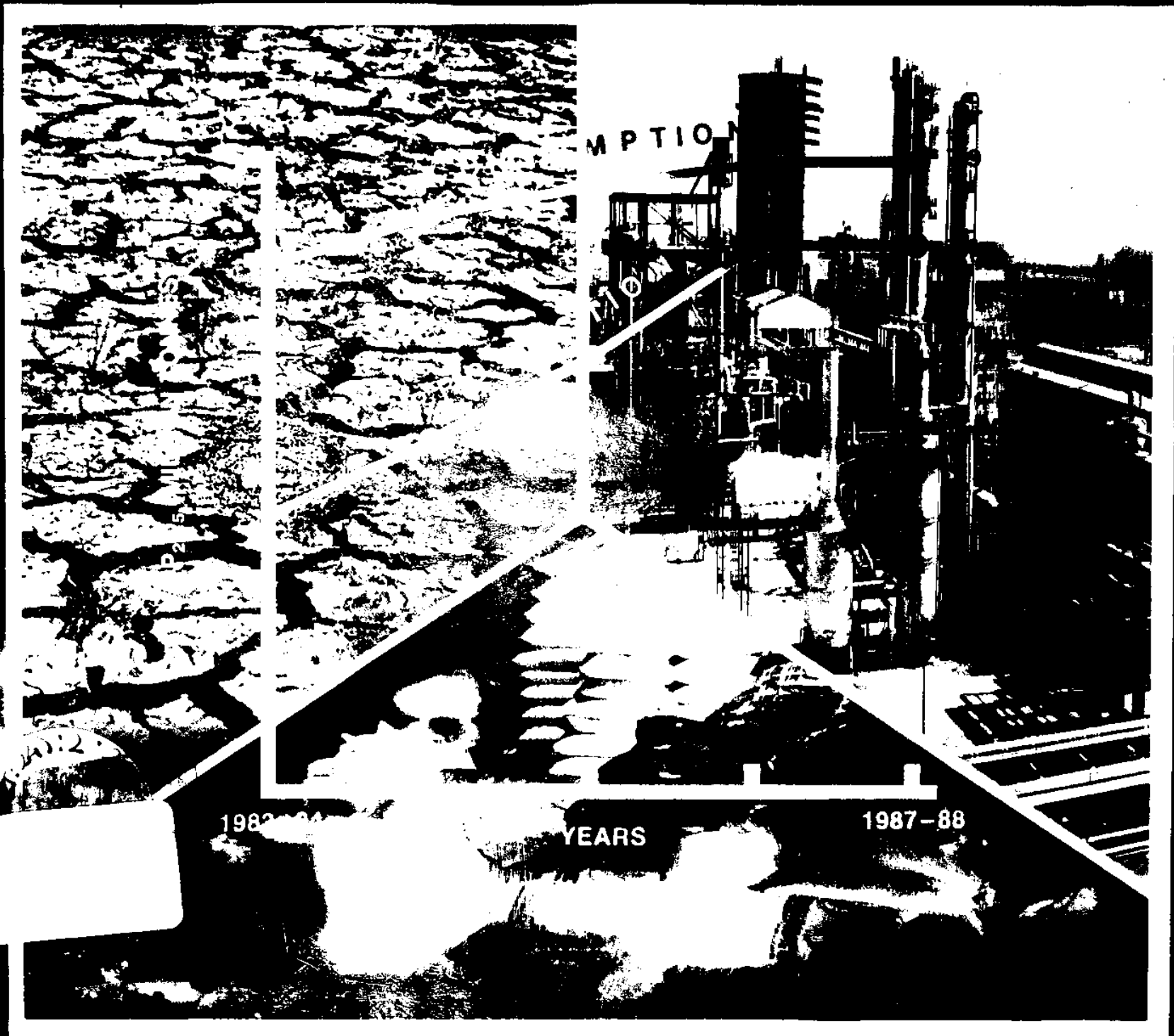


**ANNUAL REVIEW OF  
FERTILISER PRODUCTION AND CONSUMPTION  
1987-88**



**The year 1987–88 was a year of severe drought with as many as 22 of the 35 Meteorological sub-divisions reporting scanty/deficient rainfall. Production of fertilisers, though still high, stagnated at last year's level due to power and water problems besides long interruption in the supply of imported phosphoric acid. Consumption too stagnated. As a result, the stockpile of fertilisers continued unabated. Our cover pictorially depicts this fertiliser scene.**

**ANNUAL REVIEW**  
**OF**  
**FERTILISER PRODUCTION AND CONSUMPTION**  
**1987-88**

[ AUGUST 1988 ]



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# ANNUAL REVIEW OF FERTILISER PRODUCTION AND CONSUMPTION 1987-88

[ AUGUST 1988 ]

## I. GENERAL

The year 1987-88 witnessed a near stagnant production with a marginal increase of 56,900 tonnes of N and  $P_2O_5$  taken together (+0.8%) over the previous year. The installed capacity of N increased from 6.880 to 7.083 million tonnes and  $P_2O_5$  from 2.214 to 2.453 million tonnes with the commissioning of HFC-Namrup III, GSFC-Sikka and a few SSP plants during the year. Since 21 out of 49 nitrogenous plants operated at a level lower than in 1986-87, the all-India capacity utilisation of N marginally dropped from 79 to 78% during 1987-88. The overall capacity utilisation of  $P_2O_5$  also declined sharply from 81% in 1986-87 to 70% in 1987-88 mainly due to inadequate availability of imported phosphoric acid during the year on which 50 per cent of total  $P_2O_5$  capacity is based. But for improvement in capacity utilisation of SSP plants from 53 to 58% during the year, the overall production of  $P_2O_5$  would have registered a decline over 1986-87 level.

Poor weather continued to haunt Indian agriculture in 1987-88 too—4th year in succession since 1984-85. The intensity of drought in 1987-88 was worse than in 1979-80 which was originally termed as the "worst-drought year of the century." As many as 22 meteorological sub-divisions received deficient/scanty rainfall during the south west monsoon period of June-September 1987 as against 14 in 1986, 9 in 1985 and 8 in 1984. Consequently, irrigation system went awry, area under HYV declined and water table became abysmally low.

According to the provisional data, compiled from the statistics, consumption has increased (+3%) to 9.0 million tonnes of nutrients (N +  $P_2O_5$  +  $K_2O$ ) during 1987-88—increase coming mainly through  $P_2O_5$  owing to the shift in emphasis

on growing oilseeds, pulses, cotton, millets, etc. requiring comparatively less moisture from external sources and high doses of phosphates for root development. However, assessment by the Industry shows that the consumption was at best stagnant at 1986-87 level of 8.7 million tonnes, if not lower, due to inflated consumption figures shown in one state.

Despite long drawn inclement weather, assessment through crop surveys indicates a decline of only 6 million tonnes in foodgrains production during 1987-88 which is provisionally put at 138 million tonnes as against 144 million tonnes in 1986-87 and 150 million tonnes in 1985-86. Situation would have been worse had the agricultural strategy and drought relief measures not gone into full swing during these three years of the Seventh Plan.

Over the first three years of the Seventh Plan, fertiliser consumption has increased only marginally. Encouraging signs of highly favourable weather this year (1988-89) are discernible. With buoyant fertiliser consumption and resilient agriculture, we hope to do fairly well this year on both fronts backed by adequate soil moisture, transfer of technology and infrastructural facilities. However, the revised estimated consumption level of 12 million tonnes of N +  $P_2O_5$  +  $K_2O$  fixed for 1989-90 in the "Mid-term Appraisal of the Seventh Five Year Plan" is unlikely to be achieved in the remaining two years of the Seventh Plan. This assumes an increase of 1.5 million tonnes per annum in consumption in the next two years—a level we could never achieve in the past. Only once in "golden year" 1983-84 the increase in consumption at 1.3 million tonnes was somewhat nearer this level.

During the year 1987-88, fertiliser marketing scene did not show any improvement. Despite nominal im-

ports and controlled indigenous production, the stocks continued to mount with the manufacturers, particularly of nitrogenous fertilisers, causing serious liquidity problems and erosion of profitability. Stagnant demand and sizeable availability from indigenous sources coupled with heavy imports during 1984-85 to 1986-87 continued to plague the industry despite restoration of the residual character of imported fertilisers. However, efforts initiated during the year 1987-88 by the fertiliser industry, with the support of the Government of India to restore the market discipline are expected to bear fruit.

## 2. PRODUCTION

### (A) Review of Fertiliser Production During 1987-88

The zonewise number of plants, installed capacity and production of nitrogenous and phosphatic plants are given in Table 1 and that of SSP plants in Table 2.

**Installed capacity:** The total installed capacity during the year increased to 7.083 million tonnes of N and 2.453 million tonnes of  $P_2O_5$ . The additional capacity of 0.203 million tonnes N was as a result of commissioning of HFC, Namrup III (0.152 million tonnes N) and GSFC, Sikka (0.059 million tonnes N) and 0.239 million tonnes  $P_2O_5$  was contributed by the commissioning of new SSP plants (0.089 million tonnes  $P_2O_5$ ) and GSFC, Sikka (0.150 million tonnes  $P_2O_5$ ).

**Production:** The production of N and  $P_2O_5$  during the year 1987-88 remained more or less stagnant at 1986-87 level. Nitrogen production at 5.466 million tonnes and  $P_2O_5$  production at 1.665 million tonnes represented a very marginal increase of 53,400 tonnes in N production and just 3,500 tonnes increase in  $P_2O_5$  production over the previous year. The SSP

**Table 1—Zonewise capacity, production & capacity utilisation of nitrogenous and phosphatic plants**

(Capacity & production in '000 tonnes)

Zone	N								P <sub>2</sub> O <sub>5</sub>							
	1986-87				1987-88				1986-87				1987-88			
	No. of plants	Capacity	Production	% Capacity utilisation	No. of plants	Capacity	Production	% Capacity utilisation	No. of plants	Capacity	Production	% Capacity utilisation	No. of plants	Capacity	Production	% Capacity utilisation
East	13	1253	549.3	44	14	1405	668.2	53	9	461.2	259.9	69	10	476.1	286.3	61
North	8	1397	1135.2	81	8	1397	1114.7	73	24	213.5	108.5	57	26	234.1	158.4	67
South	12	1380	1146.7	84	12	1372	345.5	62	19	668.2	552.5	84	19	671.7	446.2	66
West	14	2838	2581.0	91	15	2897	2837.2	97	32	871.2	771.0	90	36	1071.4	777.5	79
<b>All India</b>	<b>47</b>	<b>6880@</b>	<b>5412.2</b>	<b>79</b>	<b>49</b>	<b>7083@</b>	<b>545.6</b>	<b>78</b>	<b>84</b>	<b>2214.1</b>	<b>1661.9</b>	<b>81</b>	<b>81</b>	<b>2453.3</b>	<b>1665.4</b>	<b>70</b>

@ The capacity includes additional 12 thousand tonnes of N from by-product A/S.

production at 2.483 million tonnes however, showed an increase of 0.477 million tonnes (material) over the previous year.

Although performance of 21 nitrogenous plants deteriorated during the year, sizeable increased contribution of N was made from all units of NFL, KRIBHCO-Hazira and RCF-Thal plants, besides the contribution from newly commissioned plants of Namrup-III, and OSFC-Sikka. FACT Cochin-II, GNFC, RCF Trombay-I to IV; all units of HFC; FCI-Sindri and Talcher, SAIL-Rourkela and HLL-Haldia also showed improvements in their performance during 1987-88, as compared to 1986-87. NFL-Vijayapur and Godavari Fertilisers-Kakinada went into trial production during the last quarter of 1987-88 and contributed 42,400 tonnes of N and 1800 tonnes of P<sub>2</sub>O<sub>5</sub>.

The percentage share of fertiliser products to the total nutrient production is given in Table 3. In nitrogen production, urea continued to dominate with 82.7% share. In phosphatic production, share of DAP increased from 43.2% in 1986-87 to 46.3% in 1987-88. The share of SSP in P<sub>2</sub>O<sub>5</sub> production also increased from 19.3% to 23.9% in 1987-88.

#### (B) Capacity Utilisation

While the capacity utilisation of N dropped marginally from 79% in 1986-87 to 78% during 1987-88 and that of total P<sub>2</sub>O<sub>5</sub> dropped substanti-

**Table 2—Zonewise capacity, production and capacity utilisation of SSP Plants—1986-87 & 1987-88 (April-March)**

('000 tonnes)

Zone	1986-87			1987-88		
	Capacity	Production	Capacity util. (%)	Capacity	Production	Capacity util. (%)
East	369.7	140.6	38	462.7	233.9	54
North	1328.2	678.0	57	1463.5	971.4	67
South	582.3	294.9	51	603.6	294.6	51
West	1680.7	892.6	54	1993.8	983.6	53
<b>All India</b>	<b>3960.9</b>	<b>2006.1</b>	<b>53</b>	<b>4523.6</b>	<b>2483.5</b>	<b>58</b>

**Table 3—Percentage share of fertiliser products to total nutrient production—1986-87 & 1987-88**

Fertilisers	% share of total nutrient			
	1986-87		1987-88	
	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>
<b>I. Straight Nitrogenous</b>	<b>85.7</b>	<b>—</b>	<b>87.1</b>	<b>—</b>
1. Urea	81.4	—	82.7	—
2. Others	4.3	—	4.4	—
<b>ii) Straight Phosphatic</b>	<b>—</b>	<b>19.3</b>	<b>—</b>	<b>23.9</b>
1. Single superphosphate	—	19.3	—	23.9
2. Others	—	—	—	—
<b>iii) NP/NPKs</b>	<b>14.3</b>	<b>80.7</b>	<b>12.9</b>	<b>76.1</b>
1. DAP	5.2	43.2	5.5	46.3
Others	9.1	37.5	7.4	29.8
<b>Grand Total (I+ii+iii)</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 4—Feedstockwise share in total capacity and production with capacity utilisation of N (1986-87 & 1987-88)**

Year	(Per cent)					
	Natural Assoc. gas	Naphtha	Fuel oil	Coal	Others	Total
<b>1986-87</b>						
Capacity	32.9	36.3	17.2	6.6	7.0	100.0
Production	34.5	38.6	17.7	3.2	6.0	100.0
Capacity utilisation	83	84	82	38	73	79
<b>1987-88</b>						
Capacity	34.1	35.3	16.6	6.4	7.6	100.0
Production	40.2	31.8	19.0	2.5	6.5	100.0
Capacity utilisation	92	70	88	31	67	78

ally from 81 to 70%, the capacity utilisation of SSP plants improved from 53% to 58%. The N capacity utilisation in the East Zone (a traditional low performance zone) improved from 44 to 53% in 1987-88. N performance in West Zone has also improved but the capacity utilisation in North and South Zones has deteriorated during 1987-88.

It would be observed from Table 4 that the naphtha based plants continue to take the major share of 35.3% in the total capacity followed by 34.1% share based on natural/associated gas as feedstock for N production. The share of installed capacity based on gas has been steadily increasing and is expected to occupy a predominant share next year.

While the capacity utilisation of gas based plants improved from 83% in the previous year to 92% in 1987-88 and that of fuel oil based plants

improved from 82 to 88%, the capacity utilisation of naphtha based plants came down substantially from 84 to 70%. The Bombay High gas based plants (RCF-Trombay and Thal, KRIBHCO-Hazira) contributed about 30% to the total N production in the country during 1987-88.

An analysis of sectorwise performance of N and P<sub>2</sub>O<sub>5</sub>, given in Table 5, shows that the share of N capacity of private sector during 1987-88 was 26.7% and the share of production was 29.5%. It is heartening to note that the capacity utilisation of N in public sector plants improved from 65.4% in 1986-87 to 66.1% during 1987-88. While the cooperative sector plants substantially improved the capacity utilisation from 93.3% to 100.2%, the capacity utilisation of private sector came down from 99.1% to 86.9% in 1987-88. In phosphatics the capacity utilisation in all sectors deteriorated during 1987-88 as compared to 1986-87.

The range of capacity utilisation of factories, given in Table 6, shows that while in 1986-87, 21 nitrogenous and complex fertiliser plants operated at a capacity above 80% of N, during 1987-88 the number came down to 18. As regards overall P<sub>2</sub>O<sub>5</sub> capacity utilisation, while 16 units operated at a capacity utilisation of above 80% in 1986-87, the number rose to 21 in 1987-88. There was remarkable improvement in SSP industry with 14 plants operating above 80% capacity utilisation in 1987-88 as compared to only 8 plants in the previous year.

### (C) Reasons for Loss of Production

Estimated loss of production during the last two years on account of identifiable major factors is given in Table 7. The production at various plants was affected mainly due to equipment break-down, power cuts or restrictions, labour unrest and water scarcity. The major equipment problems were experienced with compressors, turbines and heat-exchangers. Equipment breakdown problems were mainly faced by Ramagundam, Namrup, Durgapur, Barauni, Cochin-I, Trombay V, Phulpur, Kanpur, Tuticorin and Mangalore plants. The power problems affected the performance of the plants at Gorakhpur, Udyogamandal & Cochin-I, Namrup, Durgapur, Barauni, Rourkela, Kanpur and Mangalore. Production performance of Madras Fertilizers was severely affected on account of shortage of water during April-November 87. Inadequate availability of essential raw-materials adversely affected production of both N and P. Shortage of

**Table 5—Sectorwise performance of N & P<sub>2</sub>O<sub>5</sub> during 1986-87 & 1987-88—percentage share of capacity & production**

Sector	Share of capacity (%)				Share of production (%)				Percentage capacity utilisation			
	1986-87		1987-88		1986-87		1987-88		1986-87		1987-88	
	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>
Public	55.9	35.1	56.4	31.7	46.4	33.6	48.5	30.6	65.4	71.6	66.1	65.6
Cooperative			16.9	12.6	20.7	20.6	22.0	17.4	93.3	110.7	100.2	93.6
Private	26.7		5.7	55.7	32.9	45.8	29.5	52.0	99.1	77.2	86.9	69.6
<b>Total</b>	<b>100.0</b>		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>79.0</b>	<b>81.0</b>	<b>78.0</b>	<b>70.0</b>



Table 6—No. of factories in various ranges of capacity utilisation

Capacity utilisation range (per cent)	N		P <sub>2</sub> O <sub>5</sub> (SSP, TSP & complexes)	
	1987-88	1986-87	1987-88	1986-87
Above 100	7	7	7 (5)	9 (4)
91 to 100	3 } 18	3 } 21	8 (6) } 21 (14)	2 (-) } 16 (8)
81 to 90	8 } 1	11 } 1	6 (3) } 1	5 (4) } 1
71 to 80	6	4	10 (10)	12 (8)
61 to 70	3	10	8 (7)	5 (5)
51 to 60	6	—	9 (6)	6 (6)
41 to 50	5	2	7 (6)	9 (9)
1 to 40	10	9	26 (26)	32 (31)
nil	1	1	8 (8)	3 (3)
<b>Total No. of plants</b>	<b>49</b>	<b>47</b>	<b>91 (77)</b>	<b>84 (70)</b>

( )—Figures in brackets are for SSP and one TSP plants.

Table 7—Reasons for loss of production in N & P<sub>2</sub>O<sub>5</sub> 1986-87 & 1987-88

Reasons	1986-87			1987-88		
	Loss in prodn. ('000 tonnes)	Percentage loss in production to overall		Loss in prodn. ('000 tonnes)	Percentage loss in production to overall	
		Loss	Production		Loss	Production
<b>I. Nitrogen (N)</b>						
1. Power problems	77.9	13.0	1.4	107.8	11.2	2.0
2. Shortage of raw-materials	22.1	8.7	1.0	173.3	17.9	3.2
3. Equipment break-down	246.7	41.2	4.6	323.7	33.4	5.8
4. Labour problems	6.7	1.1	0.1	54.2	5.5	1.0
5. Others	215.3	36.0	4.0	309.8	32.0	5.7
<b>Total</b>	<b>559.7</b>	<b>100.0</b>	<b>11.1</b>	<b>968.8</b>	<b>100.0</b>	<b>17.7</b>
<b>II. Phosphate (P<sub>2</sub>O<sub>5</sub>)</b>						
1. Power problems	13.4	4.7	0.8	22.9	4.0	1.4
2. Shortage of raw-materials	68.3	23.7	4.1	284.8	50.0	17.0
3. Equipment break-down	31.6	11.0	1.9	29.6	5.2	1.8
4. Labour problems	8.0	2.8	0.5	36.6	6.4	2.2
5. Others	166.4	57.8	10.0	196.1	34.4	11.8
<b>Total</b>	<b>287.7</b>	<b>100.0</b>	<b>17.3</b>	<b>570.0</b>	<b>100.0</b>	<b>34.2</b>

imported phosphoric acid was the major reason for loss in phosphatic fertiliser production by 0.285 million tonnes P<sub>2</sub>O<sub>5</sub> during the year. The total loss in nitrogen production at 0.97 million tonnes during 1987-88 was much higher as compared to the previous year, not only as a percentage of overall production but also in absolute terms. Fertiliser production was adversely affected due to marketing problems also. SFC, GSFC and several SSP plants curtailed their production and a few SSP units remained closed for varying periods during the year due to poor offtake consequent on severe drought situation.

#### (D) Steps Taken by the Industry

Fertiliser units continued their efforts to minimise the loss of production due to mechanical breakdown and equipment failures. The production performance is expected to improve with the various rehabilitation projects, debottlenecking schemes and captive power plant installation at various units.

While captive power plants have been installed at Namrup and Durgapur, it is under installation at Barauni. For equipment and design deficiency problems, an end to end survey of Namrup I & II, Durgapur and Barauni plants has been carried out by a foreign consultant. HFC Namrup-II proposes to undertake primary reformer revamping, compressor overhauling and modification of ammonia pumps. At HFC-Durgapur, replacement of reformer tubes and overhauling of pumps and compressors and installation of a new cooling tower are being considered. At Barauni, installation of additional cooling tower, replacement of carbamate pump, air-pre-heater and boiler feed water heater are under implementation. The methanol heat-exchangers are being retubed and economizer coils of higher thickness will be introduced in service boilers. A West-German Consultancy firm has carried out a rehabilitation study for revamping of Talcher plant. The Department of Coal has been requested to provide the appropriate quality of coal to the Talcher unit. SAIL-Rourkela has planned addition, replacement and modification of equipment at a cost of about Rs 30 million.

An investment of Rs 94 million is contemplated by FCI-Corakhpur to

wards major renewals and replacement to improve capacity utilisation. At IFFCO-Phulpur, the primary reformer has been revamped and the auxiliary boiler burner has been modified. IEL proposes to replace recycle carbamate pump by centrifugal pump. At NFL Nangal-II, replacement of intercooler of air compressor, circulating water heater and gasifier refractory repair will be taken up. Shift conversion catalyst will be replaced with fresh catalyst. At Bhatinda, trays of rectisol section, waste heat boiler, ammonia condenser etc. would be replaced besides overhauling of air compressor, syn-gas compressor and CO<sub>2</sub> booster compressor. Ammonia synthesis section and CO shift conversion section would be changed with fresh catalyst. NFL-Fanpat plans to overhaul synthesis gas compressor and replace trays of rectisol section, methanol heat exchanger, ammonia condenser and gasifier refractory.

At SFC-Kota, new ammonia condenser having tubes of improved material of construction (SS304 L) is being installed. At GSFC-Baroda, modernisation of the plant is being undertaken. GNFC proposes to have a 3rd train gasifier to overcome quench ring failure problem and refractory lining failure. To improve the performance of synthesis loop a series 200 basket is being incorporated. IFFCO-Kalol has planned modification of reformer convection zone, and LTS converter would be provided with guard bed. Urea plant revamping and microprocessor based instrumentation is being considered. Air stripper for liquid effluent and hydrolyser stripper for urea effluent would be installed at Kalol. All reformer tubes in primary reformer will be replaced with larger I.D. tubes at Phulpur. At KRIBHCO-Hazira, purge gas recovery plant has been commissioned and additional desulphuriser to take care of high sulphur content in natural gas will be hooked up. At ROF-Trombay-I, work of rehabilitation is in progress.

At NFL, the Selectoxo process unit and solar heat recovery unit is likely to be installed in 1988. Installation of captive power plant and ammonia terminal at Madra is planned. Replacement of LTS converter will be taken up. At Cochin several equipment like process air-compressor, flue gas

and air drying tower in sulphuric acid plant, and reactor in complex plant will be replaced. Ammonia plant revamping is under consideration. Various revamping jobs are in progress at FACT-Udyogamandal. At SPIC-Tuticora, primary reformer tubes, heat exchangers and reformed gas boilers are to be replaced. Installation of WHB for heat recovery from diesel generator exhaust of captive power plant is in progress at MOF. Ammonia scrubber system in urea plant will be commissioned in 1988. Additional cooling tower is under implementation. NLC-Neyveli proposes to retrofit the urea plant. Improved instrument control system is being installed in a phased manner. The ceramic packing in Benfield Section will be replaced by SS packing rings. EID-Parry is converting its sulphuric acid plant to DCDA process. In phosphoric acid plant, a new reaction tank has been installed and belt filter will be introduced in place of tilting pan filter.

#### (E) Production Prospects for 1988-89

Two projects IFFCO-Aonla and Indo Gulf Fertilisers & Chemicals Corporation, Jagdishpur, each with a capacity of 0.334 million tonnes N are anticipated to go into commercial

production during the year 1988-89 besides retrofitting programme of SPIC-Tuticora (0.019 million tonnes N; 0.048 million tonnes P<sub>2</sub>O<sub>5</sub>) and a few SSP projects (0.038 million tonnes P<sub>2</sub>O<sub>5</sub>). Although NFL-Vijaypur (0.334 million tonnes N) and Godavari Fertilisers & Chemicals-Kakinada (0.054 million tonnes N 0.138 million tonnes P<sub>2</sub>O<sub>5</sub>) had gone into trial production in the last quarter of 1987-88, these would also go into commercial production this year. With these, the all-India installed capacity as on 31-3-1989 would become 8.158 million tonnes of N and 2.677 million tonnes of P<sub>2</sub>O<sub>5</sub> per annum including plants already in operation. Assuming that there will be no shortages in the timely availability of essential raw materials and feedstock, the production is expected to be between 6.2 to 6.4 million tonnes of N and 2.1 to 2.2 million tonnes of P<sub>2</sub>O<sub>5</sub> during 1988-89, including contribution from the above mentioned 5 projects besides larger share from HFC-Namrup-III and GSFC-Sikka which went into commercial production during 1987-88.

The details of estimated capacity, production and capacity utilisation of N and P<sub>2</sub>O<sub>5</sub> for 1988-89 zonewise are given in Table 8.

Table 8—Zonewise estimated capacity and production of nitrogenous and phosphatic fertilisers—1988-89 (April/March)

Zone	Capacity ('000 tonnes)	Production 1988-89		% capacity utilisation
		Quantity ('000 tonnes)	Zone's share to total (%)	
<b>Nitrogen (N)</b>				
East	1418	785	12.5	56
North	2065	1460	23.2	78
South	1445	1125	17.9	79
West	3232	2930	46.4	93
<b>All India</b>	<b>8158</b>	<b>6300</b>	<b>100.0</b>	<b>80</b>
<b>Phosphate (P<sub>2</sub>O<sub>5</sub>)</b>				
East	476	375	17.4	80
North	266	180	8.4	71
South	850	680	31.6	82
West	1085	915	42.6	86
<b>All India</b>	<b>2677</b>	<b>21.0</b>	<b>100.0</b>	<b>82</b>

### 3. FERTILISER AVAILABILITY

The excess availability of fertilisers continued to distort the marketing scene in 1987-88—the third year in succession. During the previous two years i.e. 1985-86 and 1986-87, excessive imports together with increased production in the face of sluggish demand have been the major factors contributing to excess availability. However, during 1987-88, the underlying forces behind continued glut have changed to a certain extent.

Firstly, the import scenario has undergone a sea change. Continuing the changed perception as reflected in reduction of imports in the second half of 1986-87, the Government imposed a complete ban on import of N and P fertilisers, restricting the same only to marginal quantities i.e. 0.17 million tonnes of N imported under contractual obligations. (Table 9). Further, recognising the excess indigenous stocks, it was also decided not to release the pool material w.e.f. 1-4-1987. It was also clear that whatever quantities imported during the year 1987-88 under the contractual agreements, would also not be released till such time the stock situation improved.

