AN EVALUATION OF INDIA'S FOURTH FIVE YEAR PLAN--

THE AGRICULTURAL SECTOR

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C O N T E N T S

TABLES

CONCLUSIONS

The USDA team reached several major conclusions during its evaluation of the agricultural portion of India's Fourth Five Year Plan. These are as follows:

1. India's agricultural problem can be stated in simple terms. India has essentially exhausted the supply of new land that can readily be brought under cultivation. The net area sown is expected to expand only 1.4 percent during the Fourth Plan period. Future increases in food output must come almost entirely from raising output per acre. Capital inputs must be substituted for land in the production process; purchased inputs must increase severalfold.

2. The rate of increase in foodgrain output has lagged behind the growth in demand over the past few years. As a result, imports have increased dramatically and food prices have climbed. Even so, per capita availability has shown a disturbing tendency to decline. If the production trends of the past decade continue and if the projected demand materializes, further increases in the need for foodgrain imports and further rises in foodgrain price levels are inevitable.

3. In a situation where average per capita food availability levels remain constant and income levels rise, per capita food consumption rises among the upper income groups but declines among the lower income groups. Thus it is evident that the incidence of malnutrition has risen among the low-income groups in India thus far in 1960's.

4. An examination of the performance of the agricultural sector during the Third Plan period shows increases in inputs in agriculture far exceeding the increases in output. Actual increases in the various categories of inputs averaged 71 percent during the Third Plan period but only 41 percent of the targeted increase in output was achieved. This indicates a considerable overestimation of input response coefficients. However, no adjustment has been made in the response coefficients used in the Fourth Plan. Thus capital input requirements under the Fourth Plan are greatly underestimated.

5. One of the basic shortcomings of the planning process in India is the failure to take into account those forces which tend to reduce agricultural output. Some of these contrary forces exert a considerable downward pressure on food output. The growth of population projected at 65 million during the Fourth Five Year Plan will require several million acres just for living room i.e., housing, schools, etc. Because villages are usually surrounded by cultivated land areas, the growth in size of the villages will reduce the area under cultivation. With a residential density of 10,000 per square mile, the addition of 65 million people would require 6,500 square miles, or some 4 million acres. A good part of this area is certain to be agricultural land. The potential loss from this source in cultivable land over the Fourth Plan period amounts to several million acres. Other factors also act to reduce the area under cultivation. Several lakh acres of cropland have been lost in

Rajasthan because of severe soil erosion. Large areas of cropland in the Punjab are being lost because of waterlogging and salinity.

6. Continuing rapid growth in both human and bovine populations, resulting in rising requirements of wood for fuel and forage for cattle, is reducing the protective vegetative cover of the countryside. The loss of this protective cover, which retains moisture and reduces runoff aggravates erosion problems.

7. In an economy in which nearly all the increases in food output must come from rising output per acre, the dependence of the agricultural sector on the non-agricultural sector for yield-raising inputs becomes critical. The performance of the Indian agricultural sector is now dependent upon the ability of the non-agricultural sector to supply it with the necessary yield-raising inputs. If the industrial sector should reach say only one-half of its targeted production of agricultural inputs then planned increases in agricultural output will likely fall short by a like amount.

8. The quantities of wheat now moving from the United States to India under concessional terms loom very large both in terms of U.S. wheat production and Indian foodgrain consumption. Some 2/5 of the U.S. wheat crop is now consumed in the United States, 1/5 in India, and 2/5 in all other countries. U.S. wheat moving to India accounts for 8 percent of the Indian foodgrain supply.

9. Developing countries are characteristically faced with two principal constraints on the rate of economic development. These are the limited supply of capital available for investment and the

limited foreign exchange earnings available to finance imports of capital goods. In the case of India a third constraint -- inadequate port capacity -- could limit the rate of agricultural and economic development. Import requirements of fertilizer and fertilizer raw materials for instance, could approach 10 million tons by 1970/71. Given the present rate of port expansion, there is not assurance that Indian ports will be able to handle this much fertilizer in 1970/71.

10. The problem India faces in agriculture is serious, and it could become critical. Not only must India substitute capital inputs, especially fertilizer, for land on a massive scale but because it lacks significant natural deposits of phosphatic rock, sulfur or potash, it must import its phosphatic and potassic fertilizers or the raw materials from which they are made. Even in the case of nitrogen which is produced internally the demand is outrunning internal production very rapidly. Imports of nitrogen fertilizers, substantially exceeding the internal production in 1964/65, will have to continue to supply most of the required quantities of nitrogen if food production targets are to be realized. Foreign exchange requirements of the agricultural sector, reflecting largely the growing need for fertilizer imports, will likely exceed 750 million dollars per year by 1970/71. (See Table 20, p.68).

AN EVALUATION OF INDIA'S FOURTH FIVE YEAR PLAN -- THE AGRICULTURAL SECTOR

I. INTRODUCTION

Growth in the Indian economy in general and in the agricultural sector in particular has lagged behind desired and expected levels. Development performance under the Third Five Year Plan, which is nearing its end, has been disappointing in many areas. Thus, as the Fourth Plan emerges a hard look ahead is needed to see what measures and resources are required to significantly speed up the development process.

To achieve this quickening of the development tempo an assessment must be made of the quantity and allocation of additional resources, particularly foreign exchange made available through aid programs. A look at resource requirements across economic sectors is not enough. The intrasectoral allocation is also of great importance.

The largest sector of the Indian economy is agriculture. Its performance in recent years has been very disappointing. For three consecutive years foodgrains production failed to increase. With a rapidly growing population and modest increases in consumer income this has meant a decline in average per capita food consumption and a dramatic increase in food prices and food imports. These developments have created a new level of awareness of the food and agricultural problems of India. Slowly and belatedly the scope of India's long-term food and agricultural problem is being recognized.

This paper attempts to assess the means by which the rate of agricultural output can be substantially increased and keep pace with the rapidly growing population and to sustain a high level of economic growth. Estimates also are made of the quantity and type of resources required to get the job done. Particular attention is paid to foreign exchange requirements since such resources have been relatively limited, representing one of the major impediments to more rapid development.

II. THE LONG-TERM PROBLEM

The long-term food and agricultural problem in India is one of obtaining a sustained increase in agricultural production that will meet the rapidly growing demands with a minimum of price disruption, and allow for a build-up of buffer stocks. These stocks should be sufficient to enable India to stabilize year-to-year imbalances in supply and demand.

During the 1950's India made substantial progress in increasing agricultural output. It appeared that India might be on the way to solving its food problem. However, the increases in foodgrain output in the 1950's did not carry into the 1960's. In fact, per capita grain output thus far during the 1960's, averaging 179 kilograms per person per year, is below the average of 183 kilograms during the mid-50's. For the three years from 1960-61 to 1963-64 total foodgrain output failed to increase and per capita foodgrain consumption declined. Many believed this setback to be caused by bad weather. However, Indian agriculture entered the 1960's facing a new set of problems. And, these problems were not sufficiently appreciated.

During the late 1950's and early 1960's there was a persistent deterioration of agricultural prices, particularly cereal prices, relative to the general price level. The index of wholesale cereal prices relative to the wholesale price index for all commodities declined from 94 percent in 1958-59 to a low of 80 percent in

1961-62 (Table I). Certainly, price incentives to increase foodgrain output declined during this period. The sharp price rise in the past year or so has almost restored the 1958 price relationship. This does not mean that current price relationships are necessarily optimum. It does indicate that the current price relationship is more conducive to agricultural development than that prevailing during the previous five years.

It is difficult to assess quantitatively the effect that the deterioration in real prices between 1958 and 1964 had on production. But it must have had some effect on the flow of resources into agriculture.

One must look beyond low prices, however, to explain the tapering off of food production. Resource availability must also be considered. During the 1950's a large part of the increase in agricultural output came from expanding the area under cultivation.[1/] Over the 10-year span covered by the First and Second Five Year Plans, the net area sown expanded from 293 million acres to 328 million acres or an increase of 12 percent. This annual rate of increase in net area sown has dropped sharply in recent years. The Fourth Plan calls for an increase in net area sown from 336.5 million acres to 340.3,

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1/ B. S. Minhas, A. Vaidayanathan. Analysis of Crop Output Growth by Component Elements: India 1951-54 to 1958-61, Planning Commission, Discussion Paper No. 1, November, 1964.

Table I - Index of Wholesale Prices, India, 1950-65

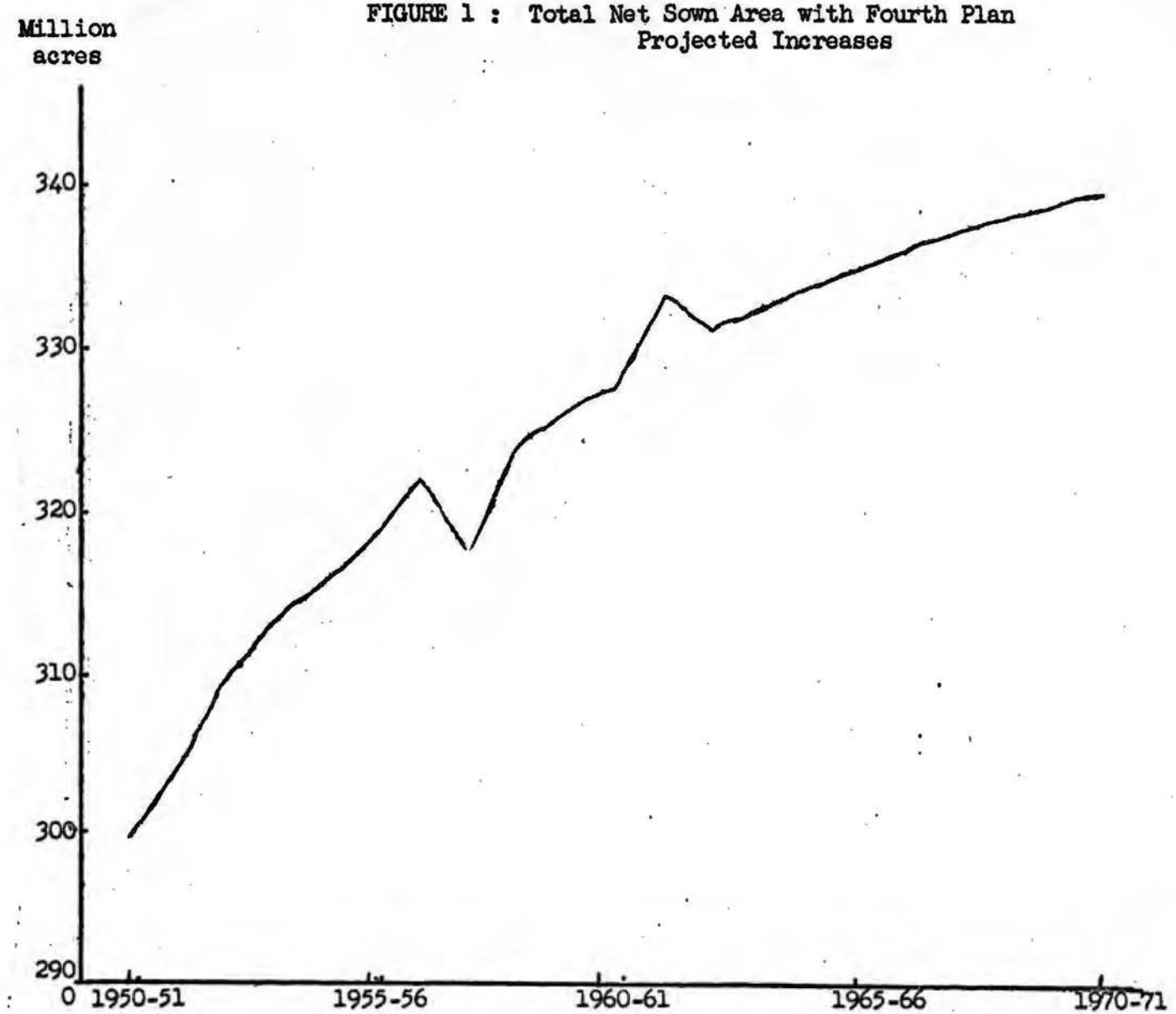
Year	Foodgrains	All Commodities	Foodgrains index as a percent of commodities index
	1952/53 = 100		
1950-51	94	112	84
1951-52	102	118	86
1952-53	99	111	89
1953-54	97	105	92
1954-55	76	97	78
1955-56	73	92	79
1956-57	93	105	89
1957-58	98	108	91
1958-59	106	113	94
1959-60	102	117	87
1960-61	102	125	82
1961-62	100	125	80
1962-63	106	128	83
1963-64	116	135	86
1964-65	143	148	97

Source: Indian Economic Statistics, Part I, General; August 1964 and Reserve Bank of India Bulletin, January 1965. The wholesale price index for foodgrains is a weighted average of the wholesale price indices for cereals and pulses.

an increase of 1.4 percent (Figure 1). Thus the annual rate of increase of 1.2 percent per year in the 1950's has slowed to an anticipated 0.3 percent in the late 1960's. The contribution of the 1.4 percent increase in the net area sown over the Fourth Plan is so small, compared to the planned increase in output, that it is scarcely significant. Thus virtually all the increases in crop output during the Fourth Plan will have to come from greater output per acre. The use of yield-raising inputs will have to be stepped up sharply just to prevent a decline in past rates of growth in agricultural output. The high cost of running out of land when the demand for food is increasing rapidly will become increasingly evident during the Fourth Plan period.

The industrial sector of the Indian economy must provide Indian farmers with yield-raising inputs such as fertilizers, pesticides and improved implements in ever-growing quantities. The use of yield-raising inputs must increase several fold between now and the end of Fourth Five Year Plan period. This will be particularly difficult because the investment and output base for agricultural inputs is small relative to projected agricultural input requirements. A vast array of resources will be required to supply the agricultural inputs needed to raise yields and production sufficiently to (1) meet the rapidly growing demands for agricultural products and (2) achieve the desired overall rate of economic growth. This is the long term problem of Indian agriculture.

FIGURE 1 : Total Net Sown Area with Fourth Plan Projected Increases



III. THE DEMAND FOR AGRICULTURAL COMMODITIES, 1970-71

The demand for agricultural commodities is growing rapidly. The major source of this rapid increase has been population growth (Table 2). In recent years population has been growing at 2.3 percent per year. Population projections for the Fourth Five Year Plan imply a growth rate of nearly 2.6 percent per year.

The importance of the accelerating rate of population growth can also be seen from the size of the absolute increases in population under the various Five Year Plans (Table 3). During the First Plan, population increased by 33.7 million persons. For the Fourth Plan an increase of 66.7 million persons is projected. Thus, the absolute growth in population expected during the Fourth Plan period is double that of the First Plan period.

In addition to population, per capita real incomes have also been increasing. Per capita real income has increased by about 2.0 percent per year in recent years. It is estimated that the income elasticity of demand for foodgrains is about 0.5.[1/] Therefore, the growth in income has contributed a one percent per year increase in the demand for foodgrains.

Demand projections for agricultural commodities made by the Planning Commission are presented in Table 4. Being projections, the growth in demands are based on specific assumptions that should be made explicit. Among them, two are very important:

1/ Development of Agriculture--India: 1960-61 to 1975-76, Perspective Planning Division, January 1964

Table 2 - Population and Income Growth, India, 1948 - 1964 and Projected Population to 1970-71

FY Starting April	Population	Index of Population	Per capita Income: 1948-49 Prices	Index of per capita Income
	Millions	1948-49=100	Rupees	1948-49=100
1948-49	346.6	100.0	249.6	100.0
1949-50	352.6	101.6	250.6	100.4
1950-51	357.6	103.2	247.5	99.2
1951-52	363.6	104.9	250.3	100.3
1952-53	370.0	106.8	255.7	102.4
1953-54	376.8	108.7	266.2	106.7
1954-55	383.9	110.8	267.8	107.3
1955-56	391.3	112.9	267.8	107.3
1956-57	399.1	115.1	275.6	110.4
1957-58	407.4	117.5	267.3	107.1
1958-59	415.9	120.0	280.1	112.2
1959-60	424.8	122.6	279.2	111.9
1960-61	434.2	125.3	293.2	117.5
1961-62	443.8	128.0	294.3	117.5
1962-63	464.0	133.9	300.4	120.4
1964-65*	476.0	137.3	--	--
1965-66*	488.3	140.9	--	--
1966-67*	500.9	144.5	--	--
1967-68*	513.8	148.2	--	--
1968-69*	527.1	152.1	--	--
1969-70*	540.1	152.1	--	--
1970-71*	555.0	160.1	--	--

Source: Estimates of National Income: 1948-49 to 1962-63. Central Statistical Organization, Department of Statistics, Government of India, February, 1964.

*Estimated: Based on growth rate of 2.58 percent per year.

Table 3

Increases in Indian Population Under each of the Five Year Plans

Period		Million People
First Plan	(1952-1956)	33.7
Second Plan	(1957-1961)	42.9
Third Plan	(1962-1966)	54.1
Fourth Plan	(1967-1971)	66.7

Table 4

Projected Consumption of Selected Agricultural Products, India, 1970-71 1/

Item	Unit	1960-61	1970-71	1970-71 as a percent of 1960-61
1. Foodgrains 2/	mil.tons	88	122	149
2. Vegetable Oils	mil.tons	1.9	3.3	174
3. Cotton	mil.bales	5.5	9.8	178
4. Sugarcane	mil. tons	88	132	150
5. Tea	th. tons	317	431	136
6. Tobacco	th. tons	312	484	155
7. Fruits & Vegetables	mil.tons	30.5	32.7	160
8. Dairy products	mil.tons	22.4	42.6	190

1/ These estimates are based on the following assumptions:

a. Prices remain constant at the 1960-61 level.
b. Population increases from 439 million in 1961 to 555 million in 1971.
c. The rate of growth in per capita income is assumed to be 3.5 percent per year. This is the lower rate of growth used by the Planning Commission.
d. The composition, family size and income distribution remain constant.

2/ Projected Consumption of 120 million tons is used in Memorandum on the Fourth Five Year Plan, Government of India, Planning Commission, October 1964. We do not consider the difference of 2 million tons to be significant.

Source: Development of Agriculture in India: 1960-61 to 1975-76, Planning Commission, January, 1964.

(1) Real per capita income is assumed to grow at 3.5 percent per year between 1960-61 and 1970-71.

(2) Constant real prices are assumed to prevail between 1960-61 and 1970-71 at 1960-61 level.

In fact, neither of these assumptions has held to date. There has been an increase in real agricultural prices since 1960-61 and real per capita income has grown at about 2.0 percent per year. Therefore, if we are still to assume that the projected demands are valid, we will have to increase the assumed rate of income growth and present a revised set of assumptions about prices.

It appears that growth in real per capita income will average about 2.0 percent per year during the Third Plan period. Therefore, an assumed growth rate of 5.0 percent per year in per capita income during the Fourth Plan would be consistent with the projections in Table 3. Further, such an assumption is not unrealistic in the context of this analysis. We are determining what the various resources requirements would be if the rate of economic development in India were to be substantially increased. A rate of growth of 5.0 percent(in per capita terms) represents a very substantial increase.

There has also been an increase in the real prices of agricultural commodities. This has had the effect of reducing consumption. If we were to assume that 1963-64 real prices rather than 1960-61 real prices were to prevail during the Fourth Plan, then projected consumption would be somewhat less. This, in fact, is quite a realistic assumption in light of the recent price-policy developments in India;

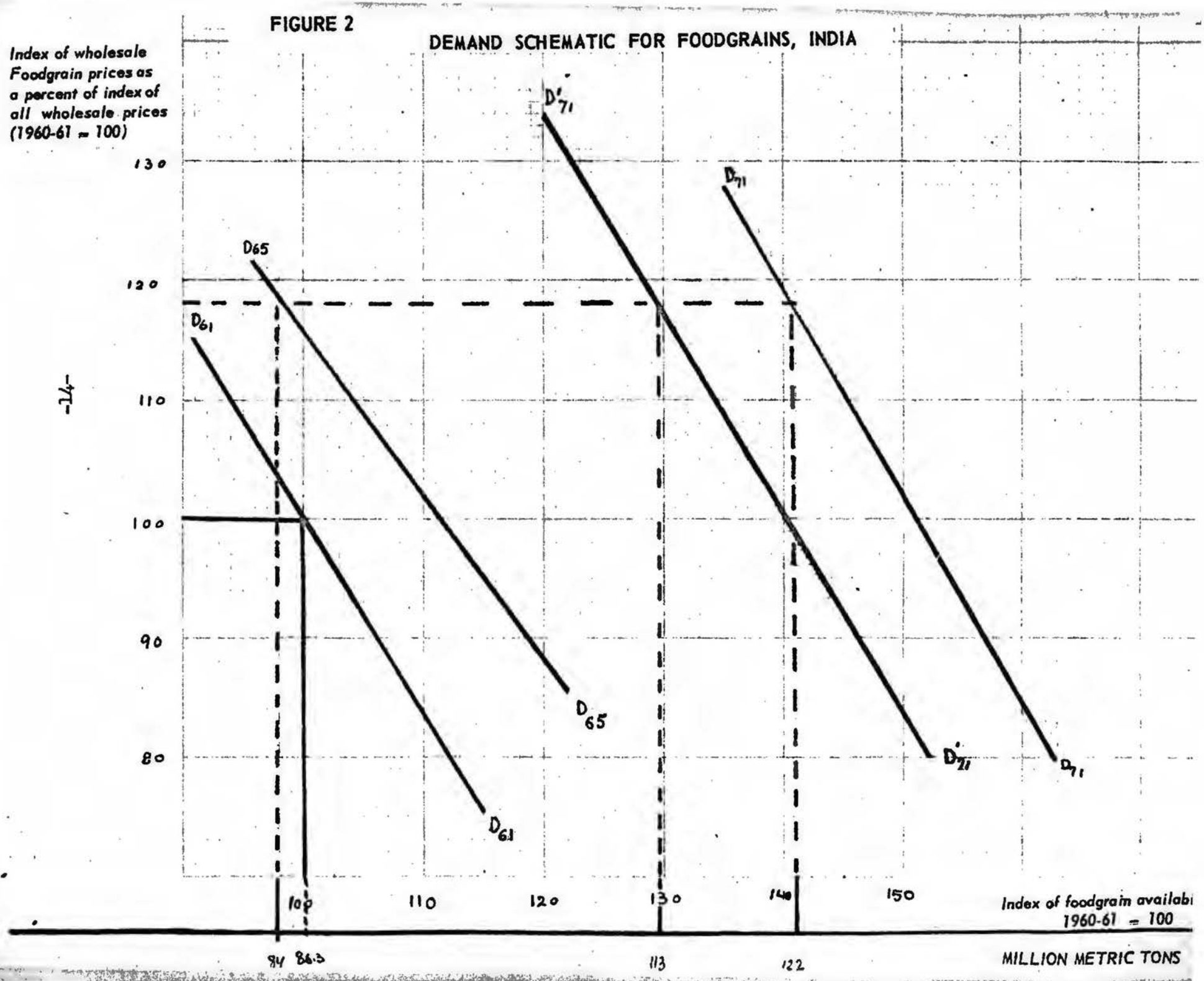
i.e., the announcement by the Government of India of an effective incentive price program for food grains and the establishment of the Food Corporation of India to implement this program. It is the objective of the Government of India to prevent food grain prices from deteriorating in the future as they have in the past. Also, foodgrain prices relative to the prices of other agricultural products will be taken into account so that increases in foodgrain production will not be obtained at the expense of other crops.

