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386-0471/004201

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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

PROJECT PAPER

INDIA - FERTILIZER PROMOTION PROJECT
(386-0471)

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ABBREVIATIONS

BDO	Block Development Officer
DAO	District Agriculture Officer
DAP	Diammonium Phosphate
DOA	Department of Agriculture
DPAP	Drought Prone Area Program
FAI	Fertilizer Association of India
FCI	Food Corporation of India
FPEC	Fertilizer Pool Equalization Charge
GOI	Government of India
HYV	High Yield Variety
ICAR	Indian Council of Agricultural Research
IFPC	Intensive Fertilizer Promotion Campaign
MOAI	Ministry of Agriculture and Irrigation
MMTTC	Minerals and Metals Trading Corporation
NCAER	National Council of Applied Economic Research
P205	Phosphate Fertilizer
RITES	Railway Industry Technical Economic Service
SFDA/MFALA	Small Farmer Development Agency/Marginal Farmer Lending Agency
SSP	Single Superphosphate
TSP	Triple Superphosphate
VLW	Village Level Workers

Project Recommendation and Summary

Part 1

A. Recommendation

1. Loan financing of fertilizer imports

FY 1979	\$ 22,000,000
FY 1980	49,000,000
FY 1981	\$ 79,000,000
	<u>\$ 150,000,000</u>

- a. Borrower: The Government of India (GOI)
- b. Implementing Agency: Ministry of Agriculture and Irrigation (MOAI).

2. Authorization of fertilizer purchases from Code 941 countries.

B. Summary Description of Project

The purpose of AID's participation in the India fertilizer program is to assist in sustaining the momentum of increased fertilizer consumption established during the past three years. The government's instruments for accomplishing this purpose include an aggressive import policy that will provide a total supply of fertilizer sufficient to ensure availability at all levels of the distribution system, and activities designed to broaden the base of consumption by both area and type of consumer.

From a base of 2.9 million nutrient tons in 1975/76, fertilizer consumption rose to an estimated 5.0 millions tons in 1978/79, representing an annual increase of approximately 20 percent. Several factors have been responsible for the dramatic increase in sales, including good weather, improved price relationships, and accelerated investments in irrigation and power. Realization of this potential, however, must be credited to an effective import program that has acted to put pressure on the supply side and ensured that availability is not a constraint. It is a continuation of this aggressive import policy that this project seeks to support.

In addition, the project contains a series of activities of the GOI intended to broaden the base of fertilizer consumption by area and type of user. Analysis of recent sales data suggests that the phenomenon of "saturation" in certain leading districts has not yet emerged and that growth in high and low using areas appears to be roughly the same. However, not only are diminishing returns in high use districts and among progressive farmers inevitable, but the GOI's specific concern for improving the welfare of the weaker sections of the community and the more

backward areas dictates that activities designed to broaden the base of participation in fertilizer use be undertaken. Consequently, the GOI plans (1) to increase the number of districts, especially in the dryland areas in which Intensive Fertilizer Promotion Campaigns (IFPC's) are to be waged, (2) to add to the villages currently "adopted" by the fertilizer industry, and (3) to provide promotional subsidies to small farmers through special credit programs, for example, those of the Small Farmer Development Agency/Marginal Farmer Lending Agency (SFDA/MFALA), and the Drought Prone Area Program (DPAP).

On the supply side, continued efforts will be made to develop a usable system of incentives that will stimulate the movement of fertilizer into the more remote areas. Actions now under consideration by the GOI include expanding dealer registration, increasing the number of supply depots off the main rail and road connections and extending differential transportation subsidies to wholesalers and retailers.

As a contribution to the effort to maintain supply pressure on the fertilizer system and to broaden the base of fertilizer consumption in remote areas and among small farmers, AID will make \$150 million in loan funds available to the GOI to help cover an estimated total import bill of roughly \$1.6 billion over the period 1979-81. The GOI intends to conduct studies aimed at (1) developing new courses of action to cope with the problems and constraints of the distribution system, and (2) analyzing the experience gained in a variety of fertilizer promotion activities. AID will consider grant financing such studies, if requested by the GOI. Investment proposals resulting from such studies may also be considered for later AID financing.

C. Summary Findings

A growth rate of 4.0 percent per annum in agriculture is a cornerstone of the 1978-83 Draft Plan. Inability to attain this rate would seriously jeopardize the shift toward a more employment oriented approach to development that characterizes the Plan's sectoral allocations. A lower growth rate would also have a negative effect on the welfare of the poor through higher food and fiber prices.

Commentators on the Plan's allocations and targets have generally agreed that contrary to previous exercises, the figures present an ambitious, but realizable course of action. Three highly complementary activities form the core of the agricultural development program. First, it is proposed to add some 17 million hectares to the current irrigated acreage of roughly 50 million hectares. Second, the GOI plans to add approximately 18,500 MW of capacity to the country's electrical power system. A major portion of this program is aimed at rural electrification and the provision of power for the operation of minor irrigation schemes. Lastly, the target for total fertilizer consumption over the 1979/80 - 1982/83 period is roughly 25 million nutrient tons, approximately 3/4 to be produced locally and 1/4 to be imported. Attainment of this level is a necessary condition for meeting the output and growth rate targets projected for agriculture.

All production processes permit some substitution, however the relationships among water, improved seeds and fertilizer are such that shortfalls in any element of the package would have a detrimental effect on the attainment of the government's target.

Moreover, because of its extreme divisibility, failure to provide sufficient fertilizer imports would particularly undermine efforts to improve productivity in the small and marginal farmer community. The findings of the National Sample Survey Study (1974), the Programme Evaluation Organization Study (1976) and the recent 22,000 household survey undertaken by the National Council of Applied Economic Research (NCAER) (1978) all suggest that, in situations where reasonably favorable agro-climatic conditions exist, normal marketing channels are sufficient to ensure that small farmers adopt improved seeds and fertilizers as readily as their larger neighbors. Admittedly, their initial acceptance of the HYV technology has sometimes lagged behind that of the wealthier, more progressive members of the community, especially in the rice areas in the South. But the only clear evidence that these discrepancies have persisted beyond one or two cropping seasons is related to periods of short fertilizer supply.

The finding that small farmers have readily adopted fertilizer in the more advanced areas that account for the major portion of India's fertilizer use does not, of course, mean that there are no constraints on the increased use of fertilizer in India. Even in the "advanced" areas, not all households use fertilizer. Continuing extension efforts are needed to increase the farming community's understanding of the benefits of chemical fertilizers. In addition, there are two types of situations in which special programs for encouraging fertilizer use are justified. The first stems from the observation that in certain districts, despite "good" moisture conditions, fertilizer consumption is below average for the State. These districts have been targeted for intensive promotion campaigns involving the coordinated efforts of all local development agencies.

The second, representing a much more difficult problem, involves districts whose current agricultural potential is marginal and where additional fertilizer sales, especially among small farmers, will necessarily go hand-in-hand with the introduction of minor irrigation facilities and improved moisture management practices. Agencies working in these areas (SFDA/MFALA, DPAP, etc.) have been empowered to provide special subsidies for fertilizer use to small farmers beyond those currently available to other users.

D. Policy Issues

The PID approval cable (Appendix F) raised issues regarding (1) the role of IFPC districts, (2) long term effects of the Project, (3) effectiveness of the distribution system, (4) evaluation standards and criteria, (5) procurement procedures, and (6) fertilizer subsidies.

Analysis during preparation of the PP has resulted in substantial alteration of the treatment of the IFPC districts. The IFPC districts are seen now as only one element in the efforts of the GOI to promote increased fertilizer consumption. Promotional activities in IFPC districts vary from state to state. A study of the IFPC program, along with other approaches to fertilizer promotion, is expected to be undertaken by the GOI.

The long term impacts of the project on small farmers and on the overall fertilizer supply and demand situation is provided in the sections on Project Background and Project Analysis.

The Project Background section of the PP includes a broad description of the fertilizer sector including evaluative comments on the effectiveness of the overall distribution system, pricing policies, and the treatment of small farmers. GOI studies of weaknesses in the distribution system are expected to bring about improvements.

Analysis of the fertilizer sector has clarified the role of the IFPC districts which will not now provide the standard of measurement for project and sector evaluation. Instead, the evaluation process may call for special studies of promotional efforts in IFPC districts and of the distribution system. A special study using the NCAER study data as a benchmark is being suggested for the latter years of the project. It would detail the impact of the project on small and marginal farmers.

AID fertilizer procurement rules and procedures were discussed in detail with the GOI by AID (SER/COM) staff. While all of the details have not been worked out, the general approach is outlined in the Implementation Section of the PP.

The nature and extent of GOI subsidies to the fertilizer sector are considered in the Background Section of the PP and Appendix L.

E. Project Paper Preparation

The Mission Project Committee includes Fletcher E. Riggs, Chairman Dr. B. Sen, and Peter Bloom. The Committee has worked closely with the staff of the Fertilizer Division, Department of Agriculture, who provided essential data and interpretations of the fertilizer situation in India. The initial analytical treatment and first draft of the Project Paper were prepared by Dr. Carl Gotsch of Stanford University, consultant to the Mission and the GOI.

Project Background and Description

Part II

A. Background: The Fertilizer Subsector:

1. Fertilizer and Growth: Fertilizer has clearly been the cutting edge of the country's recent agricultural growth. Sales have accelerated from a long-term (1952 to 1978) growth trend of roughly 17.5 percent per annum to 22.5 percent per annum during the period since 1976/77 (See Table A-11).

There is considerable debate about the precise determinants of this recent increased growth rate. Those who see weather as a primary determinant must contend with the fact that in 1969, 1969/70 and 1970/71, all years of favorable weather, annual sales were below the trend established in the preceding decade. Those who argue that improved price relationships were the cause must explain why the unprecedented growth in 1976/77 has occurred in a price environment that was less favorable to cultivators than the one which prevailed in the years before 1974/75. In any case, efforts to project future demand must contend with the fact that the recent trend is of short duration and, at least in computation, is as much a function of the fact that sales in 1974/75 - 1976/77 were below the long term trend as it is of the rapid increases in sales in 1977/78 and 1978/79. The latter were clearly above the long term trend and mark an average increase of 20 percent per annum. It has been argued and generally conceded that the absence of a clear-cut causal explanation of the determinants of sales suggest the advisability of treating the most recent experience with some caution. ^{1/}

Perhaps the best that one can say is that the current buoyance in the fertilizer sub-sector results from a combination of factors like weather, prices, promotional efforts, credit availability, increased irrigation, the high yielding varieties program, and ready availability of fertilizers resulting from domestic production policy and an import program that assures ample supplies at most levels in the distribution system most of the time. One might wish for a more definitive argument; but the limited amount of available data makes it impossible to test hypotheses about the determinants rigorously. Moreover, given the flexibility permitted through short-run adjustments by timely fertilizer imports, accurate long-range projections are not critical to the success of the

^{1/} For a detailed analysis of recent consumption patterns, see Gunvant Desai, "A Critical Review of Fertilizer Consumption after 1974/75 and Prospects for Future Growth," Fertilizer News, Vol. 23, No. 7, July 1978.

program. Of course some knowledge of the rapidity with which the sub-sector is likely to grow is required for production planning. (Various approaches to demand projection are reviewed in Appendix C.) But, as the detailed description of the project suggests, the import component will be substantial over the next decade regardless of the accuracy of production and consumption forecasts. The worst that can happen as a result of mistaken projections are temporary "shortages" and "surpluses" as measured against the desired buffer stocks. These fluctuations are inevitable where uncertainty of weather and other agro-climatic conditions are endemic to the area.

Growth accounting over short time periods is always hazardous but the application of some simple yardsticks developed by the National Commission on Agriculture suggests that fertilizer (along with favorable weather) has been far and away the most important determinant of the favorable foodgrain situation in which India has found itself in recent years. For example, the estimates in Table 1 (p. 6a) show that roughly 70 percent of the input induced increment from 1976/77 to 1977/78 stemmed from the application of additional supplies of inorganic nutrients. In absolute terms, this amounted to approximately 6.7 million tons of cereals of the record output of 125 million tons.

A number of criticisms can be leveled at the use of such simplistic methods: relationships between production inputs have not been accounted for; fertilizer response ratios vary widely between regions and crops; and estimates of the percentage of fertilizer going on to food crops are imprecise. Nevertheless, even if rather significant changes were made in the assumptions used, the annual increments in fertilizer consumption can be demonstrated to have played a major role in the successes of India's development program.

2. The Distributive Effects of Increased Fertilizer Consumption:

The observation that incremental fertilizer use is responsible for 2/3 to 3/4 of the input-induced growth in foodgrains leads directly to the conclusion that increased consumption of inorganic nutrients has played an important role in improvement - or at least avoiding a deterioration - in the welfare of India's poor. The mechanism, of course, is the general downward pressure on foodgrain prices associated with the increase in output. This has created the opportunity for the government to procure substantial amounts of cereals for release through subsidized ration shops. Moreover, while to date the latter have been of benefit primarily to the urban poor, the relative stability of the food price index for agricultural labor also suggests that the most vulnerable sections of the rural population have also benefited from the increased production of cereals.

On the income side, there is considerable evidence that, at least in agricultural areas favored by reasonably assured water supplies, small farmers have also benefited from the aggressive import policies of recent years. Fertilizer's "divisibility"* makes it an input that, in principle, is neutral to scale. The recent studies done in both India and Pakistan referred to

*"Divisibility" refers to the fact that the fertilizer can be made available directly to small farmers in varying amounts according to need, in contrast to some inputs such as capital equipment or irrigation systems.

Table 1
INDIA
GROWTH IN FOODGRAIN PRODUCTION AND ITS DETERMINANTS

	<u>Three Year Average</u>					
	<u>1967/68-1969/70 to</u>		<u>1973/74-1975/76 to</u>		<u>1976/77 to</u>	
	<u>1975/76-1977/78</u>		<u>1975/76-1977/78</u>		<u>1977/78</u>	
	M. Tons	%	M. Tons	%	M. Tons	%
Actual Increase in Output	23.0	2.7	10.8	4.9	14.4	13.0
Input-Induced Increase	22.4	2.7	8.5	3.8	9.5	8.5
of which contributed by:						
Gross Cropped Area	2.2	(9.8)	0.6	(7.1)	1.3	(13.7)
Irrigation	3.4	(15.2)	1.2	(14.1)	0.9	(9.5)
Fertilizer	14.4	(64.3)	5.8	(68.2)	6.7	(70.5)
Cropping Pattern Shift	2.4	<u>(10.7)</u>	0.9	<u>(10.6)</u>	0.6	<u>(6.3)</u>
Unexplained Residual	0.6	(100)		(100)		(100)

Source: Based on World Bank calculations and "yardsticks" developed by the National Commission on Agriculture.

- 1/ The input/output coefficients are based on the assumption that the effect of each input is separate from others when in fact the use of one increases the productivity of the others; and there are factors influencing production other than those for which there are yardsticks.
- 2/ The yardsticks adopted are: adding 1 hectare to foodgrain cropped area adds 0.45 tons to foodgrain production; adding irrigation to 1 hectare adds an additional 0.5 tons; applying 1 nutrient ton of fertilizer to foodgrain crops adds 10 tons to production; a shift of 1 hectare from pulse and coarse grain cropping to either rice or wheat adds 0.38 tons to production.

earlier show that this is also true in practice. The NCAER study (1978) of 22,000 households shows, for example, that in 8 out of 17 states the proportion of small farm households using fertilizer is greater than the proportion of all households utilizing fertilizer. In 6 states the proportion of small farm households using fertilizer is close to the average proportion of fertilizer using households and in only 2 states is the proportion of small farmer households utilizing fertilizer less than the average proportion using fertilizer. (See Table A-18.) These results duplicate earlier conclusions drawn by the National Sample Survey study and the Programme Evaluation Organization.

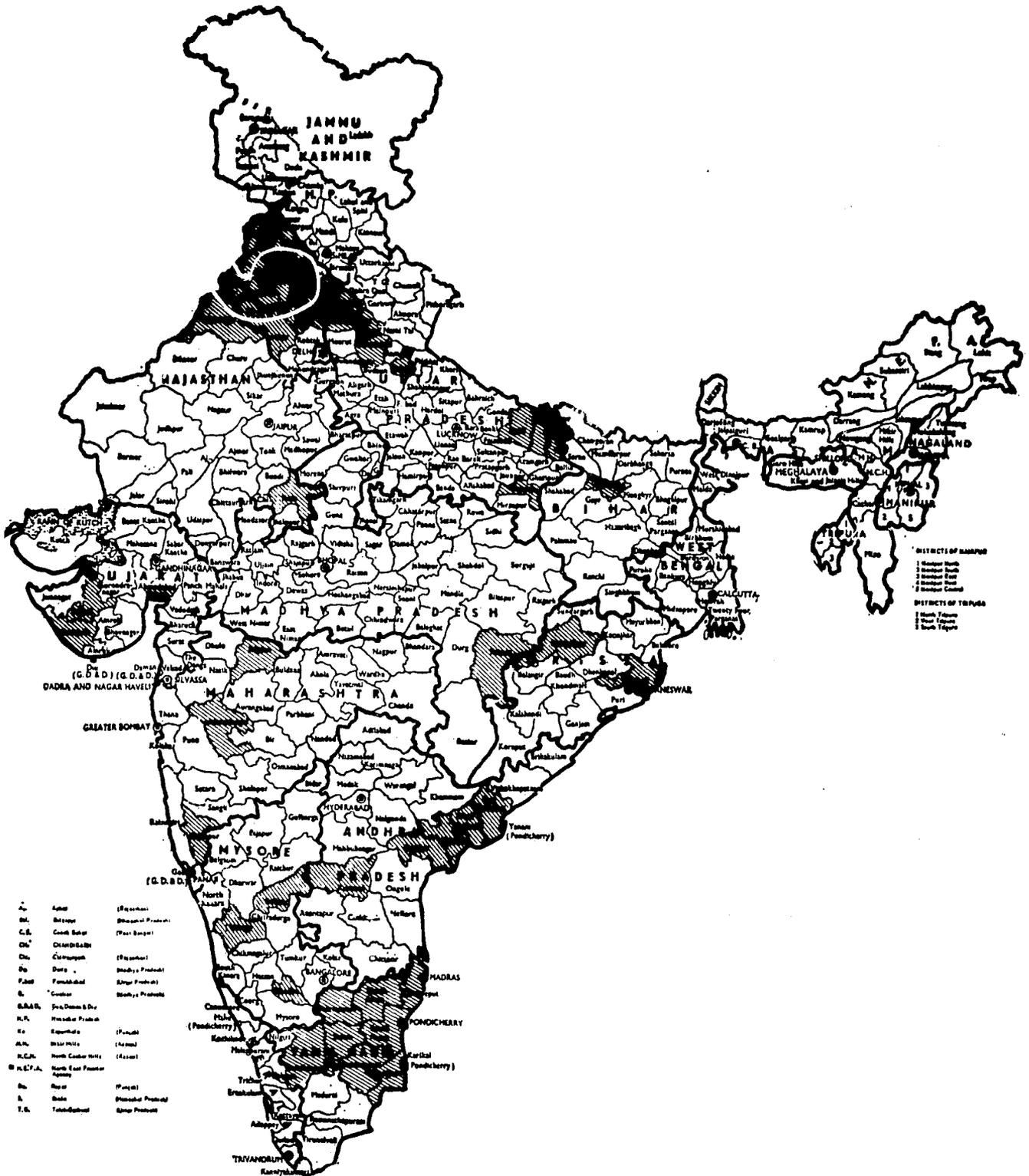
The finding that where reasonable investments in infrastructure have occurred small farmers have participated significantly in the green revolution, is not new to students of Asian agriculture. A 1975 study done in Pakistan contains similar conclusions. It suggests, on the basis of an extensive survey of the Provinces of Punjab and Sind, that the incidence of fertilizer use is lowest on large farms (over 12 acres). Medium (6-12 acres) and small (less than 6 acres) farms received fertilizer more commonly on both irrigated and unirrigated land although the study does not indicate the intensity of fertilizer use.

Evidence that, in the presence of adequate infrastructure and fertilizer availability, small farmers are reasonably well served is important. It suggests that under the existing system large numbers of the relatively poor have been able to improve their absolute standard of living. Continued extension efforts in the areas show that high rates of adoption are required. Improvements in rural capital markets are also necessary. The results showing that farm size has not been a barrier to adoption suggest that efforts to popularize divisible production inputs such as fertilizer, seeds and pesticides should continue.

3. Expanding the Base of Consumption through Promotion: The fact that markets appear to be serving small and marginal farmers reasonably well in areas where most of the fertilizer is and, for the foreseeable future, will continue to be used, suggests that special attention needs to be given to improving the system in less favorable environments. The NCAER summary findings show, for example, that there is an extreme variation in the use of fertilizer by region. The percentage of farm households using fertilizer varies from over 90 percent in the Punjab to 7 percent in Assam. (The average for the country is roughly 50 percent.) (See Table A-18.) The variation in rate of application per fertilized hectare is equally great. Tamil Nadu, a rice growing district in the south leads, with 128 kgs/hectare; while Himachal Pradesh, a mountainous area devoted primarily to speciality crops, trails, with 28 kgs/hectare. (See Table A-37.) As a result of these variations in adoption and dosage the concentration of fertilizer is substantial. Some 55 districts (15 percent) use roughly 50 percent of the fertilizer. (See Table A-15.)

Although a detailed district by district evaluation is not available, Figure 1 (p. 7a) indicates that the districts belonging to the select

Figure 1. DISTRICTS SHOWING HIGH FERTILIZER CONSUMPTION



group tend to be characterized by proximity to marketing centers controlled water supplies and power. As noted earlier, there do appear to be some interesting anomalies, i.e. districts that have a relatively high index of, say, irrigation facilities and yet are not among the top districts in fertilizer use. Recognition of this fact has prompted a number of fertilizer promotion activities in both the public and private sectors: 1/

(a) The Intensive Fertilizer Promotion Campaign (IFPC): The basic features of the campaign for the districts selected involve: working out village, block and district targets of fertilizer consumption in advance of the cropping season; fixing responsibility for achieving the targets at these levels on the Village Level Workers (VLWs), the Block Development Officers (BDOs) and the District Agricultural Officers (DAOs) or the Deputy Director-in-Charge of the district under the overall control of the District Collector; making sure that fertilizers, certified seeds and pesticides are generally available; and processing credit applications 2-4 weeks in advance of the sowing season. (Figure 2, p.8a, shows the location of IFPC districts.)

(b) Village Adoption Programs: The fertilizer industry, in addition to supplying additional sales representatives in the IFPC districts, has its own "village adoption" program as well. Some manufacturers have taken as many as 100 villages under their wing and have tried to provide trained agricultural and engineering personnel who could assist with various types of village improvement schemes. Increasing fertilizer use has been an important goal, but personnel assigned to the program emphasize adoption of a package of improved practices and a coordinating role for local government development agencies.

(c) "Block" Demonstration Program: In a number of districts the effort to introduce farmers to the benefits of fertilizer have moved away from individual farmer demonstrations to larger areas or "block" demonstrations covering the contiguous fields of a number of farmers. This program has been promoted in both West Bengal and Karnataka by fertilizer marketeers and was coordinated by the Fertilizer Association of India (FAI). The virtues of the "block" approach include the increased amount of land under improved practices and the demonstration impact of improved technology on the fields of a number of farmers - large, small and marginal - and not just the fields of well known "progressive" cultivators.

1/ A more detailed review of the various promotional programs is given in H.L.S. Tandon, "Fertilizer Promotion - A Review", Fertilizer News, Vol. 23, No. 7, July, 1978; and G.K. Sohbt, "The Role of the Fertilizer Industry in Fertilizer Promotion", Fertilizer News, Vol. 24, No. 4., April, 1979.

(d) **Integrated Nutrient Supply Scheme:** As part of its participation in village adoption programs, the fertilizer industry has also created in 63 villages what is called an "integrated nutrient supply scheme". The scheme, set up with the Indian Council of Agricultural Research (ICAR), was designed to develop an integrated approach to the management of farm-yard manure, plant residues and inorganic fertilizers. Interim reports suggest that the effect of the project in the pilot villages has been a substantial improvement in the efficiency of fertilizer use.

No comprehensive evaluation of these activities has been undertaken, but preliminary reports indicate that the IFPCs have succeeded in increasing fertilizer consumption in the selected districts substantially. Precisely how small farmers have fared in the IFPC is not known and may be included as an item of special interest in the examination of promotion programs now being discussed as a possible research project by the MOA.

The impact on small farmers of efforts to increase fertilizer use in remote, marginal agricultural areas by special organizations such as the SFDA/MFALA, and the DPAP is more straightforward, since small farmers are the mandated target group.

4. Expanding the Base of Consumption through Increased Supplies: The supply side of the fertilizer picture continues to be both a source of impressive performance and some frustration. Increasing the movement and scale of inorganic materials at the rate of 20 percent per annum in the past several years to a level of 5 million nutrient tons in 1978/79 is a creditable achievement. However, the failure over the last decade to broaden the base of consumption in the interior areas away from the rail heads must be traced in part to a persistent lack of adequate and timely supply of fertilizer.