The production during the year was admittedly short of the target. While production of P was adversely affected due to non-availability of

phosphoric acid for about two months, the shortfall in nitrogen was mainly due to problems of power and water availability adversely affecting production in some units. Nonetheless, indigenous production at 7.13 million tonnes (N+P) was higher than in the previous year at 7.07 million tonnes.

The demand has unfortunately been the biggest bottleneck. In view of unprecedented drought, the actual consumption even as per Government estimate of 9.0 million tonnes, has fallen substantially short of the target i.e. 10.3 million tonnes. This together with continuing higher level of production, has meant no improve-

ment in the stock situation despite practically no imports during 1987-88. The level of total stocks at 4.29 million tonnes (all nutrients) as on 1-4-1988 was no different from the level as on 1-4-1987 at 4.38 million tonnes.

It may also be seen that in recent years, the stocks held by the manufacturers have increased by almost five fold i.e. from 0.58 million tonnes as on 1-4-1984 to 2.76 million tonnes as on 1-4-1988 (Table 10). In fact, as on 1-4-1988 of the total stock of 4.29 million tonnes, the indigenous stocks accounted for as much as 64% as against only 39% as on 1-4-1984. This would mean that notwithstand-

Table 10—All India nutrientwise stocks of indigenous fertilisers with the manufacturers

Nutrient	('000 tonnes)						
	1-4-82	1-4-83	1-4-84	1-4-85	1-4-86	1-4-87	1-4-88
N	497.4	651.8	397.3	640.2	1131.3	1897.8	2215.7
P <sub>2</sub> O <sub>5</sub>	227.7	267.6	150.5	208.3	339.6	630.8	443.8
K <sub>2</sub> O	81.0	88.5	37.3	42.3	36.8	104.5	98.7
Total	788.1	1007.9	585.1	890.8	1507.7	2633.1	2758.2
	[81.3]	[27.9]	[-41.9]	[52.2]	[69.2]	[74.6]	[4.8]

\*=Estimated

[ ]=Figures in brackets indicate in percentage increase/decrease over the stocks held on the same day during the previous year.

Table 9—Nutrientwise gap, import and import as percentage of gap 1980-81 to 1987-88 (April-March)

Year	Gap				Import				Import as percentage of gap				Total value of imports (Rs. million)
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	
	← '000 tonnes →								← % →				
1980-81	1514.2	372.1	623.9	2510.2	1510.4	452.1	796.5	2759.0	99.7	121.5	127.7	109.9	9252.2
1981-82	925.4	372.6	676.2	1974.2	1055.1	343.2	543.8	2042.1	114.1	92.1	95.2	103.4	7166.3
1982-83	794.5	452.2	726.5	1973.2	424.6	63.4	643.7	1131.7	53.4	14.0	88.6	57.4	2735.3
1983-84	1712.9	666.2	775.4	3154.5	658.1	142.6	556.4	1355.1	38.3	21.4	71.8	43.0	3650.5
1984-85	1568.7	568.6	838.5	2975.8	2008.6	745.2	871.0	3624.8	128.0	131.1	101.9	121.8	14350.0
1985-86	1337.9	575.1	808.1	2721.1	1615.8	804.8	893.8	3314.4	120.8	139.9	110.6	121.8	14050.0
1986-87	358.1	441.5	860.2	1659.8	1105.0	279.3	839.6	2274.5	308.7	63.3	103.4	137.0	6510.0
1987-88	304.9@	632.5@	926.6	1864.0@	174.8	—	809.1	983.9	57.3	—	87.3	52.8	2237.7

@Provisional.

- Notes: (i) Gap does not take into account stocks available at the beginning of the year;  
(ii) Gap has been arrived at by deducting figures of production from consumption;  
(iii) Total K<sub>2</sub>O requirements are met through imports;

Table 11—Distribution of Meteorological sub-divisions according to Excess/Normal or Deficient/Scanty rainfall South West Monsoon period (June—September)

Item	(No.)									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Excess/Normal	34	19	29	28	25	32	27	26	21	13
Deficient/Scanty	1	16	6	7	12	3	8	9	14	22
<b>Total</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>

Excess= +20% or more  
Normal= +19% to -19%  
Deficient= -20% to -59%  
Scanty= -60% or less

ing recent efforts during the last 1½ years or so to restore the residual character of imports, perhaps, much more needs to be done to retrieve the situation.

#### 4. CONSUMPTION

##### Review of Consumption

Table 12 presents fertiliser consumption at 5 yearly intervals cover-

ing first to fifth Five Year Plans viz., 1951-52 to 1978-79 with compound rates of growth during these years. With a view to highlight the latest situation, data are presented year-wise from 1982-83 to 1987-88 covering VI Plan and first 3 years of the VII Plan. Major factors affecting consumption are enumerated in Table 13. Table 14 presents the data on actual consumption of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O and total, statewide and zone-wise with growth rates for the 3 years 1985-86 to 1987-88 (April-March). Table 17 gives the despatches by materials for 1986-87 and 1987-88.

Table 12—Consumption of fertiliser nutrients (N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O)

Year	Consumption ('000 tonnes)				Growth of consumption per annum over previous quoted year (%)			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)
1951-52	58.7	6.9	—	65.6				
1955-56 (I Plan end)	107.5	13.0	10.3	130.8	16.4	17.1	—	18.8
1960-61 (II Plan end)	211.7	53.1	29.0	293.8	14.5	32.5	23.0	17.6
1965-66 (III Plan end)	574.8	132.5	77.3	784.6	22.1	20.0	21.7	21.7
1973-74 (IV Plan end)	1829.0	649.7	359.8	2838.5	[8.6]	[11.2]	[16.1]	[10.0]
1978-79 (V Plan end)	3419.5	1106.0	591.5	5116.9	13.3	11.3	10.5	12.6
1982-83	4224.2	1435.9	726.5	6386.6	5.4	6.8	5.3	5.7
1983-84	5204.4	1730.3	775.4	7710.1	23.2	20.5	.7	20.7
1984-85 (VI Plan end)	5485.0	1881.4	828.5	8211.0	5.4 (9.4)	9.0 (10.4)	8.1 (6.7)	6.5 (9.3)
1985-86	5660.6	2005.2	808.1	8473.9	3.2	6.2	-3.6	3.2
1986-87	5772.7	2105.6	860.1	8738.4	2.0	5.0	6.4	3.1
1987-88@+	5782.6	2297.9	927.3	9007.8	0.2	9.1	7.8	3.1

@ = Provisional

+ = Collected and compiled

[ ] = Growth per annum during period from 1969-70 to 1973-74 (Base = 1968-69).

( ) = Growth per annum during period from 1930-81 to 1984-85 (Base = 1979-80).

Table 13—Major factors affecting fertiliser consumption

Item	Year						
	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
1. $\pm$ %changes in consumption over the previous year	10.0	5.3	20.7	6.5	3.2	3.1	3.1@
2. Weather	Poor	Poor	Good	Average	Poor	Poor	V. Poor
3. Area under irrigation	Increase	Increase	Increase	Increase	Increase	Increase	
4. Area under HYV	Increase	Increase	Increase	Increase	Increase	Decreased	Increased@
5. Availability	Increase in imports & substantial increase in domestic production.	Increase in domestic production Diminished imports.	Marginal increase in domestic production and nominal increase in imports.	Highest increase in imports and substantial increase in domestic production	Very heavy imports for the second year in succession supported by additional contribution from domestic production. Stocks started mounting due to unfavourable weather.	Record increase in domestic production. Sizeable imports and non-materialisation of anticipated demand due to poor weather accentuated the build up of inventories.	Heavy inventories continued due to non-materialisation of anticipated demand in the face of poor weather third year in succession.
6. Excise duty	Withdrawn w.e.f. 7-6-1980 on all fertilisers except A.S. and CAN	Withdrawn on AS and CAN w.e.f. 28-2-83	—	—	—	—	—
7. Fertiliser prices	Increased by 17-18.5% w.e.f. 11-7-1981 (over 38.5% increase effected in 1980-81)	No change	Reduced w.e.f. 29-6-83 on an average by 7.5%	No change	Increased w.e.f. 31-1-86 and brought back to 1981-82 level	No change	No change
8. input-output price relationship	Worsened	Improved	Improved	Improved	Improved	Improved	Improved
9. Promotional campaign	Block Delivery Scheme (BDS) introduced, IFPC introduced in 67	IFPC further intensified with no. of districts increasing to 104	IFPC continued in 104 districts. NAIF launched and implemented	IFPC and NAIF continued	IFPC and NAIF continued	IFPC continued and NAIF withdrawn	1. IFPC continued 2. A national project on 'Development of ferti-

	districts having good irrigation facilities/assured rainfall and relatively low fertiliser consumption level	vigorously					liser use in low consumption rainfed areas' for 3 years covering 60 districts in 16 states was initiated.
10. Remarks	—	—	Area concept for urea allocation introduced— Rabi 1984-85	1. Manufacturers were asked to offer 50% of their allocated quantity first to the cooperative institution— Kharif 1985 2. Districtwise allocation of urea introduced by the Centre§ Rabi 1985-86	1. Districtwise allocation of SSP introduced— Kharif 1986 2. Concept of Lead Fertiliser Supplier* (LFS) introduced— Rabi 1986-87 3. Offer of 50% allocation first to cooperative institutions dispensed with from Rabi 1986-87	1. In Rabi 1987-88 (w.e.f. Dec. '87) manufacturers of the following fertilisers were permitted to market unallocated quantity — SSP— any state of their choice with the condition that they will not get any extra freight over and above the normal freight already allowed by FICCI—DAP & Complexes—any state of their marketing zone. 2. During Rabi 1987-88, Pool Handling Agencies were allowed to market Pool urea to be replaced by equivalent indigenous urea, Pool stocks remaining unchanged.	

@ = Provisional

\* = Concept of LFS implemented from Kharif 1987.

§ = From Kharif '87 districtwise allocation relaxed and left to the State Govts.

**Table 14—Seasonwise consumption of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and total by states & their percentage increase—  
1985-86 to 1987-88 (April-March)**

Zone/State	Nutrient	Consumption ('000 tonnes)									± % over the previous year								
		1985-86			1986-87			1987-88@+			1985-86			1986-87			1987-88@+		
		Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total
East	Total	469.4	651.3	1120.7	518.0	736.9	1255.0	504.3	908.3	1412.6	17.1	12.0	14.1	10.4	13.1	12.0	-2.6	23.3	12.5
	N	320.4	416.3	736.7	33.3	459.5	798.8	329.7	564.8	894.5	16.6	10.3	12.9	5.9	10.4	8.4	-2.8	22.9	12.0
	P <sub>2</sub> O <sub>5</sub>	96.4	145.0	241.4	104.4	176.6	281.0	106.3	218.0	324.3	37.9	18.8	25.7	8.3	21.8	16.4	1.8	23.4	15.4
	K <sub>2</sub> O	52.6	90.0	142.6	74.3	100.9	175.2	68.3	125.5	193.8	-6.2	9.8	3.3	41.3	12.1	2.9	-8.1	24.4	10.0
Arunachal Pradesh	Total	0.10	0.12	0.22	0.20	0.13	0.33	0.14	0.10	0.24	11.1	100.0	69.2	100.0	8.3	50.0	-30.0	-23.1	-27.3
	N	0.05	0.09	0.14	0.12	0.10	0.22	0.07	0.03	0.10	25.0	350.0	133.3	140.0	11.1	57.1	-41.7	-70.0	-54.5
	P <sub>2</sub> O <sub>5</sub>	0.03	0.02	0.05	0.04	0.02	0.06	0.05	0.04	0.09	-25.0	100.0	—	33.3	—	20.0	25.0	100.0	50.0
	K <sub>2</sub> O	0.02	0.01	0.03	0.04	0.01	0.05	0.02	0.03	0.05	—	—	50.0	100.0	—	66.7	-50.0	30.0	—
Assam	Total	9.7	7.0	16.7	9.4	7.4	16.8	10.3	13.5	23.8	59.0	-9.1	21.0	-3.1	5.7	0.6	9.6	82.4	41.7
	N	5.2	4.1	9.3	5.1	3.6	8.7	5.6	6.7	12.3	44.4	5.1	24.0	-1.9	-12.2	-6.5	9.8	86.1	41.4
	P <sub>2</sub> O <sub>5</sub>	2.4	1.2	3.6	1.8	1.4	3.2	2.0	3.8	5.8	140.0	-33.3	73.1	-25.0	16.7	-11.1	11.1	71.4	81.3
	K <sub>2</sub> O	2.1	1.7	3.8	2.5	2.4	4.9	2.7	3.0	5.7	40.0	-15.0	6	19.0	41.2	28.9	8.0	25.0	16.3
Bihar	Total	211.5	290.0	501.5	212.1	315.4	527.5	196.6	405.2	601.8	38.3	26.8	31.4	0.3	8.8	5.2	-7.3	28.5	14.1
	N	159.3	192.1	351.4	158.8	202.1	360.9	141.5	262.4	403.9	33.3	18.8	25.0	-0.3	5.2	2.7	-10.9	29.6	11.9
	P <sub>2</sub> O <sub>5</sub>	37.5	67.4	104.9	37.6	78.4	116.0	39.2	97.5	136.7	78.6	55.3	62.9	0.3	16.3	10.6	4.3	24.4	17.8
	K <sub>2</sub> O	14.7	30.5	45.2	15.7	34.9	50.6	15.9	45.3	61.2	19.5	28.7	25.6	7.5	14.4	12.2	1.0	29.9	20.9
Manipur	Total	4.46	0.33	4.79	5.36	0.30	5.66	5.93	0.40	6.33	35.2	-17.5	29.5	20.2	-9.1	18.2	10.6	33.3	11.8
	N	3.65	0.19	3.84	4.18	0.15	4.33	4.52	0.16	4.68	25.9	-36.7	20.0	14.5	-21.1	12.8	8.1	6.7	8.1
	P <sub>2</sub> O <sub>5</sub>	0.72	0.10	0.82	1.03	0.11	1.14	1.30	0.21	1.5	80.0	-28.6	51.9	43.1	10.0	39.0	26.2	90.9	16.2
	K <sub>2</sub> O	0.03	0.04	0.13	0.15	0.04	0.19	0.11	0.03	0.14	125.0	100.0	116.6	66.7	—	46.2	-26.7	-25.0	-26.3
Meghalaya	Total	1.23	1.79	2.99	1.50	1.98	3.48	1.61	2.07	3.68	20.0	-5.8	3.1	25.0	10.6	16.4	7.3	4.5	5.7
	N	0.64	0.93	1.57	0.84	1.02	1.86	0.90	1.06	1.96	28.0	-15.5	-1.9	31.3	9.7	18.5	7.1	3.9	5.4
	P <sub>2</sub> O <sub>5</sub>	0.47	0.78	1.25	0.56	0.84	1.40	0.60	0.88	1.48	17.5	-2.5	4.2	19.1	7.7	12.0	7.1	4.8	5.7
	K <sub>2</sub> O	0.09	0.08	0.17	0.10	0.12	0.22	0.11	0.13	0.24	125.0	-27.3	13.3	11.1	50.0	29.4	1.1	8.3	9.1
Mizoram	Total	0.074	0.021	0.095	0.10	0.05	0.15	0.16	0.09	0.25	-26.0	-82.5	-16.8	35.1	138.1	57.0	60.0	80.0	66.7
	N	0.04	0.006	0.046	0.03	0.02	0.05	0.07	0.05	0.12	-20.0	-80.0	-42.5	-25.0	233.3	—	133.3	150.0	71.4
	P <sub>2</sub> O <sub>5</sub>	0.024	0.013	0.037	0.05	0.02	0.07	0.07	0.04	0.11	20.0	-78.3	-53.8	108.3	53.8	133.3	40.0	100.0	57.1
	K <sub>2</sub> O	0.01	0.002	0.012	0.02	0.01	0.03	0.02	0.003	0.02	-66.7	-90.0	-74.0	100.0	400.0	150.0	—	70.0	-33.3
Nagaland	Total	0.21	0.05	0.260	0.30	0.05	0.35	0.11	0.04	0.15	-16.0	25.0	-10.3	42.9	—	34.6	-63.3	-20.0	-57.1
	N	0.11	0.03	0.14	0.15	0.03	0.18	0.05	0.02	0.07	-26.7	—	-22.3	36.4	—	28.6	-66.7	-33.3	-61.1
	P <sub>2</sub> O <sub>5</sub>	0.09	0.02	0.11	0.13	0.02	0.15	0.06	0.02	0.08	—	—	—	44.4	—	36.4	-53.8	—	-46.7
	K <sub>2</sub> O	0.006	—	0.006	0.02	0.002	0.022	0.003	—	0.003	—	—	—	233.3	—	266.7	-85.0	—	-86.4
Orissa	Total	72.4	68.1	140.5	73.8	78.0	151.8	73.4	78.2	151.6	22.9	23.6	23.2	1.9	14.5	8.0	-0.5	0.3	-0.1
	N	45.6	41.5	87.1	44.8	45.8	90.6	43.0	44.9	87.0	22.6	25.0	23.7	-1.8	10.4	4.0	-3.8	-2.0	-3.0
	P <sub>2</sub> O <sub>5</sub>	17.1	16.4	33.5	18.0	19.5	37.5	19.0	20.1	39.1	22.1	22.4	22.3	5.3	18.9	11.9	5.6	3.1	4.0
	K <sub>2</sub> O	9.7	10.2	19.9	11.0	12.7	23.7	11.4	13.2	24.6	26.0	20.0	22.8	13.4	24.5	19.1	3.6	4.8	4.2

Sikkim	<b>Total</b>	0.71	0.48	1.19	0.80	0.56	1.36	0.87	0.61	1.48	7.6	-25.0	-8.5	12.7	16.7	14.3	8.8	8.9	8.9
	N	0.42	0.21	0.63	0.44	0.26	0.70	0.48	0.30	0.78	5.0	-30.0	-10.0	4.8	23.8	11.1	9.1	15.4	11.4
	P <sub>2</sub> O <sub>5</sub>	0.25	0.27	0.52	0.26	0.29	0.55	0.30	0.29	0.59	25.0	8.0	15.6	4.0	7.4	5.8	15.4	—	7.3
	K <sub>2</sub> O	0.04	0.002	0.04	0.10	0.019	0.11	0.09	0.02	0.1	—	-96.0	-55.6	150.0	450.0	161.9	-10.0	100.0	—
Tripura	<b>Total</b>	1.52	3.58	5.10	3.25	3.59	6.84	3.5	4.6	8.1	38.2	79.0	64.5	113.8	0.3	34.1	7.7	27.8	19.1
	N	1.09	2.37	3.46	2.18	2.37	4.55	2.1	2.3	4.4	36.2	82.3	64.8	100.0	—	31.5	-4.5	-4.2	-4.3
	P <sub>2</sub> O <sub>5</sub>	0.26	0.66	0.92	0.64	0.66	1.30	0.9	1.6	2.5	52.9	65.0	61.4	146.2	—	41.3	40.6	142.4	92.3
	K <sub>2</sub> O	0.17	0.55	0.72	0.43	0.56	0.99	0.5	0.7	1.2	21.4	61.8	50.0	152.9	1.8	37.5	16.3	25.0	21.1
West Bengal	<b>Total</b>	152.9	255.9	408.8	196.2	303.0	409.2	188.9	372.3	561.2	0.9	0.7	0.8	28.3	18.4	22.1	-3.7	22.9	12.1
	N	96.6	160.3	256.9	114.4	189.6	304.0	118.0	229.6	347.6	5.3	3.8	4.3	18.4	18.3	18.3	3.1	21.0	14.3
	P <sub>2</sub> O <sub>5</sub>	36.0	56.3	92.3	43.3	70.5	113.8	41.2	87.7	128.9	13.9	-6.7	0.4	20.3	25.2	23.3	-4.8	24.4	13.3
	K <sub>2</sub> O	20.3	39.3	59.6	38.5	42.9	81.4	29.7	55.0	84.7	-28.3	—	-11.8	89.7	9.2	36.6	-22.9	28.3	4.1
Telangana (NE)	<b>Total</b>	14.7	23.9	38.6	15.1	26.5	41.6	22.7	31.2	53.9	-41.2	-21.6	-30.5	2.7	10.9	7.8	50.3	17.7	29.1
	N	7.7	14.5	22.2	8.3	14.4	22.7	13.4	17.3	30.7	-57.2	-31.0	-43.1	7.8	-0.7	2.3	61.4	20.1	35.1
	P <sub>2</sub> O <sub>5</sub>	1.6	1.8	3.4	1.0	4.8	5.8	1.6	5.8	7.4	60.0	20.0	36.0	-37.5	166.7	70.6	60.0	20.8	27.1
	K <sub>2</sub> O	5.4	7.6	13.0	5.8	7.3	13.1	7.7	8.1	15.8	-10.0	-5.0	-7.1	7.4	-3.9	0.8	32.8	11.0	20.1
North	<b>Total</b>	1278.4	1971.0	3249.4	1259.6	2110.6	3370.2	1160.0	2156.8	3316.8	15.6	1.0	6.3	-1.5	7.1	3.7	-8.1	2.2	-1.0
	N	1070.7	1392.2	2462.9	1067.8	1443.5	2511.3	963.9	1405.0	2368.2	12.6	1.9	6.3	-0.3	3.7	2.0	-9.7	-2.7	-5.7
	P <sub>2</sub> O <sub>5</sub>	167.4	514.5	681.9	152.6	575.1	727.7	155.9	641.3	797.2	41.4	2.2	9.7	-8.8	11.8	6.7	2.2	11.5	9.6
	K <sub>2</sub> O	40.3	64.3	104.6	39.2	92.0	131.2	40.2	110.5	150.7	9.5	-21.1	-11.6	-2.7	43.1	25.4	2.6	20.1	14.9
Haryana	<b>Total</b>	139.6	232.6	372.2	144.1	270.8	414.9	132.3	261.5	393.8	17.6	6.7	10.6	3.2	16.4	11.5	-8.2	-3.4	-5.1
	N	123.4	173.0	296.4	126.9	200.2	327.1	111.9	188.7	300.6	15.8	4.2	8.7	2.8	15.7	10.4	-11.8	-5.7	-8.1
	P <sub>2</sub> O <sub>5</sub>	14.2	55.4	69.6	15.5	66.5	82.0	18.6	69.8	88.4	40.6	19.9	23.6	9.2	20.0	17.8	20.0	5.0	7.1
	K <sub>2</sub> O	2.0	4.2	6.2	1.7	4.1	5.8	1.8	3.0	4.8	5.3	-26.3	-18.4	-15.0	-2.4	-6.5	5.9	-26.8	-17.1
Himachal Pradesh	<b>Total</b>	11.0	12.7	23.7	11.9	14.2	26.1	12.2	13.1	25.3	7.8	11.4	9.7	8.2	11.8	10.1	2.5	-7.9	-3.1
	N	9.9	7.9	17.8	10.8	8.5	19.2	10.9	7.3	18.2	4.2	16.2	9.2	9.1	7.6	7.9	0.9	-14.1	-5.3
	P <sub>2</sub> O <sub>5</sub>	0.7	2.7	3.4	0.7	3.3	4.1	0.8	3.3	4.1	16.7	3.8	6.2	—	22.2	20.6	14.3	—	—
	K <sub>2</sub> O	0.4	2.1	2.5	0.4	2.4	2.8	0.5	2.5	3.0	25.0	10.5	12.6	—	14.3	12.0	25.0	4.2	7.1
Jammu & Kashmir	<b>Total</b>	22.3	13.8	36.1	21.2	9.1	30.3	22.9	15.2	38.1	26.0	21.1	24.1	-4.9	-34.1	-16.1	8.0	38.3	25.1
	N	17.0	8.4	25.4	16.8	5.8	22.6	17.6	10.5	28.1	18.1	10.5	15.5	-1.2	-31.0	-11.0	4.8	81.0	24.3
	P <sub>2</sub> O <sub>5</sub>	4.3	3.5	7.8	3.7	2.8	6.5	4.3	3.8	8.1	53.6	16.7	34.5	-14.0	-20.0	-16.7	16.2	35.7	24.4
	K <sub>2</sub> O	1.0	1.9	2.9	0.7	0.5	1.2	1.0	0.9	1.9	-50.0	137.5	123.1	-30.0	-73.7	-58.6	42.9	80.0	58.3
Punjab	<b>Total</b>	425.6	672.6	1098.2	428.1	687.5	1115.6	422.7	689.0	1111.7	5.3	4.5	4.8	0.6	2.2	1.6	-1.3	0.2	-0.3
	N	351.9	435.3	787.2	354.6	448.4	803.0	349.3	442.0	791.3	4.1	3.5	3.8	0.8	3.0	2.0	-1.5	-1.4	-1.5
	P <sub>2</sub> O <sub>5</sub>	63.9	223.4	287.3	63.9	225.6	289.5	63.9	233.0	296.9	13.5	6.3	7.8	—	1.0	0.7	—	3.3	2.6
	K <sub>2</sub> O	9.8	13.9	23.7	9.6	13.5	23.1	9.5	14.0	23.5	3.2	8.6	6.3	-2.0	-2.9	-2.5	-1.0	3.7	1.7
Uttar Pradesh	<b>Total</b>	677.0	1032.0	1709.0	650.7	1121.0	1771.7	566.1	1170.0	1736.1	22.5	-2.7	6.0	-3.9	8.6	3.7	-13.0	4.4	-2.1
	N	566.0	762.0	1328.0	555.7	774.1	1329.8	470.9	750.0	1220.9	17.9	0.2	7.1	-1.8	1.6	0.1	-15.3	-3.1	-8.1
	P <sub>2</sub> O <sub>5</sub>	84.0	228.0	312.0	68.3	275.6	343.9	67.9	330.0	397.9	73.9	-5.0	0.3	-18.7	20.9	10.2	-0.6	19.7	15.1
	K <sub>2</sub> O	27.0	42.0	69.0	26.7	71.3	98.0	27.3	50.0	117.3	10.2	-30.1	-18.4	-1.1	69.8	42.0	2.2	26.2	19.1

(Continued)



Table 14—Seasonwise consumption of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and total by states and their percentage increase—  
1985-86 to 1987-88 (April-March) (Concluded)