Therefore, considering the adjustments in both the income effect and the compensating prices effect, the demand projections for agricultural commodities to 1970-71 made by the Planning Commission could be accepted as a reasonable upper limit in the context of a major development push during the Fourth Plan. These projections also account for changes in final, intermediate, and export demands as well as for changes in stocks. For example, the expected growth in feed requirements and the strong need to build up foodgrain stocks have been built into the demand projections for foodgrains. Overall, the projected demands for agricultural products under the assumptions employed do not seem at all unreasonable.

The demand projections for foodgrains are also presented in graphic form in Figure 2. The index of wholesale foodgrain prices expressed as a percent of all wholesale prices are plotted against the index of foodgrains availability. The year 1960-61 is taken as the base period. The

FIGURE 2

DEMAND SCHEMATIC FOR FOODGRAINS, INDIA



demand curve D_{61} D_{61} is for the base period year.[1/] The curve D_{65} D_{65} is for the year 1965. Its position reflects the effects of income and population growth. In 1964-65 the index of foodgrain availability was 97.8 or 84 million metric tons. The corresponding price index value of real prices was 118.

A demand project to 1970-71 consistent with that in Table 4 is represented by the curves D_{71} D_{71}. The positioning of the curve is based on the projected population presented earlier, an income elasticity value of 0.5 and assumed rates of growth in real per capita income of 2.0 percent for the Third Plan period and 5.0 percent for the Fourth Plan period. The projected consumption of 122 million tons is consistent with the 1964-65 price level on this demand curve.

An alternative demand projection based on a 2.0 percent rate of growth in real per capita income over the entire period from 1960-61 to 1970-71 is represented by D'_{71} D'_{71}. At the 1964-65 price level for foodgrains, consumption would be 113 million tons or an index value of foodgrain availability of 129.5.

Alternative consumption projections would be made by assuming different parameters or different rates of change in population and income. Different combinations of foodgrain availabilities and prices could then be worked out for these basic projections.

1/ The income elasticity for foodgrains is 0.5. An average price elasticity of 0.6 at the means is assumed for the purposes of the schematic. This would mean that the sum of the cross elasticities would be 0.1, which may not be unreasonable considering the importance of foodgrains in the diet.

IV. THE SUPPLY OF AGRICULTURAL COMMODITIES, 1970-71 PROSPECTS FOR GROWTH IN AGRICULTURAL OUTPUT

The purpose of this section is to determine the amount of agricultural inputs of all types required to meet the projected consumption of agricultural commodities in 1970-71 (Table 4). Prospective output in 1970-71 can be estimated in two different ways. One is to examine the long-term trend in agricultural output. The other is to evaluate performance under the Third Plan and make inferences from this performance for the Fourth Plan.

The Long-Term Trend

In discussing the long-term trend in agricultural output we will concentrate upon the trend in foodgrain production. Little is lost in doing this because foodgrains constitute most of the food supply and represent the bulk of total agricultural production. Also, foodgrain and non-foodgrain output have increased at about the same rate over the past decade.

Foodgrain production followed a pronounced upward trend during the 1950's (Figure 2). However, there was considerable variation about this trend, reflecting the vagaries of the monsoon. Foodgrain output for 1962-63 and 1963-64 was well below the trend. Expected foodgrain output of about 87.0 million metric tons for 1964-65 would be slightly above trend.

If this trend were to continue, foodgrain output would reach 97 million tons in 1970-71, the end of the Fourth Plan. This would fall short of the Fourth Plan projected demand of 122 million metric tons by 25 million metric tons.

A trend projection of this type subsumes that the inputs into agriculture will continue to grow at a rate sufficient to maintain the past rate of growth in output. It does not mean, necessarily, the same composition of inputs as in the past. For example, India cannot look forward to as large an expansion in net cultivated area as occurred in the 1950's. Therefore, the slowdown in the rate of increase in land inputs must be compensated for by a sharp acceleration in the rate of use of other inputs, say fertilizer, just to maintain the past trend in production.

Another way to estimate total foodgrain production in 1970-71 is to make inferences about the Fourth Plan based on the Third Plan experience. A comparison of the agricultural input targets under the Third Plan and the anticipated achievement (Table 5), shows a range in target achievement from 54 percent for fertilizer to 110 percent for minor irrigation.

On the output side a target of 100 million metric tons was set for foodgrain output, but only 87 million metric tons is anticipated. Thus only 36 percent of the planned increase in output of foodgrains is likely to be achieved.

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244
60

Table 5 - Input Targets Compared with Anticipated Achievement During the Third Five Year Plan

1960-61			Third Plan					
Item	Unit	Levels of Production or Inputs	Target	Planned Increase	Anticipated Level	U.S.D.A. Team Estimated Achievement	Actual Increase Based on U.S.D.A. Estimates	Actual Increase as a percent of Planned Increase
Foodgrains	Million tons	79.7	100.0	20.3	92.0	87.0	7.3	36.0
Cotton	Lakh bales	53.9	70.65	16.75	63.4	63.4	9.5	57.0
Sugarcane (gur)	Lakh tons	104.5	100.0	7.5	110.0	110.0	5.5	--
Oilseeds	Lakh tons	65.2	98.2	33.0	75.0	75.0	9.8	30.0
Jute	Lakh bales	39.8	62.0	22.2	62.0	62.0	22.2	100.0
Irrigation								
(a) Major	Million acres	8.59	12.80	4.21	7.7	7.70	--	--
(b) Minor	Million acres	2.5	12.80	10.30	13.8	13.80	11.30	110.0
Soil Conservation	Million acres	--	11.00	11.00	11.8	11.80	11.80	107.0
Land Reclamation	Million acres	--	3.60	3.60	3.0	3.00	3.00	83.0
Consumption of Chemical Fertilizers								
(a) Nitrogenous	Million tons	.200	1.00	.800	.65	.68	.480	60.0
(b) Phosphatic (P_2O_5)	Million tons	.070	.40	.330	.25	.21	.140	42.0
(c) Potassic (K_2O)	Million tons	.025	.20	.175	.15	.11	.085	49.0
Area under improved seed (foodgrains)	Million acres	55.0	204.0	149.0	164.0	164.0	109.0	73.0
Organic or green manures								
(a) Urban compost	Million tons	2.4	5.0	2.6	4.42	4.42	2.02	78.0
(b) Green manures	Million acres	10.4	41.0	30.6	27.9	27.9	17.5	57.0
Plant protection	Million acres	16.0	50.0	34.0	40.0	40.0	24.0	71.0

Two factors account for the failure to achieve the targeted level of foodgrain production. First, the input objectives were not achieved. This accounted for some of the short-fall. Second, the input-output coefficients used in the Third Plan were unrealistically high.

On the basis of the information that we have on the Fourth Plan, inferences can be made about probable performance levels based on the same degree of achievement and overestimation of response coefficients that prevailed for the Third Plan. Under the Third Plan only about 40 percent of the planned increase in output is likely to be achieved[1/] (Table 6). The Fourth Plan envisages an increase in foodgrain production of 30 million metric tons. If 40 percent of this output target is attained, output will increase only 12 million metric tons. Adding this to the anticipated level of foodgrain output of 87 million metric tons at the end of the Third Plan gives an anticipated output of 99 million metric tons at the end of the Fourth Plan. This is very close to the projected output of 97 million metric tons based solely on trend.

Both methods of estimated foodgrain output in 1970-71 are very aggregative and crude. Both assume a close parallel between performance levels in the Third and Fourth Plans. This is not necessarily warranted. In fact some steps have already been taken to assure a somewhat better performance under the Fourth Plan. Therefore, the estimated foodgrain

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1/ This figure differs from the 36 percent used earlier because the latter is based on actual output in 1960-61, whereas the 40 percent is based on an average trend value for that year.

Table 6 — Foodgrain Output Targets Compared with Anticipated Achievement During the Third Five Year Plan

Item	Foodgrain Output
	(million metric tons)
Foodgrain production at the end of the Second Plan based on trend	78
Estimated foodgrain production at the end of the Third Plan	87
Target foodgrain production at the end of Third Plan	100
Anticipated increase in production under the Third Plan	9
Targeted increase in production under the Third Plan	22
Anticipated output as a percent of targeted output (percent)	41

output in 1970-71 of 97 million metric tons should not necessarily be interpreted as what is to be expected from the Fourth Plan, but rather as a lower bound for Fourth Plan performance.

Projected Input Requirements

If India is to expand agricultural output sufficiently to meet the levels of projected total consumption, investment in agriculture must be substantially increased during the Fourth Plan. The required increases in output are exceedingly large by almost any standard. We have estimated foodgrain production to be 87 million metric tons in the last year of the Third Plan. An increase in output of 35 million metric tons will be required during the Fourth Plan period if India is to be self-sufficient at a consumption level of 122 million metric tons.

It should be pointed out that over a broad range of levels of use many agricultural inputs are highly complementary. The maximum output response can be obtained from using a combination of several inputs such as fertilizer, improved varieties, water, and plant protection. This does not mean, however, that over a somewhat narrower range of levels of use that inputs do not substitute for each other or that significant responses cannot be obtained through disproportionate increases in inputs. We should keep in mind that changes in the composition of the input mix can be very desirable. Fertilizer use in India probably represents a case where large returns can be achieved from greater inputs, even without a rapid expansion in the use of other inputs. Eventually, however, a point is reached where further fertilizer use will yield large returns only when accompanied by greater use of other inputs. This is the point at which the complementary relationships become binding.

There are two basic questions to be considered in evaluating the inputs into agriculture required to achieve the output objectives of the Fourth Plan. Are the response coefficients assumed for the major agricultural inputs the best ones for this purpose? Is the planned level and pattern of investment in the agricultural sector adequate?

Response coefficients for the various agricultural inputs should be based on field conditions and Indian experience to the extent possible. During the Third Plan period the level of agricultural inputs did not in general reach the targeted levels. But in every case the level of major inputs came much closer to reaching the targeted levels than did the level of agricultural output. The increase in fertilizer inputs reached 54 percent of the targeted increase, the increase in improved seeds reached 74 percent of target and minor irrigation expansion actually exceeded the target, but the increase in foodgrain output amounted to only 41 percent of the planned increase.[1/] Thus it is evident that the response coefficients used were too high. The shortfall in production far exceeded the shortfall in inputs. Even more important is the fact that preliminary evidence indicates that the same coefficients used in the Third Plan will be used in the Fourth.

Table 6 gives an aggregate but useful method for obtaining a first approximation to a set of revised response coefficients for the major

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1/ Foodgrains are used here as an indicator of overall agricultural output. This is not unreasonable since the trends in food output and total agricultural output have been almost identical over the past decade or so. See Indices of Agricultural Production for the Far East and South Asia, Economic Research Service, U.S. Dept. of Agriculture.

agricultural inputs based on actual performance during the Third Plan. Basic to this approach is the assumption that all response coefficients are over or under estimated to the same degree (this assumption is relaxed later). The first column in Table 7 is the percent of targeted inputs likely to be achieved by the end of the Third Plan. The second column gives the percent of the output target likely to be achieved by the end of the Plan period. If we divide the second column by the first we get an estimate of the actual response coefficients expressed as a percent of the assumed coefficients. These figures appear in the fourth column. The last column gives the extent to which inputs would have had to be increased to offset the upward bias in the coefficients assumed in the Third Plan.

The .68 appearing at the top of column 3, for instance, means that investments in major irrigation projects were only 68 percent as effective as they were expected to be when the Third Plan was constructed. Assuming a similar production response to irrigation during the Fourth Plan, it would be necessary to increase investment in major irrigation by 47 percent above planned levels to achieve the Fourth Plan production targets. Fertilizer consumption levels would need to be increased by about one third above planned levels to achieve agricultural production targets.

It should be noted, however, that it may not be either practical or desirable to expand each input as indicated by the calculated expansion factor in column 4; i.e., there may not be sufficient scope

Table 7 -- Basis for Revising the Level and Pattern of Agricultural Investment in the Fourth Plan Period

Item	Third Plan			Calculated Expansion Factor for Fourth Plan Input
	Percent of Input Target Likely to be Achieved	Percent of Output Target Likely to be Achieved	Achieved Response Coefficient as a percent of Plan Coefficient	
I. Irrigation				
(a) Major	60	41	.68	1.47
(b) Minor	110	41	.37	2.70
II. Soil Conservation	107	41	.38	2.63
III. Land Reclamation	83	41	.49	2.04
IV. Consumption of Chemical Fertilizers				
(a) Nitrogenous (N)	60	41	.68	1.47
(b) Phosphatic (P_2O_5)	42	41	.98	1.02
(c) Potassic (K_2O)	49	41	.75	1.33
Total:	54	41	.76	1.32
V. Area Under Improved Seeds-- Foodgrains	73	41	.56	1.78
VI. Organic and Green Manures				
(a) Urban compost	78	41	.53	1.89
(b) Green manures	57	41	.72	1.39
VII. Plant Protection	71	41	.58	1.72

for expansion of all Fourth Plan inputs to the extent indicated. Therefore, allowance must be made for some compensating increase in some other input or inputs if the production targets are to be realized in the most efficient manner.

In summary, the calculated expansion factors in column 4 are simply a starting point for raising the level and revising the pattern of agricultural investment during the Fourth Plan period so the agricultural output targets can be realized. The following sections discuss each of the principal agricultural inputs in the Fourth Plan including our suggested changes in input levels.

Fertilizer

The future importance of fertilizer in Indian agriculture cannot be overemphasized. As the demand for foodgrains continues to grow and as the supply of new land that can readily be brought under cultivation is exhausted, capital inputs must be substituted for land in the production process. Fertilizer will undoubtedly be one of the principal capital inputs and one of the principal sources of additional output.

We feel that the fertilizer requirements for the Fourth Plan have been substantially underestimated. The revised response coefficient for total fertilizer inputs in Table 7 indicates that fertilizer consumption should be about one-third above planned levels during the Fourth Plan period if production targets are to be realized. On the basis of this revised response coefficient, fertilizer consumption should be

revised upward from the planned target of 3.4 million tons to 4.5 million tons. This coincides closely with the 4.6 million tons fertilizer consumption target which the AID Mission has recommended for 1970-71. These estimates are so close to the Mission figures that the USDA team has simply incorporated the Mission series as the recommended alternative to the planned levels of consumption (See tables 8-11).

Given the time required to construct new plants and to bring them into production, it appears likely that much of the increase in consumption would have to come from an expansion in imports. The estimated time normally required to bring a fertilizer plant into operation ranges from 6-9 years (Table 12). Thus, any decision to expand indigenous production in 1965, allowing for the normal period required to bring a plant into production plus another year for the additional food output to reach the marketplace, would not likely be felt until the early part of the Fifth Plan, even with an accelerated plant construction schedule. This time could, however, be reduced if a "crash" program were followed.

Although there will be some increase in domestically produced nitrogenous fertilizers, the great bulk of the increase in the use of nitrogen between now and 1970-71 would have to come from expanded imports. Lacking any indigenous supplies of potash or phosphate rock, all of the potassic and phosphatic fertilizer consumed must be imported or manufactured from imported raw materials. Thus, India, now dependent on

Table 8 — Production, Imports and Consumption of Plan Nutrients ($N+P_2O_5+K_2O$) 1950-51 to 1964-65 with Alternative Projections from 1965-66 to 1970-71

Year	Production	Imports	Consumption
	(thousand metric tons)		
1950-51	18	49	67
1951-52	25	33	71
1952-53	62	43	63
1953-54	72	22	82
1954-55	90	28	121
1955-56	91	63	135
1956-57	93	70	159
1957-58	101	121	183
1958-59	108	99	213
1959-60	116	115	259
1960-61	150	148	300
1961-62	202	117	383
1962-63	254	257	470
1963-64	340	301	586
1964-65	430	456	866

	Plan Targets	AID Targets	Plan Targets	AID Targets	Plan Targets	AID Targets
1965-66	527	536	432	475	959	1011
1966-67	755	781	473	586	1228	1367
1967-68	944	995	628	853	1572	1848
1968-69	1214	1315	815	1196	2029	2511
1969-70	1601	1779	1012	1634	2613	3413
1970-71	1926	2227	1446	2422	3372	4649

Figure 4
Fertilizer Consumption
Pounds Total Nutrients
Per Acre Arable Land (1961-62)

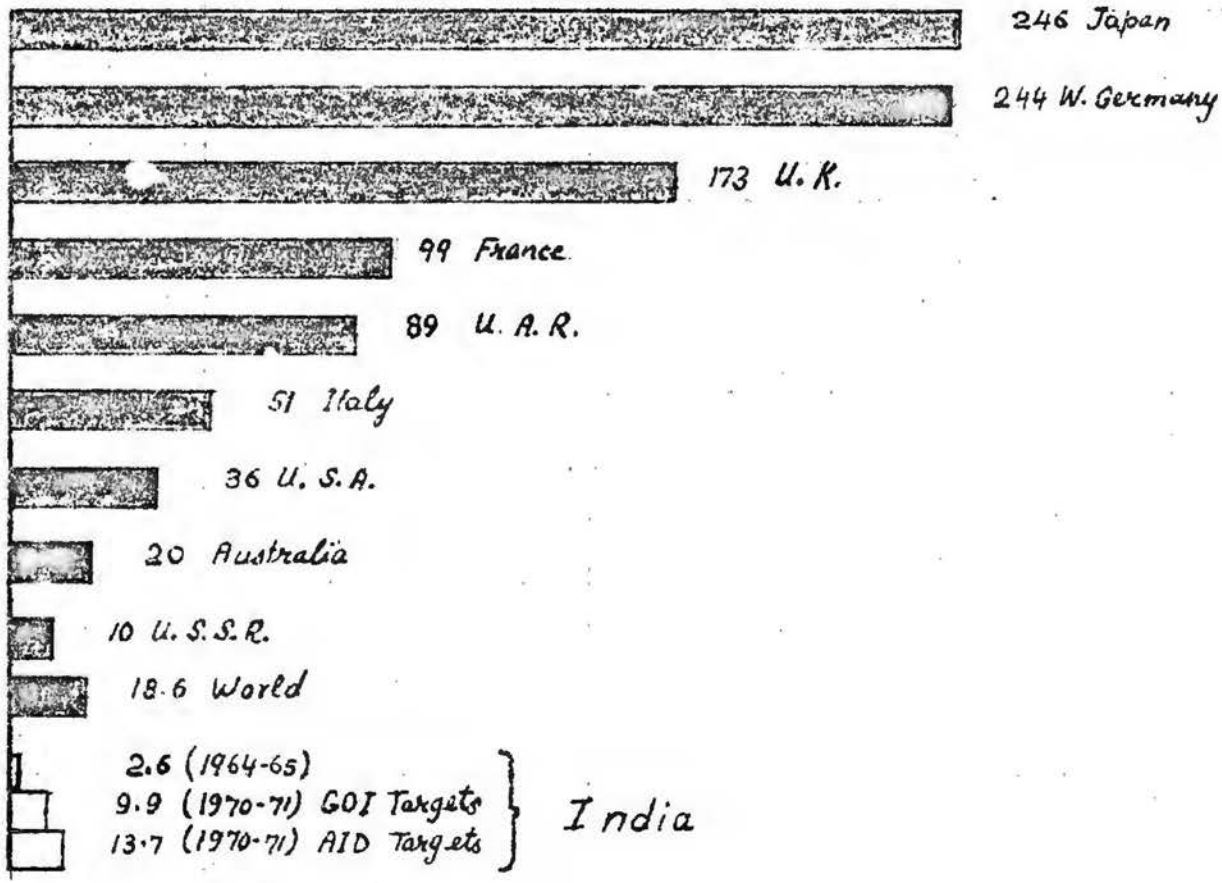

Table 9 -- Production, Imports and Consumption of Nitrogenous Fertilizers 1950-51 to 1964-65 with Alternative Projections from 1965-66 to 1970-71