At present fertilizer is distributed through a multi-channel system. (See Figure 3.) Imported fertilizer is allotted to the State governments which in turn distribute it in their respective areas through cooperatives, other institutional agencies, their own departments and private dealers. The production of the domestic manufacturers is allocated to different States where the chains of distribution are left to the manufacturers themselves. Since 1978 private wholesalers and retailers have also been given access to the central fertilizer pool to which imported fertilizers are consigned. This at least theoretically integrates the entire supply system.

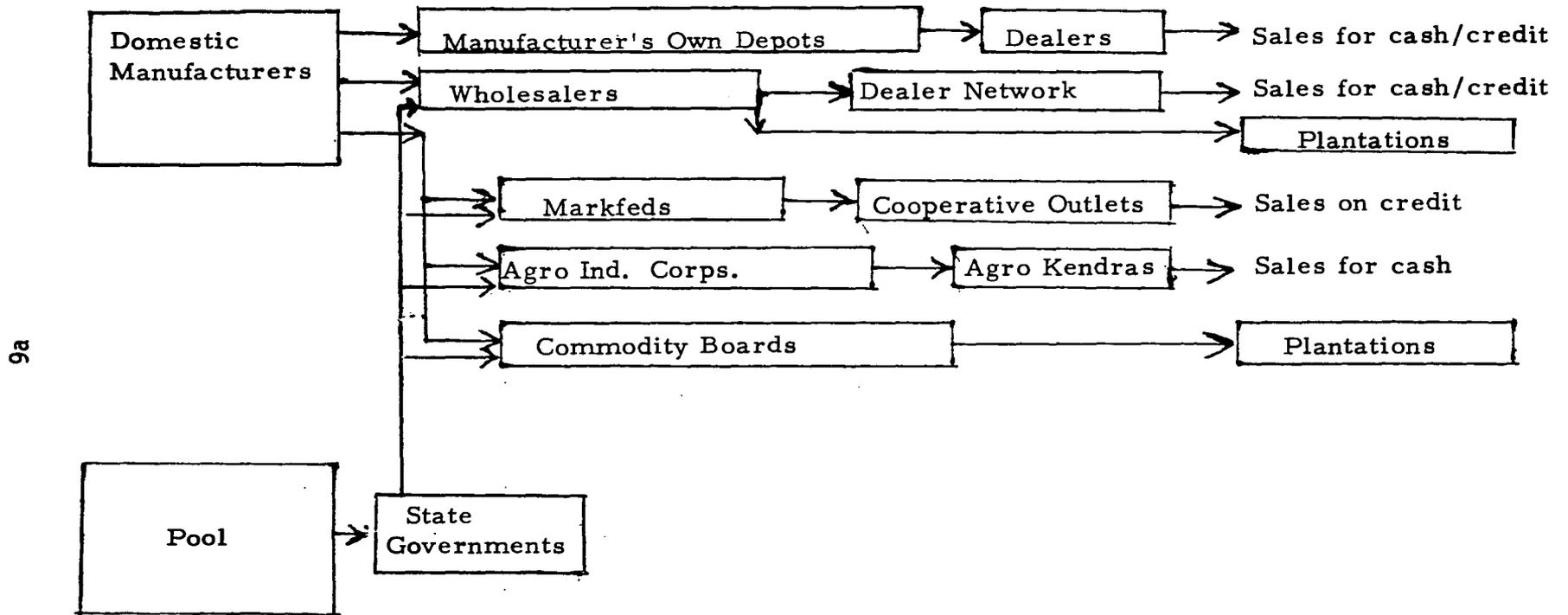
As of April, 1978 there were 101,839 retail fertilizer sale points composed of 43,264 cooperatives and other institutional outlets and 58,575 private sales points. These were distributed by State as shown in Table A-39, which also shows the dosage per cropped hectare.

Contrary to what might have been expected, there is no simple relationship between the density of the retail sales network and fertilizer consumption. More formal correlation analysis confirms this impression. The correlation

Figure 3

INDIA

FERTILIZER DISTRIBUTION SYSTEM



Note: Pool fertilizer is allocated to state governments which in turn reallocate to institutional agencies and the private trade for distribution.

coefficient between cultivated hectares per retail sales point and kilograms of fertilizer per cropped hectare is statistically insignificant.

The number of retail sales points at the State level is undoubtedly too crude a measure of potential availability to capture the effect of limited supply points on consumption at the micro level. What seems above rebuttal is that availability is at least a necessary condition for increased consumption and that the government's concerns about devising a positive mechanism for insuring that fertilizer would move to the more remote areas are well founded. As early as 1965, the Fertilizer Committee suggested, as part of an agricultural development policy, that transportation costs away from the rail heads should be subsidized. This idea has been tried by setting up "roadheads" in remote areas where no convenient railhead exists. For example, in Jammu and Kashmir over 50 points have been designated as government supply points from which dealers may receive fertilizer at the same fixed price. In an effort to decrease the pressure on the railway system, this concept has recently been expanded to cover the costs of truck transport to a number of points that would otherwise have been served by rail.

Less successful has been the effort to encourage transportation away from the railhead or "roadhead" by including provision to cover additional transportation costs in dealer margins between cost and sales price. The total margin has been a fixed sum and consequently there is no incentive for well established dealers with a reasonably high turnover to move away from their bases around primary supply depots. For example, the distribution margin for a ton of urea is Rs. 115, broken down as follows:

<u>Table 2. Distribution of Margin for Urea</u>	<u>RS./ton</u>
1. Commission for Wholesale/retailer	25.69
2. Transport charges	9.00
3. Loading/unloading	5.30
4. Godown rent	9.00
5. Shortage (Reserve for Loss)	8.79
6. Interest (on purchase)	57.22
TOTAL	<u>115.00</u>

So long as dealers are able to capture a portion of the transportation "allowance" as profit - and there is nothing illegal about doing so - they have every incentive to sell as close to the government delivery point as possible. Increased turnover, on which profits depend, ordinarily requires an investment in market development.

Unfortunately, no foolproof mechanism is available to ensure that with increased transportation-related margins, dealers would actually move the materials to remote or interior areas. One possible mechanism to prevent

misuse of an additional transportation margin and to ensure that fertilizers do reach the remote areas would be for the government to obtain proof of receipt of fertilizers at these points from District Agricultural Officers before paying the additional margin to the distributor.

The fertilizer distribution problem is not just one of transportation and dealer margins but of having adequate storage facilities at the receiving end. Given the fact that dealers in remote areas are not accustomed to moving large volumes of either outputs or inputs, it is probably unrealistic to think that warehousing would automatically come into existence on short notice. Consequently, the Sub-Working Group on Fertilizers has suggested that in areas where there appears to be a general lack of input availability, a "composite" input distribution center i.e., a small depot that could store and retail fertilizer, seed, pesticides, etc., should be established. A more concrete assessment of local warehousing needs awaits a report currently under preparation by the Administrative Staff College at Hyderabad.

The GOI is fully cognizant of the fact that improvements in the fertilizer distribution system will require substantial outlays. Under present pricing policies these would be budget outlays. This potentially large budget drain has prompted calls from some quarters for freeing retail prices and permitting dealers to charge whatever the market will bear, obviously resulting in higher prices in remote areas. Counter arguments to the proposal that buyers pay the costs of transportation directly have been made on both equity and developmental grounds. For example, input subsidies have long been recognized as a legitimate means for encouraging the adoption of new technology. Conditions in the more backward areas would fit this rationale.

A further, related argument for uniform pricing stresses equity. The backward areas that would be the major beneficiaries of the transportation subsidy are already lagging behind other areas in the country on many indices of public welfare. Consequently preferential treatment would be consistent with some concept of social justice.

If, as expected, the GOI implements some version of the proposal to provide transportation to the Block level, this will confirm the economic and political persuasiveness of the foregoing arguments. Fertilizer availability at the Block level would be assured since the fertilizer is moved at the manufacturer's expense. The operation of the retention pricing mechanism would then permit the manufacturers to recover these additional transport costs from the GOI. As suggested above, there would still be the problem of getting fertilizer moved from Block Headquarters to more remote areas, however.

5. Fertilizer Price Policy:

- a. General Background: Fertilizer prices in India are administered

prices. The policy of the Government of India is to make fertilizers available to the farmers at as low prices as possible. In pursuance of this policy, fertilizer prices were reduced seven times from July, 1975 to March, 1979. The prices of all fertilizers (except single superphosphate (SSP) and potassic fertilizers) are statutorily fixed by the GOI. Prices of potassic fertilizers (which are wholly imported) are also fixed by government. SSP prices are fixed by the FAI under a formula, laid down by government.

The pricing mechanism that has been developed over the years takes into account the divergent interests of the cultivators, the domestic fertilizer industry and the Treasury. The factors taken into account for fixing fertilizer prices are, inter alia: cost of domestic production, cost of imports, remunerative prices to farmers, need to promote consumption of specific fertilizers and subsidy to be borne by the Treasury.

Pricing of Nitrogenous Fertilizers: Pricing of nitrogenous fertilizers is based on (1) the retention prices of the domestic manufacturers which include full production costs and a fair return on capital invested, and (2) the landed cost of the imported fertilizers - urea, ammonium sulphate and calcium ammonium nitrate. The statutory price takes into account the weighted price of imported and domestically produced fertilizers as well as the farmgate price that would prove remunerative to farmers.

As it substantially increased the price of fertilizer on June 1, 1974, the GOI developed the mechanism of the fertilizer pool equalization charge (FPEC) requiring domestic manufacturers to surrender to the pool the difference between their fair delivery price and the statutory price.

Pricing of Phosphates: Since 1966 the Fertilizer Association of India (FAI) has been fixing the price of single superphosphate (SSP) on the basis of a formula agreed to by the manufacturers and the government. The manufacturers of complex fertilizers were allowed to fix prices of their products on the basis of prices of similar imported grades until 1976. The steep increases in world and Indian phosphate prices in the mid 1970's caused a decline in phosphate consumption and an undesirable balance in fertilizer use. To correct the imbalance the prices of phosphates were reduced substantially through a proportionate subsidy of Rs. 1,250 per ton of phosphate (P205) to the indigenous manufacturers. The benefit of the subsidy accrues directly to the farmer. The scheme involved total government expenditures of about Rs. 600 million in 1976-77 and Rs. 825 million in 1977-78. Currently the subsidy scheme has been adjusted for manufacturers of complex fertilizers to allow a variable subsidy to each manufacturer depending on his costs of production.

Pricing of Potash: All potassic fertilizers are imported and prices are fixed by the government. However, these prices have always been kept at reasonably low levels in order to encourage the use of potash by farmers.

b. Fertilizer Prices: As Figure 4 demonstrates, Indian farmers were not immune to the worldwide fertilizer price escalations that occurred in 1974/75. Prices of all nutrients rose drastically over a very short period of time and it is generally agreed that this was a major contributor to the drop in absolute consumption that occurred that year. Over a somewhat longer term, however, there is no statistical evidence that the smaller fluctuations shown in the figure have had any measurable effect on consumption. This is not surprising because, as the project's financial analysis indicates, benefit-cost ratios have for the most part remained reasonably favorable and have obviously been sufficient to produce a long-term upward trend in consumption.

Figure 4 also shows that in addition to the sharp reductions in the immediate aftermath of the 74/75 season, the GOI has continued to make small reductions in prices. These have been selective: different types of fertilizers have been affected differently depending upon the desired nutrient mix.

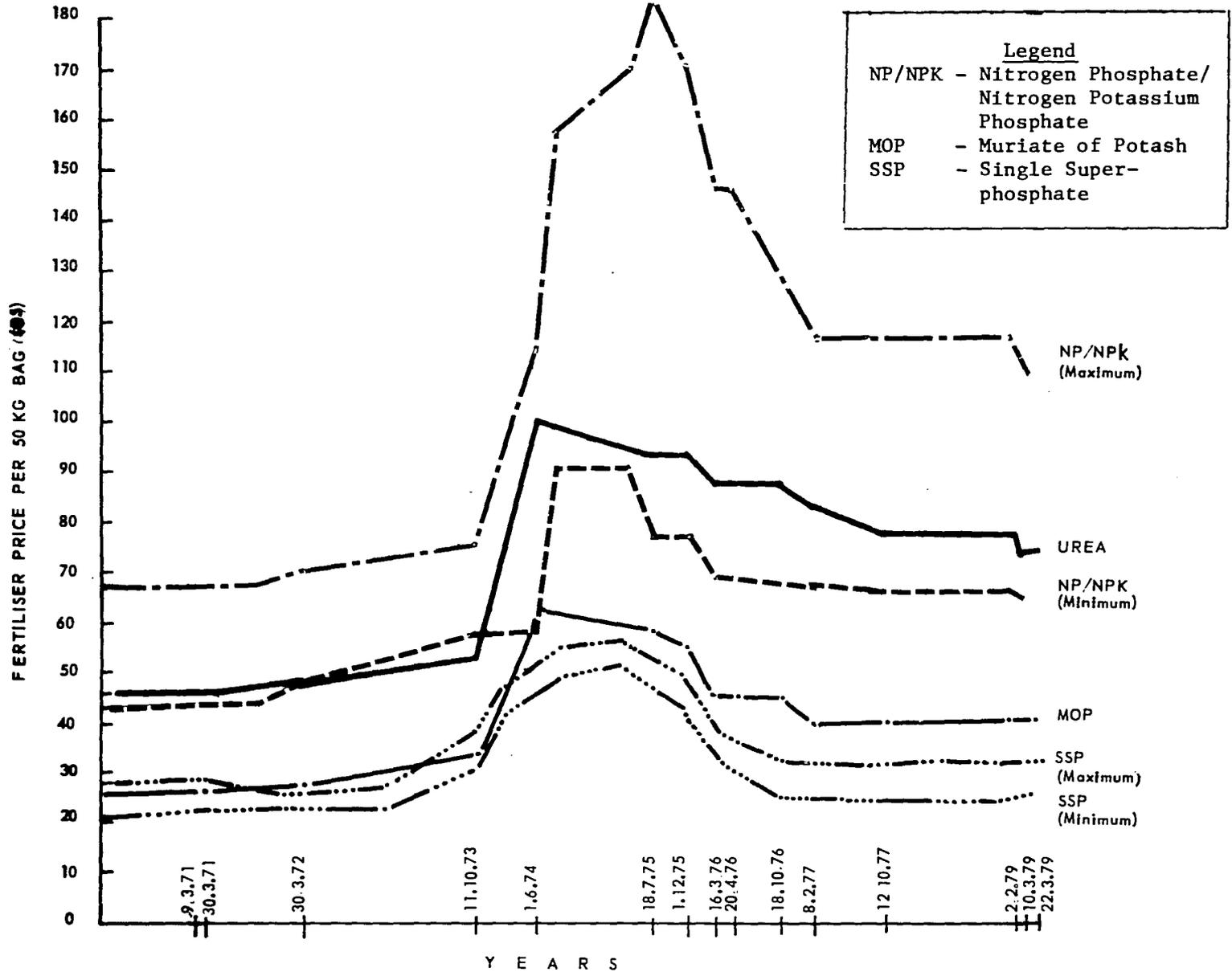
c. Subsidies and Taxes: The GOI both subsidizes and taxes fertilizer. Subsidy on fertilizers takes the following forms: (1) selling imported fertilizers below the "no profit no loss" price; (2) subsidy payment to indigenous manufacturers of statutorily controlled fertilizers under the retention price scheme; (3) phosphatic subsidy to phosphate manufacturers at Rs. 1250 per ton of P2O5; (4) freight subsidy to indigenous manufacturers of nitrogenous fertilizers; (5) road transport subsidy on domestic and pool fertilizers; and (6) customs duty on certain raw materials (like phosphoric acid) and lower excise duty on certain fertilizers, (like SSP). Subsidies are given by certain State governments for specific fertilizers. Fertilizers are also subsidized under certain schemes such as SFDA, and DPAP.

Fertilizer is subject to a number of taxes and levies which yield revenue to central and State governments. Fertilizers attract the following levies in India: (1) excise duty at the rate of 7.5 percent on all indigenously produced fertilizers except triple superphosphate (TSP) (for which the excise duty is 3.75 percent); (2) special excise duty at the rate of 5 percent of the basic excise duty; (3) countervailing duty at the rate of 7.5 percent on imported non-potassic fertilizers; (4) auxiliary duty at 5 percent on all imported fertilizers; (5) central sales tax at the same rate which State sales tax is levied, subject to a maximum of 4 percent; (6) State sales tax (in some states) ranging from 1 percent in Pondicherry to 7 percent in Orissa; and (7) octroi duty by municipal corporations.

Exact figures on the extent of subsidy payments and revenue collection by governments with regard to fertilizers is not available.

6. The Demand for Imports: The import component of total projected needs has been taken as the difference between production and consumption.

Figure 4. FARMER'S FERTILISER PRICES
(1970-71 TO 1978-79)



Both estimates are, of course, subject to considerable uncertainty. Compared to alternative projections for the short-run made by the Fertilizer Association of India, the estimates developed by the MOA (Table 3) are somewhat conservative. However they reflect a detailed micro approach that incorporates assumptions about the availability of credit, increases in irrigated acreage, "normal" weather, and so on. MOA estimates have, by and large, been very close to "actuals". Consequently, there are grounds for reasonable confidence in the estimates presented. (A discussion of various approaches to demand projection is contained in Appendix C.)

In the longer run, all estimates of import needs may be altered by substantial revisions in production plans. Figures given in Table 3 refer to projections made in the preparation of the Sixth Five Year Development Plan, but these are rapidly being overtaken as a result of new gas finds in the Bombay High field. While no firm (or indeed published) figures exist, current speculation suggests planned increases in production capacity as high as 1 million tons every year. That is one very large plant every year, beginning as soon as the extent of the gas finds is fully confirmed. Whatever the case, these plans will not have an effect on the increases in capacity that can be expected during the project period and hence do not affect the import projections.

7. Logistics and Transportation: In expanding from an annual movement of some 7.2 million tons of fertilizer materials in 1975/76 to about 8.4 million in 1978/79, the various agencies of the Indian Government have shown a remarkable elasticity in responding to the needs of an expanded fertilizer program. However, alarms have been sounded throughout the industry with respect to meeting the targets set for the coming years. A number of proposals for dealing with the problem are now being discussed or implemented. Chief among these are increased intermediate or nodal warehousing, bulk handling facilities to speed up and consolidate the movement of fertilizer imports, and a rather substantial revamping of the railway system's operation. The last proposed in the Railway Industry Technical Economic Service (RITES) report, would involve the use of block rates between a limited number of points to relieve congestion.^{1/}

The projects mentioned above will not, however, relieve short run pressures. The government has only a limited number of alternatives for coping with the immediate pressure of an additional 1.5 million tons per annum of materials projected for the 1979/82 period. First, efforts can and are being made to reduce the amount of cross-shipment. The zonal conferences that take place at the beginning of each planting season have been important in helping to establish detailed plans for the distribution of both imported and domestically produced materials. Second, continued resort will undoubtedly have to be made to road transport, even when this covers considerable distances. Third, additional

^{1/} Special rate for utilizing an entire train capacity.

Table 3.

Projected Consumption, Production, and Imports of Inorganic Fertilizer
(000 metric nutrient tons)

Years	Consumption				Production			Imports
	Nitrogen	Phosphate	Potash	TOTAL	Nitrogen	Phosphate	TOTAL	
1979/80	3,779	1,063	619	5,461	2,980	835	3,815	1,646
1980/81	4,260	1,172	691	6,123	3,577	959	4,536	1,587
1981/82	4,772	1,287	767	6,826	3,972	984	4,956	1,870
1982/83	5,315	1,407	847	7,569	4,427	1,014	5,441	2,128
Total				25,979			18,748	7,231

Source: Ministry of Irrigation and Agriculture

incentives may be required to try to induce dealers to accept off-season shipments in order to avoid the current "peaking" problems generated by the seasonality of fertilizer use. Lastly, new directives (and incentives) may be issued to insure that fertilizers have a higher priority in overall railway movement.

B. Background: The Agriculture Sector

1. Sector Allocations: The available evidence suggests that, aside from ensuring adequate supplies, the most powerful determinants of fertilizer sales (especially for small farmers) are probably less the result of actions taken in the fertilizer sub-sector than of broader policies. The most notable of these are rural credit and investments in irrigation and power, although the relationship between fertilizer use and commercialization suggests that road transportation may be equally important.

As Table 4 shows, the overall commitments to agriculture in the 1978-83 Plan have increased moderately in relative terms and substantially in absolute terms over those of earlier years. The same is true in irrigation and flood control. More dramatic has been the increase in expenditures aimed at increasing power supplies, especially in rural areas. GOI planners are persuaded that: (a) these investments in infrastructure offer the greatest opportunity for increasing rural employment through both construction and crop intensification; (b) the use of more divisible inputs such as fertilizer, seeds and pesticides will follow rapidly once assured water supplies are available; and (c) if the latter are available, small farmers will adopt new technology as rapidly as large farmers.

Based on the experience of the past several Plan periods and the evidence of broad-based participation in the adoption of HYV technology, the shift in emphasis toward investment in agriculture appears to be a sound strategy. Critics of the Sixth Plan have argued, however, that it does not go far enough. In particular, there is relatively little in the investment allocations that would provide directed, targeted employment for the large numbers of landless and near landless found in virtually every village.

This issue continues to be a matter of intense debate in Indian circles and a number of States have begun to develop rural employment schemes with their own resources. Maharashtra's Guaranteed Employment Scheme is perhaps the most widely known of these; but other versions of labor intensive public works have been activated in such States as Kerala and Karnataka as well. To date, evaluations of these pioneering efforts have been mixed. As is the case with the diffusion of improved technology, much depends on the agroclimatic conditions under which efforts at implementation are made.

2. Agricultural Price Policy: The presence of a tested technology in the agricultural sector plus evidence that the majority of cultivators,

Table 4. SECTORAL ALLOCATION OF PLAN OUTLAYS
(% of Total)

	<u>Actuals</u>		<u>Estimates</u>	<u>Projection</u>
	<u>Annual Plans</u> (1966/67 - 1968/69)	<u>Fourth Plan</u> (1969/70- 1973/74)	<u>Fifth Plan</u> (1974/75- 1977/78)	<u>New Plan</u> (1978/1979 - 1982/83)
<u>Agriculture and Allied Programs</u>	<u>10.2</u>	<u>10.7</u>	<u>10.3</u>	<u>12.4</u>
<u>Irrigation and Flood Control</u>	<u>11.9</u>	<u>11.8</u>	<u>11.9</u>	<u>13.9</u>
<u>Industry and Minerals</u>	<u>24.7</u>	<u>19.7</u>	<u>25.4</u>	<u>21.2</u>
Village and Small-Scale	1.9	1.5	1.3	1.9
Large and Medium	22.8	18.2	24.1	19.2
<u>Power</u>	<u>18.3</u>	<u>18.6</u>	<u>18.7</u>	<u>22.7</u>
<u>Transport and Communications</u>	<u>18.4</u>	<u>19.5</u>	<u>18.0</u>	<u>15.2</u>
Railways	7.7	5.9	5.4	4.8
Other	10.7	13.6	12.6	10.4
<u>Social Services</u>	<u>12.9</u>	<u>15.4</u>	<u>13.1</u>	<u>12.9</u>
<u>Other</u>	<u>3.6</u>	<u>4.3</u>	<u>2.5</u>	<u>1.6</u>
<u>Total</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Source: World Bank Reports

large and small, are acquainted with its use. is not a sufficient condition for sustained growth or desirable equity effects. Continued use involves investment, which, if it is to be done in the private sector, in turn requires guarantees of profitability. As the project's financial analysis shows, current output prices continue to provide the incentives necessary to induce farmers to apply substantial dosages of fertilizer. Table 5 shows that the terms of trade, as reflected in the relative prices of manufactures and agricultural commodities, have not been allowed to move significantly against agriculture. Favorable prices for farmers have been maintained by the GOI through a system of support prices for major agricultural commodities.

Symptomatic of the inherent dilemma faced by all governments is the conflict between raising producer prices of foodgrains in order to ensure investment incentives while responding to the needs of the poorest segments of the population. This issue has been dealt with in India through (a) a public distribution system consisting of "fair price shops" at which foodgrains and certain other essential commodities are sold at "reasonable" prices, and (b) the mandatory procurement of a certain percentage of the marketable surplus of foodgrains to meet the demands of the public distribution system. Although the prices at which the government purchased grains were below the prevailing market prices in years of poor harvest, procurement operations in years of good harvest prevented foodgrain market prices from declining below the government's procurement prices.

Historically the weighted prices of procurement acquisitions and open market sales averaged higher than the prices farmers would have received in the absence of the procurement program. The government no longer conducts mandatory procurement operations but under the agricultural price support program has stood ready to purchase any quantity the farmers are willing to sell at the support price. These acquisitions supply the public distribution system and the foodgrain reserves program.