Zone/State	Nutrient	Consumption ('000 tonnes)									±% over the previous year								
		1985-86			1986-87			1987-88@ +			1985-86			1986-87			1987-88@ +		
		Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total
Chandigarh	Total	0.38	0.69	1.07	0.46	0.61	1.07				-20.8	7.8	-4.5	21.1	-11.6	—			
	N	0.33	0.54	0.87	0.41	0.49	0.90				-17.5	35.0	8.8	24.2	-9.3	3.4			
	P <sub>2</sub> O <sub>5</sub>	0.04	0.14	0.18	0.05	0.12	0.17	3.75	8.01	11.76	-55.6	-30.0	-37.9	25.0	-12.5	-5.6	5.3	—	1.8
	K <sub>2</sub> O	0.004	0.02	0.024	0.004	0.004	0.008	3.29	6.50	9.79	-60.0	-33.3	-40.0	—	-80.0	-66.7	6.1	—	2.0
Delhi	Total	2.48	6.63	9.11	3.10	7.40	10.50	0.39	1.41	1.80	-0.8	22.8	15.3	21.9	11.6	15.3	8.3	3.6	6.5
	N	2.15	5.05	7.20	2.69	6.01	8.70	0.07	0.10	0.17	2.4	20.2	14.3	25.1	19.8	20.8	-32.7	-45.7	-41.0
	P <sub>2</sub> O <sub>5</sub>	0.27	1.40	1.67	0.31	1.21	1.52				35.0	40.0	39.2	14.8	-13.6	-9.0			
	K <sub>2</sub> O	0.06	0.18	0.24	0.10	0.18	0.28				-45.5	12.5	-11.1	66.6		16.7			
South	Total	1262.3	1086.6	2348.9	1146.3	1163.3	2309.6	1180.0	1217.4	2397.4	-10.2	-0.8	-6.1	-9.2	7.1	-1.7	2.9	4.6	3.8
	N	693.9	650.6	1344.5	647.6	691.5	1339.1	630.6	735.5	1366.1	-12.7	-2.3	-7.9	-32.6	6.3	-0.4	-2.6	6.4	2.0
	P <sub>2</sub> O <sub>5</sub>	354.4	255.5	609.9	309.5	275.3	584.8	336.9	291.4	628.3	-2.6	0.9	-1.2	-12.7	7.7	-4.4	8.9	5.8	7.4
	K <sub>2</sub> O	214.0	180.5	394.5	189.2	196.5	385.7	212.5	190.5	403.0	-13.2	2.2	-6.8	-11.6	8.9	-2.2	12.3	-3.1	4.5
Andhra Pradesh	Total	510.9	377.2	888.1	468.5	433.0	901.5	486.3	480.4	966.7	-10.0	-8.6	-9.4	-8.3	14.8	1.5	3.8	10.9	7.2
	N	321.5	247.4	568.9	303.0	280.1	583.1	302.7	317.1	619.8	-11.8	-11.7	-11.8	-5.8	13.2	2.5	-0.1	13.2	6.3
	P <sub>2</sub> O <sub>5</sub>	149.5	93.2	242.7	130.2	111.2	241.4	143.8	126.5	270.3	-3.8	-5.9	-4.6	-12.9	19.3	-0.6	10.4	13.8	12.0
	K <sub>2</sub> O	39.9	36.6	76.5	35.3	41.7	77.0	39.8	36.8	76.6	-16.2	9.6	-5.6	-11.5	13.9	0.8	12.7	-11.8	-0.5
Karnataka	Total	351.4	204.2	555.6	339.9	225.9	565.8	349.0	209.4	558.4	-3.5	-9.8	-6.0	-3.3	10.6	1.8	2.7	-7.3	-1.3
	N	179.4	116.2	295.6	179.1	122.5	301.6	169.9	116.5	286.4	-2.4	-8.5	-4.9	-0.2	5.4	2.0	-5.1	-4.9	-5.0
	P <sub>2</sub> O <sub>5</sub>	109.7	54.8	164.5	99.4	61.8	161.2	106.5	55.4	161.9	-1.5	-10.5	-2.8	-9.4	12.8	2.0	7.1	-10.4	0.4
	K <sub>2</sub> O	62.3	33.2	95.5	61.4	41.6	103.0	72.6	37.5	110.1	-13.6	-13.3	13.5	-1.4	25.3	7.9	18.2	-9.9	6.9
Kerala	Total	80.8	60.5	141.3	85.8	65.6	151.4	100.0	80.6	180.6	8.7	13.5	10.7	6.2	8.4	7.1	16.6	22.9	19.3
	N	32.6	26.7	59.3	33.7	27.1	60.8	36.7	32.3	69.0	-1.2	8.5	2.8	3.3	1.5	2.5	8.9	19.2	13.5
	P <sub>2</sub> O <sub>5</sub>	19.7	14.7	34.4	20.5	15.4	35.9	26.8	22.4	49.2	3.7	8.1	5.5	4.1	4.8	4.4	30.7	45.5	37.0
	K <sub>2</sub> O	28.5	19.1	47.6	31.6	23.1	54.7	36.5	25.9	62.4	27.8	20.5	27.3	10.9	20.9	14.9	15.5	12.1	14.1
Tamil Nadu	Total	267.1	401.2	668.3	244.3	430.2	674.5	237.5	438.2	675.7	-19.7	12.1	-3.2	-8.5	7.2	0.9	-2.8	1.9	0.2
	N	137.3	241.6	378.9	127.5	257.3	384.8	117.3	265.3	382.6	-24.8	14.3	-3.8	-7.1	6.5	1.6	-8.0	3.1	-0.6
	P <sub>2</sub> O <sub>5</sub>	62.7	82.7	145.4	58.1	82.2	143.3	58.6	85.2	143.8	-7.4	17.8	4.4	-7.3	3.0	-1.5	0.9	—	0.3
	K <sub>2</sub> O	67.1	76.9	144.0	58.7	87.7	146.4	61.6	87.7	149.3	18.5	0.7	9.3	-12.5	14.0	1.7	4.9	—	2.0
Pondicherry	Total	6.41	8.40	14.81	7.72	8.54	16.26	7.1	8.4	15.5	-8.4	15.1	3.6	20.4	1.7	9.8	-8.0	-1.2	-4.9
	N	3.39	4.60	7.99	4.23	4.48	8.71	3.9	4.2	8.1	-10.8	7.0	-1.4	24.8	-2.6	9.0	-7.1	-6.7	-6.9
	P <sub>2</sub> O <sub>5</sub>	1.16	1.60	2.76	1.30	1.68	2.98	1.2	1.8	3.0	-0.3	23.1	10.4	12.1	5.0	8.0	-7.7	5.9	—
	K <sub>2</sub> O	1.86	2.20	4.06	2.19	2.38	4.58	2.0	2.4	4.4	-1.1	22.2	9.7	17.7	8.2	12.8	-9.1	—	-4.3
Andaman & Nicobar Islands	Total	0.07	0.03	0.10	0.08	0.06	0.14	0.11	0.39	0.50	250.0	-50.0	25.0	14.3	100.0	40.0	37.5	566.7	257.1
	N	0.03	0.01	0.04	0.05	0.03	0.08	0.06	0.09	0.15	400.0	-58.4	33.3	66.7	200.0	100.0	20.0	200.0	87.5
	P <sub>2</sub> O <sub>5</sub>	0.02	0.01	0.03	0.03	0.01	0.04	0.03	0.07	0.10	1900.0	-50.0	42.9	50.0	—	33.3	—	600.0	150.0
	K <sub>2</sub> O	0.02	0.01	0.03	0.002	0.02	0.022	0.02	0.23	0.25	100.0	-50.0	—	-90.0	100.0	-26.7	900.0	1050.0	1045.5

<b>West</b>	<b>Total</b>	<b>993.9</b>	<b>761.1</b>	<b>1755.0</b>	<b>1033.0</b>	<b>770.7</b>	<b>1803.7</b>	<b>1049.6</b>	<b>831.4</b>	<b>1881.0</b>	<b>14.1</b>	<b>-4.8</b>	<b>5.0</b>	<b>3.9</b>	<b>1.3</b>	<b>2.8</b>	<b>1.6</b>	<b>7.9</b>	<b>4.3</b>
	<b>N</b>	<b>621.7</b>	<b>495.0</b>	<b>1116.7</b>	<b>648.5</b>	<b>475.1</b>	<b>1123.6</b>	<b>652.6</b>	<b>500.5</b>	<b>1153.1</b>	<b>12.2</b>	<b>-1.5</b>	<b>5.7</b>	<b>4.3</b>	<b>-4.0</b>	<b>0.6</b>	<b>0.6</b>	<b>5.3</b>	<b>2.6</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>230.9</b>	<b>211.1</b>	<b>472.0</b>	<b>278.1</b>	<b>234.0</b>	<b>512.1</b>	<b>293.2</b>	<b>254.9</b>	<b>548.1</b>	<b>13.5</b>	<b>-6.4</b>	<b>3.6</b>	<b>6.6</b>	<b>10.8</b>	<b>8.7</b>	<b>5.4</b>	<b>8.9</b>	<b>7.0</b>
	<b>K<sub>2</sub>O</b>	<b>111.3</b>	<b>55.0</b>	<b>166.3</b>	<b>106.4</b>	<b>61.6</b>	<b>168.0</b>	<b>103.8</b>	<b>76.0</b>	<b>179.8</b>	<b>27.3</b>	<b>-23.0</b>	<b>4.7</b>	<b>4.6</b>	<b>12.0</b>	<b>1.8</b>	<b>-2.5</b>	<b>23.4</b>	<b>7.0</b>
<b>Gujarat</b>	<b>Total</b>	<b>224.3</b>	<b>197.0</b>	<b>421.3</b>	<b>215.8</b>	<b>186.5</b>	<b>402.3</b>	<b>223.1</b>	<b>187.0</b>	<b>410.1</b>	<b>-10.0</b>	<b>-22.8</b>	<b>-16.5</b>	<b>3.8</b>	<b>-5.3</b>	<b>-4.5</b>	<b>3.4</b>	<b>0.3</b>	<b>1.9</b>
	<b>N</b>	<b>147.4</b>	<b>139.1</b>	<b>286.5</b>	<b>144.1</b>	<b>111.4</b>	<b>255.6</b>	<b>139.8</b>	<b>115.7</b>	<b>255.5</b>	<b>-3.3</b>	<b>-17.1</b>	<b>-10.6</b>	<b>-2.2</b>	<b>-19.9</b>	<b>-10.8</b>	<b>-3.0</b>	<b>3.9</b>	<b>—</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>60.2</b>	<b>49.1</b>	<b>109.3</b>	<b>53.7</b>	<b>58.1</b>	<b>111.8</b>	<b>66.5</b>	<b>53.8</b>	<b>120.3</b>	<b>-22.2</b>	<b>-31.2</b>	<b>-26.6</b>	<b>-10.8</b>	<b>-18.3</b>	<b>2.3</b>	<b>23.8</b>	<b>-7.4</b>	<b>7.6</b>
	<b>K<sub>2</sub>O</b>	<b>16.7</b>	<b>8.8</b>	<b>25.5</b>	<b>18.0</b>	<b>17.0</b>	<b>34.9</b>	<b>16.8</b>	<b>17.5</b>	<b>34.3</b>	<b>-13.9</b>	<b>-45.3</b>	<b>-28.2</b>	<b>7.8</b>	<b>93.2</b>	<b>36.9</b>	<b>-6.7</b>	<b>2.9</b>	<b>-1.7</b>
<b>Madhya Pradesh</b>	<b>Total</b>	<b>221.1</b>	<b>216.0</b>	<b>437.1</b>	<b>258.0</b>	<b>235.6</b>	<b>493.6</b>	<b>259.0</b>	<b>249.0</b>	<b>508.0</b>	<b>21.2</b>	<b>13.6</b>	<b>17.3</b>	<b>16.7</b>	<b>9.1</b>	<b>12.9</b>	<b>0.4</b>	<b>5.7</b>	<b>2.9</b>
	<b>N</b>	<b>131.1</b>	<b>124.8</b>	<b>255.9</b>	<b>151.4</b>	<b>138.1</b>	<b>289.5</b>	<b>153.1</b>	<b>140.0</b>	<b>293.1</b>	<b>15.7</b>	<b>13.1</b>	<b>14.4</b>	<b>15.5</b>	<b>10.7</b>	<b>13.1</b>	<b>1.1</b>	<b>1.4</b>	<b>1.2</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>74.3</b>	<b>80.5</b>	<b>154.8</b>	<b>88.4</b>	<b>85.4</b>	<b>173.8</b>	<b>89.5</b>	<b>97.0</b>	<b>186.5</b>	<b>32.9</b>	<b>17.0</b>	<b>24.1</b>	<b>19.0</b>	<b>6.1</b>	<b>12.3</b>	<b>1.2</b>	<b>13.6</b>	<b>7.3</b>
	<b>K<sub>2</sub>O</b>	<b>15.7</b>	<b>10.7</b>	<b>26.4</b>	<b>18.2</b>	<b>12.1</b>	<b>30.3</b>	<b>16.4</b>	<b>12.0</b>	<b>28.4</b>	<b>18.0</b>	<b>-2.7</b>	<b>8.6</b>	<b>15.9</b>	<b>13.1</b>	<b>14.8</b>	<b>-9.9</b>	<b>-0.8</b>	<b>6.3</b>
<b>Maharashtra</b>	<b>Total</b>	<b>572.0</b>	<b>196.0</b>	<b>668.0</b>	<b>477.0</b>	<b>179.0</b>	<b>656.0</b>	<b>493.4</b>	<b>249.0</b>	<b>742.4</b>	<b>28.9</b>	<b>-8.9</b>	<b>14.9</b>	<b>1.1</b>	<b>-8.7</b>	<b>-1.8</b>	<b>3.4</b>	<b>39.1</b>	<b>13.2</b>
	<b>N</b>	<b>288.0</b>	<b>122.0</b>	<b>410.0</b>	<b>293.0</b>	<b>105.0</b>	<b>398.0</b>	<b>309.3</b>	<b>143.0</b>	<b>452.3</b>	<b>22.6</b>	<b>-1.7</b>	<b>14.2</b>	<b>1.7</b>	<b>-13.9</b>	<b>-2.9</b>	<b>5.6</b>	<b>36.2</b>	<b>13.6</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>103.0</b>	<b>42.0</b>	<b>150.0</b>	<b>116.0</b>	<b>44.0</b>	<b>160.0</b>	<b>115.5</b>	<b>62.0</b>	<b>177.5</b>	<b>37.4</b>	<b>-16.8</b>	<b>16.2</b>	<b>7.4</b>	<b>4.8</b>	<b>6.7</b>	<b>-0.4</b>	<b>40.9</b>	<b>10.9</b>
	<b>K<sub>2</sub>O</b>	<b>76.0</b>	<b>32.0</b>	<b>108.0</b>	<b>68.0</b>	<b>30.0</b>	<b>98.0</b>	<b>68.6</b>	<b>44.0</b>	<b>112.6</b>	<b>45.0</b>	<b>-21.0</b>	<b>16.3</b>	<b>-10.5</b>	<b>-6.2</b>	<b>-9.3</b>	<b>0.8</b>	<b>48.7</b>	<b>14.9</b>
<b>Rajasthan</b>	<b>Total</b>	<b>70.8</b>	<b>150.1</b>	<b>220.9</b>	<b>79.2</b>	<b>167.9</b>	<b>247.1</b>	<b>70.5</b>	<b>144.2</b>	<b>214.7</b>	<b>2.3</b>	<b>9.3</b>	<b>7.0</b>	<b>11.9</b>	<b>11.9</b>	<b>11.9</b>	<b>-11.0</b>	<b>-14.1</b>	<b>-13.1</b>
	<b>N</b>	<b>52.6</b>	<b>108.2</b>	<b>160.8</b>	<b>58.7</b>	<b>119.7</b>	<b>178.4</b>	<b>48.8</b>	<b>100.8</b>	<b>149.6</b>	<b>3.3</b>	<b>8.7</b>	<b>6.9</b>	<b>11.6</b>	<b>10.6</b>	<b>10.9</b>	<b>-16.9</b>	<b>-15.8</b>	<b>-16.1</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>16.7</b>	<b>38.8</b>	<b>55.5</b>	<b>19.0</b>	<b>46.0</b>	<b>64.9</b>	<b>20.6</b>	<b>41.4</b>	<b>62.0</b>	<b>-1.2</b>	<b>12.8</b>	<b>8.2</b>	<b>13.8</b>	<b>18.6</b>	<b>16.9</b>	<b>8.4</b>	<b>-10.0</b>	<b>-4.5</b>
	<b>K<sub>2</sub>O</b>	<b>1.5</b>	<b>3.1</b>	<b>4.6</b>	<b>1.5</b>	<b>2.2</b>	<b>3.8</b>	<b>1.1</b>	<b>2.0</b>	<b>3.1</b>	<b>7.1</b>	<b>-8.8</b>	<b>-4.2</b>	<b>—</b>	<b>-29.0</b>	<b>-17.4</b>	<b>-26.7</b>	<b>-9.1</b>	<b>-18.4</b>
<b>Goa, Daman &amp; Diu</b>	<b>Total</b>	<b>5.32</b>	<b>1.99</b>	<b>7.31</b>	<b>2.72</b>	<b>1.67</b>	<b>4.4</b>	<b>3.3</b>	<b>2.1</b>	<b>5.4</b>	<b>40.0</b>	<b>10.6</b>	<b>30.5</b>	<b>-48.9</b>	<b>-17.1</b>	<b>-39.8</b>	<b>21.3</b>	<b>25.7</b>	<b>22.7</b>
	<b>N</b>	<b>2.40</b>	<b>0.94</b>	<b>3.34</b>	<b>1.19</b>	<b>0.77</b>	<b>1.96</b>	<b>1.5</b>	<b>0.9</b>	<b>2.4</b>	<b>14.3</b>	<b>4.4</b>	<b>11.3</b>	<b>-50.4</b>	<b>-18.1</b>	<b>-41.3</b>	<b>26.1</b>	<b>16.9</b>	<b>22.4</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>1.55</b>	<b>0.61</b>	<b>2.16</b>	<b>0.81</b>	<b>0.55</b>	<b>1.36</b>	<b>0.9</b>	<b>0.7</b>	<b>1.6</b>	<b>72.2</b>	<b>22.0</b>	<b>54.3</b>	<b>-47.7</b>	<b>-9.9</b>	<b>-37.0</b>	<b>11.1</b>	<b>27.3</b>	<b>17.6</b>
	<b>K<sub>2</sub>O</b>	<b>1.37</b>	<b>0.44</b>	<b>1.81</b>	<b>0.72</b>	<b>0.35</b>	<b>1.07</b>	<b>0.9</b>	<b>0.5</b>	<b>1.4</b>	<b>52.2</b>	<b>10.0</b>	<b>39.2</b>	<b>-47.4</b>	<b>-20.5</b>	<b>-40.9</b>	<b>25.0</b>	<b>42.9</b>	<b>30.8</b>
<b>Dadra &amp; Nagar Haveli</b>	<b>Total</b>	<b>0.32</b>	<b>0.06</b>	<b>0.38</b>	<b>0.36</b>	<b>0.07</b>	<b>0.43</b>	<b>0.29</b>	<b>0.16</b>	<b>0.45</b>	<b>6.7</b>	<b>—</b>	<b>5.6</b>	<b>12.5</b>	<b>16.7</b>	<b>13.2</b>	<b>-19.4</b>	<b>128.6</b>	<b>7.1</b>
	<b>N</b>	<b>0.20</b>	<b>0.02</b>	<b>0.22</b>	<b>0.18</b>	<b>0.04</b>	<b>0.22</b>	<b>0.10</b>	<b>0.10</b>	<b>0.20</b>	<b>11.1</b>	<b>-33.3</b>	<b>4.8</b>	<b>-10.0</b>	<b>100.0</b>	<b>—</b>	<b>-44.4</b>	<b>150.0</b>	<b>-9.1</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>0.11</b>	<b>0.04</b>	<b>0.15</b>	<b>0.18</b>	<b>0.02</b>	<b>0.20</b>	<b>0.18</b>	<b>0.05</b>	<b>0.23</b>	<b>10.0</b>	<b>33.3</b>	<b>15.4</b>	<b>63.6</b>	<b>-33.3</b>	<b>42.8</b>	<b>—</b>	<b>150.0</b>	<b>15.0</b>
	<b>K<sub>2</sub>O</b>	<b>0.01</b>	<b>0.03</b>	<b>0.02</b>	<b>0.004</b>	<b>0.007</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.02</b>	<b>—</b>	<b>—</b>	<b>100.0</b>	<b>-60.0</b>	<b>-30.0</b>	<b>-50.0</b>	<b>150.0</b>	<b>42.9</b>	<b>100.0</b>
<b>All-India</b>	<b>Total</b>	<b>4004.0</b>	<b>4470.0</b>	<b>8474.0</b>	<b>3956.9</b>	<b>4781.5</b>	<b>8738.4</b>	<b>3893.9</b>	<b>5113.9</b>	<b>9007.8</b>	<b>5.8</b>	<b>1.0</b>	<b>3.2</b>	<b>-1.2</b>	<b>7.0</b>	<b>3.1</b>	<b>-1.6</b>	<b>7.0</b>	<b>3.1</b>
	<b>N</b>	<b>2706.7</b>	<b>2954.1</b>	<b>5660.8</b>	<b>2703.2</b>	<b>3069.5</b>	<b>5772.7</b>	<b>2576.8</b>	<b>3205.8</b>	<b>5782.6</b>	<b>5.1</b>	<b>1.5</b>	<b>3.2</b>	<b>-0.1</b>	<b>3.9</b>	<b>2.0</b>	<b>-4.7</b>	<b>4.4</b>	<b>0.2</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>879.1</b>	<b>1126.1</b>	<b>2005.2</b>	<b>844.6</b>	<b>1261.0</b>	<b>2105.6</b>	<b>892.3</b>	<b>1405.6</b>	<b>2297.9</b>	<b>12.4</b>	<b>2.0</b>	<b>6.3</b>	<b>-3.9</b>	<b>12.0</b>	<b>5.0</b>	<b>5.6</b>	<b>11.5</b>	<b>9.1</b>
	<b>K<sub>2</sub>O</b>	<b>418.2</b>	<b>309.8</b>	<b>808.0</b>	<b>409.1</b>	<b>451.0</b>	<b>860.1</b>	<b>424.8</b>	<b>502.5</b>	<b>927.3</b>	<b>-2.0</b>	<b>-5.3</b>	<b>-3.6</b>	<b>-2.2</b>	<b>15.7</b>	<b>6.4</b>	<b>3.8</b>	<b>11.4</b>	<b>7.8</b>

Note: Fertiliser consumption by plantation crops in the South Zone is included in the respective states' total except in 1985-86 where only the South Zone total includes their contribution.

@=Provisional, +=Collected and compiled by FAI.

During the Plan period ending	Increase/annum during Plan periods* in absolute terms (000 tonnes)	No. of average/good monsoon years
I (1955-56)	16.3	
II (1960-61)	32.6	
III (1965-66)	98.2	4 (1961-62 to 1964-65)
IV (1973-74)	215.6	3 (1969-70 to 1971-72)
V (1978-79)	455.7	3 (1975-76, 1977-78 & 1978-79)
VI (1984-85)	591.2	2 (1983-84 & 1984-85)
VII (upto 1987-88)	265.7	None

\* Excluding Annual Plans.

Increases in fertiliser consumption during the first three Plans were due to extension of net area sown rather than intensive manuring per hectare of gross cropped area (Table 22). With the introduction of high yielding varieties (HYVs) in 1966-67 the fertiliser consumption received an impetus and growth per annum in absolute terms started improving. This was witnessed until the Sixth Plan end (1984-85), thereafter, due to unfavourable weather, quantum increases received a setback as would be seen from the Table given above.

The Mid-term Appraisal of the Seventh Five Year Plan envisages a consumption level of 12 million tonnes by 1989-90 i.e. an increase of 1.5 million tonnes per annum in the remaining two years of the Plan over 1987-88 level of 9.0 million tonnes which is a stupendous task indeed.

It may be mentioned that the golden year 1983-84 witnessed highest quantum increase of 1.31 million tonnes when 32 meteorological sub-divisions received excess to normal rainfall which was timely and widespread. Fertiliser prices were reduced on an average by 7.5% (another 10% on old stocks held by the Food Corporation of India), area under irrigation and HYVs increased and input-output price relationship improved.

Growth of fertiliser consumption depends on a variety of factors including weather, price of input and output, irrigation, timely availability, healthy marketing scene, transfer of technology, promotion and extension etc. However, it is well known that weather plays the most important role in the growth of fertiliser consumption.

The year 1987-88 witnessed the worst drought of the century. 22 out of 35 meteorological sub-divisions witnessed deficient/scanty rainfall during the south-west monsoon period (June-Sept., 1987) (Table 11) and 12 during Oct.-Dec. 1987. In 1979-80 16 sub-divisions and in 1965-66 19 sub-divisions were adversely affected, both these years witnessed acute drought situation. The monsoon failure in 1987-88—third year in succession since 1985-86—adversely hit crops in about 45 million hectares in 267 districts in 15 states and 6 Union Territories. Despite such a grim situation foodgrains production is anticipated to have declined by only 6 million tonnes from 144 million tonnes in 1986-87 to 138 million tonnes in 1987-88 (target 160 million tonnes). This represents a fall of 4.2 per cent as against 16.8 per cent witnessed in 1979-80 and 19.0 per cent in 1965-66—a resilient agriculture indeed. Districtwise rainfall data for 384 districts is also available. Its analysis shows the extent of districts affected by deficient rainfall during south west monsoon period (June-September):

Districts affected by deficient cumulative rainfall (June-Sept.)

	Percent of districts
1981	31
1982	54
1983	25
1984	37
1985	38
1986	50
1987	57

Weather being unfavourable since Rabi 1984-85 fertiliser consumption during 1987-88 witnessed a marginal increase of 3% over 1986-87 as per data compiled from the states viz., from 8.74 million tonnes in 1986-87 to 9.01 million tonnes in 1987-88—major increase coming from P<sub>2</sub>O<sub>5</sub>, followed by K<sub>2</sub>O and N. However, as per data compiled by FAI, the consumption during 1987-88 was stagnant at about 8.76 million tonnes. Consumption target for the year 1987-88 was fixed at 10.3 million tonnes. In fact, for the last three years (1985-86 to 1987-88) consumption has been growing at a nominal rate of 3 per cent or 0.26 million tonnes per annum.

A number of states recorded a negative growth rate in fertiliser consumption over the previous year, prominent among them being Uttar Pradesh, Rajasthan, Haryana, Karnataka and Punjab. On the other hand, Maharashtra, Bihar, A.P., West Bengal, Kerala and M.P. recorded a sizeable positive growth (Table 15). It may be added that Punjab and Haryana witnessed for the first time a meagre fall and Gujarat recorded an increase of 8 thousand tonnes after a lapse of 3 years viz., since 1984-85.

Kharif 1987

Level of precipitation is not the only important consideration, as the timing and duration of rainfall influence crop yields a great deal. As many as 22 meteorological sub-divisions had deficient/scanty rainfall during the South-West monsoon period of June-Sept. of 1987. The rainfall situation was particularly bad in June and July, the two months on which Kharif crops prospects depend to a large extent. Kharif crops account for about 60% of India's food-grain production, 80% of coarse grain production, more than 50% of oilseeds production and 33% of pulses which were severely affected due to widespread deficient rains.

The areas that were particularly deficient in rain were Gujarat (Saurashtra), Rajasthan (West Region), Punjab, Haryana, Uttar Pradesh, Himachal Pradesh, A.P. (except Telangana and Rayalaseema), Karnataka (except North-interior Karnataka) and Orissa. Out of these, Gujarat and Rajasthan were the worst affected and have had poor rainfall for the past three or four years.

Table 15—States according to descending order of contribution to total increase in consumption (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O)—1987-88 over 1986-87 and 1986-87 over 1985-86

Ranking in terms of increase in consumption—1987-88 over 1986-87	State	1987-88@ over 1986-87			Ranking in terms of increase in consumption - 1986-87 over 1985-86	State	1986-87 over 1985-86		
		Increase in absolute terms ('000 tonnes)	Share in contribution to total increase (per cent)	Cumulative share (per cent)			Increase in absolute terms ('000 tonnes)	Share in contribution to total increase (per cent)	Cumulative share (per cent)
1	Maharashtra	86.4	24.3	24.3	1	West Bengal	90.4	24.1	24.1
2	Bihar	74.3	20.9	45.2	2	Uttar Pradesh	62.7	16.7	40.8
3	Andhra Pradesh	65.2	18.4	63.6	3	Madhya Pradesh	56.5	15.0	55.8
4	West Bengal	62.0	17.5	81.1	4	Haryana	42.7	11.4	67.2
5	Kerala	29.2	8.2	89.3	5	Rajasthan	26.2	7.0	74.2
6	Madhya Pradesh	14.4	4.0	93.3	6	Bihar	26.0	6.9	81.1
7	Gujarat	7.8	2.2	95.5	7	Punjab	17.4	4.6	85.7
8	Jammu & Kashmir	7.8	2.2	97.7	8	Andhra Pradesh	13.4	3.6	89.3
9	Assam	7.0	2.0	99.7	9	Orissa	11.8	3.0	92.3
10	Tamil Nadu	1.2	0.3	100.0	10	Karnataka	10.2	2.7	95.0
					11	Kerala	10.1	2.7	97.7
					12	Tamil Nadu	6.2	1.7	99.4
					13	Himachal Pradesh	2.4	0.57	99.97
					14	Assam	0.1	0.03	100.0
<b>Sub Total</b>		<b>355.3</b>					<b>375.6</b>		
<b>Negative growth rate</b>									
1	Orissa	0.2	0.2	0.2	1	Jammu & Kashmir	5.8	15.8	15.8
2	Himachal Pradesh	0.8	0.8	1.0	2	Maharashtra	12.0	32.6	48.4
3	Punjab	3.9	3.8	4.8	3	Gujarat	19.0	51.6	100.0
4	Karnataka	7.4	7.3	12.1					
5	Haryana	21.1	20.8	32.9					
6	Rajasthan	32.4	32.0	64.9					
7	Uttar Pradesh	35.6	35.1	100.0					
<b>Sub Total</b>		<b>101.4</b>					<b>-36.8</b>		
<b>All India net increase</b>		<b>269.4<sup>+</sup></b>					<b>264.3</b>		

<sup>+</sup> = Includes small states/UTs/plantations

@ = Provisional

Note: For consumption figures, see table 14.