Year	Production	Imports	Consumption
		(Thousand metric tons of N)	
1950-51	9	46	55
1951-52	16	28	56
1952-53	54	43	55
1953-54	61	17	65
1954-55	73	17	92
1955-56	79	47	105
1956-57	78	54	126
1957-58	76	107	139
1958-59	79	95	162
1959-60	73	155	176
1960-61	97	117	200
1961-62	140	80	281
1962-63	175	210	350
1963-64	210	235	390
1964-65	260	350	590

	Plan Targets	AID Targets	Plan Targets	AID Targets	Plan Targets	AID Targets
1965-66	330	330	320	351	650	681
1966-67	480	480	332	412	812	892
1967-68	560	560	456	609	1016	1169
1968-69	680	680	590	851	1270	1531
1969-70	860	860	727	1146	1587	2006
1970-71	900	900	1084	1728	1984	2628

Table 10 -- Production, Imports and Consumption of Phosphatic Fertilizers 1950-51 to 1964-65 with Alternative Projections from 1965-66 to 1970-71

Year	Production	Imports	Consumption
		(thousand metric tons of P_2O_5)	
1950-51	9	-2	7
1951-52	9	-2	7
1952-53	8	-3	5
1953-54	11	-3	8
1954-55	17	-2	15
1955-56	12	7	19
1956-57	15	7	22
1957-58	25	3	28
1958-59	29	5	34
1959-60	43	11	54
1960-61	53	17	70
1961-62	62	10	72
1962-63	79	1	80
1963-64	130	10	140
1964-65	170	10	180

	Plan Targets	AID Targets	Plan Targets	AID Targets	Plan Targets	AID Targets
1965-66	197	206	10	10	207	216
1966-67	275	301	10	10	285	311
1967-68	384	435	10	10	394	445
1968-69	534	635	10	10	544	645
1969-70	741	919	10	10	751	929
1970-71	1026	1327	10	10	1036	1337

Table 11 — Production, Imports and Consumption of Potassic Fertilizers 1950-51 to 1964-65 with Alternative Projections from 1965-66 to 1970-71

Year	Production	Imports		Consumption	
		(thousand metric tons of K_2O)			
1950-51	0	5		5	
1951-52	0	7		8	
1952-53	0	3		3	
1953-54	0	8		9	
1954-55	0	13		14	
1955-56	0	9		11	
1956-57	0	9		11	
1957-58	0	11		16	
1958-59	0	15		17	
1959-60	0	31		29	
1960-61	0	14		30	
1961-62	0	27		30	
1962-63	0	46		40	
1963-64	0	56		56	
1964-65	0	96		96	
		Plan Targets	AID Targets	Plan Targets	AID Targets
1965-66	0	102	114	102	114
1966-67	0	131	164	131	164
1967-68	0	162	234	162	234
1968-69	0	215	335	215	335
1969-70	0	275	478	275	478
1970-71	0	352	684	352	684

Table 12 -- Time Required to Construct Fertilizer Plants 1/

Plant	Preliminary report		Operational completion		Elapsed time (years)
A	April	1955	November	1962	7.6
B	April	1955	February	1961	5.9
C	January	1959	December	1964	6.0
D	November	1957	September	1965*	7.9
E	July	1960	December	1966*	6.5
F	October	1959	June	1967*	7.7
G	June	1959	March	1968*	8.8

*Present Schedule

1/ Taken from the Bechtel Summary Report: Fetilizer for India, p.9

imports for two-thirds of its total fertilizer needs, will be looking to imports for some four-fifths of its total needs if consumption rises to the extent needed to achieve Fourth Plan food output targets.[1/]

The recommended increase in fertilizer consumption during the Fourth Plan is phenomenally large when compared with the increases actually achieved during the Third Plan period. Total nutrient consumption, increasing by 750,000 tons during the Third Plan, should increase by 3,600,000 tons during the Fourth Plan if the USDA/AID recommended consumption levels are to be attained.

In terms of application rates, the pounds of nutrients used per acre will need to go from 2.9 pounds in 1965-66 to 13.7 pounds by 1970-71. (See Table 13 and Figure 3). Compared with historical rates of increase this is a very rapid gain. However, compared with countries practicing very intensive utilization such as the United Kingdom, West Germany or Japan, where average application rates range from 175 to 250 pounds per acre, recommended 1970-71 consumption levels remain very low (see Figure 4).

The use of fertilizer as a means of increasing food output has received much attention in this report. Increasing fertilizer consumption will undoubtedly be the principal source of additional food output. Substantial responses in output can be obtained from current levels of inputs in other areas such as seed and irrigation. And, as the inputs

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1/ Although Table 9 shows virtually all the P_2O_5 being produced internally, the basic raw materials used in the manufacture of P_2O_5 such as phosphate rock and sulfur are imported.

Figure 3

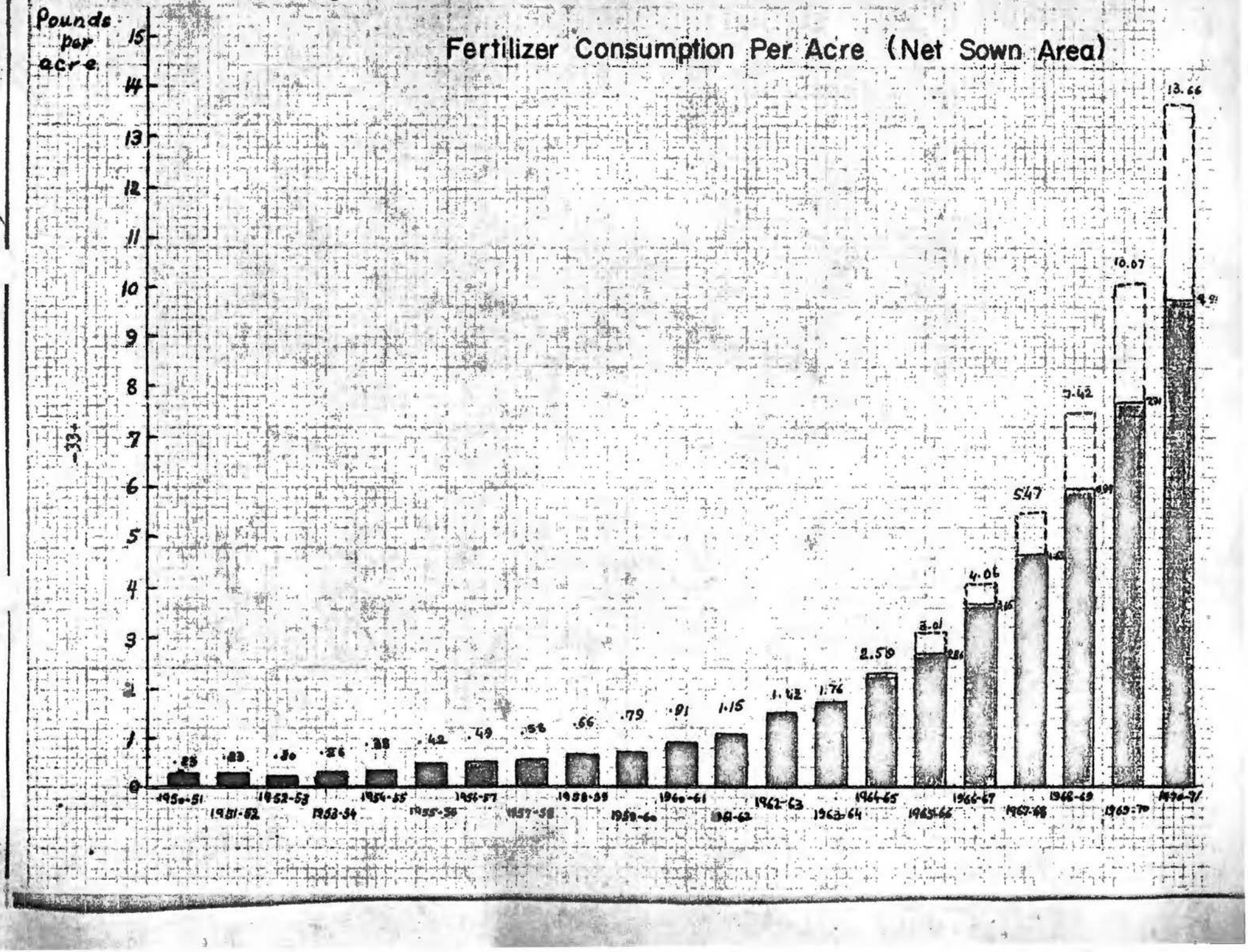
Fertilizer Consumption Per Acre (Net Sown Area)
Pounds per acre
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
.25
.33
.30
.36
.38
.42
.49
.56
.66
.79
.91
1.15
1.42
1.76
2.59
3.01
4.06
5.47
7.42
10.07
13.66
1950-51
1951-52
1952-53
1953-54
1954-55
1955-56
1956-57
1957-58
1958-59
1959-60
1960-61
1961-62
1962-63
1963-64
1964-65
1965-66
1966-67
1967-68
1968-69
1969-70
1970-71

Table 13 — Annual Fertilizer Consumption Per Acre 1950-51 to 1964-65 with Alternative Projections for 1965-66 to 1970-71

Year	Net Sown Area	Total Fertilizer Consumption		Fertilizer Consumption per Acre	
	(Million Acres)	(thousand metric tons)		(Pounds)	
1950-51	293.4	67		.23	
1951-52	304.0	71		.23	
1952-53	309.7	63		.20	
1953-54	313.2	82		.26	
1954.55	315.7	121		.38	
1955-56	318.1	135		.42	
1956-57	322.3	159		.49	
1957-58	317.6	183		.58	
1958-59	324.1	213		.66	
1959-60	326.5	259		.79	
1960-61	328.0	300		.91	
1961-62	334.0	383		1.15	
1962-63	331.5	470		1.42	
1963-64	333.0	586		1.76	
1964-65	334.5	866		2.59	
		Plan Targets	AID Targets	Plan Targets	AID Targets
1965-66	335.5	959	1011	2.86	3.01
1966-67	336.5	1228	1367	3.65	4.06
1967-68	338.0	1572	1848	4.65	5.47
1968-69	338.5	2029	2511	5.99	7.42
1969-70	339.0	2613	3413	7.71	10.07
1970-71	340.3	3372	4649	9.91	13.66

to these other areas grow the total production potential becomes even greater.

It should be recognized, however, from the outset that the effectiveness of fertilizer could drop during a period of very rapid increase in use. The great bulk of the farmers using fertilizer will be using it for the first time and it will take several years before they learn to use it most effectively. Therefore, there might be a drop in the average response coefficient. If time permitted a more gradual increase in fertilizer use, some of these short run inefficiencies could be avoided. Unfortunately, time is running out. Every effort should be made in the research and extension fields to induce cultivators to use fertilizer and teach them how to use it effectively. This effort does not have to be concentrated only in the public sector. There is plenty of room for the private sector to market fertilizer. This sector should be assisted with technical information that it can disseminate to farmers and thereby improve the output response from fertilizer.

Organic and Green Manures

Raising the productivity of soils can be considered essentially a two-dimensional process--increasing the supply of plant nutrients in the soil (primarily by use of chemical fertilizers) and improving the tilth of the soil i.e. aeration, moisture absorption and the retention of plant nutrients. This second type of improvement is achieved largely by raising the organic matter content of the soil and requires animal manures, compost materials or green manure crops.

Indian farmers are beset with some very basic handicaps in attempting to improve soil tilth. Fuel requirements of the rapidly growing human population leave less and less animal manures to be returned to land. Thus, some very pervasive forces are working against Indian farmers trying to improve their land. Basic problems of a very different type face those who wish to use green manure crops as a source of organic matter, since relatively few cultivators have equipment which will satisfactorily turn under a good green manure crop.

The use of urban compost, though increasing from 2.4 to 4.4 million tons during the Third Plan, is scarcely perceptible in the overall scheme of things. The increase in acreage covered with green manure crops, expected to increase from 10.4 million acres to 27.9 million acres during the Third Plan period, is also very small especially when compared with the total net sown area of some 335 million acres.

A substantial increase in the use of green manures is targeted for the Fourth Plan. Acreage benefitting from green manure crops is expected to increase from 28 million acres at the end of the Third Plan to 64 million acres at the end of the Fourth Plan. The increase in planned expansion is nearly triple the expansion achieved during the Third Plan period.

The need for additional organic matter in the soil is acute and it may become even more so as the use of chemical fertilizers increases.

It is not possible to make detailed recommendations in this report about any substantial increase above planned levels in the use of green manures. However, we can say that any expansion in this area of activity would have insignificant foreign exchange requirements.

Irrigation

Irrigation represents an investment area in Indian agriculture from which substantial returns can be gotten. However, such returns have not been apparent in the past. For example, the Planning Commission[1/] attributes to irrigation only 2.9 million tons out of a planned total increase of 50.5 million tons of foodgrains between 1960-61 and 1970-71, or about only 6 percent.

There is good reason why these small responses have obtained. There are also good reasons why a much larger production response can be obtained from proper investments in irrigation and related water management activities.

Much of the irrigation in India is defensive in nature.[2/] The planned availability of water is sufficient only to be useful in times of severe water shortage. Or, stated another way, it is a famine preventative measure. In addition to many areas having too little water spread thinly over the land, there are other areas in which

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1/ Development of Agriculture: India, 1960-61 to 1975-76, Perspective Planning Division, Planning Commission, January 1964.

2/ Irrigation, C. E. Lindblom AID staff paper.

the water supply cannot be controlled and used properly. Water-logging and salinization are taking large areas out of production. This is particularly critical in the Punjab. Finally, improper field and channel preparation result in much irrigation water being used inefficiently.

The defensive irrigation approach shows up in Indian planning in the form of emphasis on extending the number of acres covered. Virtually no mention is made of increasing the intensity of water use on land that is currently classified as irrigated. Another way which the concept of defensive irrigation shows up is in the patterns of multiple cropping. The percent of land that is double cropped is about the same for irrigated and unirrigated land.

Widespread acceptance of the idea of intensive irrigation, along with the use of other inputs, could increase crop output substantially. Included in the intensive irrigation approach would be an abundance of water, proper water management to prevent waterlogging and salinization, and proper field and channel preparation. Investment in intensive irrigation should not be measured just in terms of the number of acres brought under irrigation. For, much of the new investment will have to be on land that is now classified as irrigated, but qualifies only in the defensive sense.

We have seen that one estimate of expenditures required in irrigation to achieve the planned agricultural output runs 147 and 270 percent above the tentatively scheduled outlay for major and minor irrigation,

respectively (Table 7). However, it was stated earlier that these estimates are not final in the sense that the needed increase in inputs could be redistributed among the categories. Irrigation is one such area that, for the sake of realism would require some reallocations. There would be little short-run benefit from substantially expanding investments in major irrigation. Even from a long-term standpoint it is difficult to rapidly expand major irrigation works.

On the other hand, investments in minor irrigation yield a quick return. We would recommend that substantially more investment be allocated to intensive minor irrigation projects. An estimated 300 percent increase in outlays for minor irrigation would probably be required to achieve the targeted output objectives. The estimated increase in expenditures is based upon the expansion factors in Table 7, with a shift in emphasis from major to minor irrigation. These investments should concentrate on the problems of providing intensive irrigation.

Handling this rapid an expansion of investment will place many pressures on the Indian agricultural administrative structure. Recognizing this, steps should be taken at the earliest possible time to expand the manpower and skills available for this purpose. Much solid and water survey work will be needed to determine which areas are best suited for intensive irrigation.

We are not in a possition to calculate the detailed input requirements from the non-agricultural sectors of the economy and from foreign

sources. A detailed study should be undertaken to estimate (a) the number of tube wells and other minor irrigation projects that can be brought into production, (b) the detailed capital inputs, (c) the needed power inputs, (d) the credit needs to stimulate individual undertakings, (e) the expanded needs for agricultural administration to achieve the increased targets and (f) the type of minor irrigation approaches that best serve the needs of Indian agriculture. The latter point of what type of irrigation is "best" may be the most important since it is difficult to plan expenditure levels and calculate input requirements for irrigation if it is unclear how irrigation is going to be done.

Table 14: Fourth Plan Irrigation Input Targets Compared with Estimated Achievement under the Third Plan

Item	Major Irrigation	Minor Irrigation
	Million Acres	
Estimated Third Plan achievement	7.70	13.8
Fourth Plan target	14.00	17.0

Improved Varieties

The development and dissemination of improved seed represents an investment area in Indian agriculture that can yield a tremendous payoff in the next several years. This is so for several reasons. First, a

great deal of varietal improvement has already been done. Second, the Government of India has available many highly qualified people that could carry on a rapidly accelerated seed development program. Third, the development of improved varieties requires very little capital investment and foreign exchange. It can be financed heavily with internal funds.

The approach in Indian planning to the improved seed program has been one that strongly emphasized the area covered. By the end of the Third Plan about 164 million acres of foodgrains should be covered by improved seed. The target under the Fourth Plan is an area of 274 million acres. This is undoubtedly very important. But it suffers from the severe weakness that the seeds being disseminated as improved seed are not much better than those actually being used by cultivators. Therefore, in addition to stressing the area covered by improved seed, heavy emphasis should be placed on the development of substantially improved varieties.

We would recommend that investment in seed development be increased substantially above the planned levels in the Fourth Plan. We further feel that this accelerated investment can be readily absorbed by Indian agriculture and its administrative structure. To support these statements we draw upon the successful work that has been done to date by the Rockefeller Foundation and the Government of India. Several varieties of hybrid maize have been produced and are performing well in the field. A hybrid variety of sorghum has also been developed and is yielding extremely favorable results. This

seed is ready for dissemination among cultivators. Work is progressing well in the adaptation of dwarf wheat varieties and will probably be available for dissemination within two years. Work on improved rice varieties is just getting started.

There do not appear to be any bottlenecks now nor in the foreseeable future on the development side of the seed program. Impediments do exist in the multiplication and dissemination of seed to farmers. This is one of the major areas in which new investment should be concentrated. The Government of India should proceed with all haste to establish large seed farms in adequate numbers and to develop an effective distribution system. Such a distribution system would probably operate more effectively and achieve the desired rate of response if it were in the private sector. This idea is being given serious thought by the GOI.

Although detailed calculations on foreign exchange requirements for this area of investment are required, it is our opinion that these needs would be relatively small. They would consist mainly of equipment needed to expand seed production and to process seeds for use by the farmers.

Soil Conservation and Reclamation

These are areas in agricultural development which are extremely important but whose direct contribution to increasing output is sometimes hard to see. This is so because the measures are defensive as well as offensive. They are defensive in the sense of arresting

trends in losses of soil productivity and losses of cultivated land from agricultural production. They appear as offensive schemes only to the extent that new land is brought into production or old land that has gone out of production is reclaimed for productive uses.

In many parts of India there exist serious problems of soil erosion, waterlogging and salinization. Much productive land is being lost each year. For example, some of these factors are critical problems in wide areas of the Punjab. Therefore, much more attention should be given to arresting these losses.

The tentative targets set for the Fourth Plan for these areas would result in covering 22.5 million acres by soil conservation and land reclamation schemes. This represents a significant increase in investments over those in previous plans. However, we feel that even this large increase is not enough given the magnitude to increased production required during the Fourth Plan. Therefore, we would recommend that the targets in the Fourth Plan be doubled.

Much of the work that needs to be done in soil conservation and reclamation can be financed with internally generated resources. Foreign exchange requirements would be relatively small. These would be mainly for the purchase of some heavy equipment. The main bottleneck to a rapid expansion of investment in these areas lies in research, training, and organization. It is difficult to generalize the nature of the problem over large areas. Detailed soil and land use surveys are required at the appropriate geographical level, which in many instances would be a relatively small area. For investment

to be effective these surveys must precede the actual investment process. In addition much work will have to be done in building effective organizational machinery and training personnel to carry out the investment projects.

Farm Mechanization

There are many people that feel that farm mechanization can play an extremely large role in increasing agricultural output in India. However, it seems that the Government of India does not hold these views for no provision is made in the Fourth Plan for allocating funds to the broad area of farm mechanization.

From what we have been able to discern, there is some payoff to increased investments in farm mechanization. These investments can be considered in two categories; (a) development of more effective implements that can be used with existing power sources, i.e., bullock power; and (b) the introduction of tractor power.

There has been a fair amount of work done at agricultural colleges on implement development. This work should be encouraged and given more support. In addition to the research work, farm implements of various types are being produced on a growing scale. The resources required to produce them can be generated almost entirely from within the Indian economy. A rapid expansion of investments in this area of mechanization would not draw upon foreign exchange earnings to any significant extent.

Accelerated availability of tractor power to Indian cultivators would present a set of somewhat different problems. The demand by

individual cultivators for traditional sized tractors is limited because there are too few operations that are large enough to economically use them. This does not mean, however, that the individual cultivators cannot effectively and efficiently use the services of such tractors for specific and critical farm operations. In particular, many individual farmers could benefit from occasional deep plowing to break up soil hardpan and from grading and other field preparation operations that require the use of fairly large power units. Serious thought should be given to encouraging the establishment in the private sector of firms that would do these jobs for farmers on a custom or fee basis. In line with this suggestion thought should be given to (a) the availability of tractors and associated implements, (b) the availability of spare parts to keep them operating, (c) the availability of properly trained mechanics to keep the machines operating at peak efficiency and (d) the availability of fuel and lubricants. At the present time tractors are being manufactured in India, e.g., Escorts. The local manufacture of tractors could be substantially expanded. This would minimize the need to draw directly upon foreign exchange earnings.