The welfare implication of the public distribution system for the 46 percent of the population estimated to be living below the poverty line is obvious. The subsidies involved in running the public distribution system are estimated at about Rs. 5.6 billion in 1979/80.

3. Rural Credit: India's difficulties in developing rural capital markets that (a) would serve the small farmer community and (b) do so at a sustainable cost have been little different than those of other LDC's. Table 6 shows that with the exception of the Land Development Banks, small farmers receive a greater proportion of the institutional credit than their land holding would seem to entitle them. Indeed, the regulations that have been issued to the nationalized commercial banks and cooperative banks have forced them to provide a very large portion of the credit in their rural branches to very small farmers. Unfortunately, as the Experts Commission set up by the Reserve Bank of India points out, the problem of arrears has reached major proportions. Fifty to sixty percent of the loans have not been recovered, a level of performance that threatens to undermine the entire program.

TABLE 5 - RELATIVE PRICES OF MANUFACTURES AND AGRICULTURAL COMMODITIES

<u>YEAR</u>	<u>INDEX FOR MANUFACTURES PRODUCTS</u>	<u>INDEX FOR AGRICULTURAL COMMODITIES</u>	<u>PRICES OF MANUFACTURES PRODUCTS AS PERCENT OF THE PRICES OF AGRICULTURAL COMMODITIES</u>
1971-72	109.5	100.4	109.1
1972-73	121.9	110.3	110.5
1973-74	139.5	139.2	100.2
1974-75	168.8	169.9	99.4
1975-76	171.2	157.3	108.8
1976-77	175.2	158.5	110.5
1977-78	179.2	174.8	102.5

16a

Source: Economic Survey, 1978-79

TABLE 6 - DISTRIBUTION OF INSTITUTIONAL CREDIT ACCORDING TO BORROWERS IN 1975-76

INDIA

	<u>Area of Holding</u> (%)	<u>Primary Agri- cultural Credit Societies</u> (%)	<u>Land Develop- ment Bank</u> (%)	<u>Commer- cial Banks</u> (%)
Below 2 hectares	21	30	20	56
2-4 hectares	19	25	21	19
Above 4 hectares	60	41	28	25
Tenants, laborers and others		4	31	
	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
Total (Rs. million)		10,234	2,154	2,126

16b

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- Sources: 1. Reserve Bank of India, Statistical Statements Relating to the Cooperative Movement in India, 1975/76
2. Reserve Bank of India, Agricultural Credit Schemes of Commercial Banks, Report of the Expert Group, 1978
3. Reserve Bank of India, Regional Rural Banks, Report of the Review Committee, 1978

Under any circumstance, the total amount of institutional credit from the cooperative sector increased from Rs. 1,489 crores in 1976/77 to Rs. 1,822 crores ^{1/} in 1977/78. Commercial bank credit also increased substantially so that the aggregate institutional finance to agriculture increased by over 25 percent from Rs. 2,154 crores in 1976/77 to Rs. 2,756 crores. Although it is obvious from earlier observations that better access to credit could not be an adequate explanation for the increased fertilizer consumption of that year, it would be hard to imagine that such a massive addition to the availability of institutional funds even though accounting for only 35 percent of rural credit, did not relate to the equally high rate of fertilizer consumption in the same period.

4. Agricultural Extension: One of the brightest developments among agricultural organizations is the revitalization of the extension service. The "training and visit" system initiated by the World Bank has focused attention on the fact that, when information is readily available, farmers are prepared to adopt a variety of better practices many of which are relatively inexpensive. (An oft cited example is greater attention to plant population and weeding.) The caveat again, of course, is that the agricultural environment must be such that a response to better management practices can be clearly detected. Where the program has been successful in the rainfed areas, there were opportunities for increasing fertilizer sales that did not require expensive infrastructural investments in controlled water supply.

C. Background: National Development Objectives

1. The Basic Strategy: In endorsing the basic Indian approach in 1978, the Bilateral Assistance Strategy Team characterized the Sixth Plan as one in which industrial growth is to occur in part as a "trickle up" effect from the countryside to the urban areas. Rather than attempting to stimulate the industrial sector by generating a demand for urban consumer durables such as automobiles and appliances, Indian planners saw a shift in expenditure to rural areas (and the creation of incomes through agricultural development) as a means of redistributing income as well as providing a stimulus to industrial growth.

Figures recently released showing an accelerated industrial growth rate of 7.8 percent for the first 11 months of 1978/79 are encouraging. Indeed when disaggregated, the industries showing the most rapid growth are largely those producing commodities one would expect to see demanded if purchasing power of poorer rural consumers were to increase. For example, the manufacture of motor cycles, bicycles, Vanaspati, diesel engines, sugar and certain kinds of cloth has increased by 20-30 percent. At the same time, the upward trend has not been reflected in production of steel, cement, jute products, railway wagons and the like. This is consistent with the notion of creating a broad, small consumer based demand pull.

The 1979-83 Plan does not, however, carry the "trickle up" approach to the agricultural sector itself. As noted above, major expenditures

^{1/} 1 Crore = 10 million

are to be made on infrastructure investments whose impact on the farming community may be direct, but whose effect on the landless and near landless will occur largely through the operation of the labor market.

The USAID approach to assisting the development of India's agriculture and rural areas is to concentrate on technological improvements, rural/agricultural infrastructure, and agricultural inputs. Annual inputs such as fertilizer and credit, backed by improved technology, irrigation facilities, and rural electrical infrastructure, are the keys to increased agricultural output and farm income.

2. Non-Agricultural Employment: The Draft Plan envisages a series of activities designed to stimulate rural industrialization that improves employment opportunities in the rural areas. Provisions have already been made for broadening the number of commodities that will be reserved for the small industries sector. In addition, technical assistance and credit will be provided to stimulate development in those activities that would naturally have a strong rural base. These include the handlooms industry, the handicrafts industries, and the sericulture industry.

It is well recognized by Indian planners that stimulating industry in the rural areas will require more than regulations and fiscal incentives. Without adequate infrastructure, little of the projected activity will materialize. Consequently, efforts are being made to set up industrial estates as part of a general area or regional approach to rural development.

D. Detailed Description of the Project

The general goal of the project is to assist in increasing agricultural production in India with particular emphasis on raising the incomes of small farmers. The mechanism by which this is to be accomplished is a series of activities carried out by the GOI to maintain the recent acceleration in fertilizer sales. As noted, chief among these is an aggressive import policy aimed at ensuring that availability does not constrain fertilizer use. In addition, because of the inevitable diminishing returns that can be expected where there is the lion's share of the fertilizer use, both equity and continued production response demand that efforts be made to expand the base of participation. On the demand side, these will include promotional fertilizer investments, increased credit availability, an expansion of extension activities, and an increase in fertilizer supplies directed toward remote areas. Especially important will be programs in areas where the agricultural and social conditions appear to offer a potential for the development of self-sustaining markets. On the supply side, efforts will be made to improve the movement of fertilizer into the more remote areas by absorbing transportation costs and/or by covering additional transportation costs in dealer margins and improving local storage facilities.

1. Providing Fertilizer Imports (1979-82): Figure 5 shows both the past performance of the fertilizer sub-sector and projections made by the MOA regarding future requirements. (Data are given in Table 3 and Tables A.10 and A.11.) As the data indicate, the estimates are, quite reasonably, neither projections of long term trends nor an extrapolation of the recent past. Rather, as noted in Appendix C, they have been built up from more disaggregated data on irrigation potential, the anticipated extension of HYV, etc. They show roughly an 11 percent increase per annum over the 1979/80-1982/83 period.

The expected total consumption for the 1979-81 period is about 18.4 million nutrient tons. Subtracting planned production leaves an expected demand for imports of 5.1 million tons or approximately 30 percent of the total. The AID contribution would be on the order of 500,000 tons or about 10 percent of total imports. 1/ Efforts to expand the system by adding a series of "roadheads" to the railheads at which fertilizer is delivered at government expense have been reasonably successful. This technique has made it possible to reach areas not served by rail. However, as yet there has been no answer to the question of how to set up a system of delivery points and/or incentives to guarantee that fertilizer would, as a matter of course, move to the more remote areas. The costs and benefits of various incentive mechanisms are now under active consideration within the government and a decision is expected in the coming months.

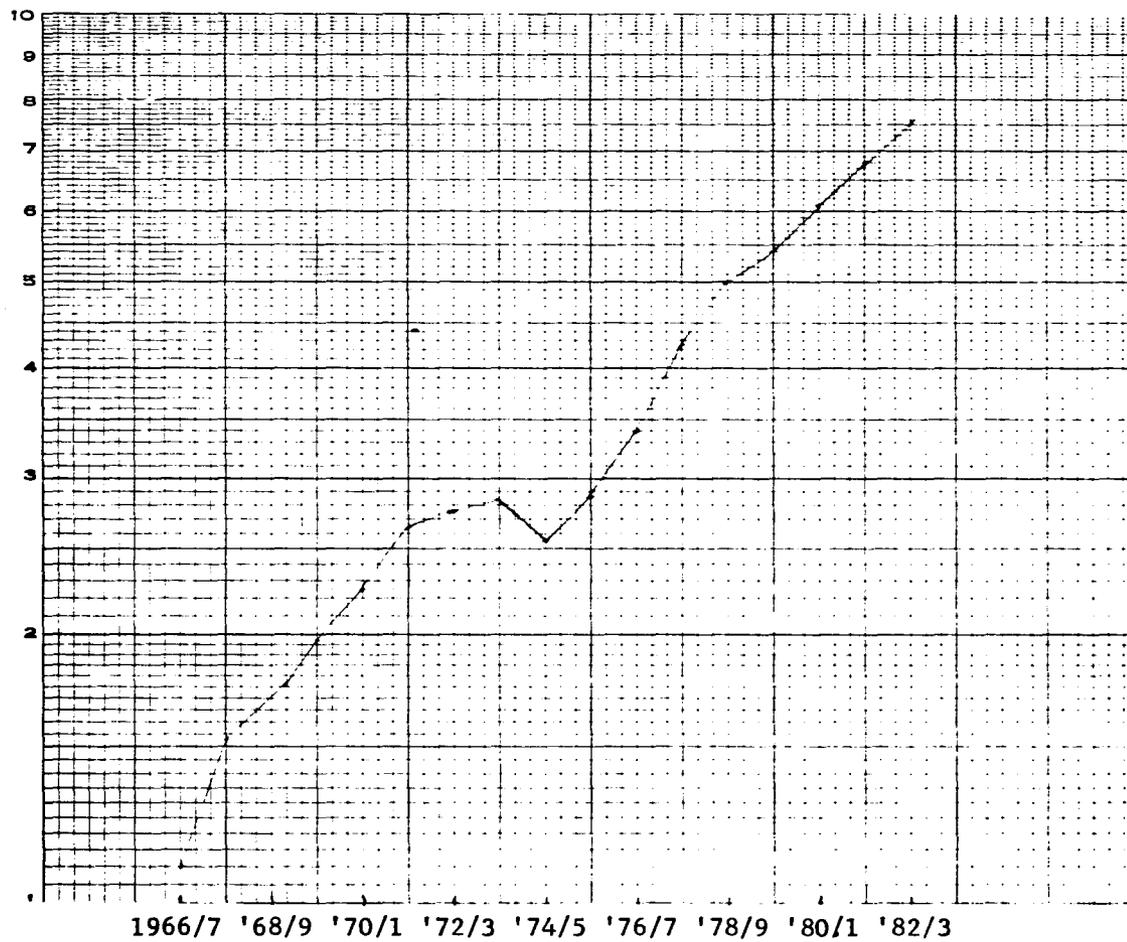
Under any plan, additional storage facilities at the grassroots level appear to be necessary for successful implementation. Because of the evidence that input availability is a key ingredient to any strategy aimed at increasing small farmer productivity, USAID has expressed to the GOI an interest in the storage problem. The GOI is currently awaiting the report of a study being carried out by the Administrative Staff College at Hyderabad regarding existing conditions and alternative solutions to the local warehousing problem. Further consultation with the GOI on this issue will take place once the report is in hand and the Government's policies have been formulated.

2. Increasing Effective Demand: Previous comments have pointed to the fact that in situations where infrastructure is reasonably well provided for and fertilizer is available, normal marketing channels will suffice as a mechanism for ensuring that the potential for fertilizer use is realized. (This is not an argument that the dissemination of improved management techniques through the extension service and the presence of added credit facilities will not result in additional sales, but that the focus of the problem has shifted out of the fertilizer sector per se.)

1/ The 1978 price per nutrient ton delivered at Bombay was \$293 for DAP and \$335 for Urea. Averaged and divided into \$150 million yields about 500,000 tons.

Figure 5. Fertilizer Consumption

Million
Nutrient
Tons



19a

Various on-going approaches to fertilizer promotion in districts having high potential but relatively low fertilizer use were discussed in earlier, background comments. Unfortunately, relatively little evaluation of the myriad of promotional programs has taken place. Given that various states, smaller localities and manufacturers now have several years of experience with such programs, it would be desirable that detailed evaluation and monitoring of selected projects were undertaken. The report of the Sub-Working Group on Fertilizer recognizes the need for synthesizing knowledge about promotional activities and suggests that an Indian institution might be asked to monitor the programs more closely with a view to assessing both the necessary structural conditions for accelerated consumption and the promotional techniques that have thus far proved to be most effective. Any such study should pay particular attention to the extent to which small farmers have participated in the various promotional schemes.

During consultations with Indian officials concerning various aspects of both the distribution system and fertilizer promotion, USAID has indicated that it would be prepared, if asked, to provide funds for such evaluations.

III. Project Analysis

As described earlier, the "project" is the importation of fertilizer and other measures by the GOI to maintain accelerated fertilizer use by farmers. Economic and financial analysis of the project is therefore an analysis of the costs and return from the use of fertilizer under appropriate sets of assumptions.

A. Economic Analysis

The computation of social or "economic" profitability requires, like all such calculations, that costs be subtracted from gross revenues. Unlike estimates of private or financial gain, however, social accounting necessitates the use of international prices that reflect the opportunity cost of other opportunities for the economy. For domestic resources that have no international markets, i.e., land, labor, and capital, the opportunity cost ("shadow prices") of the resources in alternative domestic production must be used.

The calculation of economic benefit-cost ratios for the use of fertilizer shown in Tables 7 and 8 are approximations of this procedure. Outputs (wheat and rice) have been valued at international prices; similarly, fertilizer has been valued at its border or c & f price. These two figures, together with alternative assumptions about the appropriate fertilizer response coefficient, have been used to develop the results shown.^{1/}

^{1/} Fertilizer response coefficients are based on experiments described in Table A. 38. Ratios of 10:1 are generally associated with reasonably well watered, irrigated areas and improved varieties while 6:1 would be more characteristic of rainfed regions.

Table 7 : Economic Benefit Cost (B/C) Ratios of Fertilizer Used on Wheat Under Alternative Assumptions about Wheat-Nutrient Response Ratios

Year	Border	Border	Assumption I		Assumption I		Assumption III	
	Price of Wheat (\$/MT) ^{a/}	Price of Fertilizer _{b/} (\$/MT)	Response Ratio	B/C	Response Ratio	B/C	Response Ratio	B/C
1972/73	127.58	169.64	10:1	7.5	8:1	6.0	6:1	4.5
1973/74	159.50	229.73	10:1	6.9	8:1	5.5	6:1	4.2
1974/75	195.58	654.29	10:1	3.0	8:1	2.4	6:1	1.8
1975/76	188.07	709.85	10:1	2.6	8:1	2.1	6:1	1.6
1976/77	169.05	349.12	10:1	4.8	8:1	3.9	6:1	2.9
1977/78	(169.05)	383.59	10:1	4.4	8:1	3.5	6:1	2.6

^{a/} Source: FAO Trade Yearbook, Rome, assorted years

^{b/} Source: Fertilizer Statistics, 1977-78, the Fertilizer Association of India, New Delhi, 1978
Costs are based on urea.

Table 8 : Economic Benefit-Cost (B/C) Ratio of Fertilizer Used on Rice Under Alternative Assumptions about Rice - Nutrient Response Ratios.

Year	Border	Border	Assumption I		Assumption II		Assumption III	
	Price of Rice (\$/MT) ^{a/}	Price of Fertilizer (\$/MT) ^{b/}	Response Ratio	B/C	Response Ratio	B/C	Response Ratio	B/C
1972/73	297.74	169.64	10:1	17.6	8:1	14.0	6:1	10.5
1973/74	362.20	229.35	10:1	15.8	8:1	12.6	6:1	9.5
1974/75	282.65	654.29	10:1	4.3	8:1	3.5	6:1	2.6
1975/76	272.50	709.85	10:1	3.8	8:1	3.1	6:1	2.3
1976/77	370.34	349.12	10:1	10.6	8:1	8.5	6:1	6.4
1977/78	(370.34)	383.59	10:1	9.6	8:1	7.7	6:1	5.8

a/ Source: FAO Trade Yearbook, Rome, Assorted years

b/ Source: Fertilizer Statistics, 1977-78, The Fertilizer Association of India, New Delhi, 1978. Costs based on urea.

Basing judgements about the economic desirability of the project on this type of analyses requires several simplifying assumptions. For example, it is assumed that subtracting the opportunity cost of capital tied up in fertilizer for a 6 month period would not substantially affect the profitability conclusion. The same assumption is made with regard to labor, i.e., including the cost of additional labor required to transport and distribute the fertilizer (plus any labor needed to harvest the increased yield), would leave the basic finding unchanged.

The computations shown for wheat and rice clearly establish the economic viability of the "project", i.e., the use of fertilizer, with B/C ratios ranging from 9.6 to 2.6 depending on the crop and the assumed fertilizer response coefficients. Even in "bad" years and under pessimistic assumptions about response coefficients, costs would have to increase by 50-60 percent before questions about the economic desirability of the project would occur.

Farm management studies conducted in several districts of India, after the high yield varieties were introduced, generally support this conclusion. Results of three of these studies relating to rice and HYV wheat varieties in three states are summarized in Appendix B.

B. Financial Analysis and Financial Plan

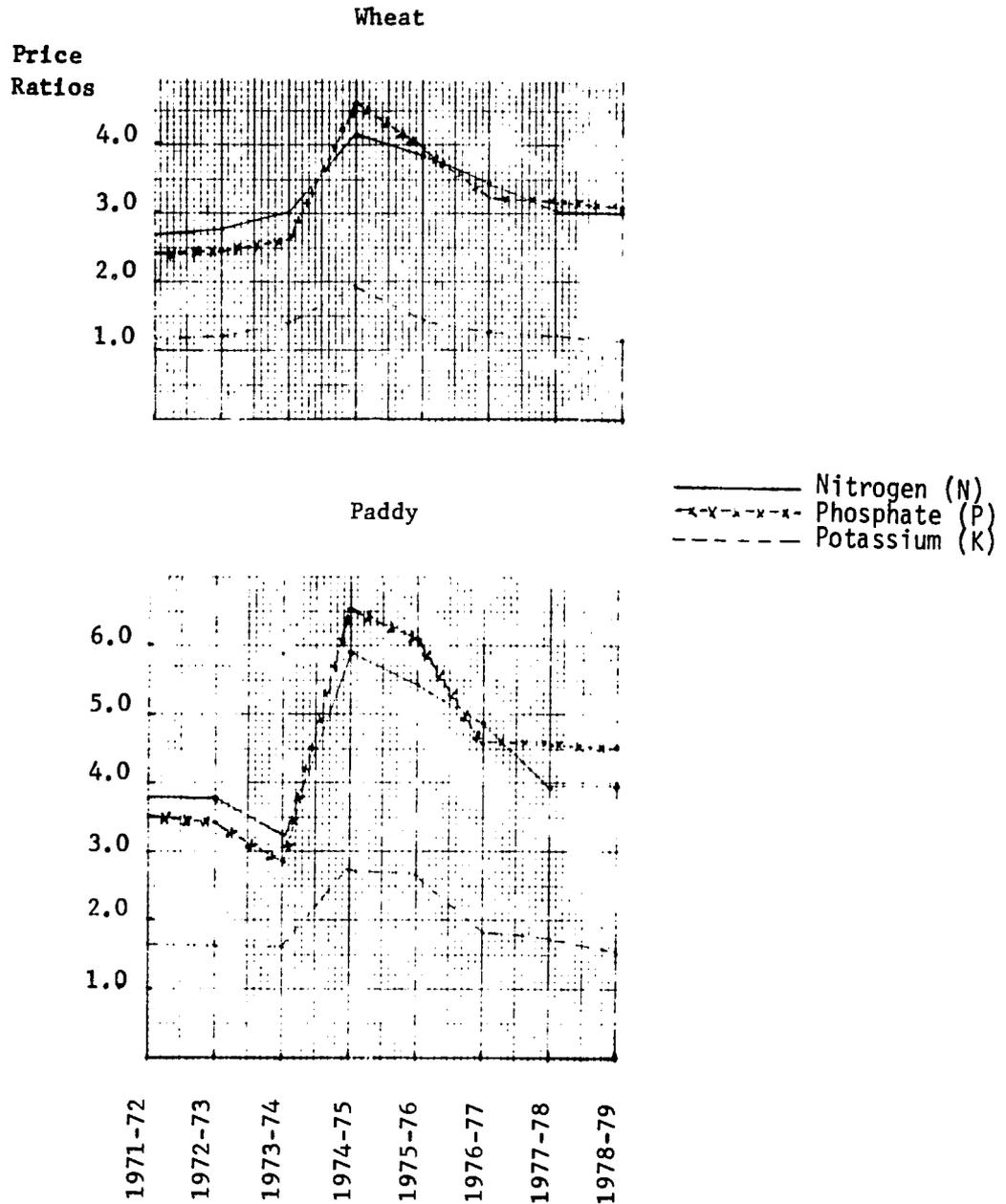
The evidence of economic soundness in using fertilizer is, as it should be, consistent with results obtained in neighboring countries where similar production technology is used. However, financial viability is not a matter of production technology and international prices but of technology and domestic price policy. Consequently, each individual country situation must be investigated separately to ensure that the private rate of return needed for implementation of the project will be realized.

In the brief analysis of agricultural sector policy presented earlier it was noted that incentives to farmer investment had been strengthened by a series of upward adjustments in the procurement price of foodgrains. Further, efforts have been made to make fertilizer investments attractive by offering certain subsidies and by removing or reducing certain taxes. The general results of these moves can be seen by comparing fertilizer-paddy and fertilizer-wheat price ratios over the last decade (Figure 6). These estimates show that the price relationships obtained in 1977/78 and 1978/79 are roughly those of the (favorable) period prior to the commodity crisis of the mid-70's (Table A. 27-29).

The benefit-cost ratios at market prices shown in Tables 9 and 10 are again based on certain simplifying assumptions. As in the case of the economic analysis, these involve no charges for capital tied up in fertilizer or for additional labor associated with fertilizer use.

Simplification of the calculations made in the financial analysis is somewhat more ambiguous than was the case in the economic

Figure 6. FERTILIZER-GRAIN PRICE RATIOS



Source: Tables A. 27-29

Table 9 - Financial Benefit-Cost Ratios for Nitrogen Fertilizer Used on Wheat Under Alternative Assumptions about Wheat - Nutrient Response Coefficients.

Year	Procurement Price of Wheat (Rs./MT) ^{a/}	Retail Price of Nitrogen (Rs./MT) ^{a/}	Assumption I		Assumption II		Assumption III	
			Response Ratio	B/C	Response Ratio	B/C	Response Ratio	B/C
1973/74	760	2280	10:1	3.3	8:1	2.7	6:1	2.0
21b. 1974/75	1050	4350	10:1	2.4	8:1	1.9	6:1	1.4
1975/76	1050	4020	10:1	2.6	8:1	2.1	6:1	1.6
1976/77	1100	3590	10:1	3.1	8:1	2.5	6:1	1.8
1977/78	1125	3370	10:1	3.1	8:1	2.7	6:1	2.0
1978/79	1125	3370	10:1	3.3	8:1	2.7	6:1	2.0

^{a/} Source: Fertilizer Statistics, 1977-78, Fertilizer Association of India, New Delhi, 1978

Table 10 - Financial Benefit-Cost Ratios of Nitrogen Fertilizer Used on Rice Under Alternative Assumptions about Rice - Fertilizer Response Coefficients.

Year	Procurement Price of Rice (Rs./MT) ^{a/}	Retail Price Of Nitrogen ^{a/} (Rs./MT)	Assumption I		Assumption II		Assumption III	
			Response Ratio	B/C	Response Ratio	B/C	Response Ratio	B/C
1973/74	1076	2280	10:1	4.7	8:1	3.8	6:1	2.8
1974/75	1138	4350	10:1	2.6	8:1	2.1	6:1	1.6
1975/76	1138	4020	10:1	2.8	8:1	2.3	6:1	1.7
1976/77	1138	3590	10:1	3.2	8:1	2.5	6:1	1.9
1977/78	1184	3370	10:1	3.5	8:1	2.8	6:1	2.1
1978/79	1307	3370	10:1	3.9	8:1	3.1	6:1	2.3

^{a/} Source: Fertilizer Statistics, 1977/78. Fertilizer Association of India. New Delhi 1978

One ton of paddy taken to yield 0.65 tons of milled rice.

analysis. For example, from the perspective of private decisions, labor costs may be either higher or lower than values that would be assigned in the economic analysis. The small farmer may not have, or wish to partake of, opportunities for off-farm employment. Consequently, he may value his own (family) labor at less than a positive social value that assumes at least some degree of labor mobility. Medium and large scale farmers who hire labor, on the other hand, may well pay institutionally determined wages that are in excess of labor's economic value.