It was during the middle of August that exceptionally good rains were received in as many as 20 sub-divisions. During the first week of September, West Bengal and North eastern states continued to have heavy rains but by the end of September, the south-West had withdrawn from Gujarat, M.P., Punjab, Haryana and Uttar Pradesh.

On account of the above wide fluctuations in rainfall duration and timing, the foodgrains production during Kharif 1987 is expected to be lower at 71.5 million tonnes (rice 54.6 million tonnes) as against 81.5 million tonnes (rice 60.4 million tonnes) in Kharif 1986.

The fertiliser consumption is anticipated to have decreased by 1.6%

from 3.96 million tonnes in Kharif 1986 to 3.89 million tonnes in Kharif 1987.

Rabi 1987-88

The season's rainfall (Oct.-Dec. 1987) was excess in Madhya Pradesh, Maharashtra, A.P., Tamil Nadu, Karnataka and Kerala and normal in sub-Himalayan West Bengal, Orissa, East Uttar Pradesh, H.P., J.&K., East

**Rajasthan and Gujarat region.** Rainfall was deficient in Assam, Nagaland, Manipur, Mizoram and Tripura, Gangetic West Bengal, Bihar hills of West U.P., Punjab, West Rajasthan and Saurashtra and Kutch. Rest of the country witnessed scanty rainfall situation.

During Oct.-Dec. 1987, 12 meteorological sub-divisions witnessed deficient/scanty rainfall situation. Due to widespread deficient/scanty rains for the past three years, water level in major 47 catchment areas/reservoirs went down below 50 per cent of capacity as against 75 per cent this time last year.

However, winter rains turned out to be reasonably well spread giving some relief to irrigation through channels. According to preliminary estimates, foodgrains production during Rabi 1987-88 is assessed at 66.5 million tonnes (wheat 46.0 million tonnes) as against 62.5 million tonnes (wheat 45.6 million tonnes) in Rabi 1986-87. As wheat, sugarcane, winter paddy etc. are grown mostly under irrigated condition, fertiliser consumption is expected to increase by 7 per cent during Rabi 1987-88 viz., 4.78 million tonnes in Rabi 1986-87 to 5.11 million tonnes in Rabi 1987-88.

#### Statewise Consumption

##### General comments

Since 1986-87, fertiliser consumption figures furnished by the respective states of the South Zone include the data on consumption by plantation.

Table 15 presents the quantum increases and decreases in consumption during 1987-88 over 1986-87 and 1986-87 over 1985-86. In both the years, net increase in consumption was around 0.265 million tonnes. It is heartening to note that the 3 states recording fall in consumption during 1986-87 improved their position in 1987-88 witnessing positive growth. On the other hand, as mentioned elsewhere, Punjab and Haryana witnessed this year a fall in consumption, after a long time. Similarly, Gujarat recorded an increase in consumption after a lapse of 3 years for reasons well known. Uttar Pradesh, the highest fertiliser consuming state witnessed a decline in consumption this year after a period of 3 years.

Bihar witnessed rise in consumption continuously.

Table 16 records share of consumption of various states in all-India consumption during 1987-88 and 1986-87. Uttar Pradesh, Punjab and A.P. continue to occupy the top three positions. Uttar Pradesh continues to share approx. 20% of all-India consumption.

#### Statewise Comments—Total Nutrients

##### EAST ZONE

##### 1. Assam

Sizeable change in fertiliser consumption was noticed in the State during 1987-88. With consumption level at 23,800 tonnes of fertiliser nutrients, the state recorded a 41.7% increase over 1986-87. Increase in gross cropped area was also a factor for increased consumption of fertilisers. The districts of upper Assam which are usually affected by floods

every year were inundated with the onset of monsoon causing damage to Autumn paddy, jute and vegetable crops. Other districts, however, received fairly good rainfall. During June-September 1987, Assam sub-division received rainfall to the tune of 1935 mm as against normal level of 1918 mm. Brisk rainfall particularly during the later part of South-West monsoon period helped in having good moisture for Rabi crops. Sequel to the favourable weather conditions, the State Government made persistent efforts to raise agricultural production through various programmes. The State Government continued to implement Special Rice Production Programme in selected blocks. Nearly 148 additional sale points were opened, raising total number to 3531 at the end of 1987-88. Short term loan to the tune of Rs. 2.25 crore was disbursed through the institutional agencies during the year. Besides promotional programmes undertaken by the State Government, the fertili-

Table 16—States according to descending order of share of consumption to all-India consumption—1986-87 and 1987-88

Ranking		States	Share of all-India total (%)	
1986-87	1987-88@		1987-88@	1986-87
1	1	Uttar Pradesh	19.3	20.8
2	2	Punjab	12.3	12.8
3	3	Andhra Pradesh	10.7	10.3
5	4	Maharashtra	8.2	7.0
4	5	Tamil Nadu	7.5	7.7
7	6	Bihar	6.7	6.0
6	7	Karnataka	6.2	6.5
8	8	West Bengal	6.2	5.7
9	9	Madhya Pradesh	5.6	5.6
11	10	Gujarat	4.6	4.6
10	11	Haryana	4.4	4.7
12	12	Rajasthan	2.4	2.8
13	13	Kerala	2.0	1.7
14	14	Orissa	1.7	1.7
15	15	Jammu & Kashmir	0.4	0.3
16	16	Himachal Pradesh	0.4	0.3
17	17	Assam	0.3	0.2

@=Provisional

Notes: 1. For consumption figures, see Table 14.

2. Share of all-India consumption relates to ranking of states in individual years

ser industry conducted dealer/farmer training programmes, workshops, etc. of late, in addition to straight fertilisers, complex fertiliser gained popularity among the farmers as a result of promotional programmes undertaken by the manufacturers of these fertilisers.

## 2. Bihar

Fertiliser consumption continued to accelerate successively over the years despite the state having passed through erratic weather conditions. During 1987-88, consumption of fertiliser nutrients was 0.602 million tonnes registering a growth rate of 14.1 per cent over the previous year. The South-West monsoon during June-September 1987 brought good rainfall but pattern of distribution was uneven. Rainfall in Bihar plateau was 1111 mm and 1385 mm in Bihar plains, which was 3 and 36% higher over their respective normal levels. During August/Sept. 87 while North Bihar received heavy rains resulting in floods, South Bihar experienced deficient and untimely rains. Nearly 14 lakh tonnes of paddy and 3-4 lakh tonnes of other crops (including pulses and maize) were destroyed during Kharif 1987. However, Rabi crop production, particularly, of wheat was favourable. During Rabi 1987-88, the State Government provided 25% subsidy on all fertilisers to the farmers in flood affected blocks through BISCOMAUN. Short term loan of Rs. 22.82 crore was disbursed in the state during the year. Apart from this, the State Government continued to implement various centrally sponsored schemes, viz., National Oilseeds Development Programme and Pulses Development Programme. Special Rice Production Programme was implemented in 118 blocks. Minikits were distributed to small and marginal farmers for pulses and oilseeds cultivation. Lead Fertiliser Suppliers also undertook

promotional measures in various forms, viz., Block Demonstrations, Group Discussions, Field Days, Farmer's/Dealer's Training Programmes, Kisan Melas, distribution of literature, etc. During the year, the number of sale points in the private channel increased by 10%, total through all channels rising to 10,900 approximately.

## 3. Orissa

Inclement weather conditions hindered the growth in fertiliser consumption during 1987-88. Consumption of fertiliser nutrients was at 0.152 million tonnes representing a marginal decline of 0.1% over the previous year. Almost the entire state received inadequate rainfall except some parts of coastal districts where it was by and large normal. During June-September 1987, the state received 782 mm rainfall which was 33% lower than the normal at 1176 mm. Despite receiving 16% higher (215 mm) rainfall than the normal at 186 mm during October to December 1987, cultivation during Rabi suffered adversely as there was not sufficient water in the catchment areas for irrigation. Steep decline in fertiliser sale points was noticed from 8638 as on 31-3-87 to 5427 at the end of January '88, mainly in the cooperative channel. The state government took various measures to raise agricultural production and fertiliser consumption. With a view to boost fertiliser consumption particularly in rainfed areas and among small farmers, the State Government authorised sale in smaller packs of 5 kg and 10 kg, allowing the industry to charge the consequential additional bagging cost from the consumers. On agricultural front, short-term loans to the tune of Rs. 8.2 crore were provided to institutional agencies. Minikits were distributed to the farmers under the promotional programmes sponsored by the State government for cultivation of pulses

and oilseeds. These were in addition to the centrally sponsored schemes, viz., Special Rice, Pulses and Oilseeds Production Programmes and Intensive Jute Development Programme. Fertiliser industry also carried out promotional programmes in various forms like Block demonstration, Kisan Melas, Dealers' Training Programmes, etc.

## 4. West Bengal

Consumption of fertiliser nutrients was 0.561 million tonnes during 1987-88 recording a growth rate of 12.4 per cent over the previous year. Distribution of rainfall was uneven in the State during June/August '87. While North Bengal received heavy rainfall resulting in floods in six districts, South Bengal districts were affected due to deficient rainfall. Major crops affected by floods were autumn paddy, winter paddy, jute and maize. Copious rains received throughout the State during September/October, 1987 were well and evenly distributed which were conducive for Rabi crops, particularly, wheat, summer paddy and potato. Consequently, fertiliser consumption increased substantially during the Rabi season. The Table below shows pattern of rainfall during South-West and North-East Monsoon periods in Sub-Himalayan and Gangetic Meteorological subdivisions of West Bengal.

The State government took up a number of measures to increase agricultural production in the State. (i) During the year short-term loans to the tune of Rs. 22 crore were distributed to the farmers through the institutional agencies; (ii) Urea at subsidised rates was made available to the farmers in the flood affected blocks which were mainly in the North Bengal districts; (iii) Minikits were distributed to the farmers; (iv) A thrust programme on Special Food-grains Production was adopted in

Sub-division	South-West Monsoon (June-Sept. 1987)		Excess (+) Deficient (-)	North-East-Monsoon (October-December 1987)		Excess (+) Deficient (-)
	Actual (mm)	Normal (mm)		Actual (mm)	Normal (mm)	
Sub-Himalayan						
West Bengal		1996	31%	208	177	17%
Gangetic West Bengal		1107	11%	100	165	-33%

7 selected districts; v) Centrally sponsored schemes viz., Special Rice Production Programme, National Oilseeds Development Programme, National Pulses Development Programme and Intensive Jute Development Programme continued to operate in the State; (vi) 614 additional sale points (mainly in the private channel) were opened with the total number rising to 23,033 during the year; (vii) Fertiliser industry continued to carry out its promotional programmes in various forms in different parts of the State.

## NORTH ZONE

### 1. Haryana

The state faced severe drought during 1987-88. Consequently, the offtake of fertiliser nutrients declined by 5.1 per cent from 0.415 million tonnes during 1986-87 to 0.394 million tonnes during 1987-88. There was practically no rainfall during June-August 1987 except scattered showers received during September '87. Actual rainfall during June-Sept. '87 was 164 mm which was 67% lower than the normal at 496 mm. There was shrinkage in the area under Kharif crops and only 11.44 lakh hectares could be cultivated against a target of 16.5 lakh hectares. Rainfall during North-East monsoon period (Oct.-Dec. '87) was equally bad. Only 13 mm rainfall was received against a normal level of 37 mm. Rabi sowing was seriously hampered. The State Government took various measures. Farmers were given 25% subsidy on all fertilisers during Rabi 1987-88 in drought affected areas. Rainfed farming practices also received due impetus. Developmental work was done in watershed and in areas outside the watershed.

### 2. Himachal Pradesh

Consumption of fertiliser nutrients came down to 25,300 tonnes during 1987-88 representing a decline of 3.1% over the previous year. Poor offtake was the result of severe drought conditions faced by the state during 1987-88 in the recent memory. The state recorded scanty rainfall at 508 mm during the June-September '87 period which was 51% lower than the normal level at 1037 mm. Contingency Plan was drawn up by the State government to recover at least a part of the loss. Farmers were ex-

horted to raise short-duration crops. During Oct.-Dec. '87, the level of rainfall was 135 mm which was 13% more than normal level. For Rabi, arrangements were made to procure 50,000 quintals of wheat seed for distribution among the farmers. State government provided 40% subsidy on all fertilisers to the small and marginal farmers. Crop Insurance Scheme also received impetus.

### 3. Jammu & Kashmir

The State witnessed positive growth rate in fertiliser consumption during 1987-88 despite unfavourable weather situation during Kharif '87. Consumption of fertiliser nutrients at 38,100 tonnes during 1987-88 shows a growth rate of 25.7% over the previous year. Increase in fertiliser consumption was more prominent during Rabi 1987-88 compared to Kharif '87. Dismal weather situation during South-West monsoon resulted in drought conditions throughout the state. During June-August '87 there was very little rainfall. More than 14,000 villages and an area of 4.54 hectares were affected due to deficient rainfall. September showers, however, helped late sowing crops during South-West monsoon period (June-Sept. '87). The state received 378 mm rainfall which was 37% lower than the normal at 604 mm. The North-East monsoon (Oct.-Dec. '87), however, brought rainfall to the tune of 149 mm which was 10% higher than the normal at 135 mm. Coupled with this, measures taken by the State government helped in raising fertiliser consumption during 1987-88. With a view to check the spread of rust diseases in wheat, the state government replaced rust susceptible varieties in Hill areas with *rust-resistant* varieties and they were distributed to the farmers.

### 4. Punjab

Fertiliser consumption at 1.112 million tonnes in the State during 1987-88 represents a decline of 0.3% over the previous year, as weather condition was unsatisfactory during the year. During South-West monsoon period, the level of rainfall was only 197 mm which was 53 per cent lower than the normal level at 471 mm. As a result, water level at irrigation sources went down. Paddy transplantation was seriously affected in the districts of Ropar, Hoshiarpur

and Gurdaspur and nearly 30% of the planned area could not be covered under paddy transplantation. Similarly, cotton and sugarcane were also affected by the dry spell. The State government advised the farmers to adopt short duration crops, viz., sunflower, toria etc. and impressed upon them to make use of gypsum particularly in areas which suffered from salinity and alkalinity. During Oct.-Dec. '87 also, the level of rainfall was equally bad. The State recorded 28 mm rainfall which was 40% lower than the normal level at 47 mm. Despite the State having being endowed with best available irrigation facilities, it could not make progress in fertiliser consumption as a result of decline in water level in irrigation channels.

### 5. Uttar Pradesh

The State which occupies the prime position in fertiliser consumption in the country could not make a headway during 1987-88. During the year, as compiled from the state, the total consumption of fertiliser nutrients was 1.736 million tonnes, against 1.772 million tonnes in 1986-87 registering a decline of 2%. However, on the basis of an exercise conducted in the FAI, the derived consumption for U.P. for 1987-88, on the basis of opening and closing stocks and fresh supplies made, works out to 1.485 million tonnes of nutrients only representing a reduction of 16.2% over 1986-87. Weather condition was extremely unfavourable during 1987-88. While during June-August '87, the State received very little rainfall, Sept. '87 was unusual. While most of the districts of western, central and southern parts of the State continued to experience drought conditions, eastern districts had excess rainfall. Overall level of rainfall was, however, deficient in both the seasons in the three meteorological sub-divisions of the State as shown in the Table on the facing page.

The State government continued to implement various agricultural development programmes to augment agricultural production in the state. (i) Under Special Rice Production Programme, State government distributed seed minikits of 10 kg each and fertiliser minikits containing 20 kg DAP and 15 kg MOP among small and marginal farmers. In ad-

Sub-division	South-West-Monsoon (June-Sept. 1987)		Excess (+) Deficient (-)	North-East-Monsoon (October-December 1987)		Excess (+) Deficient (-)
	Actual (mm)	Normal (mm)		Actual (mm)	Normal (mm)	
East UP	659	913	-28%	65	70	-6%
Plains of West UP	335	781	-51%	17	56	-70%
Hills of West UP	696	1272	-45%	45	56	-53%

dition, 50 per cent subsidy on zinc sulphate was given to these farmers; (ii) 50 per cent subsidy on oilseeds; (iii) Minikits at nominal rates were provided under National Oilseeds Production Programme (iv) Under Integrated Jute Development Programme seed minikits along with urea was distributed at nominal rates; (v) under crop insurance scheme, 50 per cent subsidy was given to the small and marginal farmers on rateable premium.

#### SOUTH ZONE

##### 1. Andhra Pradesh

Consumption of fertiliser nutrients touched 0.967 million tonnes during 1987-88 recording a growth of 7.2 per cent over the previous year. This increase in consumption is praiseworthy in the face of it remaining stagnant in the preceding two years marginally falling short of the 1984-85 record level. Weather situation remained unfavourable during South-West monsoon period of June-Sept. '87. The state received 465 mm rainfall which was 23 per cent lower than the normal at 602 mm. Nearly 17 out of a total of 23 districts were reported to have received deficient rainfall. North-East monsoon during October-December 1987, however, brought copious rains in the entire state causing floods in most districts except some areas of Rayalaseema and Telangana regions. This helped in improving water level in reservoirs, tanks and wells. Actual rainfall was 378 mm which was 86 per cent higher than the normal at 203 mm. The State also experienced 3 cyclones during Oct./November, 1987. The State government granted a subsidy of Rs. 400/ha to small and marginal farmers in crop insurance areas. The total area under crops increased to 4.67 million hectares during 1987-88 representing an increase of 13 per cent over the previous year. A number of

were taken by the State government and promotional programmes carried out by the fertiliser industry helped in raising fertiliser consumption in the State. (i) The State government reduced the licence fee for fertiliser sale points with a view to encourage the cooperatives to open additional retail outlets. Nearly 2050 additional fertiliser sale points (68% in the private channel) were opened with the total number rising to 12,508 at the end of the year 1987-88. (ii) Cooperatives extended crop loans to the tune of Rs. 279 crore to the farmers representing 76 per cent increase over the previous year. (iii) 2.12 lakh minikits of oilseeds, pulses and coarse grains were disbursed to small and marginal farmers. (iv) under National Oilseeds Development Programme, 13 districts were brought under groundnut, 6-sunflower, 7-sesamum, 5-safflower and 3 districts under castor seed. (v) under Dryland Farming Scheme, significant progress was made during 1987-88 and 355 micro watersheds were developed, 32,800 hectares were brought under land development and 1382 seed-cum-fertiliser drills were disbursed. In addition, 106,980 quintals of HYV seeds were distributed.

##### 2. Karnataka

Total consumption of fertiliser nutrients marginally came down to 0.558 million tonnes during 1987-88 recording a drop of 1.3 per cent over 0.566 million tonnes in the previous year. Consumption in the state is still considerably lower than the 1984-85 level. Dry spells during July to mid August '87 affected the standing crops. Rainfall received during mid-August and September was not enough to fill in the tanks. Water level in some of the major reservoirs came down below the critical level. Consequently, there was a shift in the cropping pattern from paddy and other cereals, millets, sugarcane and cotton to sunflower, pul-

ses and groundnut. Rainfall received during Kharif '87 was 730 mm which was 20 per cent lower than the normal level at 909 mm. However, the North-East monsoon (Oct.-Dec. 87) set in on time in October 87 and was widespread recording 302 mm rainfall as against normal at 191 mm. But water position did not improve sufficiently in the reservoirs to facilitate paddy cultivation. It could be taken up only in low lying areas of Mandya, Raichur and Bellary districts. There was a decline in paddy area and shift from paddy to semi-dry crops like jowar, ragi, maize, oilseeds and pulses. A steep decline in HYV area was noticed from 3.26 million hectares during 1986-87 to 2.93 million hectares during 1987-88. Number of fertiliser sale points declined marginally to 9295 at the end of December 87. The State government continued to make efforts to raise agricultural production. Production credit to the tune of Rs. 121.54 crore was disbursed to the farmers during 1987-88 as against Rs. 93.69 crore in the previous year. Under the National Agricultural Development Programme, 241,000 minikits were distributed to small and marginal farmers. In addition, 506 watersheds were developed under the Dryland Development Programme.

##### 3. Kerala

The year 1987-88 brought in sustained growth in fertiliser consumption for the third year in succession. Sizeable increase in fertiliser consumption at 19 per cent was observed during 1987-88 over the previous year with total quantum rising to 0.181 million tonnes. In fact, since 1981-82 consumption recorded a consistent rise all-through except 1984-85 when there was a marginal drop. During South-West monsoon period (June-Sept. '87), 1481 mm rainfall was recorded which was 31 per cent lower than the normal level at 2146



mm, Palghat, Wynad, Cannanore and Kasargode districts were adversely affected. The reservoirs had poor water storage situation and the farmers could not bring in adequate land under paddy cultivation. There was, however, fairly good rainfall during North-East monsoon period. The state recorded 660 mm rainfall during Oct.-Dec. 87 which was 31 per cent higher than the normal level at 503 mm. HYV area under paddy declined to 0.353 million hectares during 1987-88 from 0.429 million hectares in the previous year. Nevertheless, the factors which contributed to growth in fertiliser consumption are (i) under Centrally Sponsored Drought Relief Programme, out of a total of Rs. 9 crore, Rs. 5 crore was earmarked for fertiliser subsidy in all districts which was made available to the farmers for various crops such as coconut, pepper, arecanut, banana, paddy and sugarcane. (ii) A sum of Rs. 62.5 lakh was sanctioned in all districts for providing cash incentives @ Rs. 100 per hectare to farmers cultivating paddy in Kole and Kayal lands. (iii) Fertiliser Promotion Programmes were undertaken in all districts jointly by the State Government, FACT and KSCMF in paddy and coconut crops. Advisory services and placement of fertilisers at the doorstep of farmers were the twin objectives of the programme. (iv) Production credit to the tune of Rs. 264.5 crore was extended to the farmers through commercial banks and cooperatives. (v) Additional 726 sale points (73% in the private channel) were opened with the total number rising to 7363 at the end of the year 1987-88.

#### 4. Tamil Nadu

Since 1985-86, consumption in Tamil Nadu has been more or less static. The State attained a consumption level of 0.676 million tonnes during 1987-88 registering a negligible increase of 0.2 per cent over the previous year which is marginally falling short of 1984-85 level of consumption. Rainfall during April-Sept. 87 was 334 mm which was 21.9 per cent lower than the normal at 428 mm. Twelve out of 20 districts received deficient rainfall during the period. Water from major reservoirs was also released late. From Mettur dam, water was released as late as 9th November as against normal date on 12th June. Consequently,

coverage under the *kuruwai* paddy (first crop of paddy) was seriously affected. Only 0.85 lakh hectares could be covered against a normal area of 4.15 lakh hectares of *kuruwai* paddy. During North-East monsoon period (Oct.-Dec. '87), however, the rainfall was normal in most parts of the state. It was 525 mm as against the normal of 447 mm. Only one district (South Arcot) received deficient rainfall during Rabi 1987-88. A massive programme for promoting direct seeding of paddy was undertaken by the State government even in delta areas. With the help of judicious use of irrigation water, nearly 17.54 lakh hectares could be brought under paddy in Samba/Thaladi seasons. For the year as a whole, paddy coverage was 20 per cent lower than normal. HYV area increased to 2.903 million hectares during 1987-88 representing 4.3 per cent increase over the previous year. Crop loans to the tune of Rs. 187 crore were disbursed to the farmers which was 15 per cent more than the previous year. Additional 423 fertiliser sale points were opened in the State with the total number rising to 15,522 at the end of the year 1987-88. A number of agricultural programmes were initiated apart from several on-going programmes. (i) Rs. 200 worth of fertilisers, pesticides and seeds per hectare were provided by the State government to the farmers as a drought relief measure in the affected districts. (ii) Incentive was provided by the State government in terms of fertilisers, seeds and pesticides @ Rs. 35 per quintal of paddy supplied to the centres of Tamil Nadu Civil Supplies Corpn. by farmers in Thanjavur and parts of Tiruchilapalli, Pudukottai and South Arcot districts. (iii) Under Dry Land Farming Scheme 316 micro watersheds were developed covering an area of 62,272 hectares. (iv) Under Sugarcane Development Programme, Intensive Cotton Development Programme and Intensive Agricultural Area Programme, nearly 199,000, 238,000 and 2,800 hectares respectively were covered during 1987-88. (v) Nearly 18,000 seed minikits were distributed to the farmers during the year.

#### WEST ZONE

##### 1. Gujarat

The state was able to raise fertiliser consumption marginally during

1987-88 despite passing through a critical drought situation ever witnessed in its history. In fact, consumption has been static since 1985-86 due to severe drought conditions prevailing in the State for the last three years. Total consumption of fertiliser nutrients was 0.410 million tonnes during 1987-88 which shows a marginal increase of 2 per cent over the previous year. South-West monsoon broke in the entire state during the third week of June, but was uneven and totally inadequate in Saurashtra and other parts of the State. During June-September 87, the Gujarat region received 573 mm rainfall which was 42 per cent lower than the normal at 980 mm. Similarly Saurashtra region received rainfall at 137 mm which was 74 per cent lower than the normal at 531 mm. Scanty rainfall resulted in shrinkage of area under crops during the Kharif season. Production of paddy, oilseeds and cotton came down by 60, 87 and 61 per cent respectively. The situation continued to deteriorate as no rains were received during late September and early October which affected the sowing of Rabi crops. Only 5.5 lakh hectares could be sown in rabi 1987-88 wherever irrigation facilities were available. Despite such adverse weather conditions further decline in fertiliser consumption was averted due to the following steps having been taken (i) With a view to raise fertiliser consumption in low consuming areas, the State government identified talukas where fertiliser consumption was less than 5 kg/ha. Specific number of identified talukas were allotted to individual manufacturers and institutional agencies for promotional work and opening of retail outlets. As many as 367 retail outlets were opened in these areas during 1987-88. (ii) Under the scheme, for development of Adivasi farmers, the State government distributed minikits containing seeds and fertilisers to the adivasi farmers (2 kits each in Kharif and Rabi season) at subsidised rates in eight selected districts. (iii) Under National Oilseeds Development Programme, seed minikits of various oilseeds were distributed free of cost to small and marginal and SC/ST farmers. The fertiliser industry also carried out promotional programmes in the seven districts selected under IFPC besides pre-planned promotional activities.

## 2. Madhya Pradesh

Madhya Pradesh has been witnessing a consistent upward trend in fertiliser consumption which increased to 0.508 million tonnes during 1987-88 representing a growth rate of 2.9 per cent over the previous year. During the S.W. monsoon period, behaviour of weather remained erratic and uneven in different regions of MP. While eastern MP received good rains on time during July and first half of September the rainfall in western MP was inadequate, uneven and remained limited to certain areas. Reasonable amount of rains were received only in the first week of July and again in the 4th week of August. Actual level of rainfall during June-September 1987 was 771 mm in west MP and 899 mm in east MP which was 16 and 23 per cent lower than their respective normal levels.

Good rains received in the third week of October and middle of November brightened the prospects for rabi crops. During Oct.-Dec. 1987, the actual rainfall was 83 mm in west MP and 112 mm in east MP which was 54 and 53 per cent higher than their respective normal levels. A number of measures helped to augment agricultural production and fertiliser consumption in the State. (i) A transport subsidy was given to Co-operative Marketing Federation for moving fertilisers from block level and making them available in the interior areas. (ii) 806 additional fertiliser sale points (71% in the private channel) were opened in the state. (iii) The State government provided incentives to the cooperative societies and State Marketing Federation to store fertilisers in the off-season (Feb.-May), interest charges being treated as subsidy. (iv) The State government provided Crop Finance Loan to the farmers enabling them to lift fertilisers in advance of the

season during April-June charging interest w.e.f. 1st July. (v) Centrally Sponsored Schemes for oilseeds and pulses were implemented by the State Government on a continuing basis. (vi) Fertiliser industry carried out promotional programmes in 11 districts selected under IFPC in addition to their own promotional programmes. (vii) Indo-British Fertilizer Education Project launched by HFC for promoting fertilisers in the rain-fed areas continued which entered its second phase in April 1987.