From a long-term point of view there would seem also to be considerable potential in India for the use of small tractors similar to the type that the Japanese have developed and are using in their agriculture. These could have very wide-spread use in India. However, one wants to keep in mind a serious problem that is created for cultivators if they were to shift in a major way to tractor power. By

replacing bullocks as a source of power they would be losing a versatile source of power and transportation as well as an important source of fuel. Alternative sources of transportation and fuel would have to be found. We don't feel that this is an area in which a crash investment program would yield a high rate in the short run. Rather it should be viewed as a long-run investment policy and the investments geared to the rate of transition which cultivators are willing to accept or can reasonably be induced to accept.

Plant Protection

The protection of crops from insects, fungi, rodents, and other pesticides is essential if the full effects of all other agricultural inputs are to be realized. The use of pesticides, like that of chemical fertilizers, promises immediate results in expanding food output.

There are many obstacles that must be overcome before a substantial increase in agricultural output can be achieved from greatly accelerated investments in plant protection. Among these are technical knowledge required to handle and properly apply. Much training in the handling and use of pesticides must be compressed into very short period of time. Every effort should be made to train a sufficient number of personnel in order that the planned extension in plant protection can be realized. In addition, investments will have to be made in equipment needed for the application of pesticides--dusters and power sprayers.

The revised response coefficient based on the performance during the Third Plan period indicates that the effectiveness of the plant protection measures was much less than was originally anticipated. During the Third Plan period the crop area benefitting from plant protection measures increased from 16 to 40 million acres. The increase of 24 million acres was well below the targeted increase of 34 million acres. During the Fourth Plan an increase of 120 million acres is targeted for plant protection measures. This target represents a five-fold increase over the expansion in area achieved during the Third Plan.

An analysis of available information indicates that the past approach to plant protection has been one that heavily emphasized area rather than intensity of coverage. The USDA team feels that planned investments in plant protection during the Fourth Plan should be about double what is currently planned for. However, we feel that this stepped-up investment should concentrate relatively less on area extension and proportionately more on intensifying the use of plant protection measures on the areas to be covered.

This very large increase in plant protection expenditures will place particularly heavy pressures on the agricultural administrative machinery since a major increase in training and expansion activities will be required. In addition, there will be a strong demand for products from the chemical industry and from those industries manufacturing the equipment required for effective application of

pesticides. The direct demand for foreign exchange may be relatively small, but the indirect demands through the needs placed on other sectors could be appreciable.

V. IMPLICATIONS OF SHORTFALLS IN AGRICULTURAL PRODUCTION

It will be useful to examine the projected food situation in India in 1970-71 under two alternative situations. Situation I assumes for the Fourth Plan (a) a growth in agricultural output based on the long term trend (see Figure 2), (b) an increase in population of 2.5 percent per year, and (c) an increase in per capita real incomes of 2.0 percent per year. Situation II assumes for the Fourth Plan (a) a growth rate in agricultural output of over 5.0 percent per year, (b) an increase in population of 2.5 percent per year, and (c) an increase in real per capita income of 5.0 percent per year.

An examination of foodgrain consumption, production, imports and price levels under Situation I illustrates the seriousness of the Indian food and agricultural problem and the imperative need to greatly accelerate food output.

The lower growth rate in income assumed under Situation I is based on the supposition that continued slow growth in agricultural output would not support a high overall rate of economic growth. Accordingly, projected demands are lower in Situation I than in Situation II.

Situation I

Under the assumption of constant real prices for agricultural commodities at about current levels, we have projected total foodgrain production, consumption and import requirements in 1970-71 (Table 15).

Situation I

Table 15 -- Production, Imports and Availability of Foodgrains 1950-51 to 1964-65 with Projections (including demand) to 1970-71 1/

Year	Production	Imports	Availability
		(million metric tons)	
1950-51	54.9	2.1	57.0
1951-52	55.5	4.9	60.4
1952-53	61.6	1.3	62.9
1953-54	72.1	1.8	73.9
1954-55	70.6	1.0	71.6
1955-56	69.2	0.8	70.0
1956-57	72.3	1.7	74.0
1957-58	66.5	3.6	70.1
1958-59	78.7	3.4	82.1
1959-60	76.6	3.4	80.0
1960-61	80.9	5.4	86.3
1961-62	81.0	3.3	84.3
1962-63	78.5	3.6	82.1
1963-64	79.4	4.6	84.0
1964-65	87.0	6.3	93.3
	Projected Production	Projected Import needs	Projected Total demand
1965-66	87	7	94
1966-67	89	8	97
1967-68	91	10	101
1968-69	93	12	105
1969-70	95	14	109
1970-71	97	16	113

1/ These projections assume that the linear production trend prevailing from 1950-51 to 1964-65 will continue to 1970-71. An alternative method of projecting production is to assume that efforts to reach production targets under the Fourth Plan will be no more successful than under the Third Plan. This yields essentially the same production trend with a 1970-71 production of 99 million tons of foodgrains (See Table 5). Also real foodgrain prices at the 1963-64 level are assumed. Projected gross demand assumes population growth of 2.5 percent per annum and a growth in real per capita income of 2.0 percent per year.

Total foodgrain consumption is estimated at 113 million metric tons, production at 97 million metric tons and import requirements of 16 million metric tons. These projections illustrate the rate at which demand is outrunning supply (Figure 5). The import requirement of 16 million metric tons would require, in wheat equivalent, one-half of current U.S. wheat production. This amply illustrates the severity of continued lags in agricultural production.

We can also look at what Situation I means in terms of per capita foodgrain production and consumption. The amount of foodgrains produced per person in India varies widely according to the vagaries of the monsoon. The per capita foodgrain outturn of 181 kilograms during the exceptionally good crop year of 1964/65, though well above recent years, is still well below the unusually good per capita output of 188 kilograms in 1960-61 (Table 16). Per capita grain output has not shown any significant tendency to increase over the past ten or twelve years. Most of the gains in consumption were made as a result of increased imports. If the Alternative I projections materialize, per capita grain output will trend downward during the Fourth Plan.

It is significant to note that even with grain imports of 16 million metric tons in 1970-71, per capita consumption increases only modestly during the Fourth Plan.

If it were not possible for India to import 16 million tons of foodgrains in 1970-71, but only current levels of 7 million tons, per capita supplies would decline modestly over the Fourth Plan period. It should be noted, however, that in a situation where per capita supplies are declining and where incomes are rising, food prices will rise. With

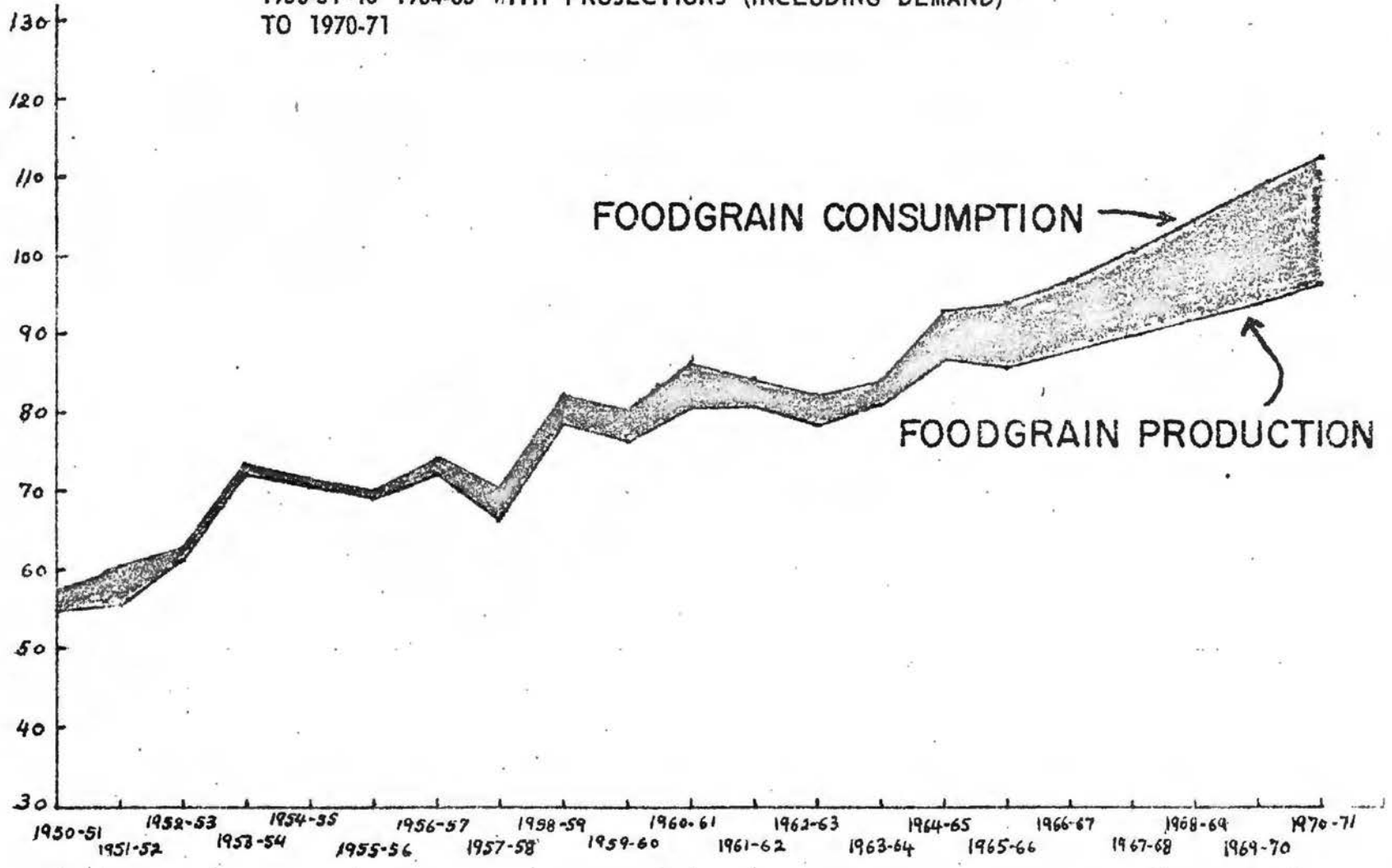
Table 16 -- Per Capita Production, Imports and Availability of Foodgrains 1950-51 to 1964-65 with Projections for 1965-66 to 1970-71 1/

Year	Production	Imports	Availability
		(kilogram per year)	
1950-51	151.0	5.8	156.8
1951-52	150.1	13.3	163.4
1952-53	163.8	3.4	167.2
1953-54	188.3	4.7	193.0
1954-55	180.9	2.5	183.4
1955-56	173.9	2.0	175.9
1956-57	178.2	4.1	182.3
1957-58	160.5	8.7	169.2
1958-59	185.9	8.0	193.9
1959-60	177.0	7.8	184.8
1960-61	183.0	12.2	195.2
1961-62	179.8	7.3	187.1
1962-63	171.0	7.8	178.8
1963-64	169.7	9.8	179.5
1964-65	181.4	13.1	194.5
	Projected Production	Projected Import needs	Projected Total demand
1965-66	177.0	14.2	191.2
1966-67	176.7	15.8	192.5
1967-68	176.2	19.3	195.5
1968-69	175.7	22.6	198.3
1969-70	175.1	25.8	200.9
1970-71	174.5	28.7	203.2

1/ See Table 15.

Figure 5

PRODUCTION, IMPORTS AND AVAILABILITY OF FOODGRAINS 1950-51 to 1964-65 WITH PROJECTIONS (INCLUDING DEMAND) TO 1970-71



7 million tons of grain imports, total grain availability would be only 104 million metric tons. Using the demand schematic in Figure 2, we could expect an index of real foodgrain prices of 132. This would be a level of real prices 32 percent above the 1960-61 level and about 12 percent above the 1964-65 level. This would imply an average increase in real foodgrain prices of 2 percent per year between 1964-65 and 1970-71.

The incidence of malnutrition could increase markedly as real food prices rose. Low income consumers, already spending a very large part of their total income on food, would not be able to expand expenditures sufficiently to offset the rise in prices. The result would be a reduction in food consumption among those income groups which already have the lowest consumption levels. Thus, the number of people suffering from severe malnutrition could increase considerably.

Situation II

Under Situation II the increases in agricultural production would be sufficient to bring about self-sufficiency in food in India by 1970-71 (See Table 17 and Figure 6). Both foodgrain production and consumption would be 122 million metric tons; no imports would be required.

Under Situation II per capita food production and availability would trend steadily upward over the Fourth Plan period (Table 18). The increase in per capita grain output would result in significant improvements in diet. The current output level of 181 kilograms per

Situation II

Table 17 - Production, Imports and Availability of Foodgrains 1950-51 to 1964-65 with Projections (including demand) to 1970-71 1/

Year	Production	Imports	Availability
		(million metric tons)	
1950-51	54.9	2.1	57.0
1951-52	55.5	4.9	60.4
1952-53	61.6	1.3	62.9
1953-54	72.1	1.8	73.9
1954-55	70.6	1.0	71.6
1955-56	69.2	0.8	70.0
1956-57	72.3	1.7	74.0
1957-58	66.5	3.6	70.1
1958-59	78.7	3.4	82.1
1959-60	76.6	3.4	80.0
1960-61	80.9	5.4	86.3
1961-62	81.0	3.3	84.3
1962-63	78.5	3.6	82.1
1963-64	79.4	4.6	84.0
1964-65	87.0	6.3	93.3
	Projected Production	Projected Import Needs	Projected Total Demand
1965-66	87	7	94
1966-67	94	5	99
1967-68	101	3	104
1968-69	108	2	110
1969-70	115	1	116
1970-71	122	0	122

1/ These projections assume that the foodgrain output targets of the Fourth Plan will be achieved. Also, real foodgrain prices at the 1963-64 level are assumed. Projected gross demand, assuming population growth of 2.5 percent per annum, an average per capita income increase of 3.5 percent per year for the 10 year span covering the Third and Fourth Plan periods (this implies an accelerated rate of growth during the 6 remaining years) and an income elasticity coefficient of demand for foodgrains of 0.5 percent. (These are the assumptions used in constructing the Fourth Plan).

Situation II

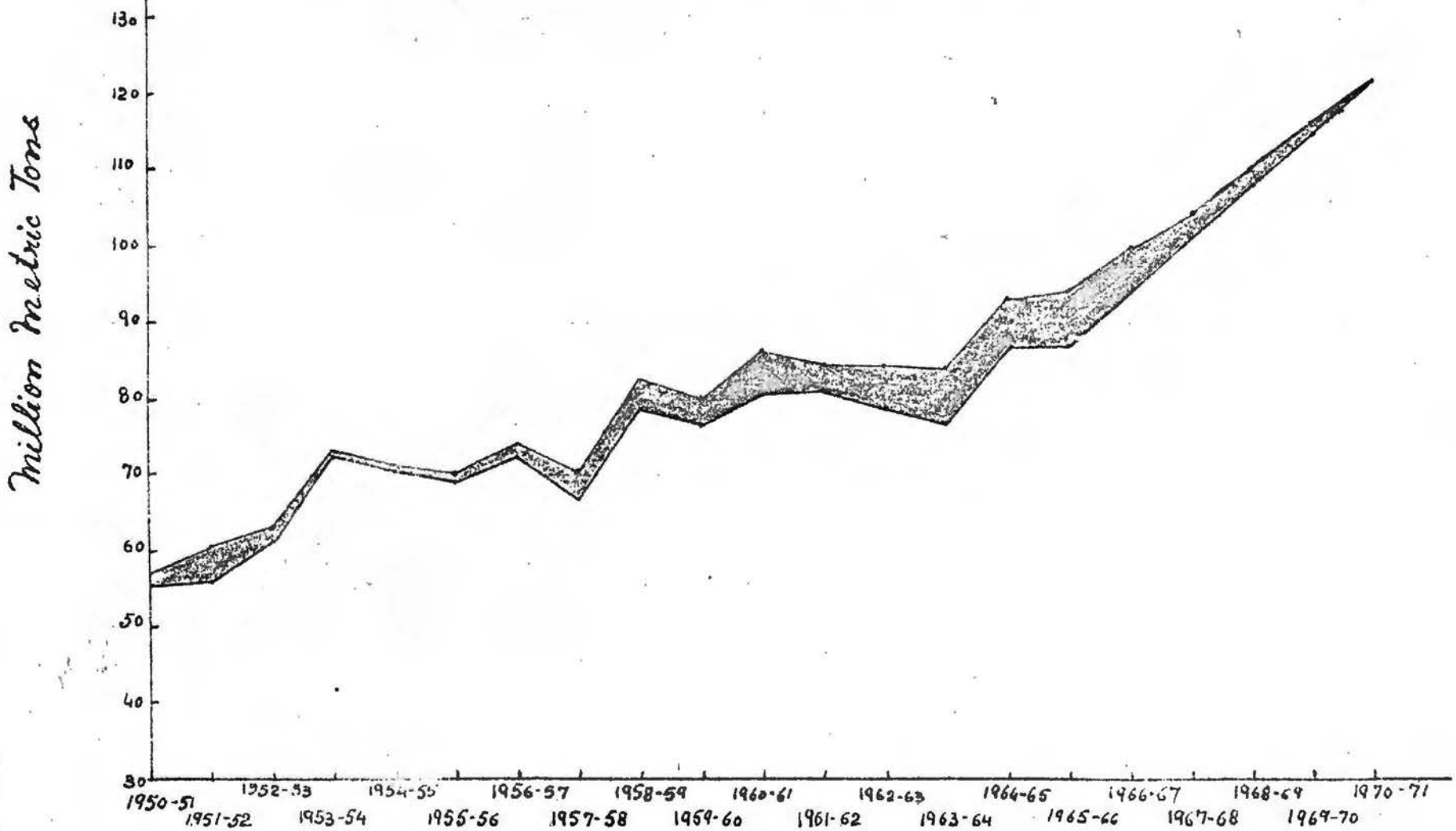
Table 18 -- Per Capita Production, Imports and Availability of Foodgrains 1950-51 to 1964-65 with Projections (including demand) to 1970-71 1/

Year	Production	Imports	Availability
	(kilograms per year)		
1950-51	151.0	5.8	156.8
1951-52	150.1	13.3	163.4
1952-53	163.8	3.4	167.2
1953-54	188.3	4.7	193.0
1954-55	180.9	2.5	183.4
1955-56	173.9	2.0	175.9
1956-57	178.2	4.1	182.3
1957-58	160.5	8.7	169.2
1958-59	185.9	8.0	193.9
1959-60	177.0	7.8	184.8
1960-61	183.0	12.2	195.2
1961-62	179.8	7.3	187.1
1962-63	171.0	7.8	178.8
1963-64	169.7	9.8	179.5
1964-65	181.4	13.1	194.5
	Projected Production	Projected Import Needs	Projected Total Demand
1965-66	177.0	14.2	191.2
1966-67	186.6	9.9	196.5
1967-68	195.5	5.8	201.3
1968-69	204.0	3.8	207.8
1969-70	212.0	1.8	213.8
1970-71	219.4	-	219.4

1/ See Table 17.

Figure 6

PRODUCTION, IMPORTS AND AVAILABILITY OF FOODGRAINS
1950-51 to 1964-65 WITH PROJECTIONS (INCLUDING DEMAND)
TO 1970-71



person in 1970-71. This would also permit a modest but significant increase in the consumption of livestock products.

The improvement in diets which will be possible with the increase projected under the Fourth Plan, although significant in terms of present consumption levels, would be very modest when compared with the diets in say the United States. U.S. diets require about 1,000 kilograms of grain per person per year. The difference between an economy which has a per capita availability of 180 kilograms of grains per year and one which has 1,000 kilograms is the difference between an economy which must consume nearly all the available grain directly, and one which can afford to convert the bulk of its grain supply into meat, milk and eggs.

At present an average American consumes about one egg per day and one quart of milk per day. The average Indian consumes something like one egg every 10 days and one quart of milk every two weeks. If efforts to increase per capita availability from about 190 kilograms to 219 kilograms are successful it will then be possible to consume say one egg every week and perhaps one quart of milk every 10 days. This will represent an improvement in nutritional terms but it would still fall short of desirable consumption levels, i.e., consumption levels necessary to maintain a vigorous and highly productive labor force.

Food Imports

The need for food imports, rather stable in the late 1950's increased rapidly in the early 1960's reaching 6-7 million metric tons

in 1964-65 and 1965-66. If the production trend of the past 15 years continues or if the percent of output targets achieved under the Fourth Plan are no greater than under the Third Plan (Situation I) the amount of imported grain needed to maintain stable prices would increase very rapidly. Imports would expand by about 2 million tons per year between 1965-66 and 1970-71. Thus the import needs estimated at 7 million tons in 1965-66 would climb to 10 million tons in 1967-68 and 16 million tons by the end of the Fourth Plan.

Situation II assumes that foodgrain production would reach the target levels of the Fourth Plan. The 1970-71 output target of 122 million tons level would make India essentially self-sufficient in grains by 1970-71. If these production targets were to be realized the need for imported grains would decrease from about 7 million tons at present to 3 million tons in 1967-68, reaching self-sufficiency by 1970-71.