It is equally difficult to generalize about appropriate capital costs. Small farmers, at least those who do not have access to institutional credit through the cooperatives, may be paying interest rates well in excess of the generally accepted cost of capital in the economy at large. Farmers who do have access to institutional credit, on the other hand, may be benefitting from an almost universal tendency to subsidize rural credit.

It would be well beyond the scope of this paper to attempt a catalogue of the different types of situations in which decisions about fertilizer use are being made. Indeed, the sensitivity test on response ratios suggests that such efforts would add little to the question of whether fertilizer is currently a profitable investment for farmers. The B/C ratios appear to be so robust that even the most pessimistic assumptions yield significant returns to private investment. In wheat, for example, even when one assumes response ratios that might be typical of the agriculturally less favorable dryland areas, the benefit/cost ratios imply an annual rate of return of 100 percent on capital invested for 6 months. If 25 percent were added to the cost of fertilizer to simulate additional capital and labor costs, the benefit/cost ratio would, under the same assumption of unfavorable response ratios, equal 1.6.

Table 9 also shows, however, that these rates of return are relatively recent. The rapid escalation of fertilizer prices in the mid-70's produced prices received-prices paid ratios that must have undermined the commitment of a good many farmers to the HYV technology. Not only were price ratios unfavorable, but poor weather conditions undoubtedly had an adverse impact on response ratios. Thus, for example, if costs of capital and labor were included, cultivators managing no better than 6:1 response ratio in 1974/75 might have thought twice about continued nitrogen applications (adding 25 percent to the cost gives B/C ratio of roughly 1.2).

Current price relationships have, as noted above, benefitted from improvements in both product and input price. (At this writing the GOI has added another Rs. 25 per MT to the wheat procurement price of Rs. 1125.) The government appears to be committed to maintaining these levels and, especially after the 1974/75 experience, to balance the need of maintaining agricultural profitability against the understandable desire to provide low cost foodgrains to consumers.

Table 11 provides the financial plan data. Since the

predominant financial element is the import of fertilizers, the financial plan is presented in these terms. The Indian fertilizer import bill over the three years of project life is estimated at \$US 1.6 billion. The AID input is expected to be \$150 million or about 10 percent.

The analyses of fertilizer promotion and distribution are expected to be designed and implemented by GOI. The USAID will request grant funding if the GOI believes external resources are required and so requests.

Table 11. Summary Cost Estimate and Financial Plan

(U.S. \$ 000)

Use of Funds	AID	GOI	Others
Procurement of Fertilizers and Shipping	\$150,000	\$1,450,000	**
Analyses of Fertilizer Promotion and Distribution	*	*	

* A cost estimate is not possible at this time.

** The GOI received over the past five years, annual grants from the Government of Norway for fertilizer imports averaging about \$6 million. In addition, the GOI has received a number of small grants from various countries, through the FAO, for fertilizer imports. An approximately \$60 million grant from the U.K. is in final stages of negotiations. The uncertainty surrounding what donors may offer, and the GOI way accept, make it impossible to quantify the contribution of other donors.

C. Social Analysis

Economic and financial analyses establish the efficiency with which a project uses social resources and the adequacy of the incentives required to ensure its implementation. However, as is well known, a project may have equity effects which are judged to be more (or less) desirable. The particular concern of both AID and the GOI that poverty be eliminated and that the welfare of the weaker elements of the community be improved, underscores the need to examine as carefully as possible the projected beneficiaries and to apply weights to the economic analysis that reflect these goals.

Previous observations about the fertilizer subsector have indicated that there are basically three kinds of use situations at present. First, there are the 50-60 districts that currently use over half the fertilizer and generate the major portion of the country's marketed surplus in foodgrains. (See Figure 1.) Perhaps most important in aggregate terms here are the benefits accruing to low income groups as a result of the downward pressure of food prices. Indeed, as Hayami and Herdt have shown, if it can be assumed that small and marginal farmers tend to retain a substantial portion of foodgrains for their own consumption, then the effects of technological changes actually improve income distribution through the workings of food market. 1/ The mechanism is simple: price declines resulting from increased supplies will hurt only those who operate farms that produce a market surplus. The remaining members of society either benefit because they are consumers or because they are basically self-sufficient and are thus unaffected by commodity price drops.

A second reason for assigning a positive weight to the equity effects of the fertilizer distribution program in the heavy use areas has two dimensions. As previously introduced evidence indicates, under broadly prevalent conditions, fertilizer's divisibility, ease of application and high profitability have insured participation by small as well as large farmers. In addition, unlike pumps, motors, threshers, and tractors, there are no economies of scale that ultimately lead to efforts by medium and large farmers to bring additional land under cultivation, thereby producing changes in the pattern of ownership that would affect small holders adversely. Nor are these aspects of the technology that drastically reduce the costs of managing labor leading to tenant displacement--as may be the case with mechanical inputs.

A second type of use situation alluded to earlier consists of backward or "lagging" regions that appear to have the potential for higher levels of productivity in terms of agroclimatic conditions, but which, for various reasons, have not realized that potential. These are the districts the GOI is including in the IFPC. (See Figure 2.) By implication these are areas containing relatively poor farmers; so successful efforts to increase the number of supply points and undertake promotional activities should reduce regional income disparities. If the programs succeeded in expanding fertilizer use, small farmers would be expected to benefit in absolute terms in the same way they have benefitted in the heavy use areas.

The third type of use situation involves some 200 districts that, for a variety of reasons, do not have conditions in which fertilizer promotion activities alone will work. Many are in mountainous, drought-prone or flood-prone areas where agriculture is marginal at best.

1/ Y. Hayami & W. Herdt, "Market Price Effects of Technological Changes on Income Distribution in Semi-subsistence Agriculture," American Journal of Agricultural Economics, 59-2, 1977.

A number of special programs, e.g., the Tribal Development Program, the Drought Prone Area Program, and the activities of the Small Farmer Development Agency, have been initiated to improve the level of economic activity in such regions. But the emphasis is on the implementation of an entire development package including irrigation or watershed management, rural electrification, and schools. Fertilizer is ultimately a part of that package but sales from the areas will not, for many years to come, play a major role in broadening base consumption. Consequently, neither the benefits of growth nor improvements in income distribution can be expected of a project in this situation.

To summarize, the major equity benefits will come from (1) downward pressure on the price of foodgrains resulting from increased marketed surplus, (2) increases in the absolute incomes of small farmers in the heavy use areas and in the heretofore lagging districts, and (3) a more equitable distribution of income between some of the advanced and more backward parts of the country.

D. The Role of Women

Given that a large percentage of Indian women who work are in agriculture, farm situations are, of course, prime candidates for generating changes in the roles of women. The myriad of cultures and classes that occupy the countryside make it difficult, however, to generalize about the impact on women of the expanded use of fertilizer. It is known, for example, that in some of the medium-size holding, Muslim agricultural households in the Punjab, increasing affluence has meant that the women of the household cease to work at menial labor and retreat into the "purdah" traditionally reserved for the wealthier families. On the other hand, the increased productivity of women in the dairying industry that has developed in Gujarat has brought them into the cooperatives and in turn, prompted more visible participation in the economic and political life of the community. One would also expect that employment opportunities for the casual labor used at the time of harvesting or picking might increase with expanded fertilizer use. Since women typically participate more than proportionately in such activities, there would be some grounds for believing that trickle down effects might be greater for them than for landless laborers as a whole.

What can be said safely is that the project is neutral in its impact on women both in terms of increasing their participation in the labor force and in increasing their incomes. Given the project's overall objective of sustaining the momentum of increased fertilizer consumption, it is neither possible nor appropriate to design it in such a way that special emphasis is placed on women. To the extent that the level of living of the entire beneficiary family is enhanced through increased agricultural production resulting from fertilizer use, it is judged that this project has an equal impact on both men and women.

E. Environmental Impact

The AID contribution to the project will add marginally to the total fertilizer available for distribution in India. The use of fertilizer at the levels common in India (25 kg. of nutrients per ha.) cannot have significant environmental consequences, either beneficial or detrimental.

Fertilizer use increases plant growth and may add more organic matter to soils - a beneficial effect. Heavy use of fertilizer in areas of excessive runoff may add chemicals to rivers and streams. This may increase growth of noxious aquatic weeds which may add to the maintenance costs of irrigation systems.

Overall, there is not expected to be significant impact on the physical and human environment. The Asia Bureau has accepted the USAID recommendation of a negative determination regarding the environmental impact of the project. (See Appendix F, PID approval cable.)

IV. Project Implementation

A. General Implementation

The Ministry of Agriculture and Irrigation (MOAI) has been assigned project implementation responsibilities by the GOI. Within the MOAI, the Department of Agriculture (DOA) has the lead role in coordinating the various actions (and actors) involved. The basic management vehicle is an inter-departmental committee of Government, chaired by the DOA, and including representation from all concerned agencies of government.

In highly abbreviated form, the process is as follows:

1. Long term estimates of fertilizer requirements are made by the DOA.
2. Short-term import requirements are made annually, or as necessary, by a committee of Government taking into account seasonal agricultural requirements, domestic fertilizer production, inventories, the import pipeline, and other factors.
3. For imports, the procurement responsibility has been given to the Minerals and Metals Trading Corporation (MMTC), a Government Corporation.
4. Handling and distribution of imported materials from port to final destination is the responsibility of the Food Corporation of India (FCI) and certain other agencies entrusted by the GOI. Potassic materials are handled by Indian Potash Limited. Handling rates are fixed by the GOI. Distribution to local areas is handled by these entities through State Governments, institutions such as Cooperatives and State Agro-Industries Corporations, and the private trade. (See Appendix J on operation of the Central Fertilizer Pool.)

B. Administrative Capacity

During the past three years, fertilizer imports have increased by roughly two million tons. The capacity of the GOI, through the procedures outlined above, to monitor its fertilizer distribution system and to keep the supply channels full of fertilizer has been amply demonstrated. This basic monitoring and management system, as adjusted from time to time by the GOI, will be operational during the life of the project.

C. Procurement Procedures

1. Types of Fertilizer to be Procured

Historically, the GOI has imported a wide range of materials (Table A-24). More recently, it has concentrated on diammonium phosphate (DAP), Urea, and muriate of potash. The U.S. has been a major supplier of all of these materials except muriate of potash (Table A-25).

2. Source and Origin of Fertilizers

The GOI requests waiver to Geographic Code 941 countries for fertilizer procurement, in particular, South Korea, Taiwan, and Indonesia. The rationale is two-fold: to broaden the base of supply and to reduce the landed cost of fertilizer in India due to lower freight costs from suppliers closer to India.

3. Method of Financing

The Project Agreement will authorize any of the three typical arrangements utilized by AID for financing fertilizer imports:

- a. Letter of Commitment.
- b. direct reimbursement, and
- c. direct payment by AID.

Normally, the GOI would prefer direct payment by AID to the suppliers. However, the GOI has registered concern over the long timespan from IFB (Invitation for Bids) to initiation of actual shipments. (See Para 5 below.) The long timespan and the highly public nature of AID financial procurement are anticipated by the GOI to impact unfavorably on its market position with regard to non-AID financed imports from the U.S. and other countries.

This concern may lead the GOI to utilize direct reimbursement if this procedure will mitigate such problems. Another option may be to confine AID financed procurement to those materials not continuously under procurement by the GOI, e.g., ammonium sulphate.

4. Invitations for Bids (IFB)

The GOI is reviewing a basic IFB acceptable to AID/Washington. AID/W approval of the GOI basis IFB, including GOI materials specifications, will be required prior to initial disbursement of funds.

5. Procurement Process

The procurement process, in general, will be handled by MMTC from New Delhi. MMTC will issue IFB's after AID/W approval, either from New Delhi or from the Indian Embassy in Washington. Bids by suppliers will be communicated to New Delhi. AID/W will be informed of bid information either directly by suppliers or by USAID/New Delhi.

MMTC and AID/W will evaluate offers. MMTC will telex (or may provide information to USAID for cable transmission to AID/W) of proposed awards to AID/W for approval. AID/W approves awards and advises MMTC by telex (or cables through USAID). MMTC will then issue Notices of Awards from New Delhi. The GOI (MMTC or Ministry of Finance) then requests issuance of a Letter of Commitment (L/Comm.) by AID by telex (or through USAID). The L/Comm. is issued by AID and accepted by suppliers.

The timespan for executing the above procedure was estimated by AID (SER/COM) staff to be approximately 80 days assuming use of mails between the U.S. and New Delhi. (See Appendix D for details of this process.) MMTC proposes to shorten this process to the maximum extent possible by use of telex and generally expediting the whole process.

The time lapse from bid opening through issuance and acceptance of the L/Comm. was estimated at 45 days. From bid opening through issuance of awards there would be about 18 days, which is the period suppliers would have to keep their bids valid. The first shipping period of suppliers could begin approximately two weeks after acceptance of the L/Comm.

This process is for procurement of fertilizer only. Freight would be separately arranged. Discussions with MMTC have indicated a preference to solicit offers on the basis of both FOB and CIF. Evaluation of such offers would be complicated by the requirement to apply Cargo Preference, which could lengthen the process.

Actual procurement under the project may vary from transaction to transaction depending on market conditions and other factors. Details will be provided in Implementation Letters.

D. AID Implementation

1. Project Monitoring by USAID

The preference of the GOI and USAID is for the maximum degree of direct contact between AID/W and MMTC in the implementation of the fertilizer import program, since the critical approvals regarding fertilizer imports are reserved to AID/W. USAID will function as an intermediary, to the extent necessary, in the import program.

USAID will monitor progress of the import program and other aspects of the project being executed by the GOI through regularly scheduled meetings with the Department of Agriculture and other agencies responsible for project implementation.

2. Project Implementation Schedule

The steps in implementation of the Fertilizer Promotion Project are as follows:

Sept '79	GOI/USAID sign Agreement
Oct. '79	CP's met
Nov. '79	Procurement initiated at times suited to the GOI's overall fertilizer import program, consistent with AID rules and regulations.
June '83	Project Activity Completion Date

E. Project Evaluation

An evaluation program will be established by the GOI. The essential elements of this program include a routine annual evaluation of progress toward attainment of the project's purposes. The kinds of data required for the evaluation will be agreed upon by USAID and the GOI. The evaluation will be arranged by the GOI. A steering committee in the MOA, in which USAID will be represented, will guide the evaluation work.

Special problems in connection with the varied fertilizer promotion efforts and with the fertilizer distribution program - particularly as it functions in interior areas - have been identified as subjects for possible analysis by the GOI. USAID has agreed to consider providing assistance to these two evaluation studies if desired by the GOI.

A detailed benchmark of the fertilizer demand situation in India is provided by the NCAER study commissioned by the Department of Agriculture. Detailed information is available on fertilizer use by small and marginal farmers. And it may be desirable in the latter stages of the project to resurvey some of the farmers sampled in the NCAER study to determine progress in fertilizer use by small and marginal farmers during the life of the project.

F. Negotiating Status, Conditions and Covenants

1. Suggested conditions precedent to initial disbursement.

- a. Legal opinion as to the binding character of the Project Agreement.

- b. Designation of authorized representative of the GOI.
2. Other conditions that are in final stages of negotiation are expected to be agreed to prior to signing of the agreement. If not agreed to by that time they will become conditions precedent to initial disbursement:
- a. Fertilizer specifications approved by AID.
 - b. An invitation for bid format and basic content approved by AID.
 - c. Charter Party format approved by AID.

Appendix A

Statistical Appendix

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A-1

India: Important Socioeconomic Characteristics

Variable	Unit	Year	Quantity
1. Area	million sq. km	1971	3.3
2. Population	millions	1971	548.0
3. Population density	number	1971	177.0
4. Rate of population growth	%	1961 - 71	2.2
5. Urban population	%	1971	19.9
6. Rural population	%	1971	80.1
7. Literacy	%	1971	29.5
8. Working population	millions	1971	180.4
9. Ratio of working to total population	%	1971	32.9
10. Proportion of working popu- lation engaged in agriculture	%	1971	69.7
11. Net national product (at current prices)	Rs. billion	1976 - 77	665.6
12. Per capita income (at current prices)	U.S. \$	1976 - 77	135.1
13. Rate of growth of NNP (at 1960-61 prices)	%	1961 - 74	3.3
14. Rate of growth of per capita NNP (at 1960-61 prices)	%	1961 - 74	1.1
15. Proportion of NDP originating in agriculture	%	1976 - 77	44.2
16. Proportion of NDP originating in manufacturing, construc- tion and utilities	%	1976 - 77	22.3

A-2

India: Salient Features of Indian Agriculture

Variable	Unit	Year	Quantity	
1. Net area sown	m. hectares	1975-76	142.24	
2. Total cropped area	"	"	171.16	
3. Net irrigated area	"	"	34.45	
4. Gross irrigated area	"	"	42.94	
5. Ratio of net area sown to total geographical area	%	"	46.77	
6. Cropping intensity	%	"	120.33	
7. Ratio of net irrigated area to net area sown	%	"	24.22	
8. Ratio of gross irrigated area to total cropped area	%	"	25.09	
8a. Proportion of total cropped area devoted to foodgrains	%	1973-74	75.30	
9. Foodgrains output	m.tons	1977-78	125.6	
10. Rate of growth of foodgrains output	%	1949-50 - 1977-78	2.8	
11. Rate of growth of agricultural output	%	1950-75	3.1	
12. Consumption of fertilizers (per hectare)				
	N	kgs	1977-78	17.0)
	P ₂ O ₅		"	5.0)
	K ₂ O		"	3.0)
	NPK		"	25.0)
13. Area under high-yielding varieties	m. hectare	1977-78	38.00	
14. Ratio of area under HYVs to total cropped area	%	1977-78	22.00	
15. Villages electrified	%	1976	31.50	
16. Gini index of land concentration	no.	1970-71	0.62	

Source: Compiled from data in (i) Fertilizer Statistics, 1977-78; (ii) Agricultural Census, 1970-71; (iii) India - A Reference Annual, 1976.

A-3

Index Numbers of Agricultural Production
(Base: Triennium ending 1969-70 = 100)

<u>Year</u>	<u>Foodgrains</u>	<u>Non-Foodgrains</u>	<u>All Crops</u>
1960-61	86.1	88.1	86.7
1965-66	75.8	91.3	80.8
1970-71	112.9	108.7	111.5
1971-72	111.4	110.9	111.2
1972-73	102.3	102.2	102.3
1973-74	110.3	117.0	112.4
1974-75	104.3	118.3	108.8
1975-76	127.2	121.3	125.3
1976-77	115.7	118.2	116.5
1977-78	132.8	132.6	132.7

Source: Economic Survey, Government of India, 1978-79

India: Production of Foodgrains
(1950-51 to 1977-78)

Year	(million tons)		
	Cereals	Pulses	Total
1950-51	45.81	9.20	55.01
1951-52	43.58	8.42	52.00
1952-53	50.01	9.19	59.20
1953-54	59.20	10.62	69.82
1954-55	57.09	10.95	68.04
1955-56	55.81	11.05	66.85
1956-57	58.30	11.55	69.86
1957-58	54.75	9.56	64.31
1958-59	63.99	13.15	77.14
1959-60	64.88	11.78	76.67
1960-61	69.31	12.70	82.02
1961-62	70.95	11.76	82.71
1962-63	68.62	11.53	80.15
1963-64	70.57	10.07	80.64
1964-65	76.94	12.42	89.36
1965-66	62.40	9.94	72.35
1966-67	65.88	8.35	74.23
1967-68	82.95	12.10	95.05
1968-69	83.60	10.42	94.01
1969-70	87.81	11.69	99.50
1970-71	96.60	11.82	108.42
1971-72	94.07	11.09	105.17
1972-73	87.12	9.91	97.02
1973-74	94.66	10.01	104.66
1974-75	90.67	10.40	101.06
1975-76	107.69	13.14	121.03
1976-77	100.36	11.21	111.57
1977-78	113.80	11.80	125.60

Source: Fertilizer Statistics, The Fertilizer Association of India, New Delhi, 1976.

India: Size Distribution of Agricultural Holdings
(1970 - 71)

Size of Holdings (Hectares)	Holdings		Operated Area		Average Size of Holding (Hectares)
	Number (000)	Percentage	Hectare (000)	Percentage	
Less than 1	35,682	50.6	14,545	9.0	0.4
1.0 - 2.0	13,432	19.0	19,282	11.9	1.4
2.0 - 4.0	10,681	15.2	29,999	18.5	2.8
4.0 - 10.0	7,932	11.3	48,234	29.7	6.1
10 and above	2,766	3.9	50,064	30.9	18.1
All Groups	70,493	100.0	162.124^{a/}	100.0	2.3
Gini index of size Distribution of Operational Holdings					.617

^{a/} Net area sown was 135.8 million hectares in 1970-71.

Source: Agricultural Census, 1970-71

A-6

India: Cropping Intensity and Irrigation by Size of Holding, 1970-71

Size of Holding (Hectares)	Cropping ^{a/} Intensity	Irrigation ^{b/}	Tubewell ^{c/} Irrigation
Less than 1	130.2	33.8	15.4
1.0 - 2.0	122.3	27.9	15.7
2.0 - 4.0	119.4	25.2	17.5
4.0 -10.0	114.2	20.4	18.4
10.0 and above	109.4	13.0	14.5
All Groups	116.4	21.4	16.6

a/ Total cropped area as % of net area sown.

b/ Net irrigated area as % of net area sown.

c/ Area irrigated by tubewells as % of total irrigated area.

Source: Calculated from the data available in All India Report on Agricultural Census, 1970-71.

Levels of Agricultural Development in India
at the District Level for the Triennium
1970-71 to 1972-73

Gross Value of Output per Hectare (Rs. in all India prices)	Cumulative Percentage of Total						No. of Districts in India
	Gross Cropped Area	Aggregate Output	Consumption of NPK	Use of Tractors	Pumpsets Installed	Gross Irrigated	
1. 2500 - 2799	0.70	1.83	2.37	5.39	0.83	2.22	1.06
2. 2000 - 2499	3.04	7.18	10.60	12.89	7.82	8.27	3.56
3. 1500 - 1999	14.48	27.84	38.93	46.81	40.68	34.08	17.73
4. 1000 - 1499	40.30	59.46	67.24	69.90	63.40	64.25	42.91
5. 500 - 999	83.96	94.20	93.79	95.88	91.56	95.75	87.94
6. 54 - 499	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Planning Commission, Fifth Five Year Plan, 1974-79, p. 7.

Growth of Agricultural Output in India
at the District Level Between the Trienniums
1962-63/64-65 to 1970-71/72-73

Annual Compound Growth Rate of Gross Value of Output (%) *	Cumulative Percentages in Total in 1970-71/1972-73						No. of Districts in India
	Gross Cropped Area	Aggregate Output	Consumption of NPK	Use of Tractors	Pumpsets Installed	Gross Irrigated Area	
1. 11.00 - 11.35	0.62	0.15	0.02	0.84	0.08	0.09	0.36
2. 9.00 - 10.99	1.38	0.98	1.22	2.89	1.26	1.19	1.42
3. 7.00 - 8.99	7.93	9.97	14.13	32.47	12.47	16.28	6.38
4. 5.00 - 7.99	13.89	17.03	20.81	46.46	20.13	24.37	12.41
5. 3.00 - 4.99	29.60	36.13	38.99	67.72	34.68	45.53	29.08
6. 1.00 - 2.99	60.58	67.75	66.24	83.74	66.63	71.90	62.41
7. 0.00 - 0.99	73.09	80.98	81.92	90.74	80.69	83.81	75.18
8. Negative	100.00	100.00	100.00	100.00	100.00	100.00	100.00

* Growth rates have been computed by valuing output in 1962-63 to 1964-65 and 1970-71 to 1972-73, at average all India prices for each crop for the triennium 1970-71 to 1972-73.

Source: Planning Commission, Fifth Five Year Plan 1974-79, p. 7.

