-27
30	2	last	expendiure	expenditure
33	Footnote	2	help Final Consumption (Production Imports)	help of the follow- ing accounting relationship : Final Consumption= (Production and Imports).....
36	Appendix 10-5	Row 14, Col. 6	10-5	10-6
36	Footnote	1	in w :	in :
37	Appendix 10-6	Col. 5, heading	1960	1980
39	Appendix 10-7	Row 6, Col. 4	94-38	94-31
42	Do.	Row 12, Col. 2	25-19	25-29
42	Do.	Row 15, Col. 2	640-47	640-57
43	Do.	Row 2, Col. 7	33-29	33-39
43	Do.	Last Row, Col. 5	1-88	1-83
44	Do.	Row 14, Col. 3	0691-01	10691-01
45	Appendix 10-9	Title	Annual d Requirements of Foodgrains i 2000 AD	Annual Seed Requirements of Foodgrains of 2000 AD in
45	Do.	Row 3, Col. 4	-41	0-41
45	Do.	Row 4, Col. 1	Oa	Oats
46	Appendix 10-12	Row 1, Col. 9	3-37	3-87
48	11-1-3	13	Whether	weather
48	Footnote	1	1961....	1961....
50		5	Varities	varieties
51		7	programme	programmes
51	11-1-11	5	year	years
56	11-2-5	5	2-92	29-2
60	11-2-17	7	area ;	area,
60	Do.	8	are	area
61	Table 11-4	Title, line 2	1958	1985
62	11-3-2	4	23-9	23-3
63	11-3-4	13	corpping	cropping
63	11-3-4	16	point	points
63	11-3-6	6	produtivity	productivity
64	11-3-9	sub-heading	Principle Crops	Principal Crops
67	Table 11-7	Row 1, Col. 2	37-0	87-0
72	11-4-11	9	periods. On	periods on



1	2	3	4	5
73	11-4-12	17	programme of	progress of
75	11-4-15	4	filling	fillip
77		4	fertilisers.	fertilisers which
78		10	which	1985
78	11-4-24	9	1984-85	1985
79		7	differences	difference
		(after table)	steeped	stepped
80	Table 11-13	Title	Productions	Production
85		3	of yield	the yield
85	11-4-37	2	Chapter 21	Chapter 22
87	11-4-41	2	Table 11-16	Table 11-6
88		4	Livestock, feed	livestock feed
93	11-4-54	1 (after table)	meat	meat
93	11-4-54	8 (after table)	15-20 gm	15-20 gm.
94	11-4-55	18	ito	to
94	11-4-56	8	to meat	to meet
95	11-5-2	6	1973 ;	1973,
96	11-5-8	4	suple-	supple-
97	11-5-11	2	sugarbeat	sugarbeat
98	Table 11-21	Col. 4	—	In the case of com-
				modities for which
				there is only one
				estimate of supply
				possibilities, it
				should be read as in
				the middle of colums
				3 and 4.
103	12-1-6	2 from bottom	durign	during
105	12-1-13	2	porgramme	programme
107	Table 12-2	item 3	20-	20-1
108	12-3-1	18	sizble	sizable
114	Footnote	—	12-5-54	12-5-54
115	12-3-17	10	and to	to
119	Footnote	3	On	One
119	Do.	4	likly	likly
119	Do.	9	Document on No.	Document No.
142	12-5-61	15	constriant	constraint
145	12-5-71	last	targets shport	port targets should
			ould	
152	12-6-15 (ii)	3	requirements	requirements
154	12-7-5	8	countacted	counteracted
155		3	pluses	pulses
174	Recommendation 24	4	characteristic	characteristics
176	Recommendation 34	last	duct from	from
178	Recommendation 47	1	ausbsidiary	a subsidiary
180	Appendix 12-1	Title	Agricultural	Agricultural
			Export	Exports
181	Appendix 12-1	Item V/3, Col. 13	3,95	3,956
182	Appendix 12-1	Item II	Borticultural	Horticultural
190	Appendix 12-4	Item 24, Col. 2	—	20-00
190	Do.	Item 27, Col. 2	—	211-00
190	footnote	2	Institute of	Indian Institute of
			Foreign Trade	Foreign Trade