At present India is dependent on imports for about 8 percent of its foodgrain supply. If the Situation I projections materialize imports will account for 10 percent of the total foodgrain supply in 1967-68 and nearly 15 percent of the total foodgrain supply in 1970-71. Under these circumstances something like 80 million Indians would be dependent on external sources of foodgrains supplied under concessional terms.

The quantities of wheat moving from the United States to India are significant in terms of both Indian consumption levels and U.S. production levels. At present, 2/5 of the U.S. wheat crop is consumed

in the United States, 1/5 is consumed in India and 2/5 is consumed in other countries. If present U. S. wheat production levels were to continue, and if the United States continues to assume primary responsibility for supplying India's food import needs, and if the Situation I projections materialize, India will require 1/3 of the U.S. wheat crop by 1967-68 and nearly 1/2 by 1970-71. More of the U.S. wheat crop would be consumed in India than in the United States.

VI. IMPLICATIONS OF "BIG PUSH" IN AGRICULTURE FOR OTHER SECTORS OF THE ECONOMY

In a subsistence type agricultural economy in which the food supply can be increased simply by expanding the area under cultivation, the agricultural sector is rather independent of the remainder of the economy, but as the supply of new land is exhausted and it becomes possible to increase the food supply only by intensifying cultivation and raising output per acre, this relationship changes. Raising yields requires inputs from many other sectors of the economy. These inputs range from physical inputs such as fertilizer and improved implements to services such as credit and transportation.

India must now look to rising output per acre for the great part of the required increase in the food supply. Thus, the demands by agriculture for inputs from other sectors will increase at a very rapid rate.

The demands of the agricultural sector for chemicals, transport facilities, fertilizer, steel, cement, electricity, diesel and gas power units, fuels, credit, and marketing facilities will all be extremely large if the agricultural output targets are to be achieved.

The agricultural inputs that must be imported will increase the demand on port capacity of the agricultural sector by several fold. This is particularly true where fertilizers are concerned. Lacking any natural deposits of potash and phosphate rock, India is dependent on imports for all of its potassium and phosphatic fertilizer needs.

Consumption of K_2O of less than 100,000 tons in 1964-65 should go to 700,000 tons in 1970-71 if the USDA/AID recommended fertilizer consumption levels are to be attained. For each ton of K_2O used about 1.6 million tons of raw material must be imported. Thus, one million tons of port capacity will be required in 1970-71 for imports of K_2O alone. The USDA/AID recommended consumption of 1.34 million tons of P_2O_5 in 1970-71 will require more than 4 million tons of imported raw materials, mostly phosphate rock and sulfur. The USDA/AID recommended consumption levels for nitrogen of 2.63 million tons in 1970-71 will not likely be attained unless at least 1.7 million tons of nitrogen are imported. If the imported nitrogenous fertilizers contained 40 percent nitrogen this would mean the import of nitrogen would require about 4 million tons of port capacity. Thus imports of fertilizer and fertilizer raw materials will require about 9 million tons of India's port capacity by 1970-71. Failure to expand port capacity rapidly enough could place a serious constraint on the rate of agricultural development in India.

Historically, agriculture's needs for transportation have been confined largely to the movement of foodstuffs from the farm to the market. Transport requirements on the input side have been quite limited. But as India's agriculture becomes capital intensive, claims against the transport system for the movement of inputs such as fertilizer, pesticides, implements, cement, steel, and fuel from the ports or the points of manufacture to the farms will multiply several times.

Concomitant with the need for expansion of transportation facilities will be the expanded requirements for marketing and distribution facilities. In the case of fertilizer alone there will be a need to increase in a major way the storage facilities available. The increased use of other inputs will also require additional storage facilities. This expansion will draw heavily upon steel and cement inputs.

The rapid expansion proposed for minor irrigation will require large amounts of inputs from other sectors. In particular, pipe, electric motors, small diesel motors, electric power and fuel. It is not possible at this time to estimate the quantities of the various inputs that will be required and the distribution of these increased needs between domestic and import sources. This area needs further study.

Careful attention will have to be paid to the amounts of credit needed to finance the stepped up rate of physical inputs flowing into agriculture. Both the amount of credit and the credit institutions required to get the job done will have to be estimated. Thought should be given to mobilizing private as well as public sector resources in the credit field.

Finally, the tremendous projected increases in physical inputs into agriculture will require the development of marketing and technical advisory services at an unprecedented rate. Factor markets will have to be expanded in both the private and public sector.

But, along with the development of marketing facilities will have to go extension, research, and regulatory activities to insure that the inputs made available to agriculture are properly and effectively utilized. The large demands for skilled personnel and program resources for these latter areas will fall heavily in the public sector. Immediate attention should be given to them for they have to precede the availability of inputs if the inputs are to be used to maximum advantage. Shortfall in the area of agricultural administration will create serious bottlenecks that could undermine the whole expansion effort.

In considering all the needs detailed above serious thought should be given to the timing of investments and availabilities of input supplies. Over a broad range, most of the required agricultural inputs have to be treated as complements, rather than substitutes, if maximum production responses are to be obtained. Input availabilities should be thought of in a "package" sense--availability of groups of inputs. For example, the availability of fertilizer without adequate irrigation and improved seed will not maximize the production response from fertilizer. Also, the availability of physical inputs without the corresponding availability of credit in sufficient quantity and at reasonable terms will result in these inputs being used at rates far less than desired. Thus, as it is important to have balanced rates of growth among sectors of the economy it is also imperative to have balanced growth within a sector.

In summary, the performance of the agricultural sector of the Indian economy cannot appreciably exceed the performance of the other sectors of the economy which must supply the yield-raising capital inputs.

VII. FOREIGN EXCHANGE REQUIREMENTS OF THE AGRICULTURAL SECTOR DURING THE FOURTH PLAN PERIOD

One of the most significant developments in Indian agriculture during the 1960's is the need to substitute capital inputs for land inputs on a massive scale. Substituting capital for land in a capital scarce economy is difficult. In India this difficult transition is made even more difficult by the fact that a large part of the agricultural inputs must be imported.

In a labor intensive agricultural economy where output can be increased only by raising yields, fertilizer is the dominant capital input. India has now reached the point where it must look to rising yields for its additional food output. Unfortunately, India does not have any significant natural deposits of phosphate rock, sulfur or potash, three of the principal raw materials used in the manufacture of chemical fertilizers. All phosphatic and potassic fertilizers used in India must either be imported or manufactured from improved raw materials.

Internal production of nitrogen is lagging far behind demand. Thus, even in the case of the one major plant nutrient which can be produced domestically, growing quantities must be imported if food production targets are to be realized. During 1964-65 imports of nitrogen (350,000 tons) considerably exceeded internal production (260,000 tons).

Table 19 -- Foreign Exchange Requirements for Imports of Fertilizers and Fertilizer Raw Materials 1961-62 to 1970-71 1/

Period	Nitrogenous Fertilizers 2/	Phosphatic Fertilizers 3/	Potassic Fertilizers 4/
	(million dollars)		
Third Plan			
1961-62	23	6	2
1962-63	61	7	4
1963-64	68	12	5
1964-65	102	15	8
1965-66	93	17	8

Fourth Plan	To Reach Fourth Plan Consumption Targets	To Reach USDA/AID Consumption Targets	To Reach Fourth Plan Consumption Targets	To Reach USDA/AID Consumption Targets	To Reach Fourth Plan Consumption Targets	To Reach USDA/AID Con. Targets
1966-67	96	120	24	26	11	13
1967-68	132	177	33	37	13	19
1968-69	171	247	45	54	17	27
1969-70	211	460	63	77	22	38
1970-71	315	502	86	111	28	55

1/ Data for Third Plan period are not actual. They are calculated using the uniform unit prices given in the following footnotes. Rupees converted to $ at 4.75 to 1.

2/ Assumes internal production of nitrogenous fertilizers will increase from present level of 260,000 metric tons (in terms of N) to 900,000 tons by 1970-71, and tnat fertilizer will be imported to the extent necessary to meet consumption targets. Imports costs calculated at 1,380 Rupees per metric ton of N equivalent.

3/ Assumes phosphatic fertilizers will be produced internally from imported raw materials. Foreign exchange requirements calculated at 3.3 tons of rock phosphate (100 rupees per metric ton) and 0.33 tons of sulfur (220 rupees/metric ton) per ton of P_2O_5.

4/ Assumes all potassic fertilizers will be imported in form of muriate of potash (KCI) at 232 rupees/metric ton and that 1.7 metric tons are required for each ton of K_2O.

Table 20 - Foreign Exchange Requirements Associated with Fertilizer, 1965-66 to 1970-71

Period	Imports of Fertilizer and Fertilizer Raw Materials		Plant Maintenance and Spare Parts	For Installation of Additional Plant Capacity	Total Foreign Exchange Requirements 1/
			(million U.S. $)		
1965-66	118		6	32	156
	Plan Targets	USDA/AID Targets			
1966-67	131	159	8	53	220
1967-68	178	233	13	84	330
1968-69	233	328	17	84	429
1969-70	296	575	23	53	651
1970-71	429	668	32	53	753

1/ Calculations based on USDA/AID recommended fertilizer consumption levels, assuming internal production of N will reach 900,000 metric tons by 1970-71 and all P_2O_5 will be manufactured internally using imported rock phosphate and sulfur. Calculations accept GOI estimates of foreign exchange requirements for plant maintenance and installation of additional capacity. Figures converted to dollars at 4.75 to 1. (See discussion of fertilizer in Section IV).

Table 21 -- Projected Foreign Exchange Requirements of the Agricultural Sector, including Industrial Plants supplying Agricultural Inputs, 1965-66 to 1970-71

Period	Fertilizer[1]	Pesticides[2]	Tractors and Implements[3]	Other[4]	Total
		(million U.S. $)			
1965-66	156	12	16	29	213
1966-67	220	18	25	29	292
1967-68	330	23	25	26	404
1968-69	429	18	25	23	498
1969-70	651	12	22	17	702
1970-71	753	12	18	11	794

1/ Includes imported fertilizers, fertilizer raw materials, plant maintenance and parts and the installation of additional plant capacity. (USDA team estimate).

2/ Includes imported pesticides, pesticide raw materials, plant maintenance and parts and the installation of additional plant capacity. (GOI estimate).

3/ Includes all foreign exchange required for either the import of tractors and implements or items required for their manufacture. (GOI estimate).

4/ Includes import requirements for thefollowing program areas: seed improvement; minor irrigation; soil conservation; land development; agricultural research, training and education; extension; animal husbandry; dairy development; forestry scheme; and agricultural marketing. (GOI estimate).

If USDA/AID fertilizer consumption targets are to be met and if internal production of nitrogenous fertilizer does not exceed the 900,000 tons estimated by AID for 1970-71, nitrogen imports will have to rise to 1.7 million tons in 1970-71. Nitrogen imports of this magnitude will require 500 million dollars in 1970-71. Imports of potassic fertilizers and the raw materials for manufacturing phosphatic fertilizers will require an additional 166 million dollars making a total of 608 million dollars for the imports of fertilizers or fertilizer raw materials. If allowances are made for plant maintenance and for the installation of additional plant capacity, the total foreign exchange requirements for fertilizer imports and production will exceed 750 million dollars by 1970-71.

Because fertilizer dominates capital inputs and because so much of the total consumption is imported, the foreign exchange requirements for fertilizer completely dominate the foreign exchange requirements of the agricultural sector during the Fourth Plan. Investment in any other category of agricultural inputs such as say minor irrigation, could be doubled without appreciably affecting the overall foreign exchange requirements of the agricultural sector.

The USDA team estimates of foreign exchange requirements for fertilizer during the Fourth Plan period suggest that the GOI estimates may greatly understate the need for foreign exchange in this area. The same may also be true for pesticides, even though time may not all...

USDA team to develop any alternative estimates. GOI estimates show a reduction in foreign exchange requirements for several categories of agricultural inputs during the Fourth Plan period (see column 4, Table 21). The USDA team feels that these estimates are unduly optimistic. It is more likely that foreign exchange requirements for these inputs will trend upward as agriculture becomes more technologically sophisticated.

CONFIDENTIAL

INDIA - ECONOMIC POLICIES AND PROGRAMS

USAID Mission
New Delhi, India
July 20, 1965

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I. INDIAN ACHIEVEMENTS AND PROBLEMS

Despite conspicuous inadequacies, performance since Independence in 1947 has successfully promoted both political stability and economic growth. In an increasingly turbulent Asia, India is an area of relatively successful U.S. policy.

The magnitude of the Indian accomplishments is frequently overlooked for several reasons. Indians individually and collectively often seem opinionated, diplomatically brittle and ideologically shrill, with the consequence that the irritations of the moment frequently eclipse the accomplishments of a decade. Moreover, Indian achievements have been comparatively orderly by LDC standards, and the nation as a whole has had far fewer attention-getting crises than almost any other.

It is the business of American policy to press hard for the correction of obstacles to economic growth. But as we re-examine our Indian program and consider our input into India's Fourth Five Year Plan which begins next April, we also need to bear firmly in mind India's long, steady record of accomplishment.

A. The Political Achievement

In many ways the most striking achievements have been political. Since the end of the Indo-Pak partition at the time of Independence, the country has held together. It has maintained orderly democratic processes, the rule of law, and the constitutional pursuit of radical economic and social change. Its adolescent democratic institutions have now successfully passed the acid test of the post-Nehru succession.

In international affairs, India's influence has ebbed and flowed; her statesmen have exhibited courageous leadership and frustrating spasms of indecisiveness; a commitment to international harmony has resulted in vital contributions to the peacekeeping efforts of the United Nations, and to some serious miscalculations. But by and large, India has built steadily over the last two decades toward the kind of effective moderate stand she exhibited in connection with the abortive Bandung II.

B. The Economic Achievement

Since the beginning of India's planned development effort in 1951, real national income has grown at an average annual rate of 3.7 %. Industrial output has risen an average of about 7% a year, and agricultural production has increased an average rate slightly in excess of 3% per year.

There are few, if any, free world LDC's which have sustained a growth rate of this magnitude for as long a period, although many have surpassed it for shorter periods--and although India may henceforward be able to do much better.

Both food production and total production have grown at rates consistently higher than that of the population (2% population growth earlier, now about 2.5%) with the result that per capita incomes in real terms have increased an average of about 1.6% a year.

Within the industrial sector, the shape of the Five Year Plans has produced substantial increases in the output of basic industrial goods. Cement is up roughly 230%, pig iron and steel ingot 300%, coal 195%, and electricity generated 460%.

During the first three years of the present Third Plan, national income rose only 9.3% for the period, reflecting (1) virtual stagnation in agriculture after a major gain in the last year of the Second Plan, and (2) annual industrial growth in the 6-9% range. These figures do not approach Third Plan targets and, in the context of the previous record and a 50% increase in investment, have been a serious disappointment.

However, the production of food grains reached a new record in 1964-65, with food grains estimated to be as much as 7.5% above the previous record. It now appears that agriculture is back on the slow growth track established in the 1950's, although it now will become more dependent on rising inputs, and less on expanding acreage.

The gain in national income for 1964-65 is thus expected to reach 6-6.5% and if sufficient surge can be maintained in agriculture and industry during 1965-6, the last year of the Third Plan, the annual growth rate for the five year period can still reach a respectable 4.2%; in any case the total gain for the period will exceed 20%, which is roughly the same level achieved during the Second Plan.

C. Self-help and Development Policy

Among the LDC's India almost invented comprehensive, systematic, democratic development planning, formalizing its effort fifteen years ago. While Indian planning has many obvious deficiencies, it has provided a necessary framework for outlays and it has steadily improved through improved data and handling of the data.

Development Financing - India now supplies about 75 per cent of its net savings needs. It has saved an increasing share of it national income (this year a respectable 10-11%), and investment this year will reach roughly 14% of the national income. With the help of foreign assistance, India has lately been increasing the input going into investment some 7-½% per year. The marginal savings rate is now in the neighborhood of 18%.

Fiscal and Monetary Policy - India has demonstrated unusual fiscal and monetary responsibility for an LDC; it has one of the best anti-inflationary records in the developing world. After a decade of relative price stability, the stagnation in food production of the early sixties precipitated an inflationary spurt of 12% in wholesale prices in 1964, according to the index; somewhat more if allowance is made for defects in the index. This spurt has now been dampened, however.

After the Chicom aggression of 1962 the Government accommodated a sharp rise in defense outlays (now roughly 4% of the GNP), partly through unexpectedly rapid tax increases, without significant disruption of the development program. Indeed, outlays on some quick yielding development efforts such as minor irrigation were increased as a result of the emergency.

Foreign Exchange Allocation - India has made a strenuous effort to control the allocation of foreign exchange in a way that prevents the importation of low priority and luxury items, otherwise limits the allocation of foreign exchange to priority needs and encourages import substitution. By and large India's import policy has successfully curbed luxury imports, even though the time has now come for overhauling import controls to achieve greater efficiency in the use of foreign exchange.

Agriculture - Agriculture has been given some increased priority in response to the three-year plateau in food output. Price supports have been introduced to provide greater price incentives to the producer, reversing the earlier tendency to allow only for low consumer prices. Fertilizer has displaced some industrial goods among India's imports. These changes are significant, in the right direction, but - as will be argued below - not enough.

Industry - Official attention is shifting from the construction of new capacity to the fuller and more efficient utilization of existing capacity. This is finally receiving a higher priority in the budget and in administrative support. (But execution has yet to display the vigor that this problem area demands.)

Development Philosophy - A new pragmatism is appearing in Indian planning. Growing up in a period of exploitative, colonial capitalism, much of present Indian leadership understandably acquired a bias toward a doctrinaire, although peculiarly Indian, socialism. This has carried with it both mistrust and ignorance of the potential of the market mechanism, as well as of that of private enterprise. Still the market is coming into its own, in recent changes in agricultural policy and in recent and possible impending changes in import policy. There is also now a growing interest in a switch from administrative to fiscal controls in domestic markets and a series of moves have been made in steel decontrol in the past year.

Private business has grown substantially during each plan period. According to present 1965-66 targets, only 17% of large-scale manufacturing and mining production is expected to originate in the public sector; and all small scale manufacturing and mining is, of course, private.

Foreign Private Investment - Recently there has been increasing recognition of the need for know-how and foreign exchange in a volume which only a large new flow of foreign private investment can provide. Although the giant Bechtel fertilizer deal has fallen through (by no means entirely because of GOI inflexibility), several other major private American deals currently look very promising.

* * *

In summary, the Indians have had fourteen years of practical experience with a courageous, comprehensive and highly responsible experiment in democratic national planning. Indian planners are now approaching the glaring weaknesses which have cropped up in the course of their efforts.

The other side of the coin is, of course, still inadequate development in foodgrain production, in exports, in the efficiency of business enterprise, in the utilization of a massive rural manpower supply, in the exploitation of the funds and skills of foreign investors, and in the vigor and venturesomeness of public administration. For all of India's gains, even on these very points, it is a fair criticism - an indication of confidence - to declare that India can do much better. It has to do much better simply to earn the foreign exchange someday to to terminate aid.

Indian ability to make changes is severely limited by acute shortage of resources, by bureaucratic momentum, and indeed by lack of familiarity with the workings of such instruments as fiscal controls in a market economy. Consortium policy will therefore be critical in assisting reform.

II. Prospects and A Proposal

As it prepares to initiate its Fourth Plan in April 1966, it appears that India has reached another critical moment in its development effort. It is our judgment that the Fourth Plan as now tentatively conceived, despite a near doubling of investment, will yield growth of only about 5% a year. The Plan therefore means a continuation of the widening gap between import requirements and exports without any clear view of an end to the need for aid. At 5%, the savings necessary to finance the Plan are touch and go. Shortfall from the 5% growth rate would undercut the necessary savings. To then push ~~hard~~ hard to mobilize them would hazard political stability by negating modest increases in consumption.

A growth rate of 8% or more a year is possible. It is desirable on many counts. It would require less total aid over time. It would provide greater marginal consumption increases in the interim. It would show Indians that their political and economic systems work .

But 8% or better can be had only if India makes the breaks in policy necessary to a breakthrough in results. Financing alone will not make the breakthrough. The two main thrusts of the needed policy changes are greater dependence on the market and a push for agriculture. The required changes are extremely large.

India's resource base and the human, the institutional, the infrastructure and the capital improvements and accumulations to date establish the foundations for much more rapid growth than has been recorded so far.

One can read almost every point of dissatisfaction with Indian development up to this date as proof that a big change in growth rates is possible. If Indian agricultural output is low relative to other countries of the world with soils no better, then certainly it can be raised. If Indian enterprise is inefficient in identifiable, remediable ways, there is room for raising its efficiency. If the market has been seriously underutilized, its fuller utilization promises great gains. If India has been timid about foreign investment, then foreign investment is a resource still largely to be exploited. If it has been wasting its underemployed rural manpower, it can look forward to sharply accelerated capital formation and income growth by putting the underemployed to work.

Only if India ~~is~~ were already pushing the limits of its prospects for growth -- which no one believes is the case -- could we say that India's growth rate for the next Plan is destined to be only an extrapolation of trends from the last Plan. Our view is that a break, a sharp kink, in the growth rates is possible, not only hypothetically, but given Indian attitudes and institutions.

Eight percent is ambitious. It takes time to see the effects on growth of changes in policy. It should be possible, however, to achieve a sustainable six percent rate within the next two years, given sufficient policy change.