A-9

India: Fertilizer Sector - Important Indicators

Variable	Unit	Year	Nutrients			
			N	P ₂ O ₅	K ₂ O	Total NPK
<u>A. Consumption, Production and Imports</u>						
(i) Cons.	000 tons	1977-78	2,913	867	506	4,286
(ii) Prod.	"	"	2,037	670	-	2,707
(iii) Imp.	"	"	758	164	599	1,521
(iv) Share of nutrients in fert. cons.	%	"	68	20	12	100
<u>B. Rate of Growth</u>						
(i) Cons.	%	1952-53	16	23	22	18
(ii) Prod.	"	to	15	19	-	16
(iii) Imp.	"	1977-78	12	19 ^{a/}	23	14
<u>C. Sixth Plan Targets</u>						
(i) Cons.	000 tons	1978-83	5,250	1,600	1,000	7,850
(ii) Prod.	"	"	4,100	1,250	-	5,350
(iii) Imp.	"	"	1,150	475	1,000	2,625
<u>D. Installed Capacity</u>						
(i) Public	%	Nov. '76	51	36	-	47
(ii) Private	"		42	50	-	44
(iii) Coop.	"		7	14	-	9
<u>E. Capacity Utilized</u>						
	%	1975-76	57	43	-	55

Source: Compiled from the data in Fertilizer Statistics, 1977-78

a/ Refers to 1963-64 to 1977-78

A-10

India: Fertilizer Nutrient Consumption (000 MT)

Year	N		P ₂ O ₅ *		K ₂ O		Total Amt. ** (N+P+K)
	Amt.	%	Amt.	%	Amt.	%	
1952-53	58	88.0	5	7.0	3	5.0	66
1953-54	89	85.0	8	7.9	8	7.1	105
1954-55	95	78.4	15	12.4	11	9.2	121
1955-56	108	82.2	13	9.9	10	7.9	131
1956-57	123	80.0	16	10.3	15	9.7	154
1957-58	149	81.1	22	11.9	13	7.0	184
1958-59	172	76.8	30	13.2	22	10.0	224
1959-60	229	75.3	54	17.7	21	7.0	305
1960-61	212	72.0	53	18.1	29	9.9	294
1961-62	250	73.8	60	17.9	28	8.3	338
1962-63	333	73.6	83	18.3	36	8.1	452
1963-64	377	69.3	116	21.4	51	9.3	544
1964-65	555	71.8	149	19.2	69	9.0	773
1965-66	575	73.3	132	16.9	77	9.8	784
1966-67	738	67.0	249	22.6	114	10.4	1100
1967-68	1035	61.4	446	26.5	204	12.1	1685
1968-69	1209	68.6	382	21.7	170	9.7	1760
1969-70	1356	68.4	416	21.0	210	10.6	1982
1970-71	1479	65.6	541	24.0	236	10.4	2256
1971-72	1798	67.7	558	21.0	300	11.3	2656
1972-73	1839	66.4	581	21.0	348	12.6	2767
1973-74	1829	64.4	650	22.9	360	12.7	2838
1974-75	1766	68.6	472	18.3	336	13.1	2573
1975-76	2149	74.3	467	16.1	278	9.6	2893
1976-77	2457	72.0	635	18.6	319	9.4	3411
1977-78	2913	67.9	867	20.2	506	11.8	4286
1978-79 (Provisional)							5060

* Excludes data related to bonemeal and rockphosphate

** Total may not add due to rounding.

Notes:

1. From 1952-53 to 1960-61, distribution figures are treated as consumption.
2. From 1961-62 onwards, consumption figures have been taken from Indian Agriculture in Brief, Ministry of Agriculture & Irrigation, New Delhi
3. Share (%) data are derived from the consumption figure

Source: Fertilizer Statistics, 1977-78, FAI

India: Growth Rates* of Fertilizer Consumption

Period	Nitrogen N	Phosphate P ₂ O ₅	Potash K ₂ O	All Nutrients N+P ₂ O ₅ +K ₂ O
1. 1952-53 to 1962-63	19.1	33.5	27.1	21.1
2. 1962-63 to 1972-73	18.6	21.5	25.3	17.7
3. 1972-73 to 1977-78	7.9	6.9	6.5	7.5
4. 1975-76 to 1977-78	16.5	36.0	34.0	21.5
5. 1952-53 to 1977-78	16.3	22.5	21.5	17.5
6. 1977-78 to 1982-83**	12.7	10.2	10.9	12.0

* Annual compound growth rates.

** Projected growth rates

Source: Fertilizer Statistics, FAI.

A-12

India: Regional Consumption of Fertilizers, 1969-78

	'000 Tons					
	Central	East	North	South	West	All India
1968-69	403	154	238	657	224	1675
1969-70	554	199	233	745	260	1990
1970-71	548	209	294	761	365	2177
1971-72	667	263	384	881	426	2621
1972-73	719	280	485	883	381	2748
1973-74	684	273	471	905	477	2839
1974-75	571	302	348	856	457	2573
1975-76	675	321	430	1000	420	2894
1976-77	971	379	530	960	496	3411
1977-78	1136	421	664	1304	654	4286
% change in 1977-78 compared to 1968-69	182	173	179	98	192	156

- Note: 1) Figures relate to April-March except 1975-76, 1976-77 and 1977-78 where February-January reporting year is used.
- 2) From 1973-74 onward, fertilizer consumption of plantation crops is separately reported as "Others". Hence, the row sum may not equal to All India consumption in the last column.
- 3) All India may not add due to rounding.

Source: Fertilizer Statistics. Annual Publications. The FAI, New Delhi.

Regional Consumption of Fertilizers, 1969-78
(Percentage Distribution)

	Central	East	North	South	West	All India
A. <u>Fertilizer Consumption</u>						
1968-69	24.0	9.2	14.2	39.2	13.4	100
1969-70	27.8	10.0	11.7	37.4	13.1	100
1970-71	25.1	9.6	13.5	35.0	16.8	100
1971-72	25.5	10.1	14.6	33.6	16.2	100
1972-73	26.2	10.1	17.6	32.2	13.9	100
1973-74	24.1	9.6	16.6	31.9	16.8	100
1974-75	22.2	11.7	13.5	33.3	17.8	100
1975-76	23.3	11.1	14.9	34.6	14.5	100
1976-77	28.5	11.1	15.5	28.1	14.5	100
1977-78	26.5	9.8	15.5	30.4	15.3	100
B. <u>Cropped Area</u>						
1. Net Cultivated area						
1975-76	35.6	17.1	6.4	20.9	19.7	100
2. Net Irrigated area						
1975-76	35.0	20.0	15.0	22.0	9.0	100

Sources: 1) Figures in A are calculated from data in Table A. 12.

2) Figures in B are derived from data available in Fertilizer Statistics, 1977-78.

A-14

India: Statewise Share of Gross Cropped Area and Fertilizer Consumption

State/Zone	Percentage Share of State to Total Gross Cropped Area 1973-74	Percentage Share of State to total fertilizer con- sumption 1977-78	Kg/ha (N+K+P/ Gross Cropped Area
<u>Central</u>			
Madhya Pradesh	12.5	3.7	7.5
Rajasthan	10.3	2.6	6.6
Uttar Pradesh	13.6	20.1	36.9
<u>East</u>			
Bihar	6.6	4.0	15.4
Orissa	4.5	1.5	8.3
W. Bengal	4.7	4.0	21.6
<u>North</u>			
Haryana	3.2	4.4	34.7
Punjab	3.7	10.6	72.4
<u>South</u>			
Andhra Pradesh	7.6	12.2	40.3
Karnataka	6.5	6.3	24.1
Kerala	1.7	1.8	26.3
Tamil Nadu	4.2	9.9	59.0
<u>West</u>			
Gujarat	6.0	6.8	28.5
Maharashtra	11.5	8.4	18.3
	100.0	100.0	25.0

Source: Fertilizer Statistics, FAI

India: Districtwise Fertilizer Consumption, 1977-78

Range of Fertilizer Consumption ('000 tons)	No. of Districts	% Districts	Total Fertilizer Consumption ('000 tons)	% Share in all India Consumption	% Cumulative Share in all India Consumption	Average Consumption ('000 tons)
Less than 5	212*	55.0	622.7	14.9	14.9	2.9
5 - 10	32	8.3	256.8	6.0	20.9	8.0
10 - 15	36	9.3	439.7	9.9	30.8	12.2
15 - 20	38	9.9	668.9	15.6	46.4	17.6
20 - 25	21	5.5	468.6	10.9	57.3	22.3
25 - 30	12	3.1	325.1	7.6	64.9	27.1
30 - 50	28	7.2	1085.1	25.3	90.2	38.7
50 - 75	5	1.3	315.3	7.4	97.6	63.0
75 & above	1	0.2	103.2	2.4	100.0	103.2
Total	385		4285.7			

* Includes Delhi (5 Districts), Manipur (5 Districts), Tripura (3 Districts), Nagaland (7 Districts), Arunachal (5 Districts), Andaman (4 Districts), Mizoram (3 Districts), Goa (3 Districts), Meghalaya (3 Districts).

Source: Fertilizer Statistics, FAI

India: Fertilizer Consumption per Hectare of Cropped Land
1960-61 to 1977-78

<u>Year</u>	<u>Kgs per hectare</u>
1960-61	1.92
1961-62	2.21
1962-63	2.96
1963-64	3.46
1964-65	4.86
1965-66	5.10
1966-67	7.00
1967-68	10.33
1968-69	11.02
1969-70	12.63
1970-71	13.67
1971-72	16.03
1972-73	16.46
1973-74	17.40
1974-75	15.9
1975-76	17.1
1976-77	20.1
1977-78	25.0

Source: Fertilizer Statistics, FAI

India: Statewise Consumption of Plant Nutrients per Hectare of Gross Cropped Area
(1977-78 and 1976-77)

State/Zone	(Kg/ha)							
	1977-78				1976-77			
	N	P ₂ O ₅	K ₂ O	Total	N	P ₂ O ₅	K ₂ O	Total
Central	<u>13.6</u>	<u>3.3</u>	<u>1.4</u>	<u>18.3</u>	<u>12.0</u>	<u>2.5</u>	<u>1.1</u>	<u>15.6</u>
Madhya Pradesh	4.7	2.3	0.5	7.5	4.3	1.8	0.3	6.4
Rajasthan	5.3	1.0	0.3	6.6	4.4	0.9	0.2	5.5
Uttar Pradesh	27.8	6.0	3.1	36.9	24.9	4.4	2.3	31.7
Delhi	21.9	7.3	2.2	31.4	31.5	15.3	10.3	57.1
<u>East</u>	<u>9.8</u>	<u>2.1</u>	<u>1.6</u>	<u>13.5</u>	<u>9.5</u>	<u>1.9</u>	<u>1.4</u>	<u>12.8</u>
Assam	1.5	0.1	0.2	1.8	0.9	0.1	0.3	1.3
Bihar	12.2	2.0	1.2	15.4	11.9	1.7	0.9	14.5
Manipur	9.1	1.9	0.9	11.9	8.2	1.6	0.4	10.2
Meghalaya	6.5	2.5	0.9	9.9	6.4	3.5	0.9	10.8
Nagaland	1.0	0.4	0.4	1.8	0.7	0.3	0.1	1.1
Orissa	5.9	1.6	0.8	8.3	6.0	1.5	1.0	8.5
Tripura	0.4	0.9	-	1.3	1.3	0.3	0.4	2.0
West Bengal	14.3	3.6	3.7	21.6	13.6	3.6	3.2	20.4

Contd.....

A-17 Continued

India: Statewise Consumption of Plant Nutrients per Hectare of Gross Cropped Area
(1977-78 and 1976-77)

State/Zone	1977-78				1976-77			
	N	P ₂ O ₅	K ₂ O	Total	N	P ₂ O ₅	K ₂ O	Total
<u>North</u>	36.1	10.2	3.0	42.3	29.9	8.7	2.2	40.8
Haryana	27.6	5.3	1.8	34.7	22.4	3.0	1.2	26.6
Himachal Pradesh	7.3	1.8	1.6	10.7	6.8	1.6	1.5	9.9
Jammu & Kashmir	10.5	2.5	0.5	13.5	10.6	2.3	0.7	13.6
Punjab	51.1	16.7	4.6	72.4	42.7	15.5	3.4	61.6
<u>South</u>	23.8	8.2	5.9	37.9	18.6	5.3	3.6	27.5
Andhra Pradesh	27.1	10.3	2.9	40.3	22.5	6.2	1.6	30.3
Karnataka	14.4	5.1	4.6	24.1	12.0	4.0	3.0	19.0
Kerala	12.4	5.4	8.5	26.3	11.2	5.2	6.7	23.1
Tamil Nadu	36.7	10.1	12.2	59.0	24.1	5.5	6.7	36.3
Pondicherry	89.6	21.5	39.4	150.5	63.5	17.3	26.9	107.7
<u>West</u>	13.5	5.2	3.1	18.3	9.9	3.0	2.0	14.9
Gujarat	17.2	8.3	3.0	28.5	13.4	5.3	1.3	20.0
Maharashtra	11.6	3.6	3.1	18.3	9.9	3.0	2.0	14.9
Goa	16.4	9.0	5.3	30.7	14.4	7.2	3.6	25.2
<u>All India</u>	17.0	5.0	3.0	25.0	14.5	3.7	1.9	20.1

Note: Gross cropped area relates to the year 1973-74 for both 1975-76 and 1976-77 years of fertilizer consumption.

Source: Fertilizer News, July 1977.

A-18

Proportions of Different Categories of Farm Households
Using Fertilizer

States	Proportion of all farm households using fert.	Proportion of small farm households using fert.	Proportion of marginal farm households using fert.
Punjab	91.9	85.6	75.5
Tamil Nadu	69.7	72.7	62.0
West Bengal	66.0	64.6	62.2
Kerala	65.3	82.1	62.6
Gujarat	62.3	57.0	46.1
Andhra Pradesh	61.8	64.5	49.4
Haryana	60.2	66.3	70.8
Karnataka	49.9	52.5	47.4
Uttar Pradesh	44.2	42.2	31.1
Bihar	42.3	48.7	29.1
Maharashtra	42.2	41.0	34.0
Jammu & Kashmir	40.5	38.0	45.3
Himachal Pradesh	33.8	54.5	25.8
Rajasthan	30.8	19.5	16.0
Orissa	21.4	28.7	10.5
Madhya Pradesh	15.4	9.4	5.6
Assam	6.5	7.8	5.5

Source: National Council of Applied Economic Research,
Fertilizer Demand Study, Interim Report, 1978

India: Seasonwise Consumption of Fertilizers
(000 tons)

Year	Kharif (Monsoon)		Rabi (Winter)		Total
	Quantity	Share (%)	Quantity	Share (%)	
1968-69	749	45	926	55	1,675
1969-70	882	44	1,108	56	1,990
1970-71	925	42	1,252	58	2,177
1971-72	1,092	50	1,529	50	2,621
1972-73	1,060	39	1,639	61	2,699
1973-74	1,202	43	1,607	57	2,809
1974-75	1,145	45	1,428	55	2,573
1975-76	1,007	35	1,887	65	2,894
1976-77	1,188	35	2,223	65	3,411
1977-78	1,552	36	2,734	64	4,286

Source: Fertilizer Statistics: Annual Publications, the FAI, New Delhi.

India: Fertilizer Consumption for Wheat & Rice Crops

State	Area (million hectares)	Fertilizer Consumption ('000 tonnes)			
		N	P ₂ O ₅	K ₂ O	Total
A. <u>Estimated average fertilizer consumption for rice in different States</u>					
(A) <u>KHARIF</u>					
West Bengal	4.86	23	5	5	33
Bihar	5.01	30	6	3	39
Orissa	4.40	16	4	2	22
Assam	2.10	2	1	1	4
Uttar Pradesh	4.51	30	4	3	37
Madhya	4.54	15	8	2	25
Punjab	0.50	36	3	2	41
Haryana	0.29	14	2	1	17
Maharashtra	1.32	15	7	6	28
Total	27.53	181	40	25	246
(B) <u>KHARIF AND RABI</u>					
Andhra Pradesh	3.22	115	43	17	175
Karnataka	1.13	44	20	15	79
Kerala	0.88	16	11	9	36
Tamil Nadu	2.62	132	43	39	205
Total	7.85	294	114	73	486
(C) <u>RABI</u>					
West Bengal	0.308	14	4	5	23
Bihar	0.103	5	1	1	7
Orissa	0.166	7	2	1	10
Total	0.577	26	7	7	40
Grand Total	35.96	501	161	110	772
Percentage to All India Consumption in 1975-76:					26.0

B. Estimated average annual fertilizer consumption for wheat in different states

Uttar Pradesh	6.05	132	32	22	186
Punjab	2.35	137	44	11	192
Haryana	1.19	46	5	2	53
Bihar	1.68	44	8	5	58
Madhya Pradesh	3.27	30	6	2	42
Rajasthan	1.50	22	4	2	28
Others	2.30	64	26	11	101
Total	18.34	475	126	55	660

Percentage to All India Consumption in 1975-76: 23.0

Source: D.R. Bhumbra, "Balanced Fertilization" in FAI-FAO Seminar on Strategy for Stimulating Fertilizer Consumption, 1976: Proceedings. The FAI, New Delhi 1977.

A-21

India: Statewise Nutrient (N:P:K) Consumption Ratio
1975-76 and 1976-77

States/Zone	1975-76 N:P:K	1976-77 N:P:K
<u>Central</u>	<u>5.3:1:0.4</u>	<u>4.8:1:0.4</u>
Madhya Pradesh	2.6:1:0.1	2.3:1:0.2
Rajasthan	5.2:1:0.1	5.0:1:0.2
Uttar Pradesh	6.4:1:0.6	5.7:1:0.6
Delhi	5.0:1:0.2	2.1:1:0.7
<u>East</u>	<u>5.2:1:0.7</u>	<u>4.8:1:0.7</u>
Assam	2.7:1:0.6	6.3:1:1.6
Bihar	8.2:1:0.6	7.1:1:0.5
Manipur	3.2:1:0.5	5.3:1:0.3
Meghalaya	3.2:1:0.2	1.8:1:0.3
Nagaland	3.3:1:0.3	2.7:1:0.3
Orissa	5.0:1:0.6	4.1:1:0.7
Tripura	5.0:1:1.3	3.9:1:1.3
West Bengal	3.6:1:0.8	3.9:1:0.9
<u>North</u>	<u>5.1:1:0.2</u>	<u>3.5:1:0.3</u>
Harayana	10.4:1:0.3	7.4:1:0.4
Himachal Pradesh	3.8:1:0.7	4.0:1:0.9
Jammu and Kashmir	7.6:1:0.3	4.6:1:0.3
Panjab	4.3:1:0.2	2.8:1:0.2
Chandigarh	6.4:1:0.1	NA:NA:NA
<u>South</u>	<u>4.0:1:0.1</u>	<u>3.4:1:0.7</u>
Andhara Pradesh	4.8:1:0.4	3.6:1:0.3
Karnataka	3.3:1:0.9	3.1:1:0.8
Kerala	2.1:1:1.1	2.1:1:1.3
Tamil Nadu	4.3:1:0.9	4.5:1:1.3
Pondicherry	3.5:1:0.8	3.8:1:1.6
<u>West</u>	<u>3.8:1:0.8</u>	<u>2.9:1:0.5</u>
Gujarat	3.1:1:0.2	2.5:1:0.3
Maharashtra	4.6:1:1.4	3.3:1:0.7
Goa	1.6:1:0.8	2.0:1:0.5
<u>Others</u>	<u>27.6:1:0.6</u>	<u>7.5:1:0.2</u>
All India	4.6:1:0.6	3.9:1:0.5

Source: Fertilizer News, July 1977.

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India: Fertilizer Nutrient Production^{1/}
(1951-52 to 1977-78)

(thousand tons)

Year	Nitrogenous (N)	Phosphatic (P ₂ O ₅)	Total* (N + P ₂ O ₅)
1951-52	28.9	9.8	38.7
1952-53	53.1	7.4	60.5
1953-54	52.9	13.8	66.7
1954-55	68.5	14.3	82.8
1955-56	76.9	12.4	89.3
1956-57	78.8	17.6	96.4
1957-58	81.1	25.8	106.9
1958-59	80.8	31.0	111.8
1959-60	83.7	51.4	135.1
1960-61	112.0	53.7	165.7
1961-62	154.3	65.4	219.7
1962-63	194.2	88.3	282.5
1963-64	219.1	107.8	326.9
1964-65	243.2	131.0	374.3
1965-66	237.9	118.8	354.7
1966-67	309.0	145.7	454.7
1967-68	402.6	207.1	609.8
1968-69	563.0	213.2	776.2
1969-70	730.6	223.7	954.3
1970-71	832.5	228.1	1,060.6
1971-72	949.2	290.3	1,239.6
1972-73	1,054.5	330.3	1,384.3
1973-74	1,049.9	324.5	1,374.1
1974-75	1,186.6	331.2	1,517.2
1975-76	1,508.0	319.7	1,827.7
1976-77	1,862.0	478.0	2,340.0
1977-78	1,999.8	669.9	2,706.9

^{1/} Excludes N production for non-agricultural purposes.

* Potassic fertilizer nutrients (K₂O) are not produced in India.

Source: Fertilizer Statistics, 1977-78, FAI

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India: Fertilizer Imports
(1952-53 to 1977-78)

	(Thousand MTs)			Total N+P+K	Total Value of Imports (m. rupees)
	N	P ₂ O ₅	K ₂ O		
1952-53	44	-	3	47	45.6
1953-54	19	--	7	26	25.2
1954-55	20	-	11	31	30.2
1955-56	53	-	10	63	73.3
1956-57	57	-	15	72	77.7
1957-58	110	-	13	123	158.8
1958-59	97	-	22	119	113.1
1959-60	142	4	33	179	162.9
1960-61	399	--	20	419	121.8
1961-62	307	-	75	382	141.1
1962-63	244	10	41	295	236.9
1963-64	228	13	40	281	187.1
1964-65	232	12	57	301	220.8
1965-66	326	14	73	413	411.9
1966-67	632	148	118	898	1,288.2
1967-68	867	349	270	1,486	1,933.0
1968-69	844	138	213	1,195	1,629.2
1969-70	667	94	120	881	1,167.7
1970-71	477	32	120	629	767.8
1971-72	481	248	268	997	899.7
1972-73	665	204	325	1,194	1,212.6
1973-74	659	213	370	1,242	1,767.5
1974-75	884	286	437	1,607	5,991.3
1975-76	996	361	278	1,635	7,227.7
1976-77	750	23	278	1,051	2,202.2
1977-78	758	164	599	1,521	3,064.4

Source: Fertilizer Statistics, 1977-78, FAI

IMPORT OF FERTILISER MATERIALS—1967-68 to 1977-78
(April-March)

Q=Quantity in '000 tonnes
V=Value in Rs. million

Year	Nitrogenous					NP/NPKs						Potassic		Total			Value
	Ammonium sulphate	Ammonium sulphate nitrate	Urea	Calcium ammonium nitrate	Ammonium chloride	Ammonium nitro-phosphate 20-20-0 24-24-0 23-23-0	Ammonium phosphate 20-20-0	Diammonium phosphate 18-46-0	NPKs (various grades)	Mono-ammonium phosphate 15-55-0	Phosphatic tripple super phosphate	Muriate of potash	Sulphate of potash	N	P ₂ O ₅	K ₂ O	
1967-68	Q 1,053.2	16.1	918.4	125.0	50.7	—	256.4	614.7	90.0	—	—	439.0	5.0	866.7	348.7	270.2	
	V 468.9	7.0	598.9	49.7	16.9	—	174.5	382.4	58.0	—	—	171.6	2.5				1,938.1
1968-69	Q 1,255.8	10.5	1,028.6	90.0	46.6	27.0	50.2	216.2	113.0	—	—	326.0	4.0	844.1	137.6	213.2	
	V 440.2	4.6	703.1	37.8	16.0	17.0	33.4	168.3	78.1	—	—	126.9	1.8				1,629.2
1969-70	Q 790.1	—	938.1	82.9	—	6.9	—	125.1	184.0	—	—	152.0	4.0	667.2	94.1	120.4	
	V 262.8	—	620.7	35.5	—	3.3	—	66.2	124.7	—	—	52.4	2.1				1,167.7
1970-71	Q 83.3	24.6	779.8	279.8	—	17.4	—	12.0	121.0	—	—	157.0	24.0	477.3	32.4	119.8	
	V 27.5	19.3	458.9	108.8	—	9.7	—	7.1	85.9	—	—	60.7	18.9				767.8
1971-72	Q 186.6	32.0	549.6	317.2	—	—	—	352.8	289.0	—	—	362.0	—	481.3	247.8	268.2	
	V 31.2	11.4	249.4	113.7	—	—	—	200.0	183.6	—	—	110.4	—				898.7
1972-73	Q 128.2	—	1,008.4	317.7	—	56.4	—	347.8	119.0	12.0	—	504.0	6.1	665.4	204.7	323.3	
	V 27.5	—	507.9	121.9	—	31.8	—	273.8	76.6	9.6	—	160.2	3.2				1,212.6
1973-74	Q 75.9	2.0	1,033.9	183.4	—	239.8	—	340.2	55.0	—	—	607.0	5.0	658.8	212.7	370.4	
	V 39.0	1.8	737.1	105.6	—	202.0	—	359.8	44.2	—	—	275.0	3.0				1,767.6
1974-75	Q 235.1	13.6	1,244.1	359.6	30.0	192.7	—	435.9	285.0	—	5.0	649.9	10.0	853.8	285.9	437.8	
	V 261.5	17.2	2,711.7	559.6	48.8	323.9	—	982.1	593.4	—	14.8	467.4	11.5				5,891.3
1975-76	Q 96.0	10.0	1,545.0	176.0	30.0	—	—	536.0	618.0	—	—	390.0	—	996.0	361.6	278.6	
	V 143.7	17.6	3,668.4	274.0	47.6	—	—	1,477.6	1,271.5	—	—	327.4	—				7,227.7
1976-77	Q —	—	1,596.9	4.5	—	34.6	—	30.1	13.4	—	—	441.0	10.5	750.1	22.8	277.8	
	V —	—	1,772.7	4.9	—	40.2	—	43.4	22.8	—	—	305.8	12.3				2,202.2
1977-78	Q 3.8	—	1,498.9	14.3	—	—	—	355.3	—	—	—	986.0	14.6	758.1	163.9	598.9	
	V 2.8	—	1,845.0	12.4	—	—	—	532.7	—	—	—	654.8	16.7				3,264.4

Source: Ministry of Agriculture & Irrigation, New Delhi.