## 3. Maharashtra

The State recorded a fairly good progress in fertiliser consumption during 1987-88 which was of the order of 0.742 million tonnes representing 13.2 per cent increase over the previous year. Monsoon arrived in the second week of June. It was sufficient to initiate sowing of crops except in a few districts of Vidarbha. Last week of June and first week of July again saw a good rainfall which was repeated in second week of August followed by dry spell until September after which the distribution of rainfall was erratic. During Oct.-Dec. 1987, the state recorded excess rainfall which brightened the prospects for the sowing of Rabi crops. The table given below shows level of distribution of rainfall during South-West and North-East Monsoon periods.

Production of foodgrains, oilseeds and pulses is anticipated to increase to 109.21, 13.23 and 13.06 lakh tonnes during 1987-88 representing an increase of 53, 58 and 54 per cent respectively, over the previous year. Likewise, production of cotton is anticipated to increase by 92 per cent over 1986-87 level of 8.69 lakh bales. Corrective measures taken by the State government helped in rais-

ing agricultural production and fertiliser consumption in the State. The schemes implemented were (i) Under National Oilseeds Development Programme minikits of sunflower seeds were distributed to the farmers in non-traditional areas. (ii) The State government introduced Managerial Subsidy Scheme with the object of encouraging cooperatives to open retail outlets in the interior areas with the financial assistance to be given for three years at the rate of Rs. 2000 per year or Rs. 200 per tonne of fertiliser actually sold, whichever is less. (iii) Approximately 250,870 fertiliser minikits were distributed to small and marginal farmers. (iv) European Economic Community Project is being implemented in the State by RCF to educate farmers about the judicious use of fertiliser with scientific and modern agricultural practices to maximise agricultural production. (v) Fertiliser industry carried out as planned promotional programmes in eight districts selected under IFPC.

## 4. Rajasthan

Unprecedented acute drought situation in the state precluded the growth of fertilisers consumption during the year 1987-88. Fertiliser consumption declined by 13.1 per cent to 0.215 million tonnes from 0.247 million tonnes in the previous year. South-West monsoon arrived late in the state. Rainfall received during the period was scanty and isolated. During June-Sept., 1987, the actual level of rainfall was 99 mm in west Rajasthan and 314 mm in east Rajasthan which were 67 and 50 per cent lower than their respective normal levels. Except Banswara, Churu and Jhalawar districts which witnessed normal rainfall, in the rest of the state it was either absent or nominal. Kharif crops could survive only within the periphery of the area

Sub-division	South-West-Monsoon (June-Sept. 1987)		Excess (+) Deficient (-)	North-East Monsoon (October-December 1987)		Excess (+) Deficient (-)
	Actual (mm)	Normal (mm)		Actual (mm)	Normal (mm)	
Madhya Maharashtra		796	-22%	181	101	79%
Marathwada		715	-21%	205	79	162%
Vidarbha		963	-30%	135	75	81%

served by Indira Gandhi Canal, Mahi irrigation system or wells. During North-East monsoon period, rainfall situation was equally poor particularly in west Rajasthan. While rainfall in West Rajasthan was 7 mm, 36 per cent lower than normal, east Rajasthan recorded 28 mm of rainfall which was 3% higher than the normal level. Apart from Drought Relief measures taken up, the State Government continued to implement various centrally sponsored programmes. Under Rainfed Programme, micro watersheds continued to be developed. In addition, seed-cum-fertiliser drills, HYV seed and agricultural implements were distributed under these programmes.

#### 5. ESTIMATES OF FERTILISER CONSUMPTION FOR 1988-89

We have made commendable progress in fertiliser consumption from 0.06 million tonnes in 1951-52 to nearly 9 million tonnes in 1987-88. Introduction of HYVs, increased irrigation facilities, adoption of scientific methods of cultivation and, above all, greater use of inputs like fertilisers have all contributed to increased agricultural production. However, favourable weather plays an important role. During the last 36 years the country experienced unfavourable weather in a number of years—worst being 1965-66, 1966-67, 1974-75, 1979-80 and 1987-88 retarding the growth of fertiliser consumption as well as agricultural production.

Weather has been bad since 1984-85 and it turned out to be the worst in 1987-88 resulting in virtual stagnation in consumption.

The weather forecast strongly indicate a favourable, timely and widespread rainfall during the year 1988-89. Most parts of the country have already witnessed normal rainfall in June and July this year. Though it is not possible to precisely estimate the consumption level at this stage, because of various other factors, the consumption is expected to increase by 0.8 to 0.9 million tonnes of nutrients (possibly N by 0.55, P<sub>2</sub>O<sub>5</sub> by 0.25 and K<sub>2</sub>O by 0.10 million tonnes) during 1988-89 over the consumption level of 1987-88. The indigenous production of N & P<sub>2</sub>O<sub>5</sub> during the year would adequately meet the likely requirement of this level without any need for import or making a

Table 17—Forms in which fertilisers are despatched  
1986-87 & 1987-88

Fertilisers	Grade	('000 tonnes)	
		Despatches (Pool+non-Pool)	
		1985-87	1987-88@
<b>I. Straight Nitrogenous</b>			
1. Ammonium sulphate	20.6% N	533.1	541.8
2. Urea	46% N	11569.8	10207.8
3. Calcium ammonium nitrate	25% N	360.3	436.9
4. Ammonium chloride	25% N	100.7	100.0
<b>I. Total N</b>		<b>5547.1</b> (84.8)	<b>4941.4</b> (86.6)
<b>II. Straight Phosphatic</b>			
1. Single superphosphate	16% P <sub>2</sub> O <sub>5</sub>	2028.9	2412.3
2. Triple superphosphate	46% P <sub>2</sub> O <sub>5</sub>	0.5	0.5
<b>II. Total P<sub>2</sub>O<sub>5</sub></b>		<b>324.9</b> (14.8)	<b>388.2</b> (22.1)
<b>III. Straight Potassic</b>			
1. Muriate of potash	60% K <sub>2</sub> O	1434.7	1454.3
2. Sulphate of potash	50% K <sub>2</sub> O	14.5	14.3
<b>III. Total K<sub>2</sub>O</b>		<b>555.1*</b> (63.8)	<b>661.4*</b> (75.2)
<b>IV. NP/NPK Fertilisers</b>			
1. Ammonium phosphate sulphate	16-20-0	74.0	64.1
	20-20-0	498.6	512.2
2. Diammonium phosphate	18-46-0	2710.0	1878.8
3. Urea ammonium phosphate	28-28-0	259.4	258.1
	14-35-14	14.4	10.0
4. Nitrophosphate	15-15-15	306.0	327.6
	20.7-20.7-0	265.4	289.7
5. Other NP & NPK fertilisers	17-17-17	572.5	330.9
	19-19-19	173.0	142.4
	14-28-14	21.2	5.1
	10-26-26	266.7	212.4
	12-32-16	391.0	178.3
<b>IV. Total</b>	<b>N</b>	<b>991.0</b>	<b>761.6</b>
<b>(through NP/NPK fertilisers)</b>		<b>(15.2)</b>	<b>(13.4)</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>1872.8</b>	<b>1361.8</b>
		<b>(85.2)</b>	<b>(77.9)</b>
	<b>K<sub>2</sub>O</b>	<b>313.0</b>	<b>218.3</b>
		<b>(36.1)</b>	<b>(24.8)</b>
	<b>Material</b>	<b>21594.5</b>	<b>19377.5</b>
<b>Grand Total</b>	<b>Nutrient</b>	<b>N</b>	<b>5703.0</b>
<b>(I+II+III+IV)</b>			<b>(100.0)</b>
		<b>P<sub>2</sub>O<sub>5</sub></b>	<b>1748.0</b>
			<b>(100.0)</b>
		<b>K<sub>2</sub>O</b>	<b>579.7</b>
			<b>(100.0)</b>

\* Direct despatches to states, @ Provisional,

( ) Percentage share of total nutrient

+ K<sub>2</sub>O component in NPKs is through MOP which is totally imported.

dent in the high level of inventory supported by the necessary agricultural credit and other related inputs which have already been arranged.

### 6. IMBALANCE BETWEEN CONSUMPTION AND DOMESTIC PRODUCTION

There was no significant increase in fertiliser consumption during 1987-88 mainly due to severe drought conditions prevailing in the country for the third consecutive year. More or less similar was the situation on production front which remained almost at the previous year's level. Consequently, the gap between production and consumption during 1987-88 did not vary very much as compared to the previous year (Table 18).

### Nitrogen (N)

Zonewise, the situation differed widely. In the east zone, increase in consumption was more than offset by the increase in production with the result, the deficit marginally declined. In north zone, with the production maintaining more or less at the previous year's level, a fall in consumption by 0.142 million tonnes resulted in a lower gap between the two. With virtually no change in consumption, the decline in production by 0.3 million tonnes further widened the gap in the south zone. West is the only zone which continues to record a surplus like previous years which increased by 0.225 million tonnes over 1986-87 mainly due to the production having increased by 0.254 million tonnes.

### Phosphate (P<sub>2</sub>O<sub>5</sub>)

Both consumption and production increased in all the four zones, except production in the south zone. It went down by 0.077 million tonnes equivalent to cumulative increase in production recorded in the other three zones. This has offset any change in all-India production of P<sub>2</sub>O<sub>5</sub>, at the same time increased the deficit in the south zone to 0.182 million tonnes. Position was more or less static in east and north zones. In west zone, surplus marginally declined owing to nominal increase in consumption, production remaining static.

### Prospects for 1988-89

It is expected that the production would be 6.3 to 6.4 million tonnes of N and 2.1 to 2.2 million tonnes of P<sub>2</sub>O<sub>5</sub> during 1988-89. Taken together with manufacturers' stocks as on 1-4-88, the total availability with the manufacturers would be sufficient to meet the consumption requirement unless there is a drastic drop in production due to unforeseen circumstances and inadequate availability of phosphoric acid from import sources as happened in the previous two years.

Table 18—Zonewise consumption, production and surplus/deficit of N and P<sub>2</sub>O<sub>5</sub>—1986-87 and 1987-88 (April-March)

Zone	(Unit: thousand tonnes)			
	N		P <sub>2</sub> O <sub>5</sub>	
	1986-87	1987-88@	1986-87	1987-88@
<b>East</b>				
1. Consumption	799	895	281	324
2. Production	550	668	260	286
3. Surplus(+)/deficit(-)	-249	-227	-21	-38
<b>North</b>				
1. Consumption	2,511	2,369	728	797
2. Production	1,135	1,115	109	155
3. Surplus(+)/deficit(-)	-1,376	-1,254	-619	-642
<b>South</b>				
1. Consumption	1,339	1,366	585	628
2. Production	1,147	846	523	446
3. Surplus(+)/deficit(-)	-192	-520	-62	-182
<b>West</b>				
1. Consumption	1,124	1,153	512	548
2. Production	2,582	2,837	773	778
3. Surplus(+)/deficit(-)	+1,459	+1,684	+261	+230
<b>All India</b>				
1. Consumption	5,773	5,783	2,106	2,298
2. Production	5,115	5,466	1,664	1,665
3. Surplus(+)/deficit(-)	-658	-317	-442	-633

@ Provisional.

### 7. AGRONOMIC ASPECTS OF FERTILISER CONSUMPTION

#### Management of Aberrant Weather Conditions

The unprecedented drought of 1987 affected 15 states and 6 Union Territories. In most states the damage was caused by long dry spells in July and August (1987). The condition of Gujarat and Rajasthan was worse because of total absence of rainfall in September and October (1987). While majority of the states were affected by drought, states like Bihar, West Bengal and other North-Eastern areas were affected by severe floods.

To offset the effects of the aberrant weather conditions, series of measures were taken. Fertiliser industry extended necessary support to the Central and State governments in their efforts in this direction, in addition to the normal promotional activities that the Industry generally undertakes. Some of the measures undertaken were:

- 1) Efficient management of available water resources by provid-

ing irrigation at the critical stages of crop growth.

- 2) Ensuring adequate availability and advising on the optimum use of agricultural inputs like HYV seeds, fertilisers and other agro-chemicals.
- 3) Advising on growing crops which require less amount of water like pulses and oilseeds.
- 4) Conversion of short term loans into medium term loans in the drought affected areas and ensuring adequate and timely credit availability.
- 5) Encouraging the farmers to adopt balanced use of fertilisers.
- 6) Intensive training of farmers in different aspects of crop production.

In addition, the fertiliser industry undertook various activities of their own, some of which are highlighted below:

**A) Short term measures**

- (i) **Supply of Agro-inputs:** During drought conditions, the purchasing power of farmers comes down considerably resulting in acute shortage of inputs in the next season. Distribution of essential agri-inputs in the form of mini-kits particularly for the cultivation of fodder, oilseeds and pulses immensely benefits the farmers. This is all the more necessary for the poor rainfed farmers. Industry has contributed immensely in this endeavour.
- (ii) **Adoption of Agro-techniques:** Adoption of low cost input technology, labour intensive programmes to provide jobs, introduction of improved seeds of appropriate cultivars having drought escaping/tolerance characteristics, extensive programme for popularising the improved seeds among the farmers, identification and introduction of location specific cropping system to increase risk coverage and boosting of fertiliser consumption, etc., are some of the important agro-techniques which were popularised.
- (iii) **Balanced use of fertilisers:** Balanced use of fertilisers is very important in drought conditions. Special emphasis was given on

the use of phosphorus which helps in root development which, in turn, is capable of extracting more moisture from the deeper layer.

- iv. **Use of seed-cum-fertiliser drills:** In rainfed conditions, placement of seed and fertiliser in the moist zone is very important and suitable seed cum fertiliser drills are useful in placing seed and fertiliser at an appropriate depth. Fertiliser industry has done commendable work in procurement of seed cum fertiliser drills and their distribution among farmers. Some companies (e.g. GSFC) have even developed their own drill and popularised the same in their marketing areas.
- (v) **Efficient use of available moisture:** As the moisture availability had become a crucial problem in drought affected areas, the crops and their varieties which could be grown successfully with less amount of water were selected.

**B) Long term measures**

In addition to the short term measures mentioned above long term measures which help in stabilising crop productivity were also adopted.

- (i) **Irrigation water arrangements:** Source of permanent irrigation facilities provide a buffer against the fluctuating weather conditions. Open wells or tube wells

were dug and existing wells and ponds were deepened.

- (ii) **Survey of ground water potential:** Farmers individually are unable to make a survey where ground water could be available. Industry (e.g. IFFCO) has helped the farmers to make a survey of potential ground water which could be used for irrigation purpose. This brings down the risk of wasting farmer's resources and encourages the use of their resources.
- (iii) **Efficient management of water resources:** Water saved is water source created. Use of latest water application methods like drip irrigation, use of plastic pipe, lining of distribution channel with polythene sheet etc., increases the potentiality of higher use efficiency of irrigation water. Role of industry lies in educating the farmers, initially even supported by the supplies of these inputs. Some companies (e.g. IEL) have set up unique examples in this respect.

**C) Role of HYV seeds, fertiliser and water**

It is interesting to note that the three important inputs, namely HYV seeds, fertiliser and irrigation water, were used as the main weapon to offset the effect of aberrant weather conditions (Tables 19 & 20). This implies that these inputs would continue to play the key role even in aberrant weather conditions.

**Table 19 - Cropwise achievement and targets of high yielding varieties (HYVs) coverage 1983-84, 1985-86 and 1986-87 to 1988-89**

Crop	1983-84	1985-86	1986-87	1987-88		1988-89 target
				Target	Anticipated achievement	
Paddy	21,740	23,474	24,022	26,474	20,754	27,373
Wheat	19,390	19,075	19,142	21,083	19,007	20,955
Maize	1,910	1,799	2,190	2,403	1,945	2,466
Jowar	5,280	6,082	5,500	6,455	5,435	6,986
Bajra	5,420	4,992	5,264	5,897	3,485	6,384
<b>Total</b>	<b>53,740</b>	<b>55,422</b>	<b>56,118</b>	<b>62,312</b>	<b>51,226</b>	<b>64,184</b>

Source: Directorate of Economics & Statistics, Ministry of Agriculture, New Delhi.

Table 20—Consumption of plant nutrients per unit of gross cropped area—1985-86 to 1987-88

Zone/state	(kg/ha)											
	1985-86				1986-87				1987-88@			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total
<b>East</b>	<b>23.2</b>	<b>7.6</b>	<b>4.5</b>	<b>35.3</b>	<b>25.2</b>	<b>8.9</b>	<b>5.5</b>	<b>39.5</b>	<b>28.2</b>	<b>10.2</b>	<b>6.1</b>	<b>44.5</b>
Arunachal Pradesh	0.7	0.3	0.2	1.2	1.2	0.3	0.3	1.8	0.5	0.5	0.3	1.30
Assam	2.5	1.0	1.0	4.5	2.4	0.9	1.3	4.6	3.3	1.6	1.5	6.4
Bihar	34.1	10.2	4.4	48.7	35.0	11.3	4.9	51.2	39.2	13.3	5.9	58.4
Manipur	20.7	4.4	0.7	25.8	23.3	6.1	1.0	30.4	25.2	8.1	0.8	34.1
Meghalaya	7.3	5.8	0.8	13.9	8.6	6.5	1.0	16.1	9.1	6.9	1.1	17.1
Mizoram	0.7	0.6	0.2	1.5	0.8	1.1	0.5	2.4	1.9	1.7	0.4	4.0
Nagaland	0.7	0.6	0.03	1.3	0.9	0.8	0.1	1.8	0.4	0.4	neg	0.8
Orissa	9.9	3.8	2.3	16.0	10.3	4.3	2.7	17.3	10.0	4.5	2.8	17.3
Sikkim	5.0	4.2	0.3	9.5	5.6	4.4	0.9	10.9	6.2	4.7	0.9	11.8
Tripura	9.8	2.6	2.0	14.4	12.8	3.7	2.8	19.3	12.4	7.1	3.4	22.9
West Bengal	33.9	12.2	7.9	54.0	40.1	15.0	10.7	65.8	45.8	17.0	11.2	74.0
<b>North</b>	<b>61.9</b>	<b>17.2</b>	<b>2.6</b>	<b>81.7</b>	<b>63.1</b>	<b>18.3</b>	<b>3.3</b>	<b>84.7</b>	<b>58.6</b>	<b>20.0</b>	<b>3.8</b>	<b>83.4</b>
Haryana	53.8	12.6	1.1	67.5	59.3	14.9	1.1	75.3	54.5	16.0	0.9	71.4
Himachal Pradesh	18.0	3.5	2.5	24.0	19.4	4.0	2.9	26.3	18.4	4.2	3.0	25.6
Jammu & Kashmir	24.7	7.6	2.8	34.1	22.0	6.3	1.2	29.5	27.3	7.8	1.9	37.0
Punjab	112.2	41.0	3.3	156.5	113.9	41.3	3.3	158.5	112.8	42.3	4.2	159.3
Uttar Pradesh	52.9	12.4	2.7	68.0	52.9	13.7	3.9	70.5	48.6	15.8	4.7	69.1
Chandigarh	217.5	45.0	6.0	268.5	225.0	42.5	2.0	269.5	102.0	18.8	1.8	122.6
Delhi	78.3	18.2	2.6	99.1	94.6	16.5	3.0	114.0				
<b>South</b>	<b>39.6</b>	<b>18.0</b>	<b>11.6</b>	<b>69.2</b>	<b>39.5</b>	<b>17.2</b>	<b>11.4</b>	<b>68.1</b>	<b>40.3</b>	<b>18.5</b>	<b>11.2</b>	<b>70.7</b>
Andhra Pradesh	46.6	19.9	6.3	72.8	47.8	19.8	6.3	73.9	50.8	22.1	6.3	79.2
Karnataka	25.4	14.1	8.2	47.7	25.9	13.8	8.8	48.5	24.6	13.9	9.4	47.9
Kerala	20.6	12.0	16.6	49.2	21.2	12.5	19.0	52.7	4.0	17.1	21.7	62.8
Tamil Nadu	53.5	20.5	20.3	94.3	54.3	20.2	20.7	95.2	54.0	20.3	21.1	95.4
Pondicherry	166.5	57.5	84.6	308.6	181.5	62.1	95.2	338.8	168.8	62.5	91.7	323.0
A & N Islands Lakshadweep	1.2	0.9	0.9	3.0	2.4	1.2	1.1	4.7	4.0	2.7	6.8	13.5
<b>West</b>	<b>15.8</b>	<b>6.7</b>	<b>2.4</b>	<b>24.9</b>	<b>15.9</b>	<b>7.3</b>	<b>2.4</b>	<b>25.6</b>	<b>16.3</b>	<b>7.8</b>	<b>2.5</b>	<b>26.6</b>
Gujarat	27.9	10.6	2.5	41.0	24.9	10.9	3.4	39.2	24.9	11.7	3.3	39.9
Madhya Pradesh	11.4	6.9	1.2	19.5	12.9	7.8	1.4	22.1	13.1	8.3	1.3	22.7
Maharashtra	20.1	7.3	5.3	32.7	19.5	7.8	4.8	32.1	22.1	8.6	5.5	36.2
Rajasthan	9.3	3.2	0.3	12.8	10.3	3.8	0.2	14.3	8.6	3.6	0.2	12.4
Goa, Daman & Diu	21.3	13.8	11.5	46.6	12.7	8.9	6.4	28.0	15.2	10.2	8.9	34.3
Dadra & Nagar Haveli	8.5	5.8	0.4	15.7	10.0	5.8	0.8	16.6	7.7	8.8	0.8	17.3
<b>All India</b>	<b>32.2</b>	<b>11.4</b>	<b>4.6</b>	<b>48.2</b>	<b>32.8</b>	<b>12.0</b>	<b>4.9</b>	<b>49.7</b>	<b>32.9</b>	<b>13.1</b>	<b>5.3</b>	<b>51.3</b>

@—Provisional

Note: Figures for consumption available for the year 1984-85.

Figures for consumption of plant nutrients per hectare have been worked out on the basis of latest gross cropped area

#### D Risk management

Weather may continue to behave in its own way. We have, therefore, to evolve weather management strategies to mitigate the effects of aberrant weather conditions. Government of India should change its strategies from crisis management to risk management. Irrigation is also rain-fed or snowfed in true sense. Therefore, we should devote our efforts to conserve rain water effectively to utilise it in drought condition as life saving irrigation. Rabi crops should be given emphasis in the flood-prone areas.

#### (E) Awareness in weather management

Recent awareness in weather management is a welcome sign. ICAR has already started an All India Coordinated Research Project on Agrometeorology. GOI is planning to evolve agro-climatic condition based strategies in Indian Agriculture. It is hoped that in future, we would be in a position to make reasonably accurate weather forecasting tailored to the needs of farm operations.

#### (F) Fertiliser promotion

(i) *Balanced use*: Our fertiliser use at present is imbalanced. N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O ratio (Table 21) is 6.2:2.5:1 in the year under review. This has marginally improved compared to last year. However, there is still need for increasing the use of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O to make N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O ratio more balanced.

(ii) *Promotion activities*: Fertiliser promotion has become more relevant in the aberrant weather and glut situations to sustain agricultural production and productivity. Various agencies like fertiliser industry, other agro-input agencies, financial and voluntary organisations, central and state governments, ICAR and its institutes, agricultural universities etc., are actively engaged in fertiliser promotion programmes to increase agricultural production and overall development of the Country. Different Programmes in Progress are: India

Table 21—Consumption ratio of N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O—1985-86 to 1987-88

Zone/State	1985-86		1986-87		1987-88@	
	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>
<b>East</b>	5.2	1.7	4.8	1.7	4.6	1.7
Arunachal Pradesh	4.7	1.7	4.4	1.2	2.0	1.8
Assam	2.4	0.9	1.8	0.6	2.2	1.0
Bihar	7.8	2.3	7.1	2.3	6.6	2.2
Manipur	29.5	6.3	33.1	6.0	33.4	10.8
Meghalaya	9.2	7.4	8.5	6.4	8.2	6.2
Mizoram	3.8	3.1	1.7	2.3	5.2	4.8
Nagaland	23.3	18.3	8.2	6.8	23.3	26.7
Orissa	4.4	1.7	3.8	1.6	3.6	1.6
Sikkim	15.8	13.0	6.4	5.0	7.1	5.4
Tripura	4.8	1.3	6.4	1.3	3.7	2.1
West Bengal	1.3	1.5	3.7	1.4	4.1	1.5
<b>North</b>	23.5	6.5	19.1	5.5	15.7	5.3
Haryana	47.8	11.2	56.0	14.0	62.6	18.4
Himachal Pradesh	7.1	1.4	6.8	1.4	6.1	1.4
Jammu & Kashmir	8.8	2.7	18.4	5.3	14.8	4.3
Punjab	33.2	12.1	27.6	12.5	33.7	12.6
Uttar Pradesh	19.2	4.5	13.6	3.5	10.4	3.4
Chandigarh	36.3	7.5	112.5	21.2	57.5	10.6
Delhi	30.0	7.0	31.1	5.4		
<b>South</b>	3.6	1.5	3.5	1.5	3.4	1.6
Andhra Pradesh	7.4	3.2	7.6	3.2	8.1	3.5
Karnataka	3.1	1.7	2.9	1.6	2.6	1.5
Kerala	1.2	0.7	1.1	0.7	1.1	0.8
Tamil Nadu	2.6	1.0	2.6	1.0	2.6	1.0
Pondicherry	2.0	0.7	1.9	0.7	1.8	0.7
Andamans	1.3	1.0	3.7	1.8	0.6	0.4
<b>West</b>	6.7	2.8	6.7	3.0	6.4	3.0
Gujarat	11.2	4.3	7.3	3.2	7.4	3.5
Madhya Pradesh	9.7	5.9	2.6	5.7	10.3	6.6
Maharashtra	3.8	1.4	4.1	1.6	4.0	1.6
Rajasthan	35.0	12.1	47.3	17.2	48.3	20.0
Goa, Daman & Diu	1.8	1.2	1.8	1.3	1.7	1.1
Dadra & Nagar Haveli	11.0	7.5	22.0	20.0	10.0	11.5
<b>All India</b>	<b>7.0</b>	<b>2.5</b>	<b>6.7</b>	<b>2.4</b>	<b>6.2</b>	<b>2.5</b>

Note:— K<sub>2</sub>O is taken as unity.

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—EEC Fertiliser Education Project, Indo-British Project, Village Adoption programme by the Industry. Of late, special emphasis is being given on the Training of Farm women and small farmers.

### 8. IMPACT OF FERTILISER USE ON FOODGRAINS PRODUCTION

Fertiliser constitutes the single most important input in increasing the foodgrains production as it gives the highest crop response in the presence of adequate moisture, availability of quality seeds, improved technology, crop husbandry and credit facilities, etc.

Before the introduction of high yielding varieties of foodgrains in 1966-67, the increase in foodgrains production was obtained largely through increase in the net cultivated area. With the introduction of high yielding varieties, the emphasis shifted to increasing the foodgrains production through intensive fertilisation and increasing crop yields per hectare (Table 22). In pre-HYV era net area sown increased by 17 million hectares, whereas foodgrains production increased by 20 million tonnes with the average yield per hectare

increasing by 93 kg. In the following two decades from 1966-67 to 1986-87, while net area sown increased by only 4 million hectares and gross cropped area went up by 15 million hectares, foodgrains production increased sizeably by 70 million tonnes mainly through increase in average yield per hectare by 498 kg. During this period, fertiliser consumption increased from 1.1 to 8.7 million tonnes. Area under HYV crops and gross irrigated area increased from 1.9 and 32.7 million hectares to 56.1 and 62.2 million hectares respectively.

Table 23 indicates a definite positive co-relation between fertiliser consumption and foodgrains production under favourable weather conditions. There have been some years when foodgrains production had either declined or marginally increased despite reasonable increase in fertiliser consumption mainly due to inclement weather. Though significant developments have taken place in irrigation, weather still plays an important role in foodgrains production as 70 per cent of the area is still rainfed. The technology transfer over the years has helped in raising the levels (troughs) even in inclement weather.

In the absence of sizeable and widespread use of fertilisers, the fall in foodgrains production would have been much more severe during the adverse weather conditions.

The scope for increasing the net cultivated area is extremely limited. The growing need for increasing foodgrains production can only be met by enhancing the crop yield per hectare which, in turn, calls for significant increase in fertiliser consumption not only in irrigated areas but also in rainfed and dryland areas in years to come.

### 9. PRICES

#### Imported Fertilisers

India is one of the major importers of fertilisers, its imports being mainly in the form of Urea, DAP and MOP. Table 24 presents their prices in US \$ per tonne f.o.b. bulk in the international market from 1981 to 1988.