What then ought to be the growth rate for the Fourth Plan? The Consortium should encourage India to make a sharp break now with past policies, especially on the use of the market and on inputs to agriculture. Given these changes now, it should be possible to reconsider in two years the pace of future growth and rewrite the Fourth Plan at that time. This is a time for a break in thinking, a sharp revision in Plan strategy, not a time to settle down for a five-year program.

The balance of this paper explores these hypotheses and the policy, administrative and financial steps requisite to their successful testing and implementation.

III. MAJOR POLICY CHANGES

Among the big policy changes required for accelerated growth, a conspicuous central place goes to a package consisting of decontrol, exchange rate adjustment, and increased allocations of foreign exchange to maintenance imports. Out of each of these changes and their mutual interactions, India can expect a surge in the pace of development. Moreover, they intertwine with and support still other required changes in policy, such as on exports and foreign private investment. In importance they run parallel with other somewhat independent changes, especially with the reformation of agricultural policy but also with policy on population and employment. We therefore propose to discuss each of these required policy changes in turn, beginning with decontrol and exchange rate adjustment.

1. Decontrol.

In India decontrol means decontrol of imports. Import controls, designed to protect India's foreign exchange and to allocate scarce imports to priority needs, have become, simply because of the essentiality of imports to most lines of industrial production, a source of all-pervasive government control over industry. Leaving aside agricultural products, discussed below, most domestic markets in India are free, although there are scattered controls, already shrinking, over a few commodities like cement and some categories of steel. To remove these domestic controls while leaving the import control system would accomplish

little. On the other hand, these few domestic controls would not long survive the elimination of import controls. The critical element in a program of liberalization is imports.*

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*The GOI is of course a price-setting authority in railroads, electric power, coal, steel, cement, fertilizer, and in any other industries in which it has established public sector enterprises. Large sellers, whether public or private, always have price-setting authority. But its exercise is not generally in India a part of a program of maximum price control and administrative allocations.

It is easy to take a position of doctrinaire opposition to an import control system, especially if one refuses to concede the legitimacy of the Indian attempt to control the pattern of growth rather than accept growth indiscriminately. The Mission's proposal that India decontrol its imports stems, however, from specific defects of the system, documented in an ever-growing number of studies, including those of a number of GOI investigatory committees, a Ford Foundation-Ministry of Industry collaboration, IBRD and IDA sectoral studies supporting maintenance loans, and Mission investigations in recent months. Evidence is overwhelming that the control system does not serve India's developmental needs and is, on the contrary, an obstacle to development, an obstacle of rare strategic importance, so varied are its adverse affects on production, on the potential for private enterprise, and on exports.

The control system:

1. Through its delays and uncertainties, imposes high costs on business enterprises, public and private alike.

2. Through misallocation of imports, wastes these scarce resources and, again therefore, imposes high costs on business enterprise.

3. Through the allocation of valuable import licenses, subsidizes inefficient and efficient enterprise alike, thus undercutting pressures toward efficiency in Indian business and keeping grossly inefficient enterprises afloat.

4. Fails, because of its own informational inadequacies, as well as because of substantial diversion of resources through the black market, to achieve an allocation of imports suitable for developmental priorities.

In addition, because it both supersedes and distorts the price-cost signals and incentives that would otherwise prevail, the system:

5. Obstructs the development of a discriminating, economically viable program of import substitution, and

6. Turns Indian enterprises away from exports toward the satisfaction of a more lucrative domestic market.

To decontrol is to wipe away these obstacles and consequently to write a new charter for industry.

It would not, however, write an end to planned growth. The other side of the coin of decontrol is the vigorous use of monetary and fiscal policy to guide the economy, especially the use of excise taxes, import surcharges (if not outright change of exchange rates), and differential rates of import surcharge to curb the general excess of import demands, dampen low-priority internal demands for commodities with import components, and to give effect, without detailed administrative intervention, to legitimate public preferences with

respect to pattern of development.*

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*Even especially troublesome problems in import control can be handled through fiscal devices. Hundreds of millions of Indians, for example, store wealth in the form of brass utensils, which draw heavily on imported copper, the import demand for which is therefore relatively inelastic. But it is possible to levy a high enough duty on copper to bring this diversion under control, at the same time avoiding, through duty rebate to copper-using manufacturers, excessive costs to them.

Scope of decontrol. Decontrol of imports should be comprehensive. It should permit free import of raw materials, intermediate goods, components, and spare parts. It should also permit free import of the fixed capital requirements of small new projects and additions to capacity. So far as the formality of decontrol is concerned, it should also permit free import of fixed capital requirements of major projects. In fact, however, the establishment of major projects will continue to be subject to indirect ministerial control in the case of public sector projects, and to industrial licensing for the private sector. Because control through the Ministries and the Industrial Licensing Committee permits the GOI to control the general direction of major investments and to choke off excessive demands for foreign exchange for such projects, formal decontrol of exchange and of imports can be extended even to capital projects. In any case, major projects, financed as they are with the help of foreign loans or investments, carry their own foreign exchange with them.

Outright prohibition of luxury consumer goods can be continued. But the discretionary administrative control of the volume or

allocation of any import inflow should be discontinued. Nor should decontrol be taken in phased steps, if only because partial decontrol requires continuing the control process in order to determine what is to be uncontrolled. Moreover, decontrol should not take the form of liberal licensing, which can easily degenerate into restrictive licensing; it should be structured so as to eliminate any discretionary review of an import purchase or foreign exchange purchase, except those necessary to implement country tying imposed by lenders.

For imports of items now coming into production within India, the GOI shows some desire to maintain an administratively controlled program of phased substitution of the indigenous for the imported inputs, even if it were to embark generally on decontrol. Such an exception to decontrol would be a mistake for several reasons; it turns out to be a broad exception, it perpetuates administrative delay and the necessity of arbitrary decisions at a point conspicuously troublesome in the present control system; and it would sanction a program that is itself misconceived, because the program confuses the <u>direct</u> demand for imports with the total demand, controlling the former but permitting heavy indirect purchase of imports.

<u>The transition</u>. Decontrol could easily stimulate a round of speculation in imports or foreign exchange if there is any doubt that the decontrol measures will stick. There may also be a temporary drain on foreign exchange from inventory buildup. It is essential therefore that the Consortium or the IMF give special

transitional support to help the GOI meet the risks of transition to the new system.

Higher prices versus more imports. If imports are not subject to administrative restriction, then purchases of imports and of foreign exchange must be constrained through price. Decontrol therefore requires substantially higher prices on imports, as well as a vigorous use of domestic excises to depress low priority demands for imports. One can speculate on what level of price increase might be required to hold the flow of imports and the demand for foreign exchange to present levels.

But the question is irrelevant, because if India is to fuel the gains in output that decontrol will spark, it must substantially increase its maintenance imports. The magnitude of the import increase and of the responding response in output are estimated below. Here we need only point out the interdependence of required price adjustment and volume of imports, and make the point that the whole burden of adjustment need not fall on price. But conversely neither can India be allowed to shrink from accepting a very large price adjustment, for new price cues and incentives are essential to enterprise efficiency, to guide India's program of import substitution, and to give a sudden great boost to exports.

2. Exchange Rate Adjustment.

The new system will ration and allocate imports through their prices. Moreover, the suppressed and distorted price cues and

incentives of the present control system must give way to a price structure for imports and exports ~~and~~ that will motivate a defensible program of import substitution and a very large expansion of exports. On both counts, an adjustment in exchange rates is essential to the sharp rise in industrial production that we believe can be achieved.

Method of adjustment. For achieving the required correction, outright devaluation has the merit of comprehensiveness; it thus poses some obstacles to back-sliding and erosion of will that alternative forms of exchange rate correction do not. But exchange auctioning or a tax on foreign exchange could also serve. The GOI's apparent inclination, however, is to take the route of import surcharges in order to correct import prices and export subsidies through tax rebate in order to correct export prices. Although the Consortium can afford to give the GOI its option, it should press for explicit devaluation.

Degree of adjustment. Leaving aside foodgrains and other non-dutiable items, the average duty on Indian imports (preceding the February, 1965, 10 per cent surcharge) has been about 40 per cent. We have some indications that the GOI is willing to raise the import surcharge from 10 per cent to 30 per cent, which would have the effect of raising this index of import prices from 140 to 170. On the export side, the Ministry of Finance indicates that it may be willing to apply a 15 per cent tax-free tax credit (or cash equivalent), with some exceptions for commodities for which such a price adjustment is not required. Assuming an effective tax rate of 50 per cent (which, in view of inadequacies in tax collection, is perhaps high), the 15 per cent

tax credit amounts to a 30 per cent subsidy on exports. We could thus consider this tax credit adjustment to imply a proposal to reduce export prices from the present level of 100 down to 77.*

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*77 plus 30% equals 100.

If these proposals are construed as GOI offers, these are the smallest adjustments in exchange rates that the US need consider. At the other extreme is the degree of adjustment that would be implicit in the 40 per cent explicit devaluation which has been proposed and discussed. This would bring the price of imports up from 140 to about 235 and the price of exports as low as 60. No one can confidently forecast the equilibrium exchange rate, and indeed what it turns out to be will not of course be independent of the level of non-project aid in support of decontrol. Our strong suspicion is that the 40 per cent devaluation would not be too much.

Between the extremes of very moderate recent Indian proposals and the rate adjustment implicit in a 40 per cent devaluation is an area for bargaining. The impetus behind the required adjustments can be strengthened by matching the liberality of non-project assistance to the strength of the GOI adjustment.

To meet its immediate foreign exchange reserve problem, the GOI may at any moment make a substantial exchange rate adjustment yet one falling short of 40 per cent. We have some intimations that the GOI

may in fact raise its import surcharge to 50 per cent. This would constitute an enormous step forward, especially since India is apparently contemplating making this adjustment on its own without approaching the Consortium for additional non-project assistance, as was arranged in support of Pakistan's earlier and much smaller exchange rate adjustment (with partial decontrol) of 1964. This is a potential move designed to cope with India's immediate reserves crisis and apparently dependent on nothing more than transitional IMF support; it therefore leaves open possibilities of further adjustment in connection with decontrol and more liberal non-project assistance to that end. It would go further than what, a few months ago, the Mission would have believed possible.

If India postpones such an adjustment until such time as it can consider, together with the Consortium, a package of exchange adjustment-decontrol-more liberal maintenance imports, the Consortium will have the opportunity of achieving in one fell swoop a major orientation of the Indian economy. If, on the other hand, India goes ahead on its own with the contemplated 50% surcharge, the Consortium should greet the reform with enthusiasm, holding out at the same time the possibility subsequently of adding decontrol through more liberal non-project support. India can then be asked to protect decontrol through whatever further rate adjustments or fiscal levies are required to balance demand and supply of imports without administrative control.

3. Exports.

Decontrol and exchange rate adjustment separately and together will constitute a transformation of Indian policy on exports. We would expect that their consequences for volume of exports would amount to what, in the absence of decontrol and exchange rate adjustment, would be considered a heroic and impossible growth. As against a probable export accomplishment in the Third Plan of roughly $8 billion, we believe that India should export at least $11.8 billion (Rs. 5600 crores) in the Fourth Plan.

In an early enthusiasm for import substitution, Indian policy neglected ~~exports~~ exports. During the 1950's they failed to expand significantly, remained roughly on a plateau; and India's share of world markets for a number of major exports actually declined. With the inauguration in the early 60's of import entitlements for exporters, exports moved upward -- to a degree that seemed quite satisfactory to many Indian policy makers. Even for this period, however, export expansion has been lagging behind the growth of national income and falling greatly behind the volume necessary for a self-reliant economy. If one corrects export growth figures for the incorporation of Goan exports and removes other increments from export figures which represent special adjustments not to be repeated, the export growth rate for the last four years has averaged only 2.8 per cent.

Exports suffer from Indian inexperience in the export trade, from inevitable defects in the quality of production to be expected in a developing country, and from a traditional quick-kill mentality in

Indian commerce that inhibits the careful long-term cultivation of markets.

But if these obstacles to exports erode only very slowly, there are other severe blockages that can be removed -- and which decontrol and exchange rate adjustment will remove.

In the first place, Indian exports suffer from a price disadvantage imposed by an inappropriate exchange rate. That price is consequential and that India is not blocked simply by a restricted total market is indicated by its failure to hold its share in a number of export markets. Secondly, quite aside from imposing a competitive disadvantage on Indian exporters relative to their competititors in other countries, the exchange rate makes the domestic Indian market greatly more attractive to Indian manufacturers. Third, the control system protects Indian manufacturers from foreign competition to such a degree as removes the spur to efficient production and good product design. Fourth, the large subsidy implicit in an import license similarly undercuts incentives toward the level of efficiency necessary to break into export markets. Fifth, the delays and uncertainties of the import licensing procedure undermine the commercial reliability of Indian exporters and even go so far as to prevent potential Indian exporters from signing contracts when the uncertainties of licensing make it unlikely that delivery promises will be kept.

Sixth, because India has no obvious natural comparative advantage in export, with the possible exception of iron ore, the development of its export trade must meticulously attend to possible small advantages

in cost that might be found in a discriminating review of export possibilities. But the present distortion of prices and costs by controls and an inappropriate exchange rate obstructs the identification of long-run economically viable export possibilities.

We believe that decontrol and devaluation will revolutionize export possibilities for India. It is indeed a revolution that is required, for no forecast of export possibilities under business-as-usual assumptions offers any hope for an expansion sufficient to terminate foreign assistance.

In addition to decontrol and exchange rate adjustment, additional maintenance imports from the Consortium are required to permit exporters to achieve the expansion of output that decontrol and exchange rate adjustment will motivate. These three -- decontrol, rate adjustment, and more liberal maintenance imports -- are the foundation of a new trend in export policy for India. They require, to be sure, supplementation through energetic GOI encouragement to exporters in the form of market research, quality control, commercial assistance, and the like. Our proposal is not, however, that the Consortium beleaguer the GOI with specific demands with respect to these supplementary steps. We do propose, however, that Consortium make unmistakably clear its expectation and intention for Indian exports by subtracting from its estimate of external aid requirements Rs. 5600 crores ($11.8 billion) to represent the minimum export earnings to be sought in the Fourth Plan.

4. Foreign Private Investment.

India has not realized ~~what~~ the financial help it might be able to attract in cash and in kind for its investment program from foreign private sources of capital. During the six years ending in 1961 the average annual gross inflow realized from these sources was $45 million or Rs. [illegible] The implicit target for such flows for the Third Plan was about Rs. 250 - 300 crores and it does not seem likely that it will have been more than half met.

Indian resistance to foreign private capital is often defended on the ground that the foreign capital quickly generates foreign exchange cost for remittance of earnings and capital service. But because it tends to generate a high proportion of reinvestment of earnings retained in India, the near term service problem need not inhibit India in seeking to expand flows of private capital.

The prospective size of the Indian domestic market and the growing Indian industrial complex as a base for future development and exports have undeniable attraction for the foreign investor. With rising Indian investment and continuing flows of official aid, an increasing inflow of foreign private funds should be expected even under present conditions. But decontrol and exchange rate adjustment should transform the attractiveness of India to foreign investors.

A target of Rs. 350 crores of realized foreign private investment for the Fourth Plan seems appropriate to the new regime we contemplate for Indian industry. If private investment moves from commitment to disbursement at the same rate we contemplate for foreign assistance

for the Fourth Plan, private commitments will go above Rs. 500 crores (nearly a 5-fold increase over Third Plan actuals).

Estimates of private capital flow have not been accorded as much attention as they merit in discussion with external donors. Past considerations have mainly focussed on the general desirability of private capital for its additional contribution of skill and management responsibility and on particular institutions and cases. While the Indian attitudes show a degree of flexibility in the acceptability of private capital, the direct effort to attract private capital and accept the costs and assurances this may require is weak. It is a matter for the Indian government to give the necessary drive to realize the effort and not a requirement on the donors to accept the responsibility for prescribing the remedies and following the subsequent performance in detail. The Consortium should simply reduce its estimate of required assistance by the Rs. 350 crores assigned to private investment.

The Consortium would need to make clear that it was up to India to create the atmosphere to realize the private capital flows and make the extra efforts to induce business capital to invest in India. Barring the most exceptional circumstances, such as a searching general review of progress at mid-Plan might reveal, India should not expect to be able to seek increased pledges of official funds to compensate for a failure to realize the private capital targets in timely fashion.

5. Agriculture

Rapid industrial growth is, of course, not enough. It is coming to be everywhere recognized that in the Fourth Plan India must do better by agriculture than in the Third -- for nutrition, for price level and political stability, for exports, and for industry's needs.

Though a 4% growth rate for the first three plans is sometimes claimed, a compound growth rate both for foodgrains and for all agricultural output of something over 3% seems a more reasonable interpretation. Considering that Indian agriculture has been acutely starved for inputs and that this starvation is a remediable obstruction to output expansion, we believe that a 5% growth rate is a feasible and minimum acceptable growth rate for the Fourth Plan. Even this growth rate should be revised upward as Indian agriculture gains momentum.

Although Indian policy makers now almost unanimously favor a higher priority for agriculture in the Fourth Plan than in the Third, preliminary Plan documents and other straws in the wind indicate that on fertilizers, price policy, credit, seeds and the other requirements of sharply increased agricultural production, recent and proposed improvements still fall short of what is necessary. The U.S. should, therefore, negotiate with India a broad agreement to join the skills and resources of the two countries in a comprehensive and persistent program for a break-

through in agricultural production. In the short run, incentives and inputs can achieve the five per cent growth rate. In the longer run, attitudinal and institutional obstacles to change can be attacked. The U.S. and India can begin their efforts in their agreement on a foodgrains target of 5% compound growth for the Fourth Plan.

Fertilizer. The GOI and the U.S. are apparently agreed that the most promising source of greatly increased output in the very near future is chemical fertilizer. The tentative GOI Fourth Plan fertilizer consumption target is 3.35 million tons of nutrient. The Mission believes GOI should establish the target 40 per cent higher, specifically at 4.7 million tons.*

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* In estimating fertilizer requirements, both the GOI and AID make use of the familiar 1 to 10 ratio of fertilizer output tonnage to foodgrain output tonnage. AID believes that this ratio is serviceable assuming continuing progress in irrigation, seeds, and plant protection. In contrast, the GOI predicts separate production gains from these improvements and counts on fertilizer itself to achieve only roughly half the proposed increases in foodgrain production. We think the GOI procedure is unwise, and we fear that it is an attractive procedure to the GOI largely because it brings fertilizer requirements down to the level consistent with GOI estimates of the probable size of the fertilizer market, which the GOI predicts simply by extrapolating the 20% growth rate for fertilizer consumption in the Third Plan. We believe that market is already expanding at greater than 20% and needs to be expanded still faster under forced draft. We also believe that the GOI underestimates the diversion of fertilizer from foodgrain production to cash crops, greatly overestimates the contribution of irrigation to output expansion (specifically does not allow for sizeable losses through salinization and water-logging from irrigation projects), and does not allow sufficient margin for error to compensate, above all, for the possibility of adverse monsoons which, for example, held agricultural production roughly constant for the first three years of the Third Plan.

Secondly, the GOI should commit itself to a fertilizer import program to make up the deficiency between production and the consumption target. The GOI and the Consortium, under U.S. leadership on agricultural policy, should carefully negotiate agreed schedules, for consumption, for production and for imports to close the gap between the two, with Consortium non-project assistance to finance the required imports.* To the extent that the GOI fails to hold to its production schedule, consumption should nevertheless be maintained by stepping up imports to offset the production shortfall. These additional imports should be financed, not out of new Consortium lending, but by reducing, out of given total pledges, the allocations to capital projects.

Thirdly, a new big push on fertilizer production is therefore required. To reduce imports as fast as possible for the fifth year of the Fourth Plan and the opening years of the Fifth Plan, additional capacity over what is now planned should come on stream on roughly the following schedule: 300 million tons (in terms of N) in 1970, 600 in 1971 and 500 in 1972. These capacities must therefore be inaugurated in the Fourth Plan. The additional production require-

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* This would require imports of the following order, given present production plans (which are, however, inadequate).

	N	P_2O_5	Total cost, including cost of K_2O ($ million)
	(000tons)		
1966-7	399	160	119
1967-8	622	200	179
1968-9	680	280	243
1969-70	470	400	189
1970-71	810	480	276

ments and their implications for imports of nitrogen are as follows:

	Production Plan	Targeted Consumption	Import Requirements	
	(000 tons)	(000 tons)	(000 tons)	
1966/7	495	892	399	
1967/8	548	1,169	622	
1968/9	850	1,531	680	
1969/70	1530	2,006	470	
1970/1	2118	2,628	510	
1971/2	2720	2,810	90	
1972/3	3230	3,220	-10	
1973/4	3620	3,560	-60	(exports become possible)

Fourthly, India needs improvements in fertilizer sales and distribution. One requirement is that there be more effective alternative sources of supply to the cultivator, in particular an end to the near monopoly by the co-ops of sales of nitrogenous fertilizers. In addition, retailers' margins on fertilizer need to be large enough to galvanize the retailers' promotion of fertilizer.

Credit. A further requirement for improved fertilizer distribution -- but required also for stimulating the use of new seeds and methods of plant protection -- is more adequate rural credit. The essentials of reform in the supply of rural credit appear to be the establishment of more and easily available alternative sources of credit and the acceptance of crop rather than other assets as security against loans. To the former, India is not yet fully committed; to the latter, it is committed only in principle. The practical problems of meeting both the two requirements call for painstaking attention to the details of retailing of farm credit and would seem to represent a clear case for intimate collaboration between the two governments.