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Import of Fertilizer Materials from the U.S.
(000 M. Tonз)

	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>
(1) Ammonium Sulphate	5.0			
(2) Urea		119.6	182.3	305.4
(3) TSP	5.2			
(4) NP (18-46-0) (DAP) (20-20-0)	410.4	442.6 7.6	30.1	264.9
	<hr/>	<hr/>	<hr/>	<hr/>
	420.6	569.8	212.4	570.3
	<hr/>	<hr/>	<hr/>	<hr/>

Source: FAI, Fertilizer Statistics, Various Issues

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India: Current Prices of Fertilizers in Terms of Nutrients
(Inclusive of Excise Duty) (50 Kg. packing)

Effective from	Nutrient	Retail price of nutrient (Rs.) through						
		Ammonium sulphate ¹ (20.0% N)	Urea		calcium nitrate ² (26% N)	ammonium (25% N)	Super-phosphate (16% w. s. P ₂ O)	Muriate of potash (60% K ₂ O)
			(46% N)	(45% N)				
December 1, 1975	per tonne	4,539	4,022	4,022	4,077	4,060	5,295	1,025
	per kg	4.54	4.02	4.02	4.03	4.06	5.30	1.83
March 16, 1976	per tonne	4,539	3,804	3,800	4,077	4,060	3,951 ³	1,517
	per kg	4.54	3.80	3.00	4.08	4.06	3.95	1.52
October 18, 1976	per tonne	4,539	3,804	3,800	4,077	4,060	3,156	1,517
	per kg	4.54	3.80	3.80	4.08	4.06	3.16	1.52
February 8, 1977	per tonne	4,539	3,587	3,578	4,077	4,060	3,156	1,342
	per kg	4.54	3.59	3.58	4.08	4.06	3.16	1.34
October 12, 1977	per tonne	4,539	3,370	3,356	4,077	4,060	3,269 ⁴	1,342
	per kg	4.54	3.37	3.36	4.08	4.06	3.27	1.34
March 9, 1979	per tonne	4,369	3,152		3,846			
	per kg	4.37	3.15		3.85			

Source: Fertilizer Statistics, 1976-77, FAI

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Nitrogen/Grain Price Ratios
(In Rupees)

	Price of N/Kg.	Price of Wheat/Kg.	N/Wheat Price Ratio	Price of Paddy/Kg.	N/Paddy Price Ratio
1971-72	2. 01	0. 76	2. 64	0. 53	3. 79
1972-73	2. 08	0. 76	2. 74	0. 55	3. 78
1973-74	2. 28	0. 76	3. 00	0. 70	3. 26
1974-75	4. 35	1. 05	4. 14	0. 74	5. 88
1975-76	4. 02 3. 80 ^{a/}	1. 05 1. 05	3. 83 3. 62	0. 74 0. 74	5. 43 5. 14
1976-77	3. 59 ^{b/}	1. 05	3. 42	0. 74	4. 85
1977-78	3. 37 ^{c/}	1. 10 ^{d/}	3. 26 ^{d/} 3. 06 ^{c/}	0. 77 ^{c/}	3. 97 ^{c/}
1978-79	3. 37	1. 125 ^{e/}	3. 00	0. 85 ^{f/}	3. 96 ^{f/}

Notes: (1) N prices are based on urea
(2) Grain prices are procurement prices

^{a/} Effective March 1976
^{b/} Effective February 1977
^{c/} Effective October 1977
^{d/} Effective April 1977
^{e/} Effective April 1978
^{f/} Effective September 1978

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Phosphate/Grain Price Ratios
(In Rupees)

Year	Price of P/Kg.	Price of Wheat/Kg.	P/Wheat Price Ratio	Price of Paddy/Kg.	P/Paddy Price Ratio
1971-72	1.86	0.76	2.45	0.53	3.51
1972-73	1.89	0.76	2.49	0.55	3.44
1973-74	2.01	0.76	2.64	4.70	2.87
1974-75	4.83	1.05	4.60	0.74	6.55
1975-76	4.52	1.05	4.30	0.74	6.11
	4.08 ^{a/}	1.05	3.85	0.74	5.51
	4.17 ^{b/}	1.05	3.97	0.74	5.64
1976-77	3.40 ^{c/}	1.05	3.24	0.74	4.59
1977-78	3.40 ^{d/}	1.10	3.09	0.74	4.59
	3.49 ^{f/}		3.17	0.77 ^{g/}	4.53
1978-79	3.49 ^{e/}	1.125	3.10	0.77	4.53
				0.85 ^{g/}	

Notes: (1) P₂O₅ prices are based on DAP
(2) Grain prices are procurement prices

a/ Effective December 1975

b/ Effective March 1976

c/ Effective February 1977

d/ Effective April 1977

e/ Effective April 1978

f/ Effective Oct. 1977

g/ Effective Sept. 1978.

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Potash/Grain Price Ratios
(In Rupees)

Year	Price of K/Kg.	Price of Wheat/Kg.	K/Wheat Price Ratio	Price of Paddy / Kg.	K/Paddy Price Ratio
1971-72	0.89	0.76	1.17	0.53	1.68
1972-73	0.92	0.76	1.21	0.55	1.67
1973-74	1.13	0.76	1.49	0.70	1.61
1974-75	2.05	1.05	1.95	0.74	2.77
1975-76	1.97	1.05	1.88	0.74	2.66
	1.83 ^{a/}	1.05	1.74	0.74	2.47
	1.52 ^{b/}	1.05	1.45	0.74	2.05
1976-77	1.34 ^{c/}	1.05	1.28 ^{c/}	0.74	1.81
1977-78	1.34	1.10 ^{d/}	1.22 ^{d/}	0.77 ^{f/}	1.74 ^{f/}
1978-79	1.34	1.125 ^{e/}	1.19 ^{e/}	0.85 ^{g/}	1.58 ^{g/}

Notes: (1) K₂O prices are based on MOP
(2) Grain prices are procurement prices

a/ Effective December 1975
b/ Effective March 1976
c/ Effective February 1977
d/ Effective April 1977
e/ Effective April 1978
f/ Effective October 1977
g/ Effective September 1978

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Gross Financial Return per Rupee Invested in Fertilizer
(In Rupees)

Year	Paddy			Wheat		
	Returns From			Returns From		
	N	P	K	N	P	K
1971-72	2.64	1.71	2.38	3.78	2.45	3.42
1972-73	2.64	1.75	2.39	3.65	2.41	3.30
1973-74	3.68	2.44	3.10	4.00	2.65	3.36
1974-75	2.04	1.07	1.80	2.90	1.52	2.56
1975-76	2.21	1.15	1.88	3.13	1.63	2.66
	2.21	1.27	2.02	3.13	1.80	2.87
	2.34	1.24	2.43	3.32	1.76	3.45
1976-77	2.47	1.52	2.76	3.51	2.16	3.92
1977-78	2.74	1.54	2.76	3.68	2.26	4.10
			2.87	3.92	2.21	
1978-79	3.03	1.54	2.87	4.01	2.26	4.20
		1.70	3.17			

Notes: (1) N, P and K prices are derived from urea, Diammonium Phosphate (DAP) and Muriate of Potash (MOP) respectively.

(2) Incremental response ratios assumed to be: N = 10, P_2O_5 = 6, K_2O = 4 for 1971-72 and 1972-73. Thereafter, the ratios are assumed to be N = 12, P_2O_5 = 7 and K_2O = 5.

A-31

India: The Break-up of the Maximum Retail Price of Urea*

Items	Rs. per ton
1. Ex-factory price	1,158.0
2. Excise duty @ 15% ad valorem	174.0
3. Fertilizer Pool Equilization Charge	65.0
4. Equated freight	38.0
5. Dealer's margin	115.0
6. Total, i. e., the maximum retail price of urea	1,550.0

* Retail price relates to the period before March 9, 1979

Source: The Marathe Committee Report, 1977

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India: Distribution Margins for Urea.

Rs. per ton				
Sl. No.	Item	Existing distribution margin effective from 1-1-67	Margin recommended by National Commission on Agriculture	Margin recommended by Quraishi Committee
1.	Commission to dealer			
	(i) Wholesaler	7.60 (1%)	8.40 (1%)	8.79 (1%)
	(ii) Retailer	19.00 (21%)	21.00 (23%)	21.97 (24%)
2.	Incentive commission (to be funded)	2.00	4.00*	2.00
3.	Administrative charges	1.00	1.00	—
4.	Transport charges :			
	(i) Riv. to wholesale godown)	2.00		
	(ii) Wholesale godown to retail)	8.00	15.00	9.20
5.	Loading & Unloading			
	(i) Wholesaler	2.50		
	(ii) Retailer	2.50	8.00	7.00
6.	Godown rent for wholesaler and retailer @ Rs. 0.30 per tonne per month for six months	4.80	9.00	6.00
7.	Shortage for wholesaler and retailer	3.80 (1 per cent)	(a) 4.20 (1 per cent) (b) 4.20 (cent) (Cooperative)	3.79 (1 per cent)
8.	Interest charges	20.30 (4 months @ 8%)	42.00 (6 months @ 10%)	29.30 (4 months @ 10%)
9.	Supervision, publicity etc.	6.50	5.60	—
		80.00	122.40	113.05 ¹

* Rs. 2.00 for cooperatives for promotion and Rs. 2.00 to be funded. On the basis of Rs. 540 per tonne of urea.

1. The Quraishi Committee recommended a round figure of Rs. 95.00.

Source: A Study on Fertilizer Demand and Marketing, Vol.III- All India Summary Report. The FAI, 1974, p.45.

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India: Break-up of margin recommended by the Ouraishi
Committee and current margin

Particulars	(Rs. per tonne)		
	Urea	Ammonium sulphate	Calcium ammonium nitrate
1. Commission			
Wholesaler at 1 per cent	8.79	4.94	5.10
Retailer at 2½ per cent	21.97	12.35	12.75
Incentive commission	2.00	2.00	2.00
2. Administrative charges	—	—	—
3. Transport charges			
Railway station to wholesaler godown	9.20	9.20	9.20
Wholesaler godown to retailer			
4. Loading & unloading Wholesaler	7.00	7.00	7.00
Retailer			
5. Godown rent at Rs. 1 per tonne average for 6 months	6.00	6.00	6.00
6. Shortage for wholesaler and retailer at 1 per cent	8.79	4.94	5.10
7. Interest charges (4 months on an average) 10 per cent	29.30	16.47	17.00
8. Supervision and other miscellaneous charges (publicity, etc.)			
Total	93.05 or Rs. 95	62.90	64.14
B. Current margin	115.00	75.00	70.00

Source: Handbook on Fertilizer Marketing. The Fertilizer Association
of India, New Delhi, 1976, p.210.

India: Number of Sale Points, 1969 to 1978

Date	Cooperative	Private	Total**
April 1, 1967	48,031	NA	NA
April 1, 1968	41,052	NA	NA
April 1, 1969	36,505	30,066	66,571
April 1, 1970	33,418	38,234	71,652
April 1, 1971	30,670	50,790	81,460
April 1, 1972			
April 1, 1973	39,266	47,120	86,395
February 1, 1974	37,911*	56,172	94,295
February 1, 1975	39,156*	59,473	98,629
February 1, 1976	39,950*	55,073	94,623
May 1, 1977	33,404*	49,916	96,220
April 1, 1978	43,264	58,575	101,839

* includes other institutional agencies.

** Since some states have governmental depots, along with cooperatives and private distributors, figures in the last column are not equal to the sum of the figures in the second and third columns.

Source: Fertilizer Statistics, 1971-72 to 1977-78

India: Statewise Distribution of Sale Points, 1976, 1977, 1978

Zone/State	As on Feb. 1, 1976			As on April 1, 1978		
	Coop. & other institutional agencies	Private	Total	Coop. & other institutional agencies	Private	Total
<u>Central</u>						
<u>Madhya Pradesh</u>						
Pradesh	3,580	1,514	5,094	3,260	3,161	6,421
Rajasthan	1,553	945	2,498	3,178	1,368	4,546
Uttar Pradesh	6,999	6,979	13,978	7,924	6,986	14,910
Delhi	30	45	75	35	51	86
<u>East</u>						
Assam	146	695	841	159	845	1,004
Bihar	277	3,595	3,872	277	3,595	3,872
Manipur	49	115	164	91	113	204
Meghalaya	15	131	1,246	8	113	121
Nagaland	12	-	12	12	-	12
Orissa	2,197	2,457	4,654	2,321	2,815	5,136
Tripura	252	23	275	252	17	269
West Bengal	1,549	14,451	16,000	850	11,332	12,182
<u>North</u>						
Haryana	615	576	1,191	693	1,038	1,731
Himachal Pradesh	1,357	182	1,539	1,553	199	1,752
Jammu & Kashmir	N. A.	N. A.	1,042	1,169	-	1,169
Punjab	816	1,766	2,382	870	1,550	2,420
<u>South</u>						
Andhra Pradesh	1,335	6,871	8,207	1,478	6,726	8,204

India: Fertilizer Use by Holding Size, 1970-71

Size of holding (Hectares)	% of area fertilized to gross cropped area		Kg. of nutrient per fertilized hectare	
	<u>Wheat</u>	<u>Rice</u>	<u>Wheat</u>	<u>Rice</u>
0 - 2.5	43.7	41.4	53.0	52.0
2.5 - 8.5	53.6	49.3	58.7	42.1
8.5 +	51.9	72.8	54.4	62.7
Average	50.0	47.0	56.2	49.7

Source: Fertilizer Use on Selected Crops in India, NCAER and Fertilizer Association of India, September, 1974. Based on a sample survey of over 4,000 farmers throughout India. Reproduced here from the World Bank, Report No.1529-IN, p. 91

Fertilizer Application Rates by States*

	In kilograms per fertilized hectare					
	Size of Farms (hectares)					
	Below 1	1 - 2	2 - 4	4 - 10	Above 10	All Households
Central:						
Madhya Pradesh	72.1	66.9	55.4	41.3	41.9	46.5
Rajasthan	59.2	55.6	57.9	59.0	48.1	55.5
Uttar Pradesh	73.5	66.0	65.4	65.6	47.7	64.6
West:						
Gujarat	78.7	64.7	59.7	43.1	34.7	45.8
Maharashtra	90.5	95.8	85.4	75.3	63.3	77.3
North:						
Haryana	54.6	64.2	57.0	74.5	98.2	76.6
Himachal Pradesh	41.7	26.0	20.9	22.3	17.3	28.5
Jammu & Kashmir	45.6	50.8	47.0	34.4	-	47.0
Punjab	88.1	80.3	90.9	90.8	93.6	90.8
East:						
Assam	69.1	51.2	56.2	50.1	15.4	49.4
Bihar	64.7	50.8	45.7	45.4	49.3	49.7
West Bengal	100.0	103.6	77.3	65.9	177.5	89.5
Orissa	86.9	71.5	77.6	97.3	111.5	90.8
South:						
Andhra Pradesh	109.6	118.5	115.9	117.4	85.6	111.7
Karnataka	169.1	131.7	106.3	97.4	39.3	104.6
Kerala	93.4	88.6	73.4	171.4	-	92.0
Tamil Nadu	133.5	133.0	122.5	120.5	127.3	128.1

Source: National Council of Applied Economic Research,
Fertilizer Demand Study, Interim Report, New Delhi 1978.

* Arithmetic mean of state data gives 73 kg/ha. for All India.

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YARDSTICKS OF ADDITIONAL PRODUCTION FROM THE USE OF FERTILISERS ON HIGH YIELDING AND LOCALLY IMPROVED TALL VARIETIES

State	District covered	Variety	No. of experiments	Yardsticks of additional production in tonnes				
				Per tonne of N		Per tonne of P ₂ O ₅		Per tonne of K ₂ O
				at 60 kg N/ha	at 120 kg N/ha	at 30 kg P ₂ O ₅ /ha	at 60 kg P ₂ O ₅ /ha	at 60 kg K ₂ O/ha
A. RICE (unhusked)								
Kharif (Irrigated)								
Andhra Pradesh	Chittoor	IR-8	198	8.6	8.6	13.2	11.2	6.6
	Nizamabad West Godavari	Locally Improved	198	8.9	7.4	10.0	8.8	3.3
Bihar	Shahabad	IR-8	117	14.8	12.4	12.8	8.0	7.0
		Locally Improved	143	13.6	11.6	10.1	7.0	6.9
Haryana	Karnal	IR-8	67	15.2	12.6	6.4	4.1	1.0
		Locally Improved	91	15.9	13.0	7.8	6.5	0.8
Karnataka	Shimoga	IR-8	75	8.2	7.9	21.8	14.0	6.7
	Raichur	Locally Improved	79	10.2	8.4	20.7	14.2	4.3
Madhya Pradesh	Raipur	IR-8	119	7.5	8.1	21.2	13.3	5.2
		Locally Improved	169	8.4	7.1	21.4	16.5	7.3
Tamil Nadu	Thanjavur	IR-8	257	15.3	12.8	20.4	21.3	6.2
	Coimbatore	Locally Improved	212	10.1	10.2	14.8	14.4	6.3
Uttar Pradesh	Varanasi	IR-8	79	10.6	9.2	3.7	3.9	3.3
West Bengal	Burdwan	IR-8	63	15.9	11.1	8.7	4.2	2.8
Average		IR-8	975	12.0	10.3	13.5	10.0	4.8
		Locally Improved	892	11.2	9.7	14.1	11.2	4.8
Kharif (Unirrigated)								
Kerala	Alleppey Palghat	IR-8	188	8.3	6.6	7.2	5.5	3.5
Maharashtra	Poona	IR-8	86	4.6	4.1	3.7	3.9	5.3
	Nasik	TN-1	102	5.9	5.0	6.4	5.4	3.2
	Poona Nasik	Locally Improved	229	2.8	4.5	7.2	5.1	3.4

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Average		IR-8	274	6.4	5.3	5.4	4.7	4.4
		Locally Improved	229	2.8	4.5	7.2	5.1	3.4
Rabi (Irrigated)								
Andhra Pradesh	Chittoor	IR-8	174	8.6	8.2	13.3	13.0	6.9
	West Godavari	Locally Improved	133	8.0	6.2	7.4	4.1	3.3
Karnataka	Shimoga	IR-8	102	18.5	16.5	27.7	20.7	8.3
	Raichur							
Madhya Pradesh	Raipur	Locally Improved	28	9.9	8.5	12.1	11.0	1.8
Orissa	Cuttack	Jaya*	152	14.2	13.0	15.3	14.2	6.4
	Sambalpur							
Tamil Nadu	Thanjavur	IR-8	98	12.7	12.0	11.6	10.0	6.1
		Locally Improved	176	11.4	11.0	12.8	11.2	7.1
Average		IR-8*	428	13.8	12.6	18.8	16.0	7.2
		Locally Improved	337	9.8	8.6	10.8	8.8	4.1
Rabi (Unirrigated)								
Kerala	Alleppey	IR-8	249	8.9	7.2	10.1	5.7	2.8
	Palghat							
	Alleppey	TN-1	59	6.7	5.5	5.2	5.0	4.9
	Alleppey	Locally Improved	178	4.6	3.8	6.7	5.2	4.0
	Palghat							
B. WHEAT (Irrigated)								
Bihar	Shahabad	S-308	158	16.6	13.0	7.5	7.4	4.1
	Monghyr	Locally Improved	305	11.6	9.2	10.3	9.6	3.8
Delhi	Delhi	S-227	74	16.0	14.7	19.1	16.1	3.8
Gujarat	Mehsana	S-227	234	5.5	4.9	14.6	8.5	2.4
	Bhavnagar	Locally Improved	322	3.9	3.3	8.9	9.3	2.8
Haryana	Karnal	S-227	124	16.0	13.6	9.1	5.9	5.7
		S-308	95	11.8	11.3	3.9	5.3	1.3
		Locally Improved	57	12.3	8.9	6.5	--	--
Madhya Pradesh	Hoshangabad	S-227	249	14.3	11.6	6.1	6.9	5.3
		Locally Improved	124	12.2	9.6	6.8	7.0	1.6
Marharashtra	Nasik	S-308	126	7.3	5.2	10.1	7.3	1.9
		Locally Improved	128	6.5	4.7	8.6	6.5	2.1
Punjab	Ludhiana	S-227	144	10.8	8.0	15.0	8.8	--
		S-308	116	12.0	8.7	15.1	10.8	1.4
		Locally Improved	59	6.8	5.3	11.3	--	--

*Includes 'Jaya' which belongs to the same group.

(Continue

**YARDSTICKS OF ADDITIONAL PRODUCTION FROM THE USE OF FERTILISERS
ON HIGH YIELDING AND LOCALLY IMPROVED TALL VARIETIES (Concluded)**

State	District covered	Variety	No. of experiments	Yardsticks of additional production in tonnes				
				Per tonne of N		Per tonne of P ₂ O ₅		Per tonne of K ₂ O
				at 60 kg N/ha	at 120 kg N/ha	at 30 kg P ₂ O ₅	at 60 kg K ₂ O/ha	at 60 kg K ₂ O/ha
Rajasthan	Pali	S-227	98	5.7	6.0	6.7	2.7	4.3
Uttar Pradesh	Varanasi	Locally Improved	89	6.7	5.8	5.0	2.8	3.0
	Aligarh, Kanpur, Jhansi	S-227	675	13.7	11.5	7.6	6.9	4.0
West Bengal	Burdwan	Locally Improved	353	8.0	6.3	5.2	5.1	3.1
		S-227	82	10.8	8.2	9.0	3.9	3.2
		S-308	61	13.5	10.3	5.6	8.8	5.0
Average		S-227	1,689	11.6	9.8	10.9	7.5	4.1
		S-308	555	12.2	9.7	8.4	7.9	2.7
		Locally Improved,	1437	8.5	6.6	7.8	6.7	2.7
C. JOWAR								
Kharif (Irrigated)								
Gujarat	Bhavnagar	CSH-1	61	1.8	2.4	9.0	4.0	3.2
		Locally Improved	55	1.6	1.6	5.6	3.2	0.9
Kharif (Unirrigated)								
Maharashtra	Parbhani	C-H-1	114	2.9	2.7	8.2	6.2	2.3
Uttar Pradesh	Jhansi	Locally Improved	109	2.2	1.6	3.8	2.3	1.0
		CSH-1	38	3.8	3.3	2.0	1.8	1.6
		Locally Improved	38	3.6	3.0	2.0	1.4	1.4
Rabi (Irrigated)								
Maharashtra	Parbhani Poona	CSH-1	168	2.7	2.4	5.5	4.0	2.0
		Locally Improved	191	2.9	2.1	3.8	2.5	3.2
D. MAIZE								
Kharif (Irrigated)								
Punjab	Ludhiana	Vijay-1	108	9.3	8.0	8.5	8.1	1.6

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Kharif (Unirrigated)

Bihar	Monghyr	Ganga Safed-2	83	15.7	14.0	12.3	13.5	5.9
	Jaunpur		86	12.6	10.0	11.3	10.6	5.4
Himachal Pradesh	Mandi	Ganga-3	30	5.9	4.9	7.2	10.6	5.0
		Him-123	41	6.8	4.6	6.6	4.7	4.3
Uttar Pradesh	Kanpur	Ganga-5	74	14.0	11.6	5.5	4.6	2.4

Rabi (Irrigated)

Andhra Pradesh	Nizamabad	Ganga-3	34	8.6	7.8	3.9	7.9	5.5
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E. BAJRA

Kharif (Irrigated)

Gujarat	Mehsana	N-207	27	3.1	2.0	4.8	4.4	0.0
Delhi	Delhi	HB-1	38	5.8	5.9	6.7	6.9	2.7
Uttar Pradesh	Aligarh	HB-1	38	4.9	5.4	4.1	7.0	2.5
		Local	25	4.6	4.3	2.0	3.8	0.7

Kharif (Unirrigated)

Gujarat	Mehsana	Locally Improved	193	2.5	2.3	5.9	4.8	2.4
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Rabi (Irrigated)

Tamil Nadu	Coimbatore	HB-3	105	5.4	4.7	3.3	6.5	1.5
		X-3	103	4.5	3.7	8.0	5.4	1.3

- Note:**
1. An estimate of the average response per unit application of the development measure, such as fertiliser, is defined as "yardstick" of its contribution towards increased production of the crop.
 2. Data of those districts where the experiments were conducted atleast for two years and with more than 25 experiments per variety were used to determine the yardstick.
 3. The doses* at which the yardsticks of additional production were formulated are:
60 and 120 kg/ha of N,
30 and 60 kg ha of P₂O₅,
and 60 kg/ha of K₂O.
- Responses to K₂O were measured over a basal application of 120 kg/ha of N and 60 kg/ha of P₂O₅.
- * One tonne of fertiliser nutrient can benefit an area of 33.33 hectares at 30 kg/ha of the nutrient; at double this dose, the material can be applied over 16.66 hectares, and an area of 8.33 hectares can be covered at 120 kg/ha of the nutrient.