Prices in the international market depend on (i) demand/supply balance and (ii) importing countries' capacity to pay.

Demand/supply balance of fertilisers is mainly guided by the quantum purchases (imports) planned by the two major importers viz., China and India. So also their prices in the international market. Prices tend to increase with import requirement of these two countries going up.

Prices of Urea and DAP started declining from May 1986 and reached their lowest by 1986 end. Since then these have been on the rising trend following entry of China in a big way during 1987-88 even though India did not import except for some marginal quantities under the contractual agreement. During 1987, Urea and DAP prices increased by \$30-35 per tonne and \$70-80 per tonne, respectively. The rising trend has continued even during the earlier part of 1988 and the price of urea has more than doubled to about US \$140 per tonne FOB quite apart from the impact of increasing dollar-rupee value. On the basis of projected demand-supply gap into the 90s, it is clear that the prices in the international market would tend to escalate still further.

Table 22 — Fertiliser consumption vis-a-vis growth and production of foodgrains—pre and post HYV era

Period	Area sown (million hectares)		Average yield of foodgrains (kg/ha)	Fertiliser consumption unit of gross cropped area (t/ha)	Total foodgrains production (million tonnes)	Total fertiliser consumption (N+P+K) (million tonnes)
	Net	More than once				
<b>I. 1951-52 to 1965-66 (pre-HYV era)</b>						
1965-66	136	19	629	5.05	72.3	0.785
1951-52	119	14	536	0.55	52.0	0.066
<b>(I) Increase</b>	<b>17</b>	<b>5</b>	<b>93</b>	<b>4.50</b>	<b>20.3</b>	<b>0.719</b>
<b>II. From 1966-67 onwards</b>						
1986-87	141@	35@	142P	49.65	144.1P	8.738
1966-67*	137	20	644	7.00	74.2	1.101
<b>(II) Increase</b>	<b>4</b>	<b>15</b>	<b>493</b>	<b>42.65</b>	<b>69.9</b>	<b>7.637</b>

\* HYVs were introduced in 1966

P=Provisional.

@ For 1984-85 (latest available).



Table 23—Fertiliser consumption vs foodgrains production 1962-63 to 1987-88

Year	Fertiliser consumption (all nutrients) ('000 tonnes)	Gross cropped area (million hectares)	Gross area under HYV crops (million hectares)	Gross irrigated area (million hectares)	Weather (for purposes of agriculture production)	Foodgrains production (million tonnes)
1962-63	452	156.8	—	29.5	Average	80.1
1963-64	544	157.0	—	29.7	Average	80.6
1964-65	773	159.2	—	30.7	V. Good	89.4
1965-66	785	155.3	—	30.9	V. Poor	72.4
1966-67	1,101	157.4	1.9	32.7	V. Poor	74.2
1967-68	1,539	163.7	6.0	33.2	Good	95.1
1968-69	1,761	159.5	9.3	35.5	Average	94.0
1969-70	1,982	162.3	11.4	36.9	Good	99.5
1970-71	2,256	165.8	15.4	38.0	V. good	108.4
1971-72	2,656	155.2	18.2	38.4	Average	105.2
1972-73	2,768	162.1	22.3	39.1	V. Poor	97.0
1973-74	2,839	169.9	86.0	40.3	Poor	104.7
1974-75	2,573	164.2	26.3	41.7	V. Poor	99.8
1975-76	2,894	170.9	31.9	45.3	Good	121.2
1976-77	3,411	167.2	33.6	43.2	Poor	111.2
1977-78	4,286	172.3	38.9	45.9	Good	126.4
1978-79	5,117	175.2	40.1	50.6	Good	137.9
1979-80	5,255	167.2	38.4	52.6	V. Poor	109.7
1980-81	5,516	173.3	43.1	54.1	Poor	129.6
1981-82	6,067	177.0	46.5	56.0	Poor	133.3
1982-83	6,387	173.4	47.5	58.1	Poor	129.5
1983-84	7,710	180.2*	53.7	58.6	Good	152.4
1984-85	8,211	176.0*	54.1	60.5	Average	145.5
1985-86	8,474		55.4	62.2	Poor	150.4
1986-87	8,738		56.1		Poor	144.1*
1987-88	9,008*		51.2 <sup>+</sup>		V. Poor	138.0*

\* = Provisional

<sup>+</sup> = Anticipated achievement.

Table 24—International prices of urea, DAP and MOP

Year	Range of f.o.b. prices (bulk)		
	Urea	DAP	MOP
1982	128-151	195-202	63-65
1983	113-125	167-220	72-91
1984	139-179	170-230	85-95
1985	85-170	158-220	70-85
1986	63-108	125-205	60-75
1987	79-130	137-210	60-75
1988 (first half)	95-140	172-220	79-85

(US \$/tonne of material)

It may be added that against the import requirement of 6 million tonnes of urea for 1988, China has already contracted for 2.2 million tonnes in the first half of 1988. It is also planning to import 2-2.5 million tonnes of DAP during the year.

#### Raw Materials

Almost entire sulphur and 70-75% of phosphate rock requirement are met through imports which are canalised through the MMTC. The prices as notified by MMTC from time to time are given in Tables 25 and 27.

Table 26 lists the prices of indigenous phosphate rock from Jhamar Kotra (Rajasthan) also used by the fertiliser industry in manufacturing phosphatic fertilisers.

It may be seen from Table 25 that the price of Jordan rock (70/72% TPL) continuously increased from one quarter to another and by the end of the year 1987-88, it went up by Rs. 27 per tonne for shipload and Rs. 41 per tonne for ex-jetty deliveries.

With effect from April 1, 1988 Jordan rock prices have also increased sharply and the differential between ex-jetty and shipload prices has gone up from Rs. 172 to Rs. 232 per tonne.

Unlike phosphate rock, price of sulphur (Table 27) first decreased during July/September 1987 and then started going up gradually in the remaining part of the year 1987-88, though by 31st March, 1988, it was still lower than the one prevalent on April 1, 1987.

It is to be noted from Col. 6 that the difference between ex-jetty and shipload prices of sulphur at Rs. 20 per tonne till March 31, 1987 had sharply increased to Rs. 86 per tonne from April 1, 1987. On April 1, 1988, it further increased to Rs. 98 per tonne and price of sulphur under all three categories has gone up.

Jhamarkotra prices fixed by the RSMR are given in Table 26, which have continuously been increasing during the year 1987-88. The difference between the ground and material remaining at Rs. 100 per tonne. The price of ground material is comparable with that of ex-jetty price of Jordan rock, ti

Table 25—MMTC's prices of imported rock (Jordan 70/72 per cent TPL) for consumers—1985-86 to 1987-88 (April-March)

Price effective from (1)	Price on (Rs /tonne)		
	Shipload delivery (2)	Ex-jetty delivery (3)	Difference (4)=(3-2)
1. April 1985	676 (-)	833@ (49)	+157@ [+49]
2. July 1985	646 (-30)	803@ (-30)	+157@ [-]
3. October 1985	603 (-43)	753@ (-50)	+150@ [-7]
4. January 1986	629 (+26)	780@ (+27)	+151@ [+1]
5. April 1986	638 (+9)	788@ (+8)	+150@ [-1]
6. July 1986	595 (-43)	746@ (-43)	+150@ [-]
7. October 1986	627 (+32)	811@ (+66)	+184@ [+34]
8. January 1987	672 (+45)	856@ (+45)	+184@ [-]
9. April 1987	643 (-29)	821@ (-35)	+178@ [-6]
10. July 1987	649 (+6)	813@ (-8)	+164@ [-14]
11. October 1987	671 (+22)	836@ (+23)	+165@ [+1]
12. January 1988	690 (+19)	862@ (+26)	+172@ [+7]
13. April 1988	837 (+147)	1069@ (+207)	+232@ [+60]

(-) = Increase, decrease over the previous notified shipload or ex-jetty prices.

@ = Only for Calcutta port.

[] = Increase/decrease between ex-jetty and shipload prices.

**Table 26 — RSMM's prices of Udaipur rock for consumers  
1985-86 to 1987-88 (April-March)**

Price effective from	Rs./tonne		
	Price f.o.r. despatching station (on cash basis)		
	- " chips	Ground and bagged material	Differential
(1)	(2)	(3)	(4)=(3-2)
1. 1-1-1985	682 (+23)	782 (+23)	+100 [-]
2. 1-1-1986	678 (-4)	778 (-4)	+100 [-]
3. 1-4-1986	696 (+18)	796 (+18)	+100 [-]
4. 13-8-1986	696 (-)	816 (+20)	+120 [+20]
5. 3-9-1986	653 (-43)	773, 847* (-43)	+120 [-]
6. 7-11-1986	685 (+32)	805, 847* (+32) (-)	+120 [-]
7. 20-12-1986	685 (-)	822, 847* (+17)	+137 [+17]
8. 20-1-1987	30 (+45)	867, 847* (+45)	+137 [-]
9. 20-5-1987	701 (-29)	838, 847* (-29)	+137 [-]
10. 3-8-1987	707 (+6)	844, 847* (+6)	+137 [-]
11. 1-10-1987	737 (+30)	874, 847* (+30)	+137 [-]
12. 15-1-1988	748 (+11)	885, 847* (+11)	+137 [-]

( )=Increase/decrease over the previous notified prices.

\* =Beneficiated rock.

[ ]=Increase/decrease between the prices of ground and chips materials.

**Note:** 1. Royalty is extra which has gone up from Rs. 5 to Rs. 15 per tonne w.e.f. 23-7-1987 for chips and ground materials.

2. Royalty for beneficiated rock is fixed at Rs. 25/- per tonne w.e.f. 3-9-1986.

being moderately higher (Rs. 25 to 45 per tonne) than the latter.

#### Fertiliser Prices

Table 28 lists the current maximum sale prices of all fertilisers (statutorily controlled) notified under the ECA effective January 31, 1986. These are compared with the corresponding set of previous prices notified on June 29, 1983 and July 11, 1981. It would be noticed that the current prices are at par with those of July 11, 1981 except SSP in which case, the current price is higher by Rs. 10 per tonne for powder SSP and Rs. 30 per tonne for granular SSP.

The table also provides fertiliser prices in terms of nutrients N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O. It would be observed that the unit price of P<sub>2</sub>O<sub>5</sub> through SSP has become slightly higher compared to DAP.

#### 10. ECONOMICS OF FERTILISER USE

With the upward revisions in the procurement prices of paddy and wheat subsequent to the fertiliser prices notified as on January 31, 1986, the economics of fertiliser use is successively becoming more favourable to the farmers (Table 29).

It would be seen that the physical return i.e. ratio of kg of a particular agricultural product required to purchase 1 kg of fertiliser nutrient has become smaller compared to the previous changes. Smaller the ratio, the greater is the profitability and vice versa.

Likewise, gross financial return has also improved i.e. the ratio of the value of extra crop output to the value of the additional nutrient use has also gradually become larger than the previous ones.

#### 11. CROP INSURANCE

The Crop Insurance Scheme was introduced in Kharif 1985 with a view to provide financial support to the farmers in the event of a crop failure due to unforeseen circumstances like drought or flood. It also provided the credit eligibility to the farmers in the event of crop failure for the next crop season. The scheme covered rice, wheat, oilseeds, pulses, millets, cotton and fruit crops. Farmers drawing crop loans from coope-

Table 27—MMTC's prices of sulphur for consumers 1985-86 to 1987-88 (April-March)  
(For Fertiliser Industry)

Price effective from	Price on					(Rs./tonne)
	Shipload delivery	Ex-jetty delivery	Ex-godown delivery	Differential		
	(2)	(3)	(4)	(5)=(3-2)	(6)=4-3	
1. April 1985	2195 (+37)	2323 (+44)	2343 (+44)	+128 [+7]	+20 [-]	
2. July 1985	2166 (-29)	2294 (-29)	2314 (-29)	+128 [-]	+20 [-]	
3. October 1985	2003 (-163)	2144 (-150)	2164 (-150)	+141 [+13]	+20 [-]	
4. January 1986	2023 (+20)	2164 (+20)	2184 (+20)	+141 [-]	+20 (-)	
5. April 1986	2023 (-)	2163 (-1)	2183 (-1)	+140 [-1]	+20 [-]	
6. July 1986	1958 (-65)	2098 (-65)	2118 (-65)	+140 (-)	+20 (-)	
7. October 1986	1795 (-163)	2028 (-70)	2048 (-70)	+233 [+93]	+20 [-]	
8. January 1987	1838 (+43)	2075 (+47)	2095 (+47)	+237 [+4]	+20 [-]	
9. April 1987	1658 (-180)	1863 (-212)	1949 (-146)	+205 [-32]	+86 [+66]	
10. July 1987	1459 (-199)	1634 (-229)	1720 (-229)	+175 [-30]	+86 [-]	
11. October 1988	1539 (+80)	1715 (+81)	1801 (+81)	+176 [+1]	+86 [-]	
12. January 1988	1699 (+60)	1784 (+69)	1870 (+69)	+185 [+9]	+86 [-]	
13. April 1988	1665 (+66)	1850 (+66)	1948 (+78)	+185 [-]	+98 [+12]	

( )=Increase/decrease over the

[ ]=Increase/decrease between

and shipload, ex-jetty or ex-godown prices.

shipload prices as well as between ex-godown and ex-jetty prices.

**Table 28—Current maximum sale prices of fertilisers to farmers in terms of material and nutrient—effective 31-1-1986 (vis-a-vis 29-6-83 and 11-7-81)**

Material	Maximum selling price (Rs./tonne net)			Increase/decrease in material prices				Maximum selling price			
	Effective from			31-1-86 over 29-6-83		29-6-83 over 11-7-81		Effective from			
	11-7-81	29-6-83	31-1-86 (current)	Amount (Rs./tonne net)	Per cent	Amount (Rs./tonne net)	Per cent	11-7-81	29-6-83	31-1-86 (current)	
(1)	(2)	(3)	(4)	(5)=(4-3)	(6)	(7)=(3-2)	(8)	(9)	(10)	(11)	
		<b>Material</b>							<b>Nutrient N</b>		
1. Ammonium sulphate (20.6% N)	Decontrolled w.e.f. 8-6-80	1,500 <sup>1</sup>	1,650	150	10.0			Decontrolled w.e.f. 8-6-80	7.28 <sup>1</sup>	8.01	
2. a) Calcium ammonium nitrate (26% N)		1,615 <sup>2</sup>	1,770	155	9.6				6.21 <sup>2</sup>	6.81	
b) Calcium ammonium nitrate (25% N)		1,550	1,700	150	9.7				6.20	6.80	
3. Ammonium chloride (25% N)	—	1,550 <sup>3</sup>	1,700	150	9.7			6.20 <sup>2</sup>	6.80		
4. Urea (46% N)	2,350	2,150	2,350	200	9.3	-200	-8.5	5.11	4.67	5.11	
									<b>Nutrient P<sub>2</sub>O<sub>5</sub></b>		
5. a) SSP (61% WS P <sub>2</sub> O <sub>5</sub> )											
— Powder	940 <sup>4</sup>	850	950	100	11.8	-90	-9.6	5.87 <sup>4</sup>	5.31	5.94	
— Granular	1,070 <sup>5</sup>	1,000	1,100	100	10.0	-70	-6.5	6.69 <sup>5</sup>	6.25	6.88	
b) SSP (14% WS P <sub>2</sub> O <sub>5</sub> )											
— Powder	820 <sup>7</sup>	750	820	70	9.3	-70	-8.5	5.86 <sup>5</sup>	5.36	5.86	
6. TSP (46% P <sub>2</sub> O <sub>5</sub> )											
— Powder	2,400	2,200	2,400	200	9.1	-200	-8.3	5.22	4.78	5.22	
— Granular	2,600	2,400	2,600	200	8.3	-200	-7.7	5.65	5.22	5.65	
7. Urea ammonium phosphate											
24-24-0	3,050	2,800	3,050	250	8.9	-250	-8.2	7.60	7.00	7.60	
28-28-0	3,600	3,350	3,600	250	7.5	-250	-6.9	7.75	7.29	7.75	
14-35-14	3,400	3,150	3,400	250	7.9	-250	-7.4	6.80	6.33	6.80	
8. Ammo. phosphate sulphate											
16-20-0	2,300	2,150	2,300	150	7.0	-150	-6.5	7.41	7.01	7.41	
20-20-0	2,600	2,400	2,600	200	8.3	-200	-7.7	7.89	7.33	7.89	
9. Diammonium phosphate 18-46-0	3,600	3,350	3,600	250	7.5	-250	-6.9	5.83	5.46	5.83	
10. Nitrophosphate with potash 15-15-15	2,100	1,950	2,100	150	7.7	-150	-7.1	6.72	6.33	6.72	
11. Nitrophosphate 20-20-0	2,400	2,200	2,400	200	9.1	-200	-8.3	6.89	6.33	9.89	
12. NP NPK fertilisers											
17-17-17	2,600	2,400	2,600	200	8.3	-200	-7.7	8.01	7.45	8.01	
14-28-14	3,050	2,800	3,050	250	8.9	-250	-8.2	7.25	6.66	7.25	
19-19-19	2,950	2,750	2,950	200	7.3	-200	-6.8	8.25	7.80	8.25	
10-26-26	2,950	2,750	2,950	200	7.3	-200	-6.8	7.21	6.78	7.21	
12-32-16	3,250	3,000	3,250	250	8.3	-250	-7.7	7.16	6.62	7.16	
									<b>Nutrient K<sub>2</sub>O</b>		
13. MOP (60% K <sub>2</sub> O)	1,300	1,200	1,300	100	8.3	-100	-7.7	2.17	2.00	2.17	
14. SOP (50% K <sub>2</sub> O)	2,100	1,950	2,100	150	7.7	-150	-7.1	4.20	3.90	4.20	

<sup>1</sup>=w.e.f. 21-8-84    <sup>2</sup>=w.e.f. 7-9-84    <sup>3</sup>=w.e.f. 19-4-85    <sup>4</sup>=w.e.f. 23-3-82    <sup>5</sup>=w.e.f. 13-7-82

Note : — 1. Prices of all fertilisers are under statutory control w.e.f. 19-4-85.  
2. W.e.f. 31-1-86 prices of all fertilisers have been reverted to the level of 11-7-81 except SSP (powder and granular) containing 16% w.s. P<sub>2</sub>O<sub>5</sub>.

Table 29—Economics of application of N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O on paddy and wheat

Particulars	1971-72	1974-75	1979-80	1980-81	1981-82	1983-84	1985-86	1986-87	1987-88		1988-89
			w.e.f. 21-9-79	w.e.f. 8-6-80	w.e.f. 11-7-81	w.e.f. 29-6-83	w.e.f. 31-1-86	w.e.f. 12-12-86	w.e.f. 27-8-87	w.e.f. 12-11-87	w.e.f. 2-5-88
<b>A. FERTILISER &amp; FOODGRAIN PRICES (Rs./kg)</b>											
<b>Nutrient prices (Rs./kg)</b>											
1. N—based on urea	2.01	4.35	3.15	4.35	5.11	4.67	5.11	5.11	5.11	5.11	5.11
2. P <sub>2</sub> O <sub>5</sub> —based on SSP	2.89	5.33	3.54	4.72	4.88						
to						5.31	5.94	5.94	5.94	5.94	5.94
—based on DAP	3.53	5.93	4.60	5.62	6.11						
—based on complex	1.86	4.83	3.55	4.93	5.83	5.46	5.83	5.83	5.83	5.83	5.83
to	2.46	5.00	4.18	5.81	6.72	6.33	6.72	6.72	6.72	6.72	6.7
to											
3. K <sub>2</sub> O—based on MOP	2.97	9.92	4.98	6.98	8.25	7.80	8.25	8.25	8.25	8.25	8.25
	0.89	2.05	1.34	1.83	2.17	2.00	2.17	2.17	2.17	2.17	2.1
<b>Output prices (Rs./kg)</b>											
4. Procurement prices of paddy	0.53	0.74	0.95	0.95	1.05	1.22	1.42	1.46	1.50	1.50	1.60
5. Procurement prices of wheat	0.76	1.05	1.15	1.17	1.30	1.51	1.62	1.66	1.66	1.73	1.73
<b>B. PHYSICAL RETURNS</b>											
<b>Paddy</b>											
6. Kg of paddy required to buy 1 kg N	3.79	5.88	3.32	4.58	4.87	3.83	3.60	3.50	3.41	3.41	3.19
7. Kg of paddy required to buy 1 kg P <sub>2</sub> O <sub>5</sub>											
—as SSP	5.45	7.0	3.73	4.97	4.65						
to						4.35	4.18	4.07	3.96	3.96	3.71
—as DAP	6.66	8.01	4.84	6.13	5.82						
—as complex	3.51	6.53	3.74	5.19	5.55	4.48	4.11	3.99	3.89	3.89	3.64
to	4.64	7.57	4.40	6.12	6.40	5.19	4.73	4.60	4.48	4.48	4.20
to	5.60	13.41	5.24	7.35	7.86	6.39	5.81	5.65	5.50	5.50	5.16
8. Kg of paddy required to buy 1 kg K <sub>2</sub> O	1.68	2.77	1.41	1.93	2.07	1.64	1.53	1.49	1.45	1.45	1.6
<b>Wheat</b>											
9. Kg of wheat required to buy 1 kg N	2.64	4.14	2.74	3.72	3.93	3.09	3.15	3.08	3.08	2.95	2.95
10. Kg of wheat required to buy 1 kg P <sub>2</sub> O <sub>5</sub>											
—as SSP	2.80	4.08	3.08	4.03	3.75						
to						3.52	3.67	3.58	3.58	3.43	3.43
—as DAP	4.64	5.65	4.00	4.97	4.70						
—as complex	2.45	4.60	3.09	4.21	4.48	3.62	3.60	3.51	3.51	3.37	3.37
to	3.24	3.33	3.63	4.97	5.17	4.19	4.15	4.05	4.05	3.88	3.88
to	3.91	9.45	4.33	5.97	6.35	5.17	5.09	5.97	5.97	4.77	4.77
11. Kg of wheat required to buy 1 kg K <sub>2</sub> O	1.17	1.95	1.17	1.56	1.67	1.32	1.34	1.31	1.31	1.25	1.25
<b>C. GROSS FINANCIAL RETURN ON EVERY RUPEE INVESTED IN FERTILISERS (Rs.)</b>											
<b>Paddy</b>											
12. Return from nutrient N	2.64	2.04	3.62	2.62	2.47	3.13	3.33	3.43	3.52	5.52	3.76
13. Return from nutrient P <sub>2</sub> O <sub>5</sub>											
—based on SSP	1.10	0.97	1.88	1.41	1.51						
to						1.61	1.67	1.72	1.77	1.77	1.89
—based on DAP	0.90	0.87	1.45	1.14	1.20						
—based on complex	1.71	1.07	1.87	1.35	1.26	1.56	1.70	1.75	1.80	1.80	1.92
to	1.29	0.93	1.59	1.14	1.09	1.35	1.48	1.52	1.56	1.56	1.67
to	1.07	0.52	1.34	0.95	0.89	1.09	1.20	1.24	1.27	1.27	1.36
14. Return from nutrient K <sub>2</sub> O	2.38	0.80	3.54	2.60	2.42	3.05	3.27	3.36	3.46	3.46	3.69
<b>Wheat</b>											
15. Return from nutrient N	3.78	2.90	4.38	3.23	3.05	3.88	3.80	3.90	3.90	4.06	4.06
16. Return from nutrient P <sub>2</sub> O <sub>5</sub>											
—based on SSP	1.58	1.38	2.27	1.4	1.86						
to						1.99	1.91	1.96	1.96	2.04	2.04
—based on DAP	1.29	1.24	1.75	1.41	1.49						
—based on complex	2.45	1.52	2.27	1.66	1.56	1.94	1.95	1.99	1.99	2.08	2.08
to	1.85	1.31	1.93	1.41	1.35	1.67	1.69	1.73	1.73	1.80	1.80
to	1.54	0.74	1.62	1.17	1.10	1.36	1.37	1.41	1.41	1.47	1.47
17. Return from nutrient K <sub>2</sub> O											
	2.56	4.29	3.20	3.00	3.79	3.73	3.82	3.82	3.99	3.99	3.99

For 1971-72, incremental response are:  
For 1974-75 and thereafter:  
Note: Prices of fertilisers mentioned

extra product per additional kg of nutrient) for paddy and wheat assumed for analysis  
P<sub>2</sub>O<sub>5</sub>=6                      K<sub>2</sub>O=4  
P<sub>2</sub>O<sub>5</sub>=7                      K<sub>2</sub>O=5  
years 1971-72 and 1974-75 are as on 1st April.

ratives, commercial banks and Regional Rural Banks for raising these crops were covered under the scheme. However, ever since the introduction of the scheme the weather has been erratic. As a result, the claims are stated to have far exceeded the premium collected. In Kharif 1987, which witnessed the worst drought, the claims were reported to have been nearly 30 times the premium collected. The government is reported to have temporarily suspended the scheme for Kharif 1988 pending review of the scheme.

## **12. LEAD FERTILISER SUPPLIER**

The concept of Lead Fertiliser Supplier (LFS) for each district and for each State was introduced in the Zonal Conferences for Rabi 1986-87.

During 1987-88, the LFS at the State and the district levels were identified by the State Governments in consultation with the fertiliser manufacturers and associated them in implementing the objectives of the concept. LFS have been requested to prepare detailed action plan and chalk out strategy for increased fertiliser consumption for each district for the next five years in collaboration with the State government functionaries.

Fertiliser manufacturers already being in close touch with the situation in marketing field, their involvement as LFS with the State governments at district and state levels in assessing past consumption as well as determining future requirements would start bearing fruit. Most

States' estimates of consumption are anticipated to be close to actuals and the fertiliser requirements of the States for the ensuing season are expected to become gradually more realistic.

The concept in itself is good which ultimately helps in bringing the desired improvement in compiling data of fertiliser consumption and also in making more realistic demand assessment. It is also hoped that the industry would receive due compensation through the pricing formula in case it involves additional financial burden in view of undertaking additional promotional work in the rainfed and other inaccessible areas.