Seed. Seed from State and Center seed farms is widely alleged to be no better than the seed otherwise available to Indian farmers and much poorer in quality than seeds developed by the best Indian farmers and sold in small quantities to their neighbors. Yet exceedingly promising new strains have recently been developed for Indian use, and deficiencies in seed multiplication and distribution therefore now constitute a critical obstacle to big increases in production.

The present Indian program needs a thorough overhauling. Its deficiencies are so much part and parcel of general imperfections in Indian administration that we are unable to suggest formulae for general reform of seed multiplication and distribution. A crash program is clearly called for, and it would be reasonable for the Consortium to ask for evidence, by the date of a pledging session, that reform was well underway.

One specific requirement can be identified. It is that seed multiplication and distribution be made sufficiently profitable, in public and private sector alike, to finance a high quality effort.

An obvious supplement to a crash program for the Center and State programs is to liberate the demonstration competence of private seed firms by allowing them adequate returns for their work, even to the point, of subsidized credit, investment guarantees to reduce their costs or risks or if necessary, outright subsidies. This would both produce and multiply the quality seed directly and stimulate through competition the improvement of Center and State seed programs.

Research and Extension. The Ministry of Food and Agriculture should be encouraged and assisted to carry through in a consequential way its emerging plans for reorganization of agricultural extension and research. Some of the key elements in reform are:

1. Effectively converting a large number of VLW's from multi-purpose workers to agricultural extension workers -- and not to general purpose agriculture administrative officers.

2. Tying research in India's many agricultural research stations to the actual needs of the extension services, which India has so far failed to do.

3. According promotion, prestige and positions of policy-making responsibility to members of the specialist technical services in agriculture rather than universally subordinating them to generalists.

4. Raising the practical agricultural competence of those engaged in extension work.

5. Establishing an effective line of authority for agricultural extension work, obstructed neither by Center-State conflict nor by lack of coordination in Community Development and Food and Agriculture.

6. Finding effective ways to "retail" useful information to cultivators (as through salesmen of agricultural supply houses in the U.S.) because agricultural extension officers and VLW's taken together will probably never be sufficiently numerous to go beyond "wholesaling" and limited "retailing."

Plant Protection. During the Fourth Plan an increase of 120 million acres is tentatively targeted for plant protection measures. This target represents a five-fold increase over the expansion in area achieved during the Third Plan. The past approach to plant protection has been one that heavily emphasized area rather than intensity of coverage. Although planned investments in plant protection during the Fourth Plan should be about double what is currently planned, this stepped-up investment should concentrate relatively less on area extension and proportionately more on intensifying the use of plant protection measures on the areas to be covered.

This very large increase in plant protection expenditures will place particularly heavy pressures on the agricultural administrative machinery since a major increase in training and expansion activities will be required. In addition, there will be a strong demand for products from the chemical industry and from those industries manufacturing the equipment required for effective application. For keeping abreast of scientific advance in methods of plant protection, for vigor in the promotion of plant protection measures, and for organizational competence in production and distribution, India needs to tap the services of private enterprise in addition to State and Center programs already underway.

Irrigation and Water Management. The all-embracing goal here is to establish sufficient dominance of agricultural considerations and agricultural personnel in the development of water and irrigation. A more specific embraced objective is to supplement drought-relief irrigation with irrigation and drainage for sustained high yield. For the latter, India needs a new concept of irrigation.

As a minimum, the Consortium and the Bank should join with the U.S. in its already declared intention to refuse any further financial support to irrigation projects for which the possibilities of disciplined irrigation for sustained high yield have not been carefully examined. (The U.S. policy is not to require that drought relief irrigation give way to the newer concept uniformly but that no project overlook the possibilities of the latter.)

Secondly, the GOI should establish a well-financed and staffed, high level prestigious study of the relative merits of the two kinds of irrigation, with special reference to a few upcoming concrete irrigation projects.

Thirdly, India should face up to the impossibility of dealing with many of its water management problems and its potential for irrigation except on a regional basis. The complex water management problems of the semi-arid northwest call for geographical integration beyond what India has so far been able to achieve. The same is true for such a problem as conflict between Madras and those states, Kerala and Mysore, which control the headwaters of the rivers of Madras.

Prices, Price Incentives and Buffer Stocks. On two counts India has recently made major advances in agricultural price policy. In establishing high minimum support prices, it has finally recognized the importance of incentive prices for farm producers and turned away from its earlier near exclusive preoccupation with holding agricultural prices down to protect urban consumers. Secondly, recognizing the futility of administrative price controls on agricultural prices, it has accepted the principle that buffer stocks are essential for effective price stabilization.

These reforms are still, however, under attack. At this writing, there are disturbing rumblings of backsliding from the buffer stock principle, and although highest levels in the Food and Agriculture Ministry insist there will be no retreat, the Government still is not secure from State pressures. In any case, the continued existence of a food zone system and of legally imposed maximum prices for procurement show that India still has

a long way to go to free food production from the disincentive effects of output prices legally manipulated to the disadvantage of the producer. The U.S. should render India every possible assistance in improving the performance of its agricultural markets in procurement, and in carrying off a buffer stock operation with the required skill. In the next year or two its PL 480 supplies should be used to support and entrench the required policy changes; thereafter (see below) the thought of the PL 480 program should be turned increasingly to the inducement of additive rural manpower and investment activities.

Agrarian Reform, Community Development, and Town-Centered Development. Continuing uncertainty over tenure in land is a deterrent to investment in agriculture on the side of both tenant and landlord. So, also, is fragmentation of holdings. There are, of course, no simple formulas to guide the required reforms. Nor are there in other areas of complex institutional change, like Community Development or town-centered agro-industrial development. These are areas, however, in which India can make enormous contributions to agricultural productivity, areas that demand both unusual wisdom and political will, and areas in which the U.S. should expect high if not immediate pay-offs on its assistance. They are not areas whose complexities and uncertainties excuse GOI inaction.

6. Mobilization of Manpower and Rural Development

India's most unexploited resource is manpower. Each year the unemployment figures rise; during the Fourth Plan employment generation will fall short of the rising labor force by about 2-3 million, bringing the total unemployment to 14-15 million by the end of the Plan. In a predominately agricultural economy, outright unemployment is less general than severe underemployment. But the amorphousness of underemployment defies statistical estimate. It is a major rural problem, however, by any judgment.

Few positive measures have been taken to meet the problem, nor has the GOI agreed on a solution. It is necessary that the GOI take immediate steps to mobilize available manpower, simultaneously creating employment opportunities and capital formation. Both social instability and resource waste heavily underscore the immediate need for action, already long delayed.

A sizeable increase in the level of effective employment will require higher standards of administrative efficiency as well as programs for raising the skilled manpower component in industry; and it also will require a much more vigorous effort to mobilize rural manpower.

India's rural manpower program has not had an impressive record. Expenditures during the Third Plan have amounted to only Rs. 18-19 crores compared to a planned outlay of 150 crores, and the level of employment generation has been only 350,000, compared to a Plan target of 2.5 million. The problems are numerous:

1. poor administration,
2. excessive red tape, particularly with regard to the timely release of funds,
3. inadequate consideration in planning of labor availability and employment patterns,
4. lack of technical personnel, and
5. an inability to enlist local participation in project ideas.

To overcome these bottlenecks the GOI needs to introduce among others the following remedial measures:

1. local participation in program planning and execution,
2. an evaluation mechanism to effect program review and indicate corrective actions, and
3. a training program for technical and administrative personnel.

A pilot program incorporating these reforms and using PL 480 Title II grain for partial payment of wages in kind is now underway in the State of Uttar Pradesh. The GOI should draw from the experience gained from this program in order to develop an effective and viable program that can be repeated throughout India.

It seems clear that the Consortium should take a firm position on the necessity for Indian vigor in rural public works. It should push the GOI to overcome its vacillation and to take up a program of the scale required. The specific elementary problem to be overcome is repeated GOI backsliding on earlier resolves, as in the cutback to Rs. 50 crores of an earlier tentative Fourth Plan proposal for Rs. 250 crores for rural works, which repeats with acceleration the cutback of the Third Plan. The cut should be restored.

The Consortium should encourage the GOI to consider a two-pronged attack such as has been recently proposed: (1) intensification of present programs, though with closer ties to Panchayat Raj, and (2) a supplementary or alternative program under the leadership of a youth development corps roughly along the lines of the earlier American CCC. But the Consortium's sticking point should be action -- early, persistent, self-corrective, and large-scale -- rather than the specifics of any now contemplated program.

The U.S. is in a position to ask for a gradual switchover of PL 480 foodgrains. They have been used up to now for closing the gap between domestic supply and demand; they are now also going to be used for a time to help India build up buffer stocks; they should increasingly be allocated to supporting rural public works. The U.S. can use Section 104(g) contracts to require, in connection with the rupee financing of these imports, that substantially larger GOI rupee support be given to rural works than now contemplated. The GOI can be asked to make the re-allocation even at the cost of some small rise in foodgrain prices that will follow from the increased demands of those who receive income from works projects, for foodgrain prices are still perhaps short of levels that represent a good reconciliation of the need for incentive prices for farmers and price stability for urban consumers.

7. Family Planning

Family planning is on a different plane from the other policies so far discussed. It is required not, as with the other policies, to accelerate growth but under any and all circumstances. If growth is not accelerated, family planning may be the only way to keep per capita income on the rise. If growth is accelerated, family planning is required to avoid spilling much of its human benefits. India should not plan the new effort we propose only to see great and fruitful aggregative gains shrink to small per capita bonuses.

India's human resources today number nearly half a billion, almost one seventh of all the people on earth. By 1981, at the present rate of increase, the population will have increased another fifty five percent, reaching three quarter billion -- over double the population of India in 1951. The small family planning program launched so far cannot be expected to result in any significant fall in birth rate; the results so far are tiny compared to the size of India's population.

For the Fourth Five Year Plan, India should mount a dynamic and nationwide program, one that reaches every village in the country, similar in size and comprehension to the malaria eradication program. The technological breakthrough scored by

the intra-uterine device makes it possible to implement a swiftly expanding program; India now has the opportunity to make significant reductions in the population growth rate.

However, before going ahead with such a program, it will be necessary to adopt important administrative reforms. The following points are illustrative of the steps India must take in the field of family planning; all of these points among others should be adopted.

There appears to be a healthy ferment in Governmental circles in India on the urgency of family planning. A new high-level family planning board has been appointed and the position of a new family planning commissioner has been established with new funds and some new degree of financial and administrative autonomy. Some states appear to be moving ahead even faster than the Centre. Yet we cannot at this time determine just what these innovations promise in large-scale follow-through, nor in a rapidly changing situation can we specify what the Consortium should ask of India.

Presumably a successful program would require a budget more like Rs. 200 crores than the tentative allocation of Rs. 95 crores. It would also require (as now appears to have been provided) a semi-autonomous group at the Centre which would be charged solely with family planning and which would be financially relatively autonomous. The Centre

would presumably have to assume full support to the states for a period of, say, ten years on a unit item budget with no possibility of diversion of funds from family planning to other purposes. States would have to develop plans under broad guidelines prescribed by the Centre, with Central planning assistance, and with funds available subject only to post audit. The program would have to receive priority in the allocation of any scarce or rationed resources (e.g. cement, jeeps) to avoid any unnecessary delays in establishing the physical facilities and in obtaining the equipment needed for the program. Several dozen training centers would have to be completed and staffed within roughly the coming year. A personnel system to recruit qualified workers and pay them enough to induce them to work in the countryside would also be required.

These details do not, however, need to be sticking points in Consortium-GOI negotiations. All that is required is that at the time Consortium funds are pledged there be abundant evidence at hand that the GOI and the states are moving intelligently, vigorously, and on a large-scale in family planning.

IV. QUALITY OF ADMINISTRATION AND DECISION MAKING

Indian public administration is deficient in information and research resources, administrative skills at some levels, acceptance of responsibility, venturesomeness,and the flair for improvisation -- all to a degree that makes general administrative reform appear essential. Sweeping administrative reform, it is easy to believe, could greatly accelerate growth.

But a successful general attack on administration is unlikely for several reasons, the most important of which is that the disabling traits of administration are rooted in change-resistant culture patterns, in social structure. And if these patterns and structure could easily be overthrown, India would long ago have ceased to be an underdeveloped country.

It would therefore make no sense to ask for the removal of these administrative defects as a condition of foreign assistance, for any society capable of so liberating itself would no longer need foreign assistance. We can only ask for specific manageable gains.

In these matters, perspective is helpful. Five years from now, visitors to India will report that despite costly Consortium assistance most Indians are shabbily dressed and live crowded into tiny rooms, that sanitation is inadequate, and that monsoon floods wash away villages within fifteen miles of New Delhi. Sociologists will continue to find that caste obstructs democracy in the villages. Demographers will

find an excessive birth rate, and the census will reveal that literate Indians still number less than 35% of the population. Foreign investors will continue to deplore the absence of the Protestant ethic in their Indian collaborators.

Yet these visitors will be looking at an India better dressed and housed than now, with thousands of new village wells for pure water, with the erosion of caste spreading from urban areas to towns and villages, with millions of new literates, millions fewer undernourished infants, and millions of new entrepreneurs.

Similarly five years hence, tourists, foreign technicians, and government officials from abroad will still find cause to complain about bureaucratic inefficiency, traditionalism, complacency, and even corruption. Yet we can expect specific limited improvements in administration and decision making and should push hard to get them.

To push through with decontrol, for example, will be to achieve great gains in administration along several lines. Decontrol will enormously reduce the decision-making burden on the civil service, because it removes from the agenda of public administration thousands of questions of "who gets what?" In decentralizing these decisions to the market mechanism, it leaves presently overburdened scarce administrative talent free for tasks of development rather than constraint. Through restoring prices to their usual functions, decontrol also feeds to the administrator essential price-cost information now unavailable

or misrepresented. Elimination of price control on agricultural products and of state and zonal restrictions on movement of foodgrains will greatly simplify tasks of administration under which agricultural administration now staggers.

Beyond these wide ranging gains in the administration of economic affairs, the GOI should be expected to achieve other specific improvements in administration and decision making (a) where they have been identified, (b) are remediable, and (c) are critical for the success of the Fourth Plan. They include the following:

1. Reform of tax structure and administration. As a minimum the GOI should establish a major study of tax structure, as well as persist in its present efforts toward reform of tax administration.

2. Rationalization of transport and transport policy. This requires reform of cost analysis for the railroads, a thorough examination of the relative costs of rail and road transportation for various categories of goods, and consequent adjustments in rates, road and rail investments, and truck and road taxes.

3. Overhaul of port administration.

4. The development of one or a few completely integrated mine-rail-port operations for iron ore export.

5. Grid integration of electric power capacity.

6. A reconsideration and replanning of rural electrification so that it is not expanded indiscriminately but to support the needs of irrigation and town-centered agro-industrial development.

7. Managerial reform for such conspicuously defective public sector enterprises as Bhopal Heavy Electricals.

8. Development of an established, routine high-level capacity for sectoral analyses and capital project evaluation.

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Urgent needs for administrative improvement in rural public works and family planning have already been noted above.

V. PLAN FRAME

A. Investment Allocation:

In October 1964 the GOI issued a Memorandum on the Fourth Five Year Plan calling for a growth rate of about 6.5 percent to be obtained from an outlay of Rs. 22,600 crores of which Rs. 19,975 crores was to be investment. Subsequent information about projects modifies certain aspects of this Plan. The GOI itself discovered that the costs of projects in the organized industry and minerals sector would rise to as much as Rs. 6,309 crores, against the Memorandum allocation of Rs. 5,600 crores. Foreign exchange costs were not dealt with explicitly in the Memorandum in all cases, but further analysis by the Mission and later information from the GOI indicate these would be on the order of Rs. 3,495 crores of payments during the five year period, an amount greatly exceeding the planners' original expectations.

Even when the Memorandum was issued the GOI financial allocation was to be limited to Rs. 21,500 crores unless later conditions became more propitious. This lower limit would cover about Rs. 19,000 crores of investment, and it is the lower limit figure which has been adopted in all subsequent official considerations of the Plan's financial magnitude.

Even a Rs. 19,000 crore investment Plan might prove to be too demanding , if not of domestic savings, then of foreign exchange. More importantly, however, we are concerned about the relative sectoral allocation of investment.

In the table below the sectoral investment and foreign exchange components of two Plans are displayed. Plan A corresponds to our best interpretation of the GOI Plan at this time. Plan B is an alternative more in consonance with the size and distributive pattern we regard as necessary to successful development. It must be emphasized that Plan B is tentative and, in part, illustrative only, since in many cases it is not based on detailed sectoral studies. Indeed the sectoral allocation of reductions in investment is largely arbitrary,although there is a basic logic behind them.

Our studies of agriculture have shown a need to spend relatively more than in Plan III and Plan A and the increase in proportion in Plan B (relative to the smaller total of Rs. 18,000 crores) is substantial, even though the absolute allocation is no larger than in Plan A. Investment in organized industry and minerals has been cut abat 30 percent from Plan A and 21 percent from the Memorandum allocation. We also would allocate a larger amount of this investment to fertilizer production than does the GOI Plan. Generally our position is that

PLAN IV INVESTMENT

(Rs. Crores)

Sector	Total Investment		Foreign Exchange	
	Plan A	Plan B	Plan A	Plan B
1. Agriculture & Irrigation	3,225	3,225		
2. Rural Works	25*	250		
3. Roads	750	750	14	14
4. Ports	200	160	48	40
5. Railways	1,400	1,300	250	208
6. Other Transport & Communications	1,300	1,000		
7. Power	2,000	1,750	485	420
8. Organized Industry & Minerals	6,309	4,400	2,043	1,418
9. Small Industry	680	475		
10. Education	733	700		
11. Health	677	650		
12. Housing & Construction	1,870	1,825		
13. Other	1,515	1,515		
14. Foreign Exchange for Excluded Sectors			655	500
Totals	20,684	18,000	3,495	2,600

*By other information, now at 50.

Notes - on the following page.

Notes to Table on Plan IV Investment -

1. All items in Plan A investment correspond to amounts in Memorandum on the Fourth Five Year Plan, except sector (8), which is derived from more recent unpublished information.
2. Foreign Exchange requirements for Plan A from official sources, except (7) and (14). Sector (7) based on Mission analysis of GOI power program. Sector (13) Exchange requirements based on Plan III proportions for all sectors not showing explicit requirements.
3. Plan B is Mission modification of Plan A.
4. All figures in 1963/64 prices.

more and better use of existing capacity is needed rather than simply further additions. Foreign exchange, therefore, is to be used in greater measure for maintenance imports and less for creating new capacity. In the case of rural works, Plan B allocates ten fold the amount in Plan A, reflecting the high priority we attach to mobilization of underemployed manpower for development. Although no specific foreign exchange requirement is made for this activity, it is probable that a program of this magnitude will require a million tons of imported foodgrains.

In the Power sector we have accepted the Memorandum statement of foreign exchange needs, but have adjusted the total investment downward to accord with our judgment as to what can be achieved with the exchange alloted. The Plan A. exchange requirement for power is our estimate of the probable cost of the GOI Plan. The Railway allocation reflects a reasoned analysis of time requirements, while the only modest reductions in Education, Health and Housing reflect approval of the important increases in GOI allocations to these sectors over the Third Plan. It is possible that total outlays for education and health programs have been increased more sharply than is desirable, in the light of absorption possibilities, but a final judgment would require further study. 1/

1/ Details on several sectors may be found in various background papers.

The net effect of the adjustments in Plan B is to reduce total investment by 13 percent and the foreign exchange component from 17 percent to 14.3 percent. Against the proposed GOI financial allocation in the Memorandum, however, investment is reduced by only 5.3 percent.

B. Is 6 Percent Possible?

The history of post-Independence growth rates suggests that a 6 percent rate should be obtainable, given the policy changes called for. Decontrol and rate adjustment, together with more maintenance imports should achieve a big jump in growth, with the intangible effects of liberalization, though impossible to estimate accurately, potentially radical. Fertilizer alone in agriculture should achieve a big jump in production; and the new seeds recently developed could account for still another discontinuity in past trends. We have, however, tried to check these estimates through some calculations based on conservative assumptions.

Our calculations of the probable income-generating effects of investment indicate that, were it feasible, Plan A itself, with current efficiencies, could provide a 6 percent growth of national income. With investment distributed in the same proportions as Plan A, but reduced to the Rs. 19,000 crores official

financial allocation, the growth rate falls to 5.6 percent again -- given present level of efficiency in capital use. Given the altered distribution of Plan B, the growth rate with Rs. 18,000 crores investment is 5.5 percent, on the same efficiency assumption. With Plan A distribution of Rs. 18,000 crores, the growth rate would be 5.3 percent.[1/]

But what can we get with the improved utilization of capacity envisaged?

Although we have reduced the total size of the investment plan, through the better use of capacity it should be possible to obtain a higher growth rate than would be obtained with the larger plan that neglects this matter. To use capacity, however, requires more imported as well as more domestic raw materials, components, and the like.

Our calculations run as follows: It is not possible to be certain about maintenance import requirements because of imperfections in the data. Last year, however, the GOI prepared a study suggesting Rs. 5,300 crores would be needed during the Fourth Plan as against the revised requirement of Rs. 4,250 crores for Plan III. A cursory examination of these figures reveals this weakness: with some obvious adjustments it appears that

1/ The incremental capital-output ratio is taken as 2.0 for agriculture, 4.25 for industry-transport-communications-power, and 2.38 for the remaining sectors. See: Some Aggregative Assumptions...Annex 2. ICOR under Plan A is 3.16. With Plan B it is 3.04. Thus redistribution without change in efficiency is responsible for raising the Plan B growth rate 0.2 points. Note that ICOR here refers to net additions to capital and net national output.