Source: "Evaluation of yardsticks of additional production for the use of fertilisers on high yielding and locally improved tall varieties of cereals"—I.A.R.S. (I.C.A.R.), New Delhi, 1973.

- Summary:**
1. In general, additional production of about 10 tonnes/tonne of nitrogen were obtained for rice in Kharif and wheat in Rabi under irrigated conditions to an application of 60 kg N/ha. On equal nutrient basis the yardstick of additional production from the use of phosphorus was about a tonne less for rice and three tonnes less for wheat per tonne of P₂O₅. The yardsticks of additional production from the use of potassium at 60 kg K₂O/ha were about 40 per cent of the yardsticks of additional production from the use of nitrogen for these two crops. The yardsticks of additional production from the use of fertiliser for other cereals were much lower compared to rice and wheat.
 2. The data available on jowar, maize and bajra were too meagre to see the trend of the hybrids. However, it was observed that higher yardsticks of additional production per unit of fertiliser application for Ganga Safed-2 variety in comparison with Jaunpur was a possibility.

**Interstate Comparison of Retail Sales Points (RSP)
and Fertilizer Consumption per Hectare, 1977-78.**

Hectares of cropped area (gross) per RSP*	State (rank in brackets)	Consumption per hectare of cropped area (gross)**
838 (1)	Pondl	150.3 (1)
495 (2)	Kerala	26.3 (9)
527 (3)	Himachal	10.7 (16)
577 (4)	Tamil Nadu	59.0 (3)
453 (5)	W. Bengal	21.6 (11)
690 (6)	J & Kashmir	13.5 (14)
902 (7)	Goa	30.7 (7)
1,029 (8)	Manipur	13.5 (15)
1,390 (9)	Tripura	1.3 (23)
1,506 (10)	Orissa	8.3 (18)
1,539 (11)	Karnataka	24.1 (10)
1,581 (12)	U.P.	36.9 (5)
1,579 (13)	Andhra Pradesh	40.3 (4)
1,678 (14)	Meghalaya	9.9 (17)
1,693 (15)	Gujarat	28.5 (8)
2,585 (16)	Punjab	72.4 (2)
2,915 (17)	Bihar	15.4 (13)
3,149 (18)	Haryana	34.7 (6)
3,164 (19)	Assam	1.8 (21)
3,326 (20)	Madhya Pradesh	7.5 (19)
3,514 (21)	Maharashtra	18.3 (12)
3,776 (22)	Rajasthan	6.6 (20)
9,416 (23)	Nagaland	1.8 (22)

Source: FAI, *National median 1,680 ha/RSP

**National median 25 kg/ha

Appendix B

STRUCTURE OF COSTS AND RETURNS FROM WHEAT AND PADDY CULTIVATION

Introduction

This appendix summarizes the results of farm management studies relating to wheat and paddy crops in Ferozepur (Punjab), Muzaffarnagar (Uttar Pradesh) and Coimbatore (Tamil Nadu).

Directorate of Economics and Statistics, Ministry of Agriculture:

- (1) Studies in the economics of farm management in Ferozepur District (Punjab), three-year consolidated report (1967/68-1969/70), New Delhi 1974.
- (2) Studies in the economics of farm management in Muzaffarnagar district (U.P), combined report for the years 1966/67-1968/69, New Delhi 1974
- (3) Studies in the economics of farm management in Coimbatore District (Tamil Nadu), three-year combined report (1970-71 to 1972-73), New Delhi 1976.

The period of investigation in each district was three years. The study of Ferozepur District relates to the period 1967/68-1969/70; that of Muzaffarnagar to 1966/67-1968/69, while the Coimbatore study relates to 1970/71-1972/73. This series of studies, sponsored by the Union Ministry of Agriculture, was discontinued after 1972/73.

While all three studies provide data on costs and returns from cultivation of local varieties of paddy, those of Ferozepur and Muzaffarnagar provide data on high yielding wheat varieties. The Ferozepur study contains some information on IR-8 paddy, but the data relate to a small fraction of farms and only to the last year of investigation. This appendix is concerned with the data on high yielding wheat in Ferozepur and Muzaffarnagar, and paddy in Muzaffarnagar and Coimbatore districts.

Design of the Studies

Sampling design of the farm management studies has been multistage stratified random, with the villages as the primary unit and operational holding as the ultimate unit. In all these districts, 150 operational holdings were selected from 15 villages. However, the grouping of holdings into different size-groups was not uniform. Thus, in Ferozepur where the average size of holdings is quite large, the smallest size of holdings was defined as less than 6 hectares whereas it was less than 2.87 hectares in Muzaffarnagar and less than 2.02 hectares in Coimbatore.

Cost Concepts

Four concepts of cost, costs A1, A2, B and C were used in these investigations. Cost A1 covers the cash and kind expenditures (or out-of-pocket expenses) actually incurred by an owner-operator. It includes cash and kind expenditures on human labor, bullock labor, seeds, manures, fertilizer, land revenue and cess, irrigation charges, depreciation of implements, machinery and buildings, and interest on crop loans and working capital. Cost A2 is derived by adding rent paid for leased-in land to cost A1. Cost B is calculated as cost A1 (or-2) plus the imputed value of rent chargeable to owned land and interest on fixed capital excluding land. Lastly, cost C is derived by adding the imputed value of the farm family labor to cost B.

These cost concepts have been widely used to derive different measures of farm income. Farm business income derived as gross income minus cost A1 for owner-operator from the farm business and from investment in owned land and fixed capital. This is the measure most frequently used in India in farm management analysis; it is also used here in the derivation of benefit-cost ratios in the following pages. Other income measures include (1) family labor income, derived as gross income minus cost B; (2) farm investment income, defined as gross income minus cost C plus the difference between cost B and cost A2; and (3) net income (for a farm which is run strictly as a business proposition) defined as gross income minus cost C.

High Yielding Wheat Varieties

Table Nos. 1 and 2 show the rate of return to farmers growing high yielding varieties of wheat in Ferozepur and Muzaffarnagar districts.

Data are averages of three years. Details regarding the composition of costs are not available except for the average farm. Fertilizer use, in terms of nutrients N, P and K, averaged 56 kg per hectare in the smallest size-group of farmers in Ferozepur, rising to 103 kg per hectare in the largest size-group of farms. In Muzaffarnagar by contrast fertilizer (nutrient) application was inversely related to farm size, declining from 49.77 per hectare in the smallest size-group to 31.37 kg/ha in the farms belonging to the largest size group. Benefit-cost ratios were attractive in both districts for both owner-operators and tenant farmers.

Benefits from Paddy Cultivation

Table Nos 3 and 4 show the structure of costs and ratios of return to paddy farmers in Muzaffarnagar and Coimbatore districts.

A striking feature of the two tables is the variation in costs in the two districts, partly, it can be explained in terms of differences in the quantity of inputs used in the two districts. Thus, in Muzaffarnagar average fertilizer application was only 8.72 kg (nitrogen equivalent) per hectare while in Coimbatore it was more than 94 kg per hectare. Again, irrigation costs were the least in Muzaffarnagar. On the whole, the rate of return to paddy farmers was satisfactory in Coimbatore and highly attractive in Muzaffarnagar.

Table 1 Rate of Return to HYU Wheat Farmers:Ferozepur
(1967/68 to 1969/70)

	Farm Size (HA)					Average
	Below 6	6-9	9-14	14-24	24 and above	
Yield (Quintal/HA)	21.02	28.74	24.29	23.54	29.26	25.40
Gross Return/HA (RS.)	2378.28	2252.75	2176.17	2315.09	2619.23	2316.51
Cost of Production/ HA (RS.)						
Cost A1	869.70	893.64	921.71	869.59	819.54	872.63
Cost A2	921.08	948.85	973.08	918.78	847.12	920.02
Net Return/HA (RS.)						
In terms of Cost A1	1508.58	1309.76	1254.46	1439.01	1799.69	1443.88
In Terms of Cost A2	1457.20	1254.56	1203.09	1389.82	1772.82	1396.49
Benefit-cost Ratio						
In Terms of Cost A1	2.73	2.52	2.36	2.66	3.09	2.65
In Terms of Cost A2	2.58	2.37	2.23	2.51	3.09	2.51

**Table 2-Rate of Return to NYU Wheat Farmers: Muzaffarnagar
1966/67 to 1968/69)**

	FARM SIZE (HA)					
	Below 2.87	2.88 4.71	4.72 6.96	6.97 10.65	10.66 and above	Average
Yield (Quintal/HA)	34.82	32.16	30.32	29.56	29.62	30.50
Gross Return/HA (RS.)	3850	3575	3312	3344	3164	3311
Main Product	3489	3181	2954	2989	2840	2960
Cost of Production (RS)						
Cost A1	1259	858	830	807	654	756
Cost A2	1336	870	830	807	657	760
Net Return (RS.)						
In Terms of cost						
A1	2592	2718	2483	2537	2511	2555
In Terms of Cost						
A2	2514	2705	2482	2537	2511	2551
Benefit-cost ratio						
In Terms of Cost						
A1	3.06	4.17	3.99	4.14	4.84	4.38
In Terms of Cost						
A2	2.88	4.11	3.99	4.14	4.84	4.36

**Table 3 - Rate of Return to Paddy Farmers: Muzaffarnagar
(1966/67 to 1968/69)**

	<u>Farm Size (HA)</u>					
	Below 2.87	2.88 4.71	4.72 6.96	6.97 10.65	10.66 and Above	Average
Yield (Quintal/HA)	23.40	26.02	21.06	19.92	23.43	22.28
Gross Return/HA (RS.)	1867	2050	1691	1584	1855	1769
Main Product	1759	1916	1590	1485	1774	1669
By-product	107	134	101	100	82	100
Cost of Production (RS)						
Cost A1	421	374	401	377	429	400
Cost A2	443	380	408	379	429	405
Net Return (RS.)						
In Terms of Cost						
A1	1446	1676	1290	1207	1426	1368
In Terms of Cost						
A2	1424	1670	1283	1206	1426	1364
Benefit-cost ratio						
In Terms of Cost						
A1	4.43	5.48	4.22	4.20	4.32	4.42
In Terms of Cost						
A2	4.21	5.39	4.14	4.18	4.32	4.37

**Table 4 - Rate of Return to Paddy Farmers:Coimbatore
(1970/71 to 1972/73)**

	FARMS SIZE (HA)					
	Below 2.02	2.03 3.34	3.35 5.67	5.68 10.52	10.53 and above.	Average
Yield (Quintal/HA)	30.72	29.82	35.64	33.64	34.93	33.83
Gross Return/HA (RS.)	2662.65	2359.42	2749.08	2597.75	2634.08	2629.51
Cost of Production/HA (RS)						
Cost A1	1246.31	1368.37	1339.22	1356.34	1537.25	1374.73
Cost A2	1388.21	1404.25	1339.22	1385.17	1537.25	1400.57
Net Return/HA (RS)						
In Terms of Cost						
A1	1415.95	991.05	1409.86	1241.42	1096.84	1254.79
In Terms of Cost						
A2	1274.05	995.17	1409.86	1212.59	1096.84	1228.95
Benefit-cost Ratio						
In Terms of Cost						
A1	2.14	1.72	2.05	1.92	1.71	1.92
In Terms of Cost						
A2	1.92	1.68	2.05	1.88	1.71	1.88

Appendix C

Discussion of Fertilizer Supply and Demand Forecasting Methods for Fertilizer Production

Estimation of Fertilizer Demand

Estimation of fertilizer demands for the country presents considerable difficulties due mainly to lack of reliable information on fertilizer dosages actually used for individual crops in different regions of the country. Attempts at production function analysis, which would lead to forecasting results with an element of precision, have been unsuccessful, particularly when estimating from data relating to actual farming rather than experimental conditions. Of the several other possible approaches, none is entirely free from uncertain assumptions.

The National Commission of Agriculture has projected fertilizer requirements based on the following:

1. replenishment of nutrients removed by crops,
2. area under crops and estimated doses, and
3. agricultural production, demand and response ratios of crops to application of fertilizer.

Insofar as the first method is concerned, it may be mentioned that the applied and native nutrients undergo transformations which can make it difficult to estimate nutrient availability at any one time: estimates based on this assumption may be erroneous and not realistic.

The basic data required for the second method are:

1. area under various crops, high yielding as well as local varieties and areas irrigated and rainfed; and
2. the estimated fertilizer doses for each of the above conditions regarding crops and irrigation.

The data in respect of (1) may not present much difficulty but there is a good deal of flexibility in the choice of the doses.

Using the third method, i.e. calculating the amount of additional produce obtained by the addition of a unit quantity of fertilizers, is straightforward. The usual value of this rate is taken to be 10, meaning that 1 tonne of NPK nutrients is likely to give an additional production of 10 tonnes of grains. Since the response ratio could vary from one agro-climatic region to another due to differences in the level of irrigation interaction effect of nutrients and the level of soil fertility, this method can be only indicative.

Another approach for estimating the fertilizer requirement is the Trend Line method, which takes into account the consumption pattern over a number of years. FAI has substituted the "Trend Line method" by the "Best Quadratic Fit" which excludes aberrant years from consideration. The objection to this is that the past trends may not be reflected in the future, especially in the case of fertilizer use which depends upon a number of variable such as soil, climate, irrigation, cropping pattern, fertilizer responses, infra-structure for fertilizer marketing, credit availability and extension technology on fertilizer use management, that are themselves highly variable. However, the NCAR has collected voluminous data on various structural factors affecting fertilizer use from 20,000 sample studies and is attempting a projection of fertilizer demand for the next 10 years.

The Working Group constituted by the Planning Commission, to review the progress made in the Fifth Plan, adopted another approach to estimate fertilizer demand. This approach, applied to 1982-83 is based on the area projections made by the Crops Division and the dosage adopted on the basis of the actual level of application achieved. Assuming that out of the total nutrients consumed, two-thirds were used by high yielding varieties and one third by cash crops and crops other than high yielding varieties, with a consumption level of about 43 lakh tonnes of nutrients in 1977-78 and with a total of 37 million hectares covered under the high-yielding varieties programme, the average rate of application per hectare comes to 78 kgs.^{1/} Since the rate of application is higher in the case of HYV wheat and rice compared to

^{1/} 1 Lakh = 100,000

Maize, Jowar and Bajara, the dosages used in 1977-78 were reasonably computed as 118, 108, 64, 50, 50 for HYV wheat, paddy, maize, jowar and Bajara respectively. The computation generally lies between the findings indicated by various studies and examined by the Planning Commission. In view of the level of application already achieved and the agronomic considerations, during the year 1982-83 the following average dosages are estimated as probable:

	<u>N</u>	<u>P205</u>	<u>K20</u>
HYV wheat 122 kg/ha.	78	30	14
HYV paddy 118 kg/ha.	75	25	18
Hybrid maize Jowar & Bajara 60 kg/ha.	40	14	6

In the case of irrigated and unirrigated crop varieties of cereals, pulses and cash crops, most realistic dosages of fertilizer application have been assumed.

On the basis of these parameters the fertilizers requirements by the end of 1982-83 work out to 78,000 lakh tonnes of N+P+K nutrients (51.5 lakh tonnes of N, 17.2 lakh tonnes of P and 9.3 lakh tonnes of K). It will be noted that this estimated level of consumption more or less corresponds to the estimate made by the N.C.A.E.R., the Planning Commission and the Fertilizer Association of India.

Estimation of Demand in the Short Run

As far as the short-term demands of fertilizers are concerned the Fertilizer Division in the Department of Agriculture assesses the requirements of fertilizers for each crop season in consultation with the State Governments/Union Territories/Commodity Boards before a commencement of that crop season. The method of estimation of fertilizer requirements in terms of N, P205 and K20 for each crop season-Khariff/Rabi-involves the following steps:

1. Selection of the best season in terms of total fertilizer consumption in each State/Union Territory since 1969-70,
2. Levels of fertilizer consumption in best season taken as the base,
3. Obtaining the data on area under different crops during the selected best seasons,
4. Conversion of the area under different crops to be standard area for the past season,
5. Estimation of average dose for the best consumption season,
6. Estimation of required average doses for the current season,
7. Assessment of area under crops in the season for which fertilizer requirements have to be estimated,
8. Conversion of area under different crops in the current season to be standard area, and
9. Estimation of fertilizer requirement for the current season.

Average dose in the Season is worked out at different rates over the last season bearing from State to State but in on case the rate of increment is given for more than three installments.

Requirement of the Season is worked out on the basis of standardised area under different crops and the average dose for the season in a particular State. In order to keep the estimates realistic, the assessments are restricted to:

1. As per formula,
2. 30 percent increase over the best consumption and
3. as suggested by the State Government in the Zonal Conference, which ever is the least.

Supply of Fertilizers

The Fertilizer Division in the Department of Agriculture holds zonal conferences on fertilizers with the State Governments, domestic manufacturers and others before the commencement of each crop season. After the requirements of fertilizers for the ensuing crop season are finalized, a coordinated and rational plan of supplies of fertilizers from various domestic manufacturers and from imports is finalized to meet the above requirements of each State, etc, in full. The domestic supplies of fertilizers are finalised after the estimates of production by each manufacturer during the ensuing season are confirmed by the Ministry of Petroleum Chemicals and Fertilizers. In drawing up the supply plan of fertilizers criss-cross movements and long haulages are avoided and the whole distribution is regulated under the Essential Commodity Act. The supply position of fertilizer to the State Governments is reviewed constantly each month and if any shortfall in the supplies from the domestic manufacturers is noticed that is met from the Central Fertilizer Pool which is a Residual supplier.

Prepared by:
Fertilizer Division
Ministry of Agriculture
and Irrigation
Government of India

Synthesized Procurement Schedule

**Arrangements for FOB Commodity Only -
Freight separately arranged
All Activities in New Delhi**

IFB would require suppliers to send informational copies of their offers, with evidence of their bid bonds, to AID/W 48 hours after bid opening.

It is assumed that AID/Washington will have approved the basic IFB prior to the following activities.

- | | |
|---|----------------|
| 1. MMTC cables Embassy desired type and amount of fertilizer, shipping schedule and proposed bid opening date. | 1 day |
| 2. Embassy passes to AID/W for approval | 1 day |
| 3. AID/W approves | 1 day |
| 4. Embassy and AID/W prepare final version of IFB, print copies and mail | 3 days |
| 5. IFB's en route via mail to suppliers | 3 days |
| 6. Suppliers receive IFB's and formulate offers | 10 days |
| 7. Bids en route via mail to New Delhi | 14 days |
| 8. Bid opening | 1 day |
| 9. MMTC & AID/W evaluate offers | 10 days |
| 10. MMTC cables proposed awards to AID/W via USAID | 2 days |
| 11. AID/W approves proposed awards | 1 day |
| 12. Transmittal of approval to MMTC via USAID | 3 days |

-2-

13.	Issuance of Notices of Awards (Telex and Mail)	1 day
14.	Suppliers arrange for Performance Bonds and transmittal to MMTC	10 days
15.	MMTC requests issuance of L/Com via USAID. USAID cable transmits to AID/W	3 days
16.	L/Com issued by AID and accepted by suppliers	14 days
	Total	78 days

Notes:

- (a) First shipping period of suppliers could begin approximately 2 weeks after receipt by suppliers of L/Com.
- (b) Immediately after bid opening MMTC would cable AID/W number of offers received so that AID/W can be assured of having been sent copies of all offers by suppliers.
- (c) Time lapse from bid opening through issuance and acceptance of L/Com = 45 days
- (d) Offers would have to be valid for 18 days (Step # 8 through Step # 13.)

APPENDIX E

Fertilizer Promotion Logical Framework

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p><u>Sector Goals</u> Increase agricultural output over 1979-83 period. Increase small farmer incomes</p>	<p><u>Measures of goal achievement:</u> Annual average growth rate of crop output of four percent Continued participation of small farmers in adoption of HYV package.</p>	<p><u>Data:</u> GOI statistics on agricultural production. Review and synthesize relevant evaluation reports of ARDC, SFDA/MFAL, Program Evaluation Organization, REC etc.</p>	<p><u>Assumptions:</u> "Normal" weather over '79-'82 period. "Normal" plant disease and plant infestation. Implementation of projected levels of investment in irrigation and other complementary inputs.</p>
<p><u>Project Purpose:</u> Maintain current momentum of fertilizer consumption on an equitable basis.</p>	<p><u>EOPS:</u> Increase national fertilizer consumption at an average rate of 10%/annum. Increase growth rate of "lagging" areas relative to State averages. Continued participation of small farmers in increased fertilizer consumption.</p>	<p>Data prepared by Fertilizer Section, MOA. Using NCAER study as a bench mark may be necessary to fund sample survey to evaluate progress.</p>	<p>Current crop/fertilizer price relationships will be maintained. Planned increase in rural credit will be attained. Investment plans for complementing inputs will be achieved. Planned extension activities in lagging areas will be implemented.</p>
<p><u>Outputs:</u> Adequate supply of fertilizer at local level. Expanded base of consumption.</p>	<p><u>Magnitude of Output</u> Consumption of approximately 25 million N. T. of fertilizers. Additional supply points will be established in the "lagging" areas.</p>	<p>Data prepared by Fertilizer Section, MOA. Data prepared by Fertilizer Sections, State DOA. Jointly agreed upon GOI/AID evaluation studies of distribution and promotion activities</p>	<p>Transportation and storage will not be a constraint. Current foreign exchange picture will not change dramatically Production capacity, will develop on schedule.</p>
<p><u>Inputs:</u> GOI: Government budget to cover fertilizer imports, transportation costs, promotional activities, personnel salaries and general operating expenses. AID: \$ 150 million for fertilizer imports.</p>	<p><u>Implementation targets:</u> GOI: Continuous import program sufficient to maintain necessary buffer stocks. AID: Fertilizer imports according to following schedule: FY 1979 \$22 mil* FY 1980 \$49 mil* FY 1981 \$79 mil* *landed cost</p>	<p>GOI Reports and instructions. AID Procurement and disbursement records.</p>	

DITIONAL MEASURE MIGHT BE THE INCREASE IN NUMBER OF SUCH SMALL AND MARGINAL FARMERS USING FERTILIZER AS QUANTIFIED IN NCAER DATA USED IN ANNEX 7 OF PID.) EVALUATION COVENANT SHOULD BE INCLUDED IN LOAN AGREEMENT SO THAT TECHNIQUES SHOWN SUCCESSFUL BY EVALUATION AND AGREED TO BY BOTH PARTIES MIGHT BE IMPLEMENTED IN LATER PROJECT STAGES AND THAT PROBLEMS IDENTIFIED BY EVALUATIONS COULD BE CORRECTED BY MUTUAL AGREEMENT. FURTHER COMMENTS ON EVALUATIONS WILL FOLLOW AFTER DISCUSSIONS WITH DR. GOTSCH ON MARCH 28.

(4) PROCUREMENT -

PROCUREMENT OF FERTILIZERS FOR THIS PROJECT IS COMPLICATED DUE TO AMOUNTS AND AID EMBARGO ON FERTILIZER PROCUREMENTS WHICH IN EFFECT PROHIBIT FINANCING FERTILIZER SHIPMENTS FROM THE U.S. DURING PERIOD FEBRUARY 1 TO MAY 30, UNLESS EXCEPTION GRANTED BY AID/W. (SEE REFTTEL.) SCHEDULING OF PROCUREMENT SHOULD ASSURE THAT FINANCING IS AVAILABLE WHEN NEEDED AND THAT SUPPLY MEETS ANTICIPATED DEMAND. IS LONG-RANGE CONTRACTING FOR SHIPMENT AND DELIVERY OF FERTILIZER ONE POSSIBLE SOLUTION? R. WILEY, SER/COM, PLANS TO ADDRESS THESE QUESTIONS DURING ONE WEEK TDY IN NEW DELHI. WE ASSUME GOI HAS ITS OWN SYSTEM AND SCHEDULE FOR PROCUREMENT OF COMMODITIES, SUCH AS FERTILIZER, AND THIS COULD BE ADAPTED TO AID REQUIREMENTS. PP, IN ANY CASE, SHOULD BE VERY SPECIFIC ON PROCUREMENT ARRANGEMENTS.