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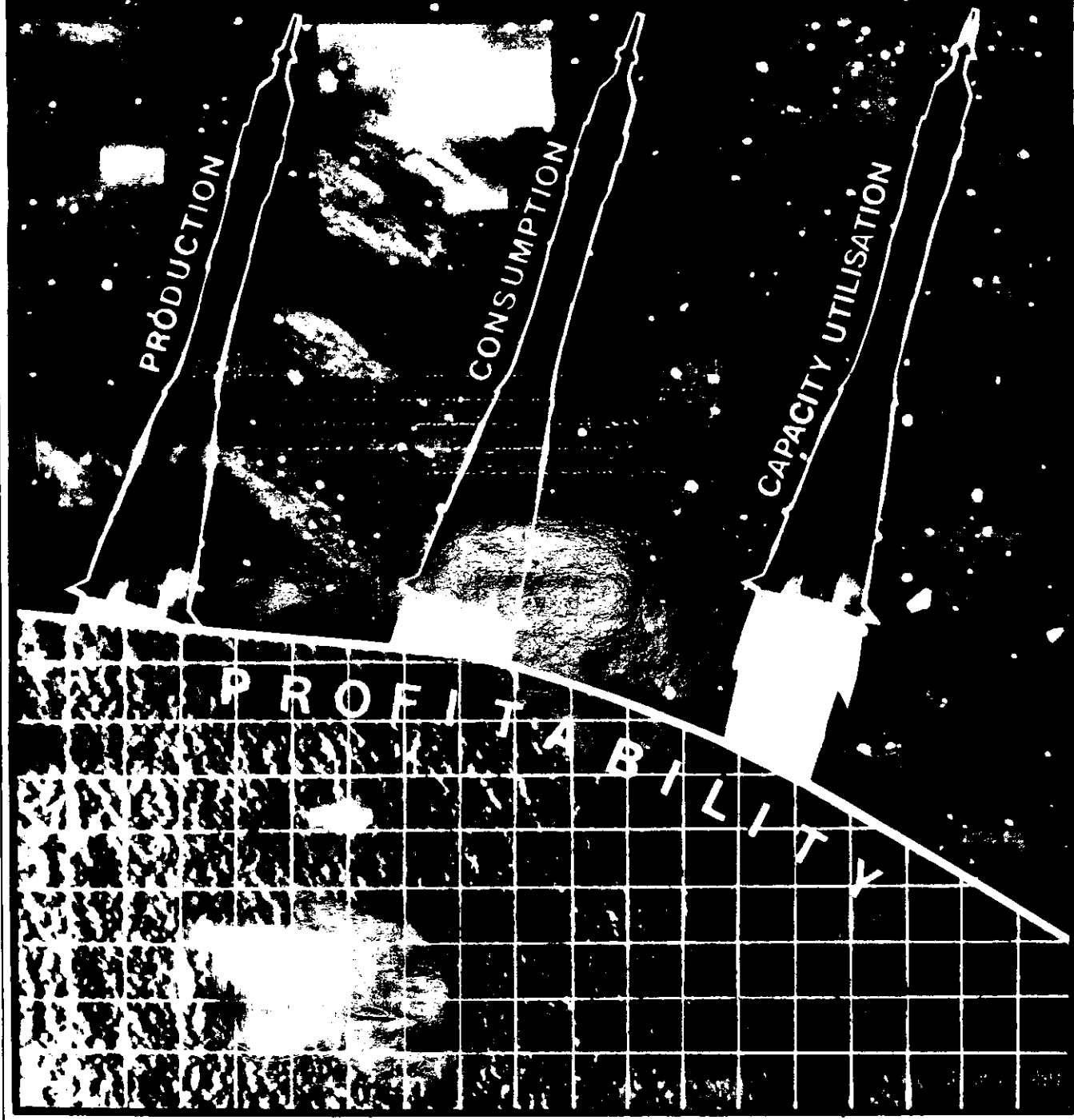
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SEPTEMBER 1989

ANNUAL REVIEW OF  
FERTILISER PRODUCTION AND CONSUMPTION

1988-89



#### **OUR COVER**

**1988-89 was a year of achievements for the Fertiliser Industry. Production, capacity utilisation and consumption touched all time high during the year. Despite the spectacular achievements, the industry's profitability have been sliding down. Our cover symbolically shows this scenario.**

**ANNUAL REVIEW**  
**OF**  
**FERTILISER PRODUCTION AND CONSUMPTION**  
**1988-89**

[ SEPTEMBER 1989 ]



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# FAI ANNUAL REVIEW OF FERTILISER PRODUCTION AND CONSUMPTION 1988-89

[ SEPTEMBER 1989 ]

## HIGHLIGHTS

- ★ The year 1988-89 has been an year of record achievements in capacity, production, capacity utilisation and consumption of plant nutrients. Foodgrains production too witnessed a record achievement.
- ★ Production of N went up from 5.466 to 6.712 million tonnes, a record additional 1.246 million tonnes.
- ★ Record addition to production (0.587 million tonnes) of  $P_2O_5$  and capacity utilisation reaching a record level of 87 per cent as against 70 per cent in the previous year. But for the shortage of imported phosphoric acid during the last quarter of the year 1988-89 (April-March), the capacity utilisation of  $P_2O_5$  would have gone upto 94-95 per cent.
- ★ Both N and  $P_2O_5$  production surpassed the target—N by 0.31 million tonnes and  $P_2O_5$  by 52 thousand tonnes.
- ★ Capacity utilisation of N attained a record level of 85 per cent as against 78 per cent in the previous year—an achievement never witnessed before. Capacity utilisation of gas-based plants attained a record level of 95 per cent.
- ★ Out of 52 N plants, 30 plants attained capacity utilisation of above 80 per cent as against 18 in the previous year.
- ★ Likewise, out of 95  $P_2O_5$  plants, 37 attained capacity utilisation of above 80 per cent as against 21 in the previous year. These include 23 SSP plants as against 14 in the previous year.
- ★ Three giant gas-based plants at Vijaypur, Aonla and Jagdishpur based on HBJ pipeline went into commercial production in a single year adding 1.002 million tonnes N capacity—the total rising to 8.148 million tonnes N. Godavari Fertilisers and Chemicals, Kakinada, with a capacity of (54,000 N; 138,000  $P_2O_5$ ) and a few SSP plants went into commercial production during the year.
- ★ Consumption crossed the 10 million mark with a record increase of 2.271 million tonnes of N +  $P_2O_5$  +  $K_2O$  reaching a level of 10.967 million tonnes, a growth rate of 26.8%. This surpassed the previous highest increase of 1.323 million tonnes witnessed in 1983-84 with a growth rate of 20.7%.
- ★ None of the major 17 States witnessed a decline in consumption during the year. U.P. witnessed an increase of 0.63 million tonnes and became the first state to cross 2 million tonnes mark. Andhra Pradesh also recorded a phenomenal increase of 0.4 million tonnes in consumption. It became the third state in the country to cross 1 million tonne mark after U.P. and Punjab. It now occupies the second position next only to U.P. while Punjab now ranks III in order of consumption.
- ★ Consumption per hectare of gross cropped area increased to 62 kg as against 49 kg in the previous year.
- ★ Foodgrains production too registered record increase of 32 to 34 million tonnes over the previous year, reaching 170-172 million tonnes during 1988-89—Second Agricultural Golden Year.

## 1. GENERAL

The year 1988-89 was a unique year for agricultural as well as fertiliser sectors. In terms of physical performance there was unprecedented increase in the installed capacity production, capacity utilisation and consumption of fertilisers.

The year witnessed an increase in terms of capacity and production for both N and  $P_2O_5$ . There was substantial increase in the capacity (by 1.065 million tonnes for N and 0.213 million tonnes for  $P_2O_5$ ) as compared to 1987-88. This showed an increase of about 15% for N and 9% for  $P_2O_5$ . There was significant increase in the production as well. Against a production target of 6.4 million tonnes of N fixed for 1988-89, the actual production was 6.712 million tonnes exceeding the target by 5%. This was higher by 1.247 million tonnes (or by 23%) as compared to the previous year. Against a production target of 2.2 million tonnes of  $P_2O_5$  fixed for 1988-89, the actual production was 2.252 million tonnes exceeding the target by 2%. This was higher by 0.586 million tonnes (or by 35%) as compared to the previous year. The production of  $P_2O_5$  (in terms of DAP and complexes) could have been much higher if there were no shortages of imported phosphoric acid during the last quarter of the year. The capacity utilisation during 1988-89 touched a new record of 85% for N and 87% for  $P_2O_5$  achieving an impressive growth. The capacity utilisation for  $P_2O_5$  would have been still higher but for the shortage of imported phosphoric acid during the last quarter. In fact the capacity utilisation upto Jan. 89 was about 95%. SSP plants also showed an improvement in capacity utilisation from 58% to 65% as compared to the previous year.

After a gap of 4 years of continuous drought conditions prevailing in the country, the monsoons finally broke which were adequate and timely. Out of 35 Meteorological sub-divisions, 32 sub-divisions received excess/normal rainfall whereas the remaining 3 sub-divisions were either deficient or had scanty rains. At the micro level, as many as 88% of the districts received normal to excess rains. This provided the much needed relief to the farmers and the industry alike. Conse-

quently, irrigation system which had totally dried down was revived. The water table which had become critically low during the preceding year was well within the reach of the crop roots. Plentiful rainfall helped in spreading the residual moisture for the Rabi crops.

From the provisional data compiled from State Governments and Lead Fertiliser Suppliers, the fertiliser consumption in the country was around 11 million tonnes during 1988-89 showing an increase of 2.3 million tonnes as compared to 1987-88 (the final consumption figure for 1987-88 has been worked out at about 8.7 million tonnes of  $N + P_2O_5 + K_2O$ ). This surpassed the increase in fertiliser consumption in any single year eclipsing the quantum increase in fertiliser consumption of 1.34 million tonnes during 1983-84, hitherto known as the Golden Agriculture Year.

In view of the forecast of a good and timely monsoon, Government of India launched some thrust programmes like Special Food Grain Production Programme, National Pulses and Oilseeds Development Programme, Intensive Jute and Cotton Development Programme and Wasteland Development and Reclamation of Alkali Soils Programme. In order to boost fertiliser consumption in the interior areas, additional retail outlets were opened. These programmes coupled with steep rise in fertiliser consumption is likely to yield about 170-172 million tonnes of foodgrain production exceeding the target by about 4 to 6 million tonnes.

It is interesting to note that, according to the Mid-Term Appraisal of the Seventh Plan, the fertiliser consumption target for the terminal year of Seventh Five Year Plan i.e. 1989-90 was re-fixed at 12.0 million tonnes of  $N + P_2O_5 + K_2O$ , which hitherto was eluding the planners but now seems to be almost within the reach. The fertiliser industry also heaved a sigh of relief when the total stocks of  $N + P_2O_5 + K_2O$  as on 1-4-1989 were lower by 23% as compared to 1-4-1988. However, the urea glut still continued to play havoc with the marketing system. In spite of excellent monsoon, the total indigenous production could not be covered under ECA allocation both during Kharif 1988 and Rabi 1988-89 and the industry had to re-

main content with only about 58% of its production being allocated to the states and the remaining 42% was meant for building up inventories for the next season in the allocated states. While the government continued with its decision of not importing urea, the import of DAP was increased during the year to compensate for the loss of indigenous production of DAP and complexes on account of non-availability of imported phosphoric acid since the capacity and production of phosphatic fertiliser plants based on imported phosphoric acid accounted for 53% and 56% of total  $P_2O_5$ , respectively.

## 2. PRODUCTION

### (A) Review of Fertiliser Production during 1988-89

The zonewise number of plants, installed capacity and production of nitrogenous and phosphatic plants are given in Table 1 and that of SSP plants in Table 2.

**Installed capacity:** The total installed capacity during the year increased to 8.148 million tonnes of N and 2.66 million tonnes of  $P_2O_5$ . The additional capacity of 1.075 million tonnes of N was realised with the commencement of commercial production by NFL-Vijapur, IFFCO-Aonla, Indo-Gulf, Jagdishpur (334,000 tonnes N each) Godavari Fertilisers (54,000 tonnes N) and SPIC retrofit (19,000 tonnes N). The additional capacity of  $P_2O_5$  was through Godavari Fertilisers (138,000 tonnes  $P_2O_5$ ), SPIC retrofit (19,000 tonnes  $P_2O_5$ ) and new SSP plants (49,000 tonnes  $P_2O_5$ ).

**Production:** The production of N and  $P_2O_5$  during the year 1988-89 touched almost 9 million tonnes registering 25.7% increase over the previous year production. Nitrogen production of 6.712 million tonnes and  $P_2O_5$  production of 2.252 million tonnes represented a sharp increase of 1.246 million tonnes in N production and 0.586 million tonnes in  $P_2O_5$  production over the previous year. The SSP production at 2.944 million tonnes (material) showed an increase of 0.456 million tonnes (material) over 1987-88.

Performance of over 20 nitrogenous plants improved during the year. Notable increased contribution came from SPIC, MFL, SFC, IFFCO-Phulpur,

Table 1—Zonewise capacity, production & capacity utilisation of nitrogenous and phosphatic plants—  
1987-88 and 1988-89 (April-March)

(Capacity & production in '000 tonnes)

Zone	N								P <sub>2</sub> O <sub>5</sub>							
	1987-88				1988-89				1987-88				1988-89			
	No. of plants	Capacity	Production	Capacity utilisation (%)	No. of plants	Capacity	Production	Capacity utilisation (%)	No. of plants	Capacity	Production	Capacity utilisation (%)	No. of plants	Capacity	Production	Capacity utilisation (%)
East	14	1405	668.2	50	14	1412	609.7	43	10	476.1	286.3	61	10	476.1	405.0	85
North	8	1397	114.7	80	10	2065	1584.3	88	26	234.1	155.4	67	20	262.3	180.2	71
South	12	1372	845.5	62	12	1440	1188.8	84	19	671.7	446.2	66	18	843.1	704.7	88
West	15	2897	2837.2	98	16	3231	3329.6	105	36	1071.4	777.5	79	37	1084.5	962.6	90
<b>All-India</b>	<b>49</b>	<b>7083<sup>a</sup></b>	<b>5465.6</b>	<b>78</b>	<b>52</b>	<b>8148</b>	<b>6712.4</b>	<b>85</b>	<b>91</b>	<b>2453.3</b>	<b>1665.4</b>	<b>70</b>	<b>95</b>	<b>2666.0</b>	<b>2252.5</b>	<b>87</b>

<sup>a</sup>All-India capacity includes additional 12 thousand tonnes of N from by-product A/S.

ICI-Kampur, MCFL, NLC and GSFC-Sikka. In addition, four new plants namely, Godavari Fertiliser-Kakinada, Indo-Gulf-Jagdishpur, IFFCO-Aonla and NFL-Vijaipur contributed 693,000 tonnes 'N' during the year amounting for 56% of the net increase in production over previous year.

The present share of fertiliser products to the total nutrient production is given in Table 3. In nitrogen production, urea continued to dominate with 81.3% share. In phosphate production, share of DAP increased sub-

stantially from 46.3% in 1987-88 to 51.3% in 1988-89. The share of SSP in total P<sub>2</sub>O<sub>5</sub> production was 21 per cent.

#### (B) Capacity Utilisation

The capacity utilisation of 'N' improved markedly from 78 to 85 per cent and that of P<sub>2</sub>O<sub>5</sub> from 70 to 87 per cent as compared to the previous year. It would have been still higher but for non-availability of imported phosphoric acid during the last quarter. SSP plants improved the perfor-

mance, achieving a capacity utilisation of 65 per cent against 58 per cent last year. The 'N' capacity utilisation deteriorated slightly in the East Zone but was higher in other three zones. West zone achieved the highest capacity utilisation of 104 per cent during the year. The P<sub>2</sub>O<sub>5</sub> capacity utilisation was higher than last year in all the four zones of the country.

It would be observed from Table 4 that the plants based on natural/associated gas have acquired predominant share in nitrogenous fertiliser production. 41 per cent of 'N' capacity in the country is now based on natural/associated gas and naphtha as feedstock has now been relegated to the second place, having 30.5 per cent share.

The capacity utilisation of gas based plants improved from 92 to 95 per cent and that of naphtha based plants from 70 to 84 per cent. The fuel oil based plants maintained the capacity utilisation at the same level of 88 per cent as last year. The two coal based plants continued to perform poorly and their capacity utilisation deteriorated to 22 per cent.

An analysis of sectorwise performance of N and P<sub>2</sub>O<sub>5</sub> given in Table 5, shows that 53.2 per cent share of N capacity is in public sector contributing 45.9 per cent of production. It

Table 2—Zonewise capacity, production and capacity utilisation of SSP plants—1987-88 and 1988-89 (April-March)

('000 tonnes of SSP)

Zone	1987-88			1988-89		
	Capacity	Production	Capacity utilisation (%)	Capacity	Production	Capacity utilisation (%)
East	462		54	462.7	273.1	59
North	1463		68	1639.2	1126.1	71
South	603		56	506.7	352.9	70
West	1993		52	2084.3	1192.6	60
<b>All-India</b>	<b>4523.0</b>	<b>2488.2</b>	<b>58</b>	<b>4692.7</b>	<b>2944.7</b>	<b>65</b>



is noteworthy that public sector nitrogen plants have improved their performance this year achieving 71.1 per cent capacity utilisation as compared to 66.1 per cent in the previous year. Private sector accounted for 28.0 per cent of 'N' capacity and contributed 30.4 per cent of N production. The capacity utilisation improved from 96.9 per cent in 1987-88 to 98.1 per cent in 1988-89. Cooperative sector also improved further and achieved a new high of 110.6 per cent capacity utilisation in 'N' production. In phosphatics, the capacity utilisation improved substantially in public and private sectors and marginally in the cooperative sector.

The range of capacity utilisation of plants given in Table 6 shows that while in 1987-88, 18 nitrogenous and complex fertiliser plants operated at a capacity above 80 per cent N, during 1988-89 the number shot up to 30, a remarkable achievement. In phosphatics, 37 plants operated at capacity more than 80 per cent in 1988-89 compared to 21 plants in 1987-88. There was further improvement in performance of SSP industry, wherein 23 SSP plants operated at higher than 90% level in 1988-89 compared to only 14 plants in this category during the previous year.

### (C) Reasons for Loss of Production

Estimated loss of production during the last two years due to identifiable major factors is given in Table 7. Production in several plants was adversely affected due to equipment breakdown, shortage of raw materials and power problems. Equipment re-

Table 3—Percentage share of fertiliser products to total nutrient production—1987-88 & 1988-89

Fertilisers	% share of total nutrient			
	1987-88		1988-89	
	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>
<b>I. Straight Nitrogenous</b>	<b>87.1</b>	—	<b>85.3</b>	—
1. Urea	82.8	—	81.3	—
2. Others	4.3	—	4.0	—
<b>II. Straight Phosphatic</b>	—	<b>23.9</b>	—	<b>20.9</b>
1. Single superphosphate	—	23.9	—	20.9
2. Others	—	—	—	—
<b>III. NP/NPKs</b>	<b>12.0</b>	<b>76.1</b>	<b>14.7</b>	<b>79.1</b>
1. DAP	5.5	46.3	6.7	51.3
2. Others	7.4	29.8	8.0	27.8
<b>Grand Total (I+II+III)</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Table 4—Feedstockwise share in total capacity and production with capacity utilisation of N—1987-88 & 1988-89

Year	(per cent)					
	Natural/associated gas	Naphtha	Fuel oil	Coal	Others	Total
<b>1987-88</b>						
Capacity	34.1	35.3	16.6	6.4	7.6	100.0
Production	40.2	31.8	19.0	2.5	6.5	100.0
Capacity utilisation	92	70	88	31	87	78
<b>1988-89</b>						
Capacity	41.0	30.5	14.4	5.6	8.5	100.0
Production	43.1	31.4	15.4	1.5	8.6	100.0
Capacity utilisation	95	84	88	22	85	85

Table 5—Sectorwise performance of N & P<sub>2</sub>O<sub>5</sub> during 1987-88 & 1988-89—percentage share of capacity & production

Sector	Share of capacity (%)				Share of production (%)				Percentage capacity utilisation			
	1987-88		1988-89		1987-88		1988-89		1987-88		1988-89	
	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>
Public	56.4	31.7	53.2	29.3	48.5	30.6	45.9	29.8	66.1	65.6	71.1	86.3
Cooperative	16.9	12.6	18.8	11.7	22.0	17.4	23.7	13.2	100.2	93.6	110.6	95.9
Private	26.7	55.7	28.0	59.0	29.5	52.0	30.4	57.0	86.9	69.6	98.1	85.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>78.0</b>	<b>70.0</b>	<b>85.0</b>	<b>87.0</b>

Table 6—No. of factories in various ranges of capacity utilisation  
1988-89 and 1987-88

Capacity utilisation range (per cent)	N		P <sub>2</sub> O <sub>5</sub> (SSP, TSP & complexes)	
	1988-89	1987-88	1988-89 <sup>1</sup>	1987-88 <sup>2</sup>
Above 100	15 <sup>7</sup>	7 <sup>7</sup>	15 (10) <sup>7</sup>	7 (5) <sup>7</sup>
91-100	7 <sup>3</sup> 30	3 <sup>3</sup> 18	10 (4) <sup>3</sup> 37 (23)	8 (6) <sup>3</sup> 21 (14)
81-90	8 <sup>3</sup>	8 <sup>3</sup>	12 (9) <sup>3</sup>	6 (3) <sup>3</sup>
71-80	5	6	9 (8)	12 (10)
61-70	2	3	5 (5)	8 (7)
51-60	5	6	8 (6)	9 (6)
41-50	4	5	7 (7)	7 (6)
1-40	6	10	23 (23)	26 (26)
Nil	—	1	6 (6)	8 (8)
<b>Total no. of plants</b>	<b>52</b>	<b>49</b>	<b>95 (80)</b>	<b>91 (77)</b>

( ) = Figures in brackets are for SSP and 1 TSP plants.

<sup>1</sup> = Includes 15 complex fertiliser plants.

<sup>2</sup> = Includes 14 complex fertiliser plants.

lated problems were mainly faced by Cochin, Panipat, Gorakhpur, Ramagundam, Sindri, Talcher, Barauni, Durgapur, Namrup and Mangalore plants. Power problems affected the performance of Bhatinda, Nangal, Panipat, Cochin, Rourkela, Gorakhpur, Ramagundam, Talcher, Durgapur, Barauni, Kota, Kanpur and Goa. Inadequate supply of raw materials adversely affected production of both N and P<sub>2</sub>O<sub>5</sub>. Problems in raw-material supply accounted for 2,62,000 tonnes of N production and shortage of imported phosphoric acid was responsible for loss in phosphatic fertiliser production by 230,000 tonnes P<sub>2</sub>O<sub>5</sub> during the year.

#### (D) Steps Taken by the Industry

Fertiliser units continued their efforts to minimise the loss of production due to mechanical breakdown and equipment failures. The production performance is expected to improve with the various rehabilitation projects, debottlenecking schemes and captive power plant installation at various units.

Captive power plants at each have been commissioned at Bhatinda and Panipat. From the revamped ammonia plant at Nangal is expected to come on line in Nov. '89. Urea reactor lining, inspec-

tion and repair are planned at Nangal Bhatinda and Panipat. To overcome the limitation of CO<sub>2</sub> availability in urea production, a proposal for CO<sub>2</sub> recovery from reformer gases is under consideration at NFL-Vijaipur. At Indo-Gulf, Jagadishpur, a purge gas recovery unit is proposed to be installed to reduce the specific energy consumption. At FCI-Gorakhpur, a scheme to replace the old urea plant by TEC-ACES process is under consideration. At SFC-Kota, the leaking tubes in ammonia condenser of urea plant would be replaced with better materials of construction.

At Namrup-I unit, changing of sulphuric-acid to DCDA process and overhauling of major compressors and instruments etc. are planned. At HLL, Haldia, the capacity of 200 TPD sulphuric-acid plant after conversion to DCDA has been increased to 330

Table 7—Reasons for loss of production in N & P<sub>2</sub>O<sub>5</sub>  
1987-88 & 1988-89

Reasons	1987-88			1988-89		
	Loss in prodn. ('000 MT)	% loss in prodn. to overall		Loss in prodn. ('000 MT)	% loss in prodn. to overall	
		Loss	Prodn.		Loss	Prodn.
<b>I. Nitrogen (N)</b>						
1. Power problems	107.8	11.1	2.0	87.9	8.9	1.3
2. Shortage of raw materials	173.3	17.9	3.2	262.4	26.6	3.9
3. Equipment breakdown	323.7	33.4	5.8	309.0	31.3	4.6
4. Labour problems	54.2	5.6	1.0	8.1	0.8	0.1
5. Others	309.8	32.0	5.7	320.3	32.4	4.8
<b>Total</b>	<b>968.8</b>	<b>100.0</b>	<b>17.7</b>	<b>987.7</b>	<b>100.0</b>	<b>14.7</b>
<b>II. Phosphate (P<sub>2</sub>O<sub>5</sub>)</b>						
1. Power problems	22.9	4.0	1.4	24.3	7.1	1.1
2. Shortage of raw materials	284.8	50.0	17.0	229.9	66.9	10.2
3. Equipment breakdown	29.6	5.2	1.8	34.4	10.0	1.5
4. Labour problems	36.6	6.4	2.2	4.2	1.2	0.2
5. Others	198.1	34.4	11.8	50.9	14.8	2.3
<b>Total</b>	<b>570.0</b>	<b>100.0</b>	<b>34.2</b>	<b>343.7</b>	<b>100.0</b>	<b>15.3</b>

TPD. Revamp schemes to increase DAP production are under consideration. At SAIL-Rourkela, various modifications and replacement schemes in ammonia, nitric-acid and CAN plants are under active consideration.

At RCF, the work of rehabilitation of the front end of Trombay-I plant via steam revamping route is expected to be completed by the end of 1989. Modification in the evaporation and prilling section of Trombay-I urea plant to control dust emission is in progress. A new HP ammonia stripper will be installed in Trombay-V urea plant. At KRIBHCO-Hazira, installation of process-optimizer in one of the ammonia plants and high pressure urea hydrolysers in urea plants have been planned during 1989-90. At IFFCO-Kalol, several modification schemes such as reformer convection zone modification, syn-gas loop modification, installation of hydrolyser etc. have been planned. At OSFC, replacement of primary reformer tubes in ammonia-II plant, replacement of tower packings in ammonia plant and installation of a concentration unit in phos-acid plant have been planned. At CNFC-Bharuch, replacement of existing catalyst basket with new TOPSOES-200 basket in ammonia converter is planned.

At FACT-Udyogamandal, the oxygen plant is being revamped and waste heat boiler, intermediate heat exchanger and absorption tower in the sulphuric-acid plant are being replaced. At FACT-Cochin, the process air compressor which has posed limitation to ammonia production, is being replaced. An end to end survey of Cochin ammonia plant has been conducted and a techno-economic feasibility report to improve the capacity utilisation and energy efficiency, has been submitted to the Govt. for approval and financial assistance. At MFL, a 6.4 MW captive power unit is being installed. The performance of Selectox unit, which was commissioned during 1988-89 at MFL, has been found satisfactory. Replacement of ammonia converter with a new generation converter, effluent treatment plant and utilisation of treated sewage water as cooling water are some of the schemes to be implemented by MFL. An end to end survey of the entire MFL complex is being taken-up. At ETD-

Parry, in the phos-acid plant a new attack tank has been commissioned and belt filter is being installed. The debottlenecking studies of ammonia and urea plant have been completed at MCFL-Mangalore. NLC-Neyveli has drawn-up a proposal for retrofitting of urea plant with a modern single stream process. At SPIC-Tuticorin, absorption tower, economizer and waste heat boiler in the sulphuric-acid plant would be replaced.

#### (E) Production Prospects for 1989-90

During 1989-90, CNFC-nitrophosphate project (68,000 te N; 33,000 te  $P_2O_5$ ), FACT's caprolactum plant giving ammonium sulphate as by-product (46,400 te N), PPOL-Amjhore SSP plant (42,000 te  $P_2O_5$ ) and two other standard size SSP plants (10,600 te  $P_2O_5$  each) are expected to go into commercial production. With these, the all-India installed capacity as on 31-3-90 would become 8.25 million tonnes of N and 2.762 million tonnes of  $P_2O_5$  per annum. While the production of N is expected to increase to 7 million tonnes, in view of the shortage of imported phosphoric acid, the production of  $P_2O_5$  may be only around 1.8 million tonnes against 2.25 million tonnes during 1988-89 and the target of 2.4 million tonnes of  $P_2O_5$  during 1989-90.

The details of estimated capacity, production and capacity utilisation of N and  $P_2O_5$  for 1989-90 zone-wise are given in Table 8.

### 3. FERTILISER AVAILABILITY

The excess availability of nitrogenous fertilisers during 1988-89 continued to distort the marketing conditions though widespread and timely monsoons, one of the best of the century, were responsible for an all time high fertiliser consumption of about 11 million tonnes of N +  $P_2O_5$  +  $K_2O$ .