Rs. 4,700 crores would in all likelihood be sufficient to maintain capacity operating at about the 1963/64 rate. On the other hand, to meet the Mission's targets for fertilizer consumption, imports will have to increase Rs. 300 crores over the amounts allowed in the study, bringing the total to Rs. 5,000 crores.

The Mission's preliminary and very rough study of import requirements for increased use of capacity indicated that for 1963/64 about Rs. 85 crores would have been needed to operate fully the then current number of shifts in the engineering and chemical industries. For an extra shift the requirement would have been Rs. 370 crores, bringing the total (for increased use of capacity) to Rs. 455 crores a year.

For analytical purposes we assume no change between 1963/64 and 1966/67 in the <u>increment</u> in imports needed for operating fully on the current shift basis, since the rise in <u>base</u> maintenance imports to Rs. 900 crores presumably is sufficient to hold the line. For an extra shift the added imports rise to Rs. 400 crores in 1966/67 because of additions to capacity and after allowing for net import substitution. In subsequent years of Plan IV the increment in both categories is assumed to be in proportion to the rise in base maintenance requirements.

In the Table on the page following, the results of these assumptions are shown. Column (5) indicates the phasing of actual imports to work present shift capacity more fully, while column (8) does the same for an added shift. By the end of Plan IV 90 percent of the present shift potential increases is presumed realized. Of the extra shift potential 60 percent becomes actual by 1970/71.

By these estimates, over the Plan as a whole the increased use of capacity requires about Rs. 1100 crores of additional maintenance imports, bringing total maintenence needs to Rs. 6,100 crores. Although it is difficult to demonstrate conclusively, the evidence available strongly suggests that this is a realistic possibility, provided the necessary decontrol and price adjustments take place. And if these additional imports of materials, spares, components of certain kinds and some types of machinery are made there can be a substantial increase in production. 1/

1/ See background paper. It appears that power bottlenecks can be avoided with proper scheduling. No doubt labor and managerial problems will cause difficulties, but these should be resolvable over five years.

Plan IV: Additional Maintenance Imports for Better Utilization of Capacity
(Rs. Crores)

Year	Base Maintenance Imports	Increase %	Addl. for Present Shifts	Phasing I	Addl. Imports I (4x5)	Addl. for Extra Shift	Phasing II	Addl. Imports II (7x8)	Total Addl. I+II (9+6)	Total Maintenance Imports (10+2)
1	2	3	4	5	6	7	8	9	10	11
1966/7 1	900		85	40	34	400	10	40	74	974
1967/8 2	950	5.6	90	60	54	422	25	107	161	1111
1968/9 3	1000	5.2	95	70	67	446	35	156	223	1223
1969/70 4	1050	5.0	100	80	80	468	45	210	290	1340
1970/1 5	1100	4.8	105	90	95	490	60	294	389	1489
Totals	5000		475		330	2226		807	1137	6137

In the industries which would absorb the bulk of the additional maintenance items, direct imports constitute about 25 percent of gross output. From input-output data, we estimate that to increase gross output in these industries by 100 requires about 85 of indirect output from domestic supplying industries. Combining both forms of production (total 185), the total value added in the process is about 92. If we assume that additional imports to support indirect output are 10 percent of indirect gross output, the ratio of total imports to total value added is 33.5 or 36 percent.

However, it is virtually certain that this ratio will rise sharply with increased use of capacity in the engineering and chemical industries, because a high proportion of the indirect supplies will have to be imported. This phenomenon not only will increase the numerator of the ratio, but also reduces the denominator. Instead of the full domestic income-generating effects of steel production, for example, at the margin where all additional steel must be imported, only some of the trade and transport margins contribute to the rise in value added.

Using interindustry flow data for the Indian economy, it appears that the marginal ratio of imports to value added in the relevant industries could rise as high as 95 percent.

So as not to overstate growth possibilities, let us adopt a conservative view of the income generating effects of additional maintenance imports. For the added output from present shifts, let us take the marginal import-value added ratio to be not less than 75 percent, and for the extra shift not less than 95 percent. The resulting income effects in 1970/71 from these cautious assumptions are shown below.

Income Increase from Additional Imports: 1970/71
(Rs. Crores)

	Imports	Income
Phase I	95	127
Phase II	294	310
Total	389	437

With this addition to the income generated by the Rs. 18,000 crore investment Plan, the income growth rate rises from 5.5 percent to 5.9 percent. Should this come about, retrospectively the incremental capital output ratio, already reduced from 3.2 to 3.0 by the original reallocation of investment would have been further cut to 2.8 through fuller use of capacity.

Increasing income via added imports will have Keynesian multiplier effects as well as the effects already discussed. Since the foci of increased production are the engineering and chemical industries, a sizeable portion of the additional income generated will be taken by taxes or saved. It is estimated that 42 percent of income will flow directly into taxes and savings, while of the 58 percent spent on consumption, by the industrial group, about 10 percent will flow to governments as indirect taxes. This leaves about 52 percent, of which we might assume 10 percent is imports. The net impact on domestic resource demand of the first round is then about 47 percent of the increase in output. In subsequent rounds of spending the leakage will be smaller because the tax and savings effects are much less in the economy as a whole than in the organized industrial sectors. The multiplier therefore should exceed two. If we take it conservatively as two, the additional income creating potential in 1970/71 equals the original increase in income, i.e., Rs. 437 crores.

On the other hand, it is clear that output will not expand fully to meet this demand. Especially if no allowance is made for further imports for the consumption oriented industries, a

good part of this effect will be realized as price rises rather than increments in real income. But some allowance could be mede for additional income from services and other essentially domestic resource using sectors. Any significant allowance would raise the national income growth rate to something in excess of 6 percent.

Perhaps more important than the multiplier effects in creating additional income is the fact that the original rise in output will generate a substantial rise in savings and taxes. With total income over the Plan as a whole rising by Rs. 1290 crores as a result of better capacity use, taxes may rise by Rs. 280 crores and savings Rs. 360 crores without regard to later rounds.

C. Savings

To finance a Rs. 18,000 crore investment Plan requires an equivalent amount of savings. In India's case, not all of this needs to be mobilized from internal sources, because her need for real imports exceeds her capacity to finance them. The various components of this real net import requirement are discussed in several sections of this paper and will be summarized in the section on aid. For present purposes we need only take the single round number of Rs. 4,000 crores net imports,[1] which constitutes the foreign contribution to savings. For a Rs. 18,000 crore plan, therefore, the domestic resource mobilization requirement is reduced to Rs. 14,000 crores. As explained in the background paper,[2] the necessary marginal savings ratio, i.e., the ratio of additions to savings from increments in income, depends heavily upon the initial average savings - income ratio 1965/66, which is believed to be about 10-11 per cent. The display below shows how the savings effort is affected by this and by the increase in the growth rate resulting from added maintenance imports:

Marginal & Average Savings Ratios
Rs. 18,000 Crore Plan

1965/66 Average Savings %	Income Growth Rate % 6.0	5.4
10	22.3 (13.1)	25.2 (13.5)
11	17.4 (12.6)	19.7 (13.0)

Note: Bracketed figures are average savings ratios 1970/71. Unbracketed figures are marginal savings ratios for Plan IV.

1/ This being the number the GOI has been discussing and close to the (differently composed) total we emerge with below.

2/ Some Aggregative Assumptions...

The increase in the growth rate which reduces the ICOR also eases the savings problem considerably. Since the marginal savings ratio is believed to have been around 18 per cent in Plan II and about 15 per cent in the early years of Plan III, the savings requirements appear entirely feasible, and some might argue that a larger investment could be achieved. On the other hand moving to a Rs. 19,000 crore Plan would further raise the foreign exchange requirements and might prove infeasible for that reason. Certainly it would place substantially greater demands on fiscal policy and would risk creating an inflationary environment which, in turn, would militate against the large gains in exports that must be achieved. Thus, although Rs. 18,000 crores of investment (1963/64 prices) might not demand a greater relative domestic resource mobilization effort than has been achieved, there are still sound reasons for accepting a continuation of the historical trend in this sphere. When the real net import requirement declines, during the Fifth Plan, the need for a sharp increase in domestic savings will have to be faced.

D. Financing Public Sector Outlay:

The Memorandum allotted Rs. 15,620 crores of the Rs. 22,600 crores Plan to public sector outlay. It is generally assumed that the Rs. 1,000 crore cut in the official financial allocation applies entirely to the public sector, and the round amount considered needed has been taken as Rs. 14,600 crores. At a meeting of the GOI Resources Committee in mid-July 1965, it was decided after

prolonged consideration and study that Rs. 3,000 crores of "additional taxation" would be needed to cover a Fourth Plan, presumably, of this magnitude. Additional taxation in this context includes revenue from higher postal rates, railway tariffs, and certain public sector enterprises prices as well as increased rates of regular taxes. This approximates the additional tax effort in real terms actually realized during the Third Plan, although the revenue was used to finance defense, rather than for economic development.

Although the Mission has not yet been able to examine the latest GOI analysis of public sector finances it is believed that an allowance of about Rs. 5000 crores for defense is included, which amounts to a 4.4% growth rate. Increases in pay alone would account for a substantial part of this, and the implication is that no great change in the defense effort itself is anticipated. We also believe that administrative expenditures are forecast to grow at 5 per cent, while total current expenditures grow at 6.2 per cent. Most probably a sharp rise in interest payments accounts for the difference between this total rate and the lower figure for defense and administration. On the other side of the ledger total current revenues at 1965/66 tax rates are probably being projected to grow at 8 per cent, which would leave a Rs. 3200 crore surplus on current account available for financing the Plan. The remaining finance, of course, is obtained from various capital account items, including aid. After all these items are counted, there apparently remains a Rs. 3000 crore gap.

It is likely that the GOI financial resources study is based on non-inflationary growth, a rather unrealistic assumption given past price trends. If prices do rise, there will most probably be a negative effect on real revenue realization because the specific nature of excise taxes and some customs duties will outweigh the positive effects from the progressive personal taxes. It is probable, therefore, that additional taxation in excess of Rs. 3,000 crores will be necessary to finance a Rs. 19,000 crore investment Plan even if current outlays are held to the levels suggested. On the other hand a Rs. 18,000 crore Plan will reduce both the inflationary prospects and the need for revenues. Assuming 70 percent of the cut is taken by the public sector, the additional tax requirements on GOI assumptions will fall to Rs. 2,300 crores. But with the kind of activity to be induced by import liberalization and greatly augmented exports, it is quite likely that some inflationary pressures will still be operating, so additional resource requirements may still have to be in the neighborhood of Rs. 3,000 crores.

If import liberalization is accompanied by a devaluation or substantial import surcharge, a good part of the additional revenues can be obtained from this source. For example, a 50 per cent surcharge on commercial imports will net the exchequer Rs. 2,200 crres assuming Rs. 4,400 crores of private commercial imports. Even if half of the projected exports of Rs. 5,600 crores must be subsidized at 30 per cent the net additional revenue is Rs. 1,360 crores. Thus only Rs. 1,640 crores or about Rs. 110 crores a year would have to be raised from

other sources. If half of this comes from State sources, which would mean a slightly better performance than achieved during the Third Plan, the Centre's tax effort beyond the surcharge would amount to Rs. 55 crores a year, a modest requirement considering that a substantial portion of it could be raised from increased rail rates.

On the basis of the scanty evidence presently available, it must be concluded that the public sector resource problem will not be overly demanding provided there is a substantial change in the exchange rate or a significant import surcharge. Without this kind of measure, it would be far more difficult to manage the public finances.

E. Fifth Plan Growth Rate.

As argued in Section II, we should look forward to a wholesale review of pace and pattern of development after two years' experience with the new program, especially with liberalization. We would hope to shoot then for, say, 8% growth.

Yet the emphasis proposed for non-project imports might be thought to pose a threat to the project accomplishments in the Fourth Plan on which growth in the Fifth Plan must rest. Again, on this issue, we have put our estimates through the wringer of calculations on cautious assumptions. We ask the simple question in these calculations: Can a 7% rate be reached in Plan V with, at the same time, the progress toward and termination that we should expect?

If, by the end of Plan IV, new capacity is used with greater efficiency, the marginal capital-output ratio will decline. Suppose the investment in industry previously needed to raise output by 100 rupees per year now yields 130 rupees per year. Similarly suppose for power the yield became 120 and for transport 110 rupees per year. The net effect, given Plan B investment proportions, is to cut ICOR to 2.76.

If income grows at 6% during Plan IV, for 7% growth in Plan V, an income increment of Rs 10,200 crores is necessary. All of this need not be obtained through more

investment, however, because there will still be some opportunity to increase income by increasing the utilization of capacity existing at the beginning of the Plan. Extension of the analysis applied to maintenance imports for Plan IV indicates Rs 450 crores of imports could be used for this purpose over and above a "base" maintenance requirement of Rs 6,700 crores. About Rs 110 crores of the maintenance imports for increasing extra shifts occurs in 1975/76, when it is assumed that 85% of the extra shift potential is realized. By that time it is reasonable to assume a reduction of the import-value added ratio because of import substitution. If this ratio is taken as 0.5, the result is an increment in income of Rs 220 crores. Thus the total increase in income to be achieved from additional investment by 1975/76 is reduced to about Rs 10,000 crores. With an ICOR of 2.76, this requires approximately Rs 27,600 crores net investment during Plan V.

If exports grow at 8% during the Fifth Plan, total receipts will be Rs 8,400 crores. 1/ As stated above, maintenance imports may amount to Rs 6,700 crores. Even

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1/ A slower export growth rate is taken for Plan V because the effects of a devaluation or subsidies will probably be largely worked out over five years. Also it may prove more difficult to continue export growth at a rate greatly exceeding the growth of national income and from the high base assumed to be reached by 1970/71.

with a continued rapid growth of agriculture, it is likely that imports of agricultural products above the maintenance base will be required, although they should phase out by the end of the Plan. Suppose these imports amount to Rs 500 crores. Also the Plan program will have an import content. Even if this is reduced to 10% of investment the total requirement will be Rs 2,760 crores. Thus net imports will be about Rs 1,500 crores.

With Rs 1,500 crores from abroad the domestic savings required to finance investment is Rs 26,100 crores. If the average savings ratio is 13% in 1970/71, this implies a marginal savings ratio of 27.4%; with a 14% initial savings ratio, the marginal ratio is 25.2%. It is clear, therefore, that the domestic savings effort will be more difficult than in the Fourth Plan, but it should be possible to manage this if the Fourth Plan lays the base along the lines indicated above.

Under the assumptions used here, aid continues during the Fifth Plan, but it is at a significantly lower level. The table below summarizes aid requirements.

BALANCE OF PAYMENTS PLAN V

Requirements	Rs Crores	Rs Crores	
PL480		500	
Maintenance imports		6750	
Base	6250		
Additional	450		
Plan imports		2760	
Total imports		9960	
Debt Service		2200	
Total requirements			12,160
Resources			
Exports		8400	
Foreign Private Investment		500	
External Assistance		3260	
PL480	500		
External Asst.exPL480	2760		
Aid Pipeline	1450		
Non-Consortium	260		
Consortium	1050		
Total resources			12,160

Most of these figures have been explained. The debt service requirement is based on an analysis which assumed Rs 4,000 crores of aid for Plan IV and the terms of 1963/64. It does not include service on Plan V aid, but this may be compensated for by improved terms. In anticipation of growing opportunities and receptivity, private investment here rises substantially from the Plan IV level of Rs 350 crores.

The Rs 1,310 crores of utilization from Plan V aid means a new commitment requirement of about Rs 2,000 crores. If a quarter of this is given by non-Consortium sources, Plan V Consortium commitments are reduced to Rs 1,500 crores or an

average Rs 300 crores per year, less than half the Plan IV requirement. By the end of the Fifth Plan, the need for aid would virtually be eliminated, except perhaps for some need to cover a portion of additional debt service.

VI. BALANCE OF PAYMENTS AND AID REQUIREMENTS

A. Foreign Exchange Requirements.

We can now match requirements and resources as follows, entering as Consortium drawals an amount sufficient to balance.

Balance of Payments Plan IV

Requirements:		(Rs. crores)	
PL 480		1,000	
Maintenance imports		6,100	
Base	5,000		
Additional for decontrol	1,100		
Project imports		2,600	
Total imports		9,700	
Debt Service		1,300	
Total requirements			11,000
Resources:			
Exports		5,600	
Foreign private investment		350	
External assistance		5,050	
PL 480	1,000		
External assistance ex PL-480	4,050		
~~AID~~ aid pipeline (1400)			
Non-Consortium drawals (350)			
Consortium drawals (2300)			
TOTAL RESOURCES			11,000

The external assistance requirement exclusive of PL 480 is, it will be noted, Rs. 4050 crores, which is roughly equal to the Rs. 4000 crores figure that has been conspicuous in recent Fourth Plan papers and discussion.1/ It may be that the GOI has found roughly the right figure for the wrong reasons.

The items in the balance are explainable as follows:

1. PL 480 imports: If the 6% income produced by the various measures discussed is attained, consumption can rise at about 3.1% per capita or 5.6% in the aggregate. This, in turn, will cause the demand for foodgrains to rise at about 4.3% a year. Even with a 5% increase in foodgrain production, under these assumptions there will be continuing, though declining, excess demand. Over the plan period the total PL 480 foodgrain import requirement on this basis is about 21.3 million metric tons, with imports in 1970/71 amounting to 3.5 million metric tons. The value of PL 480 foodgrain imports will approximate Rs. 700 crores. In addition, we may assume other PL 480 imports (cotton, corn, oil, etc.) of about Rs. 200 crores, bringing the total to Rs. 900 crores. If a large rural works program is launched this will require an additional Rs. 100 crores.2/ If 10% of this Rs. 1000 crore total is used for U.S. uses consumption purposes, Rs. 900 crores will be available for financing development.3/

1/ Unless the Indians' Rs. 4000 crores includes their unknown allowance for foreign private investment -- in which case the proper comparison is between Rs. 4000 crores (GOI) and our Rs. 4400 crores (4050 plus 350).

2/ See Background paper on Rural Manpower Programs.

3/ We are not assuming that the foodgrain supplies and rupee finance necessary for a large works program will be entirely provided by additional Title II imports. Rupee finance from Title I imports -- and in effect the foodgrains themselves will have to be diverted increasingly

support of rural works, leaving India with the necessity of bearing the burden of some foodgrains price increase as income from public works employment increases the demand for foodgrains over and above incremental PL 480 shipments.

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2. Commercial imports: We have assumed that Rs. 5000 crores will be required to maintain the economy at the present rate of capacity utilization, but with sufficient additional imports to meet the U.S. fertilizer consumption target. In addition, as estimated above, Rs. 1100 crores will be necessary for increasing capacity utilization. To this must be added the project foreign exchange payments for the Plan which total Rs. 2600 crores given a Rs. 18,000 crore investment. The sum of these commercial imports is thus Rs. 8700 crores.

3. Debt Service: This subject is discussed in detail in various background papers. Total debt service during the Fourth Plan will amount to Rs. 1300-1400 crores.

4. Exports: The export prospects have been discussed above. Without special efforts earnings may be only Rs. 4850 crores; the GOI target is Rs. 5100 crores. We believe the dynamism injected by the new policies advocated here will make possible export earnings of Rs. 5600 crores, which implies a 9.4% growth in exports.

5. Foreign Private Investment: As discussed above, we expect a sharp change in the inflow of foreign private capital. Although only about Rs. 125 crores will be realized in the Third Plan, we are advocating a Fourth Plan target of Rs. 350 crores in anticipation of important changes in public policy and the economic climate.

6. Aid Pipeline: India will enter the Fourth Plan period with a pipeline of about Rs. 1450 crores. This should be used over the five year period.

7. Non-Consortium Aid: Most of this will come from the Communist countries. Although it is too early to predict a total, we are assuming a substantial increase in commitments to Rs. 600-700 crores.

B. Consortium Commitments.

The exact amount of new commitments required to cover the Rs. 2300 crores will depend on utilization rates, which in turn are affected, among other things, by the project-nonproject division. Assume that all non-Consortium aid and private foreign investment is for projects and that all but Rs. 250 crores of the pipeline is also project. Assume also that debt service and maintenance imports are first and second charges on export earnings. Then we have the following:

	Rs. Crores		Rs. Crores
Project needs	2600	Nonproject needs	7400
Less private investment	-350	Less exports	-5600
	2250		1800
Less project pipeline	-1150	Less nonproject pipeline	-250
	1100		
Less non-Consortium drawals	-350		
Consortium Project	750	Consortium nonproject	1550

Now if we assume nonproject utilization at 77% of commitments and project at 49%, the following new Consortium pledge requirements emerge:

	Rs. Crores	%	Say
Project	1530	43.1	43
Nonproject	2020	56.9	57
Total	3550		100

On basis of comparison with Third Plan utilization rates, these proposed rates are possible. This being so, Consortium policy should be that the GOI should do whatever is necessary to achieve them.

Carry-over to Plan V. With new Consortium commitments of Rs. 3240 crores and utilization of Rs. 2150 crores, the carry-over is Rs. 1090 crores. In addition there will be a non-Consortium aid carry-over of about Rs. 350 crores or about Rs. 1450 crores in all. Thus the amount available from the pipeline for Plan V will be about the same as it will have been for Plan IV.