(5) SUBSIDIZATION -

EXTENT OF GOI SUBSIDY IS OF CONCERN. PP SHOULD ADDRESS ISSUE OF SUBSIDIZATION OF FERTILIZER AND HOW IT RELATES TO VIABILITY OF SECTOR.

(6) ENVIRONMENT -

THE APAC ACCEPTED RECOMMENDATION FOR A NEGATIVE DETERMINATION. CERTAIN PROJECT-SPECIFIC OR COUNTRY-SPECIFIC ISSUES

SHOULD BE ADDRESSED IN THE PP BY THE PROJECT TEAM. FOR EXAMPLE, THESE MIGHT INCLUDE CONTAMINATION OF SURFACE OR GROUNDWATER SUBSEQUENTLY USED FOR BATHING OR CONSUMPTION, OR AQUATIC PRODUCTS WHICH ARE CONSUMED. RECENT FIELD ASSIGNMENT OF DR. FRED HUBBARD MAY HAVE SURFACED USEFUL SOURCES FOR ANALYTICAL ASSISTANCE. IN ADDITION, MISSION SHOULD REQUEST ANY ENVIRONMENTAL DISCUSSIONS DONE ON FERTILIZER PROJECTS IN BANGLADESH, SRI LANKA AND PAKISTAN.

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5C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights? Yes.

2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? No.

3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? Yes.

4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government? No.

5. FAA Sec. 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? No.

- 6. FAA Sec. 620(a), 620(f); App. Sec. 107, III. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique, or Angola? No. No assistance will be permitted to these countries.

- 7. FAA Sec. 620(1). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? AID is not aware of any such involvement.

- 8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No.

- 9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? No.

- 10. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters, No such actions have been taken against U.S. fishing activities in international waters.
 - a. Has any deduction required by Fishermen's Protective Act been made? No.
 - b. Has complete denial of assistance been considered by AID Administrator? No.

- 11. FAA Sec. 620(g); App. Sec. 503. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? No.

- 12. FAA Sec. 620(s). "If contemplated assistance is development loan (including Alliance loan) or security supporting assistance, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems?" (An affirmative answer may refer to the record of the taking into account, e.g.: "Yes as reported in annual report on implementation of Sec. 620(s)." This report is prepared at the time of approval by the Administrator of the Operational Year Budget. Yes. India spends a relatively small amount of its foreign exchange on military equipment. Latest available figures are an estimated \$200 million military imports or 2% of \$7.5 billion in total foreign exchange in FY 79. India will spend only 16.5% of its central government budget on defense in FY 79/FY 80. India's military purchases include a variety of modern weapons systems bought primarily from the U.K. and France.

Upward changes in the Sec. 620(s) factors occurring in the course of the year, of sufficient significance to indicate that an affirmative answer might need review, should still be reported, but the statutory checklist will not normally be the preferred vehicle to do so.)

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No.
14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? India is not in arrears regarding its U.N. obligations.
15. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? No.
16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? No.
17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977 although not a "nuclear-weapon State" under the nonproliferation treaty? Based on information received from the State Department the answer to both of these questions is no.
18. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

- a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment.

Yes. These criteria are based on India's Five Year Development Plan (1978-83) and incorporated in Country Development Strategy Statement (CDSS).

b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor?

Yes.

c. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

- (1) Making appropriate efforts to increase food production and improve means for food storage and distribution.
- (2) Creating a favorable climate for foreign and domestic private enterprise and investment.
- (3) Increasing the public's role in the developmental process.
- (4) (a) Allocating available budgetary resources to development.
(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.
- (5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.
- (6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

d. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

e. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, has Congress specifically authorized such use of funds, or is assistance for population programs, humanitarian aid through international organizations, or regional programs?

c.1. The Government of India has placed its highest development budget priority on agriculture and rural development with increased efforts in irrigation, dairy development, rural electrification research on high yielding seed, cottage industries, agricultural credit etc. India has recently agreed with the World Bank(IDA) on a grain storage project to construct an additional 3.6 million tons of storage capacity and is beginning to plan another 1.5 million tons of storage with future assistance from other donors.

2. India welcomes foreign private investment in priority areas involving needed technology or production for export. Domestic private investment in India's mixed economy is encouraged.

3. The present Government emphasizes decentralization of decision-making and is promoting greater state and local involvement in the development process.

4. a & b. In recent years, Government of India defense expenditures have declined as a percentage of the total central government budget. Proportionally more funds have been available for development purposes. India is not intervening in other free countries' affairs.

5. Democratic elections in March 1977 restored full political liberties, a free press, an independent judiciary, and respect for human rights.

6. The present government has a strong commitment to improving the lives of India's poor through a strategy of rural based employment opportunities and agricultural development. FY 1980 budget has a strong rural bias.

d. India is in both of these groups.

No.

c. Security Supporting Assistance Country Criteria

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

Not applicable.

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

Not applicable.

c. FAA Sec. 533(c)(2). Will assistance under the Southern African Special Requirements fund be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President determined (and reported to the Congress) that such assistance will further U.S. foreign policy interests?

Not applicable.

d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

Not applicable

e. App. Sec. 113. Will security assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?

Not applicable

f. FAA Sec. 620B. Will security supporting assistance be furnished to Argentina after September 30, 1978?

Not applicable

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT.

- | | |
|---|---|
| 1. <u>App. Unnumbered; FAA Sec. 603(1); Sec. 601</u> | |
| (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; | (a) Formal notification will be provided to Congressional Committees. |
| (b) Is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure) | (b) Yes in Country OYB. |
| 2. <u>FAA Sec. 611(a)(1)</u> . Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance? | Yes |
| 3. <u>FAA Sec. 611(a)(2)</u> . If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance? | None needed |
| 4. <u>FAA Sec. 611(b); App. Sec. 101</u> . If for water or water-related land resource construction, has project met the standards and criteria as per <i>the Principles and Standards for Planning Water and Related Land Resources</i> dated October 25, 1973? | Not Applicable |
| 5. <u>FAA Sec. 611(e)</u> . If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project? | Yes |
| 6. <u>FAA Sec. 209, 619</u> . Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate? | No. |

A

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
9. FAA Sec. 612(c); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?
11. ISA 14. Are any FAA funds for FY 78 being used in this Project to construct, operate, maintain, or supply fuel for, any nuclear powerplant under an agreement for cooperation between the United States and any other country?

The Project will contribute to an increase in the flow of international trade in agriculture, foster private initiative among farmers, encourage development of co-operatives and private sector trade, improve technical and productive efficiency of agriculture and improve farm income. The project is not concerned with labor unions.

AID loan funds are expected to be used to purchase fertilizer from the U.S.

India will contribute approximately 90% of the costs of the program. No U.S. owned rupees are being used in this project.

(The US owns Indian rupees that are being used for various US Govt. agencies program and administrative support and these currencies are expected to be liquidated for current ongoing activities over the next decade. A decision by the Development Coordinating Committee (DCC) on Dec. 21, '77 determined that local costs of selected projects in India would be financed by dollar appropriation for FY 78 and FY 79, not by U.S. owned local currency.

---- No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 291a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

Use of modern agricultural inputs and increased productivity would result in improvement of incomes of the farmers, especially small farmers, increased employment opportunities for the rural poor. Since cooperatives are involved in fertilizer distribution, the project would strengthen cooperatives. The urban poor are not directly addressed by the project, but will indirectly benefit from increased availability of food to urban areas.

E1

b. F/A Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available? [Include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

The project is directed towards increasing fertilizer use and agricultural production and incomes among the rural poor.

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(b) to help alleviate energy problems;

(c) research into, and evaluation of, economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

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(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on: (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor union, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

The Govt. of India will finance more than 90 percent of its fertilizer import program during the period 1979-82. AID's contribution would be about 7 percent.

Not applicable.

The project directly contributes to the country's self-help efforts to increase foodgrain production and meet its food needs. It does not directly contribute to areas under items (1), (3), (4) & (5), but there is likely to be an indirect effect on these areas from better income and improved quality of life. Women will be integrated into the national economy in that greater employment opportunities will be provided to them.

The project is directed toward food-grain production needs of the country. Success of this project is likely to result in increased cooperative activity and greater participation by the poorer sections of the rural population in basic self-government type activities.

B1

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(6). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

2. Development Assistance Project Criteria (Loans only)

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(c). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

The project contributes directly to increased foodgrain production and indirectly to other aspects of rural development. It is related to and consistent with other development activities and long-range objectives. The PP concludes that the project is economically and technically sound.

There will be no adverse effects on the U.S. economy.

The U. K. Govt. has provided a grant for fertilizer purchase. AID is not aware of interest in financing by U. S. private sources.

India's growing foreign exchange reserves are an indication of the country's capacity to repay. Additionally, the loan will create increased potential for production, the proceeds from which will contribute to loan repayment. Funds will be extended in compliance with Indian and U.S. practices and under AID's concessional rates:

Yes.

Yes.

8.

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

Not applicable.

f. FAA Sec. 620(e). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

Not applicable.

3. Project Criteria Solely for Security Support or Assistance

a. FAA Sec. 531. How will this assistance support private economic or political stability?

Not applicable.

b. FAA Sec. 531(a)(1). Will assistance under the Western Hemisphere Special Requirements Fund be used for military, guerrilla, or paramilitary activities?

Not applicable

4. Additional Criteria for Alliance for Progress

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

Not applicable.

a. FAA Sec. 251(b)(1), -(6). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CERCEES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

CHECKLIST OF STATUTORY CRITERIASTANDARD ITEM CHECKLISTPROCUREMENTA. PROCUREMENT

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed? Yes.
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegations from him? Yes.
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed? Yes.
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? Yes.
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? Yes.
6. FAA Sec. 603. Compliance with requirement in Sec. 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. Yes.

7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? Yes.
8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S. flag carriers will be utilized to the extent such service is available? Yes.
9. FY 79 App. Act Sec. 105. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States? Yes.

CONSTRUCTION

B. CONSTRUCTION

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? Yes.
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? Yes.
3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million? Not applicable

C. OTHER RESTRICTIONS

1. FAA Sec. 122(e). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?
3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-bloc countries, contrary to the best interests of the U.S.?
4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction?
5. Will arrangements preclude use of financing:
 - a. FAA Sec. 104(f). To pay for performance of abortions or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to undergo sterilization?
 - b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?
 - c. FAA Sec. 660. To finance police training or other law enforcement assistance, except for narcotics programs?

C. OTHER RESTRICTIONS

Yes.

Not applicable.

Yes.

Yes.

Yes.

Yes.

Yes.

- d. FAA Sec. 662. For CIA activities? Yes.
- e. FY79 App. Act Sec. 104. To pay pensions, etc., for military personnel? Yes.
- f. FY79 App. Act Sec. 106. To pay UN assessments? Yes.
- g. FY79 App. Act Sec. 107. To carry out provisions of FAA Sec 209(d) and 251(h)? (Transfer to multilateral organizations for lending.) Yes.
- h. FY79 App Act Sec. 112. To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields? Yes.
- i. FY79 App. Act Sec. 601. To be used for publicity or propaganda purposes within U.S. not authorized by Congress? Yes.

Appendix H

UNCLASSIFIED
Department of State

INCOMING
TELEGRAM

-109-

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ACTION AID-31

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TO SECSTATE WASHDC 513

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AIDAC

C O R R E C T E D C O P Y F O R T E X T

FOR ASIA/TR RIGGS

E. O. 12065: N/A
SUBJECT: FERTILIZER PROMOTION- 611E CERTIFICATION

FOLLOWING IS 611E CERTIFICATION FOR INCLUSION IN FERTILIZER
PROMOTION PP:

" INDIA - FERTILIZER PROMOTION CERTIFICATION
PURSUANT TO SECTION 611 (E) OF THE FOREIGN ASSISTANCE
ACT OF 1961, AS AMENDED.

I, JOHN L. WITHERS, PRINCIPAL OFFICER OF THE AGENCY FOR
INTERNATIONAL DEVELOPMENT OF INDIA, HAVING TAKEN INTO
ACCOUNT AMONG OTHER THINGS THE MAINTENANCE AND UTILIZATION
OF PROJECTS IN INDIA PREVIOUSLY FINANCED OR ASSISTED BY
THE US AND THE COMMITMENT AND RESOURCES OF THE GOVERNMENT
OF INDIA APPLIED TO FERTILIZER PRODUCTION.
IMPORTS AND PROMOTION DO HEREBY CERTIFY THAT IN MY
JUDGEMENT INDIA HAS THE FINANCIAL AND HUMAN RESOURCES
CAPABILITY TO IMPLEMENT, MAINTAIN AND EFFECTIVELY UTILIZE
THE ASSISTANCE PROPOSED UNDER THE FERTILIZER PROMOTION
PROJECT.

-/SD./-
JOHN L. WITHERS, MISSION DIRECTOR
USAID/INDIA

JUNE 26, 1979
DATE

GOHEEN

UNCLASSIFIED

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

INDIA

Fertilizer Promotion
A.I.D. Loan No. 386-T-226
A.I.D. Project No. 386-0471

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan to the Government of India (the "Cooperating Country") of not to exceed Twenty-Two Million United States Dollars (\$22,000,000) to help in financing certain foreign exchange and local currency costs of goods and services required for the project. The project principally finances fertilizer imports, the major portion of which will be targeted to smaller farmers and backward and remote farming areas as part of India's fertilizer program. The main purpose is to assist India in sustaining the momentum of increasing fertilizer consumption established during the past three years. The project may, in addition, finance the costs of other agricultural commodities, fertilizer distribution and related studies, technical assistance, training and equipment.

I hereby approve the total level of A.I.D. appropriated funding planned for this project of not to exceed One Hundred Fifty Million United States Dollars (\$150,000,000) which will be loan funded, including the funding authorized above, during the period FY 1979 through FY 1981. I approve further increments during that period of loan funding up to One Hundred Twenty-Eight Million United States Dollars (\$128,000,000), subject to the availability of funds and in accordance with A.I.D. allotment procedures. I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rates of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by A.I.D. shall have their source and origin in countries included in A.I.D. Geographic Code 941, or in the Cooperating Country, except as A.I.D. may agree otherwise in writing; provided, that fertilizer financed by A.I.D. shall have its source and origin in the United States, except as A.I.D. may otherwise agree in writing.

Ocean shipping financed under the Loan shall be procured in the United States or in the Cooperating Country, or, in the case of ocean shipping for the transport of bulk commodities, in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

Clearances:

GC, Markham Ball
A/AA/PPC, Charles Paolillo
AA/Asia, John H. Sullivan

Date

Initial

_____	_____
_____	_____
_____	_____

Signature _____

Robert H. Nooter
Acting Administrator

Date

Drafted: ASIA/PD/SA:J^{sc}Osborn/LC¹²lyburn:GC/ASIA:CStephenson:fv:9/17/79:X58450

APPENDIX J

Note on Central Fertilizer Pool

Source: Ministry of Agriculture and Irrigation

The Government of India started a Trading Scheme in 1944 for distribution of fertilizers now popularly known as Central Fertilizer Pool. The functions of Central Fertilizer Pool have changed from time to time. For example, until 1965, the Pool distributed imported as well as indigenous fertilizers. Gradually, the indigenous factories were given freedom to market their own production in a phased manner and by January, 1969, they were allowed to distribute 100 percent of their production. Today, Central Fertilizer Pool handles and distributes only imported fertilizers.

Imported potassic fertilizers are handled and distributed by M/s. Indian Potash Limited, a joint venture undertaking. As regards imported non-potassic fertilizers, before March, 1976, imports were handled and distributed by Food Corporation of India, acting as agents for the Department of Agriculture. The Food Corporation of India began handling and distributing non-potassic fertilizers on an ownership basis in January, 1976. From July, 1978, other agencies, like Hindustan Fertilizer Corporation, Southern Petrochemical Industries Corporation, Bangalore Chemicals and Fertilizers and Indian Potash Limited have also been entrusted to handle and distribute non-potassic fertilizers on ownership basis. During 1944, when the Pool was born, fertilizers to the tune of only 27,550 tonnes was imported. During the last 4 years, the following quantities of fertilizers were imported:

Figures in Million Tonnes

1975-76	3.26
1976-77	2.14
1977-78	2.67
1978-79	4.13

Prior to 1969, only Ammonium Sulphate used to be imported in bulk. From 1969 onwards gradually the bulk shipments of different types of fertilizers have been introduced and today, about 70 percent of India's fertilizer imports is in bulk. Mechanical unloading and handling facilities have also been installed at a few major ports, like Kandla, Madras, and Bombay. Facilities at Haldia are being installed.

Imports of fertilizers are arranged by the Minerals and Metals Trading Corporation (MMTC), on behalf of the Government. Port handling and distribution of material are done by the agencies mentioned earlier (FCI, IPL, HFC, SPIC) at the handling rates fixed by Government. Detailed distribution is done by these agencies like Cooperatives, Agro-Industries and through private trade.

The Pool is meant to function as a residual supplier i.e. to arrange for supplies to meet the gap between the agronomic requirements and indigenous supplies.

Appendix K

M.M.T.C. - its functions and involvement in Fertilizers

The Minerals and Metals Trading Corporation of India Limited is a public sector undertaking of the Government of India whose 100 percent of shares are held by the Indian Government. The Corporation has its head office at Express Building, 9 & 10, Bahadur Shah Zaffar Marh, New Delhi-110002. Regional Offices are in Bombay, Calcutta, Madras, Visakhapatnam, Goa and other major ports. The Corporation is managed by a Board of Directors headed by the Chairman. All the Directors are appointed by the Government of India.

The turnover for the year 1978-79 was on the order of Rs1157.67 crores (about U.S. \$1.5 billion). The Corporation deals with the export of minerals and ores such as iron/managanese and barytes coal and the import of non-ferrous metals, stainless steel, Industrial Raw Materials and Fertilizers.

The import of fertilizers from Rupee currency areas was canalised through M.M.T.C. in January 1979. With effect from 1st August, 1975, however, the entire import of fertilizers including import from the general currency areas was canalised through this organization. While the Ministry of Agriculture, Government of India finalizes the quantum of import in consultation with other relevant Ministries such as the Ministry of Chemicals and Fertilizers and the Ministry of Finance, M.M.T.C. is the purchasing agency that finalizes contracts with overseas suppliers and ensures their proper implementation.

Although indigenous capacity and production of nitrogenous and phosphatic fertilizers have considerably increased, there is need to import fertilizers in order to help the growth of agricultural production. More than a fourth of the requirements of nitrogenous fertilizer and a fifth in the case of phosphatic fertilizer had to be imported in 1977-78. There is no production of potassic fertilizers in the country. MMTC, therefore, arranged for the imports of fertilizers to meet these needs of agriculture.

Increased Supply of Fertilizers

During 1977-78 MMTC's imports made available to Indian agriculture, 1.5 million tonnes of urea, nearly 1.0 million tonnes of muriate of potash and about 350,000 tonnes of di-ammonium phosphate. Other fertilizers, including calcium ammonium nitrate and ammonium sulphate, were also made available. Even without domestic production of potassic fertilizers, the quantity of muriate of potash made available through MMTC's imports in 1977-78 was more than double that of the preceding year.

With the growing demand of fertilizers in the country, MMTC has increased its efforts to supplement the availability of fertilizers from domestic production through importation. In the first five months of 1978-79, 815,000 tonnes of urea were made available by importation, compared to 158,000 tonnes in the same period of 1977-78. In the case of di-ammonium phosphate, MMTC supplied over 400,000 tonnes in the first five months of 1978-79, which exceeds the entire quantity made available by the Corporation during 1977-78. The positions of ammonium sulphate, calcium ammonium nitrate, and sulphate of potash are similar.

Owing to the diversified and specialised needs for fertilizers in Indian agriculture, imports of mono-ammonium phosphate and zinc sulphate have been made by the Corporation for the first time during the last seventeen months.

Supply of Rock Phosphate and Sulphur Stepped Up

Raw materials like sulphur and rock phosphate needed for domestic production of fertilizers are also made available by MMTC through importation. While indigenous production of rock phosphate went up from 560,000 tonnes in 1976-77 to 670,000 tonnes in 1977-78, requirements for production of phosphatic fertilizers increased much faster. Therefore, MMTC made available to the fertilizer factories more than 1.0 million tonnes of rock phosphate through importation during 1977-78, as against 625,000 tonnes in the preceding year.

During the current year the indigenous production of phosphatic fertilizers is expected to go up still further. MMTC has, therefore, made arrangements for meeting their full requirements. A number of new suppliers has been identified. In the case of sulphur too, sales by MMTC increased in 1977-78 by nearly 6 percent. In the first five months of the current year sulphur sales have increased by nearly 20 percent over the co-responding period of last year.

APPENDIX L

India's Foodgrain Exports

The following material regarding India's foodgrain situation was prepared to respond to questions raised from various sources because of India's unique situation. It is included here for additional background information. Future editions of the Missions CDSS will provide additional/current analysis of the foodgrain situation.

Question: How can India export grain when there are so many hungry people in India?

Answer: -- The situation is unique: for once India has more grain that it can store and more than it can afford to provide to the poor through public distribution schemes; hence, the Government of India is exporting some of the surplus rather than lose it to spoilage or pests.

-- The GOI is in fact distributing much of its unstoreable grain to poor Indians by greatly expanding its food-for-work programs, by increasing State Government food inputs to school lunch programs, and by enlarging the present network of 240,000 Fair Price Shops to 350-375,000 (a 50% increase:). In FY 1979 CARE will completely phase out of food-for-work as the GOI picks up and enlarges the program with its own new commitment of 1,000,000 metric tons annually.

-- There are limitations, however, to public distribution systems (food-for-work, school lunch, Fair Price Shops) which depend on government subsidies to be economically viable; the Indian Government cannot afford an unlimited drain on the budget from welfare programs, nor does it wish to stimulate inflation, which would have greatest impact on the poor.

-- Exporting foodgrain should be viewed as a net benefit to the poor of India, considering that export earnings contribute to the Government of India budget which, in turn, strongly supports policies and programs committed to equitable growth and basic human needs. India's poor are concentrated in the rural agricultural sector. The GOI budget for fiscal year 1978-79 makes a 39% increase in funding for agriculture, compared to 17% average increase for all expenditures.

Question: Why are we assisting India in agricultural production when its granaries are bursting?

- Answer: -- There are three reasons: poverty, short-term reserves, and long-term needs. The granaries are full because India has too many people who are poor to buy enough food. At least 25% are underfed. The long-term solution to grain surpluses is to increase the purchasing power of the rural poor by providing employment and income, so they can buy enough food.
- India maintains a 12 million ton grain reserve for short-term insurance against bad harvests. Thus, the current grain surplus is considered temporary, since a few bad harvests could wipe out the reserve. India's grain stock of 20 million tons, including 12 million reserve and 8 million for current distribution, is only about 17% of one year's consumption.
- In the long run, even with normal harvests, India is projected to have an 18-22 million ton food deficit annually by 1990, according to a study by the International Food Policy Research Institute (IFPRI). Furthermore, India has the potential to reduce by one half the total food deficit projected for the 34 low income countries, if the Indian farmer could merely increase his production by 4.0% annually rather than the current rate of 2.5%. Hence, the need for long-term labor-intensive agricultural development in India is clear, for both India and other countries.

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Department of State

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UNCLAS NEW DELHI 17146

AIDAC

E. O. 12065: N/A
SUBJECT: FERTILIZER PROMOTION - GOI LETTER REQUEST

1. FOLLOWING IS EXACT TEXT OF GOI LETTER REQUEST FOR ASSISTANCE
FOR FERTILIZER PROMOTION PROJECT:

SEPTEMBER 19, 1979

DEAR MS. BOUGHTON:

THE GOVERNMENT OF INDIA HEREBY REQUESTS A LOAN FROM THE
GOVERNMENT OF THE UNITED STATES IN THE AMOUNT OF DOLS 22
MILLION TO ASSIST IN FINANCING THE IMPORTATION OF CHEMICAL
FERTILIZERS AS PART OF THE GOVERNMENT OF INDIA'S OVERALL
PROGRAM FOR INCREASING FERTILIZER CONSUMPTION THROUGHOUT THE
COUNTRY AND TO BROADEN THE BASIS OF PARTICIPATION IN FERTILIZER
USE IN REMOTE AREAS AND AMONG SMALL FARMERS. IT IS ANTICIPATED
THAT THE GOVERNMENT OF INDIA WILL PROVIDE THE EQUIVALENT OF
NOT LESS THAN DOLS 400 MILLION AS PART OF THE OVERALL PROGRAM.

WE WOULD APPRECIATE YOUR EARLIEST CONSIDERATION OF
THIS REQUEST FOR FINANCING.

SINCERELY,
(SIGNED)
S. N. KAO
DIRECTOR
DEPARTMENT OF ECONOMIC AFFAIRS,
MINISTRY OF FINANCE,

2. PLEASE EXPEDITE SIGNING OF AUTHORIZATION AND ADVISE BY
IMMEDIATE CABLE WHEN SIGNED.
GOWFFN

ADVANCE COPY

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