The import scenario with respect to nitrogenous fertilisers remained more or less static when compared with 1987-88 situation. No significant quantity of urea was imported during 1988-89 except about 0.111 million tonnes of urea against contractual obligations. The Government continued to hold back the stocks of imported urea and did not release it in the market. It was, however, released in the market only on replenishment basis from indigenous production to prevent damage. As against nil imports of phosphates during 1987-88, Government imported 0.856 million tonnes of DAP besides small quantities of other NP/NPKs, not only to bridge the gap between anticipated consumption and indigenous production but also to maintain the  $P_2O_5$  stocks already at a low level due to spurt in

Table 8—Zone-wise estimated capacity and production of nitrogenous and phosphatic fertilisers—1989-90 (April-March)

Zone	Capacity ('000 tonnes)	Production		% capacity utilisation
		Quantity ('000 tonnes)	Zone's share to total (%)	
<b>I. Nitrogen (N)</b>				
East	1,412	678	9.7	48
North	2,055	1,800	25.7	88
South	1,486	1,248	17.8	86
West	3,299	3,274	46.8	101
<b>All-India</b>	<b>8,252</b>	<b>7,000</b>	<b>100.0</b>	<b>86</b>
<b>II. Phosphate (<math>P_2O_5</math>)</b>				
East	518	272	15.1	53
North	273	202	11.2	75
South	843	551	30.6	65
West	1,129	775	43.1	71
<b>All-India</b>	<b>2,762</b>	<b>1,800</b>	<b>100.0</b>	<b>66</b>

Table 9 - Nutrientwise gap, import and import as percentage of gap 1980-81 to 1988-89 (April-March)

Year	Gap				Import				Import as % of gap				Total value of imports (Rs. million)
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	
	← '000 tonnes →								← % →				
1980-81	15.4	372.1	623.9	2510.2	1510.4	452.1	796.5	2759.0	99.7	121.5	127.7	108.9	9252.2
1981-82	925.4	372.6	676.2	1974.2	1055.1	343.2	643.8	2042.1	114.0	92.1	95.2	103.4	7166.3
1982-83	794.5	452.2	726.5	1973.2	424.6	63.4	643.7	1131.7	53.4	14.0	88.6	57.4	2735.8
1983-84	1712.9	666.2	775.4	3154.5	656.1	142.8	556.4	1355.1	38.3	21.4	71.8	43.0	3650.5
1984-85	1568.7	568.6	838.5	2975.8	2008.6	745.2	871.0	3624.8	128.0	131.1	103.9	121.8	14350.0
1985-86	1338.0	575.1	808.0	2721.1	1615.8	804.8	893.8	3314.4	120.8	139.9	110.6	121.8	14050.0
1986-87	360.5	443.7	860.2	1864.4	1105.6	279.3	889.6	2274.5	306.7	62.9	103.4	136.7	6510.0
1987-88	202.7@	497.6@	864.5@	1564.8@	174.8	—	809.1	983.9	86.2	—	93.6	62.9	2237.7
1988-89	482.0@	447.0@	1073.6@	2002.6@	218.8	407.4	982.4	1608.6	45.4	91.1	91.5	80.3	6201.0

@ Provisional

- Notes: 1. Gap does not take into account stocks available at the beginning of the year.  
2. Gap has been arrived at by deducting figures of production from consumption.  
3. Total K<sub>2</sub>O requirements are met through imports.

demand. The gap could have been smaller but for shortage of phos acid during the fourth quarter. However, P<sub>2</sub>O<sub>5</sub> imports covered only 91 per cent of the gap between consumption and production (Table 9).

The fertiliser production increased by 1.2 and 0.6 million tonnes with respect to N and P<sub>2</sub>O<sub>5</sub>, respectively. Despite this impressive increases in production, the increases in consumption being sharper (1.5, 0.5 and 0.2 million tonnes of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, respectively) than the production, there was a draw down on the inventories to meet the requirement bringing down the stocks of indigenous fertilisers with the manufacturers as on 1-4-1989 compared to the situation as on 1-4-1988 (Table 10). While the total stocks slumped low by 31%, it was lower by 30%, 41% and 38% in the case of N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O, respectively as compared to 1987-88. In spite of this trend, the entire production of N could not be covered under ECA allocation both for Kharif 1988 and Rabi 1988-89.

#### 4. CONSUMPTION

##### Review of Consumption

If one were to review trend, it would be seen that fertiliser consumption dropped only twice—once in 1960-61 and again

in 1974-75—during the entire span of 38 years covering the period from 1951-52 to 1988-89. On the other hand, one would also note that the quantum increase of more than 1 million tonnes was realised only twice—once in 1983-84 and again in 1988-89, in the latter case it was more than 2 million tonnes over the previous year—highest quantum jump ever achieved indeed.

Increases in fertiliser consumption during the intervening years varied very widely due to a number of fac-

tors, the most important being the weather, followed by irrigation facility developed, area under HYVs covered etc. In Table 12, consumption data is arranged according to the Five Year Plan periods and compound (exponential) growth rates worked Planwise with a view to smoothen out year to year fluctuations. For a detailed review of the recent past, data from 1982-83 to 1988-89 have been provided yearwise covering VI Plan and first 4 years of the VII Plan. Major factors affecting consumption are enumerated in Table 13.

Table 10—All India nutrientwise stocks of indigenous fertilisers with the manufacturers

Nutrient	('000 tonnes)						
	1-4-83	1-4-84	1-4-85	1-4-86	1-4-87	1-4-88	1-4-89
N	651.8	397.3	640.2	1131.3	1897.8	2215.7	1545.0
P <sub>2</sub> O <sub>5</sub>	267.6	150.5	208.3	339.6	630.8	443.8	261.7
K <sub>2</sub> O	88.5	37.3	42.3	36.8	104.5	98.7	61.4
<b>Total</b>	<b>1007.9</b>	<b>585.1</b>	<b>890.8</b>	<b>1507.7</b>	<b>2633.1</b>	<b>2758.2</b>	<b>1868.1</b>
(% increase/@ decrease)		-41.9	52.2	89.3	74.6	4.8	-32.3

@—Over the stocks held on the same day during the previous year.

**Table 11—Distribution of Meteorological sub-divisions according to excess/normal or deficient/scanty rainfall South West Monsoon period (June-September)**

Item	(No.)									
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
1. Excess/Normal	19	29	28	23	33	26	26	21	14	32
2. Deficient/Scanty	16	6	7	12	2	9	9	14	21	3
<b>Total</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>
3. % of districts having normal to excess rains			69	46	85	64	65	52	43	88

Excess = + 20% or more  
Normal = + 19% to -19%  
Deficient = -20% to -59%  
Scanty = -60% or less

Data on actual consumption of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and total with their growth rates, statewide and zonewise, for the past 3 years 1986-87 to 1988-89 (April-March) are presented in Table 14. Table 17 records the despatches of fertiliser materials during 1987-88 and 1988-89.

The upsurge in consumption by 2.27 million tonnes alone during 1988-89, touching 10.968 million tonnes mark (26% growth rate) brought in a sea change on the consumption front. With the advent of

HYVs in mid 60's and its expansion in ever growing irrigation and assured rainfall areas (vide Table 23), the growth per annum in absolute terms received an impetus as is shown in Table A.

From the above, the following highlights during the year 1988-89 emerge:—

- (i) total consumption nearing 11.0 million tonnes crossed not only 9.00 but also 10.00 million tonne mark in one single year.

- (ii) quantum increase of 2.27 million tonnes was the highest ever achieved in any one year.

- (iii) quantum increase of 2.27 million tonnes equalled the total increase witnessed during the entire V Five Year Plan (1974-75 to 1978-79) viz., 2.28 million tonnes. It was also twice the increase witnessed during the IV Year Plan (1969-70 to 1973-74);

- (iv) the extremely good performance during the year improved the level of total increase from 0.484 million tonnes witnessed during the first 3 years to 2.756 million tonnes during the first 4 years of the VII Plan; and

- (v) preliminary rainfall survey reveals that the year 1989-90 is anticipated to be another favourable year, weatherwise. As a result while the consumption may increase further during the current year, it is unlikely to reach even the reduced target of 12.00 million tonnes as anticipated in the Mid-Term Appraisal of the Seventh Five Year Plan.

#### Rainfall Situation

To sum up, such an exquisite performance of fertiliser consumption during 1988-89, keeping in view that the preceding three drought years (1985-86 to 1987-88) had caused acute moisture stress in the soil, would not have been possible had the rains not been copious, timely and wide-

**Table A—Increases in consumption during Plan Periods**

During the 5 yearly plan		Consumption in absolute terms ('000 tonnes)		No. of average/good monsoon years
Plan	Period ending	Increases during Plan Periods		
		Overall	Per annum	
1. IV	(1973-74)	1,080	216	4 (1969-70 to 1971-72 and 1973-74)
2. V	(1978-79)	2,280	456	3 (1975-76 to 1977-78 and 1978-79)
3. VI	(1984-85)	2,955	591	2 (1983-84 and 1984-85)
4. VIII	(i) (upto 1987-88)	484 <sup>1</sup>	161 <sup>1</sup>	None
5.	(ii) (upto 1988-89)	2,756 <sup>2</sup>	689 <sup>2</sup>	1 (1988-89)

<sup>1</sup>=Covering first 3 years of the VII Plan.

<sup>2</sup>=Covering first 4 years of the VII Plan.

spread throughout the country. During the pre-monsoon season (March-May 1988) as many as 24 meteorological sub-divisions had excess/normal rains whereas 32 sub-divisions experienced excess/normal rainfall during the South-West monsoon period of June-September 1988 (as against 14 during June-September 87) (vide Table 11). Out of 384 districts for which rainfall data is available, the widespread rains during June-September 88 covered approximately 88 per cent of the districts (as against 43 per cent during June-September 87). Further, during the North-East monsoon season (October-December 1988) which accounts for about 20 per cent of the annual precipitation, the rainfall was not quite favourable and 10 sub-divisions received excessive/normal rainfall as against 23 sub-divisions during October-December 1987.

#### Agricultural production

On account of the country having experienced an overall favourable monsoon, not only fertiliser consumption reached a new high of nearly 11.0 million tonnes surpassing the target of 10.2 million tonnes fixed for the year but also as the preliminary estimates show, the foodgrains production is likely to attain a level of 170-172 million tonnes (vide Table 23) crossing the target of 166.57 million tonnes during both the seasons of the year 1988-89. This records an increase of 32-34 million tonnes (i.e. 23% to 24% increase over the 1987-88 level of 138.41 million tonnes)—thanks to the easy availability of fer-

tilisers and other inputs which could support the unprecedented upsurge in demand, transfer of technology backed by extension efforts and improved management practices. In this context, it would be of interest to record the progress made in inputs adoption and output (foodgrains) achievement during the year 1988-89 (*II Agricultural Golden Year*) and 1983-84 (*I Agricultural Golden Year*) which were more or less similar, weatherwise on account of the reasons enumerated in Table B.

Besides fertilisers, other inputs too played a major role in boosting foodgrains production such as, irrigation, HYVs, improved seeds, pesticides, agricultural credit etc. Progress made by these is highlighted in Table C comparing 1983-84 and 1988-89 with their respective preceding years:

Both, fertiliser consumption and foodgrains production recorded higher increases during 1988-89 as against 1983-84 when compared with their respective preceding years.

During 1988-89, the highest growth rate in fertiliser consumption was recorded by N (27%) followed by  $P_2O_5$  (25%) and  $K_2O$  (24%) overall being 26%. More or less, similar trend was observed during Kharif 1988 as well as Rabi 1988-89 seasons. Weather having been favourable, all major 17 states recorded increase in consumption as compared to 8 states recording negative growth rates during 1987-88 due to acute drought (Table 15). Progress made during the two seasons—Kharif 1988 and Rabi 1988-89 is detailed in the following paragraphs.

#### Kharif 1988

Timing, duration, spread and ultimately the level of precipitation all are important which determine the 'health' of crop. As mentioned elsewhere, 32 meteorological sub-divisions witnessed excess/normal rainfall during June-September 1988 from South-West monsoon (Table 11). The season's rainfall was excess (+20% or more) in Haryana, Punjab, H.P. and J & K in the north; A.P., Tamil Nadu and interior Karnataka in the south; Gujarat, Madhya Maharashtra, Marathwada and Vidarbha in the west and Arunachal Pradesh in the east. Areas which received normal (—19% to +19%) rainfall during this period were plains of U.P. in the north; Coastal Karnataka and Kerala in the south; Madhya Pradesh, Konkan and Goa in the west and Assam, Meghalaya, Nagaland, Manipur, Mizoram, Tripura, West Bengal, Sikkim, Orissa and Bihar in east. Only the hills of west Uttar Pradesh, west Rajasthan and east Rajasthan were reported to be deficient (—20% to —59%) in rains during this period.

The South-West monsoon advanced into Kerala on May 26, 1988, progressed satisfactorily (except Saurashtra initially) and kept up the schedule. The onset of monsoon was in time over most parts of the country and by June 15, it progressed into Maharashtra, South Gujarat, North Interior Karnataka, South Telengana, Coastal A.P., Orissa, W.B., Bihar and Eastern U.P. by July 1, monsoon covered the entire country. incessant

Table B—Weather during and preceding the two Agricultural Golden Years—1983-84 and 1988-89

Item	1983-84	1988-89
<b>i. No. of preceding year</b>		
(a) poor, weatherwise	4 (1979-80 to 1982-83)	4 (1984-85 to 1987-88)
(b) acute drought year	1 (1979-80)	1 (1987-88)
(c) No. of sub-divisions having excess/normal rainfall during the acute drought year (June-Sept)	19	14
<b>ii. During the year</b>		
(a) No. of sub-divisions having excess/normal rainfall (June-Sept)	33	32
(b) % of districts having excess rains	85	88
<b>iii. Increase over the preceding year</b>		
(a) foodgrain production (million tonnes)	23	32.34 (P)
(b) fertiliser consumption (million tonnes)	1.32	2.27 (P)

(P = Provisional).

Table C—Progress made in inputs adoption and output achievement during the First (1983-84) and Second (1988-89) Agricultural Golden Years

Year	Weather	No. of sub-division with excess/normal rain-fall (June-Sept.)	Fertiliser consumption (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O) (million tonnes)			Foodgrains production (million tonnes)			Achievement				
			T		%A	T	A	%A	Irrigation (million ha)	HYV coverage (million ha)	Improved seeds distributed (million ha)	Pesticides consumed (million quintals)	Institutional credit for Agriculture (Rs billion)
1. 1988-89	V. Good	32 (88)	10.20	10.97 <sup>p</sup>	108%	166.57	172.0 <sup>p</sup>	103%	NA	65.0 <sup>p</sup>	5.68 <sup>p</sup>	0.85 <sup>p</sup>	117.51 <sup>t</sup>
2. 1987-88	V. Poor	14 (48)	10.30	8.70 <sup>p</sup>	84%	160.00	138.4 <sup>p</sup>	87%	63.3	54.1	5.63	0.49 <sup>p</sup>	82.14 <sup>p</sup>
	Increase(+)/ decrease(-)	18	—	2.27	—	6.57	33.6	—	—	10.9	0.05	0.36	35.37
	±%	—	—	26.1%	—	—	24.3%	—	—	20.1%	0.9%	73.5%	43.1%
3. 1983-84	V. Good	33 (85)	7.20	7.71	107%	142.0	152.4	107%	58.6	53.7	4.50	0.55	50.88
4. 1982-83	Poor	23 (46)	7.20	6.39	89%	1.39- 141.5	129.5	92%	58.1	47.5	4.21	0.50	53.27
	Increase(+)/ decrease(-)	10	—	1.32	—	1.75	22.9	—	0.5	6.2	0.29	0.05	—
	±%	—	—	20.7%	—	—	17.7%	—	0.9%	13.1%	6.9%	10.0%	—

<sup>p</sup>=Provisional.

<sup>t</sup>=Target.

**A**=Achievement.

( )=% of districts having normal/excess rains.

Table 12—Consumption of fertiliser nutrients (N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O)

Year	Consumption ('000 tonnes)				Growth of consumption per annum over previous quoted year (%)			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total (N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O)
1951-52	58.7	6.9	—	65.6				
1955-56 (I Plan end)	107.5	13.0	10.3	130.8	16.4	17.1	—	18.8
1960-61 (II Plan end)	211.7	53.1	29.0	293.8	14.5	32.5	23.0	17.6
1965-66 (III Plan end)	574.8	132.5	77.3	784.6	22.1	20.0	21.7	21.7
1973-74 (IV Plan end)	1829.0	649.7	359.8	2838.6	[8.6]	[11.2]	[16.1]	[10.0]
1978-79 (V Plan end)	3419.5	1106.0	591.5	5116.9	13.3	11.3	10.5	12.6
1982-83	4224.2	1435.9	726.5	6386.6	5.4	6.8	5.3	5.7
1983-84	5204.4	1730.3	775.4	7710.1	23.2	20.5	6.7	20.7
1984-85 (VI Plan end)	5486.0	1886.4	838.5	8211.0	5.4	9.0	8.1	6.5
					(9.4)	(10.4)	(6.7)	(9.3)
1985-86	5660.9	2005.2	808.0	8474.1	3.2	6.3	-3.6	3.2
1986-87	5772.7	2105.6	850.2	8738.5	2.0	5.0	6.5	3.1
1987-88@	5668.3	2163.0	864.5	8695.8	-1.8	2.7	0.5	-0.5
1988-89@	7194.4	2699.5	1073.6	10967.5	26.9	24.8	24.2	26.1

@ = Provisional

[ ] = Growth per annum during IV Plan period from 1969-70 to 1973-74 (Base=1968-69)

( ) = Growth per annum during VI Plan period from 1980-81 to 1984-85 (Base=1979-80)

rains during July did hinder sowing operations. By the end of September, the monsoon, however, withdrew from North-West India including Punjab, Haryana and parts of Gujarat and West M.P. but sudden flash floods due to heavy rains in mid-Sept. in Punjab, Haryana, MP & J&K did affect agricultural operations and damaged the rice crop. However, on the whole, the behaviour of monsoon was excellent during June-September 1988 and, from all accounts, the Kharif 1988 foodgrains production at 95.0 million tonnes is expected to exceed the target set at 92.50 million tonnes.

The fertiliser consumption during Kharif 1988 too has not lagged behind and has recorded a growth of 38 per cent over Kharif 1987 reaching the level of 5.22 million tonnes as against 3.78 million tonnes witnessed during Kharif 1987.

#### Rabi 1988-89

Sowing intensity during Rabi season largely depends upon the advance of south-west monsoon as rainfall pattern during the East monsoon covering the period October-December.

Till November 1988, the rainfall was rather inadequate. The situation took a turn for the better in the second fortnight of December particularly, in the Northern states. However, 10 meteorological sub-divisions witnessed excess/normal rainfall during October-December 1988 as against 23 in October-December 1987. These include Arunachal Pradesh, Assam, Meghalaya, Nagaland, Manipur, Mizoram, Tripura, H.P. and Vidarbha which experienced excess rains and normal in Gangetic West Bengal, Haryana, Punjab and West M.P. Incessant rains in the peninsular region during the later half of South-West monsoon season sustained the Rabi sowings in the south.

On the whole, country was not that lucky to receive widespread and copious rains during the Rabi season as was witnessed during Kharif 1988. However, ample water available in catchment areas and 47 major reservoirs from the preceding Kharif sustained agricultural operations during Rabi season. Good soil moisture gave impetus to the vigorous Rabi production Campaign launched to avail of the ample water availability. Winter rains in early January 1989 in J & K, Punjab, H.P., Haryana,

Western U.P., Rajasthan and Saurashtra Region of Gujarat brightened the prospects for a bumper Rabi crop.

Estimates of Rabi crop production currently available confirm the preliminary assessment. It is estimated that the production during Rabi 1988-89 would be 76.68 million tonnes surpassing the target of 74.07 million tonnes fixed for the season. Fertiliser consumption too during this season is anticipated to achieve a level of 5.75 million tonnes (17% growth) as compared to 4.92 million tonnes during Rabi 1987-88.

The food production and fertiliser consumption situation is summarised in Table D.

#### Statewise Consumption

##### General comments

Table 15 presents the quantum increase/decrease in consumption for 17 major states during 1988-89 over 1987-88 and 1987-88 over 1986-87. A striking feature is that, on account of 1988-89 being a favourable year weatherwise, none of the states witnessed a fall in consumption over 1987-88.



Table 13—Major factors affecting fertiliser consumption

Item	Year							
	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
1. $\pm$ % Changes in consumption over the previous year	10.0	5.3	20.7	6.5	3.2	3.1	-0.5@	26.1@
2. Weather	Poor	Poor	Good	Average	Poor	Poor	V. Poor	V. Good
3. Area under Irrigation	Increase	Increase	Increase	Increase	Increase	Increase	Decrease	Increase
4. Area under HYV	Increase	Increase	Increase	Increase	Increase	Increase	Decrease	Increase
5. Availability	Heavy imports & substantial increase in domestic production.	Increase in domestic production. Diminished imports.	Marginal increase in domestic production and nominal increase in imports.	Highest increase in imports and substantial increase in domestic production.	Very heavy imports for the second year in succession supported by additional contribution from domestic production. Stocks started mounting due to unfavourable weather.	Substantial increase in domestic production. Sizeable imports and non-materialisation of anticipated demand due to poor weather accentuated the build-up of inventories.	Drastic cut in imports. Heavy inventories continued due to non-materialisation of anticipated demand in the face of poor weather third year in succession.	Record increase in domestic production and meagre imports. Record growth in consumption due to good weather. Consequently, inventory came down but still quite high.
6. Excise duty	Withdrawn w.e.f. 7.6.1980 on all fertilisers except AS and CAN	Withdrawn on AS and CAN w.e.f. 28.2.83	—	—	—	—	—	—
7. Fertiliser prices	Increased by 17-18.5% w.e.f. 11.7.1981 (over 38.5% increase effected in 1980-81)	No change	Reduced w.e.f. 29.6.83 on an average by 7.5%	No change	Increased w.e.f. 31.1.86 and brought back to 1981-82 level	No change	No change	No change— However, 7.5% discount on urea was given to the farmers
8. Input output price relationship	Worsened	Improved	Improved	Improved	Improved	Worsened	Improved	Improved
9. Promotional campaign	Block Delivery Scheme (BDS) introduced. IFPC introduced in 67 districts having good irrigation facilities/assured rainfall and relatively low fertiliser consumption level	IFPC further intensified with no. of districts increasing to 804	IFPC continued in 104 districts. NAIF launched and implemented vigorously	IFPC and NAIF continued	IFPC and NAIF continued	IFPC continued and NAIF withdrawn	1. IFPC continued 2. A national project on 'Development of fertiliser use in low consumption rainfed areas' for 3 years covering 60 districts in 16 states was initiated	1. IFPC continued 2. A national project on 'Development of fertiliser use in low consumption rainfed areas' continued 3. Special Food-grains Production

10. Remarks

Area concept for urea allocation introduced Rabi 1984-85

1. Manufacturers were asked to offer 50% of their allocated quantity first to the co-operative institution Kharif 1985
2. Districtwise allocation of urea introduced by the Centre\* Rabi 1985-86

1. Districtwise allocation of SSP introduced Kharif 1986.
2. Concept of Lead Fertiliser Supplier (LFS)<sup>+</sup> introduced Rabi 1986-87
3. Offer of 50% allocation first to cooperative institutions dispensed with from Rabi 1986-87

1. In Rabi 1987-88 (w.e.f. Dec. '87) manufacturers of the following fertilisers were permitted to market unallocated quantity of
  - a) SSP—any state of their choice with the condition that they will not get any extra freight over and above the normal freight already allowed by FICC
  - b) DAP & Complexes—any state of their marketing zone
2. During Rabi 1987-88, Pool Handling Agencies were allowed to market Pool urea to be replaced by equivalent indigenous urea, Pool stocks remaining unchanged

Programme launched in 169 districts of 14 States covering wheat, maize rice, arhar and gram

1. This practice continued throughout the year 1988-89 on SSP, DAP & Complexes.
2. Pool Handling Agencies continued to market Pool urea to be replaced by equivalent indigenous urea, Pool stocks remaining unchanged
3. As a result of good monsoon manufacturers of nitrogenous fertilisers were permitted to sell additional 20 per cent of their ECA allocation for Kharif 1988
4. LFS were actively involved along with state Govts. in estimating demand projection and past consumption to bring about a more realistic statistics

@ = Provisional

+ = Concept of LFS implemented from Kharif 1987.

\* = From Kharif '87 districtwise allocation relaxed and left to the State Govts.

Table 14—Seasonwise consumption of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and total by states & their percentage increase 1986-87 to 1988-89 (April-March)

Zone/State	Nutrient	Consumption ('000 tonnes)									* % over the previous year								
		1986-87			1987-88@			1988-89@			1986-87			1987-88@			1988-89@		
		Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi+	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi+	Total
East	N	339.6	459.3	798.8	312.2	538.3	850.5	415.6	579.4	995.0	6.0	10.3	8.4	-8.1	17.2	6.5	33.1	7.6	17.6
	P <sub>2</sub> O <sub>5</sub>	104.4	176.6	281.0	78.4	196.5	274.9	128.2	207.1	335.3	8.3	21.8	16.4	-25.0	11.1	-2.3	63.6	5.4	22.0
	K <sub>2</sub> O	74.4	101.0	175.3	57.8	113.4	171.2	83.5	124.4	207.8	41.3	12.2	22.9	-22.3	12.3	-2.4	44.5	9.7	21.4
	Total	518.4	736.8	1255.1	448.3	848.2	1296.5	627.3	910.7	1538.0	10.4	13.1	12.0	-13.3	15.1	3.3	39.9	7.4	18.6
Arunachal Pradesh	N	0.120	0.100	0.220	0.070	0.030	0.100	0.040	0.100	0.140	140.0	11.1	57.1	-41.7	-70.0	-54.5	-42.9	233.3	40.0
	P <sub>2</sub> O <sub>5</sub>	0.040	0.020	0.060	0.050	0.040	0.090	0.020	0.050	0.070	33.3	0.0	20.0	25.0	100.0	50.0	-60.0	25.0	-22.2
	K <sub>2</sub> O	0.040	0.010	0.050	0.020	0.030	0.050	0.020	0.010	0.030	100.0	0.0	66.7	-50.0	200.0	0.0	0.0	-66.7	-40.0
	Total	0.200	0.130	0.330	0.140	0.100	0.240	0.080	0.160	0.240	100.0	8.3	50.0	-30.0	-23.1	-27.3	-42.9	60.0	0.0
Assam	N	5.1	3.6	8.7	5.6	6.7	12.3	6.90	7.20	14.10	-1.9	-12.2	-6.5	9.8	86.1	41.4	23.2	7.5	14.6
	P <sub>2</sub> O <sub>5</sub>	1.8	1.4	3.2	2.0	3.8	5.8	2.80	3.70	6.50	-25.0	16.7	-11.1	11.1	171.4	81.2	40.0	-2.6	12.1
	K <sub>2</sub> O	2.5	2.4	4.9	2.7	3.0	5.7	2.50	3.20	5.70	19.0	41.2	28.9	8.0	25.0	16.3	-7.4	6.7	0.0
	Total	9.4	7.4	16.8	10.3	13.5	23.8	12.20	14.10	26.30	-3.1	5.7	0.6	9.6	82.4	41.7	18.4	4.4	10.5
Bihar	N	158.8	202.1	360.9	124.0	235.9	359.9	195.4	246.5	441.9	-0.3	5.2	2.7	-21.9	16.7	-0.3	57.6	4.5	22.1
	P <sub>2</sub> O <sub>5</sub>	37.6	78.4	116.0	11.3	76.0	87.3	52.2	85.0	137.9	0.3	16.3	10.6	-69.9	-3.1	-24.7	368.1	11.8	58.0
	K <sub>2</sub> O	15.7	34.9	50.6	5.4	33.3	38.7	23.2	32.0	55.2	6.8	14.4	11.9	-65.6	-4.6	-23.5	329.6	-3.9	42.1
	Total	212.1	315.4	527.5	140.7	345.2	485.9	271.5	363.5	635.0	0.3	8.8	5.2	-33.7	9.4	-7.9	93.0	5.3	30.1
Manipur	N	4.18	0.15	4.33	4.52	0.16	4.68	4.77	1.22	5.99	14.5	-21.1	12.8	8.1	6.7	8.1	5.5	662.5	28.6
	P <sub>2</sub> O <sub>5</sub>	1.03	0.11	1.14	1.30	0.21	1.51	1.72	0.36	2.08	43.1	10.0	39.0	26.2	90.9	32.5	32.3	71.4	37.7
	K <sub>2</sub> O	0.15	0.04	0.19	0.11	0.03	0.14	0.16	0.11	0.27	66.7	0.0	46.2	-26.7	-25.0	-26.3	45.5	266.7	92.3
	Total	5.36	0.30	5.66	5.93	0.40	6.33	6.65	1.69	8.34	20.2	-9.1	18.2	10.6	33.3	11.8	12.1	322.5	31.1
Meghalaya	N	0.84	1.02	1.86	0.90	1.06	1.96	0.54	1.20	1.74	31.2	9.7	18.5	7.1	3.9	5.4	-40.0	13.2	-11.5
	P <sub>2</sub> O <sub>5</sub>	0.56	0.84	1.40	0.60	0.88	1.48	0.34	1.02	1.36	19.1	7.7	12.0	7.1	4.8	5.7	-43.3	15.9	8.1
	K <sub>2</sub> O	0.10	0.12	0.22	0.11	0.13	0.24	0.05	0.25	0.30	11.1	50.0	29.4	10.0	8.3	9.1	-54.5	92.3	25.0
	Total	1.50	1.98	3.48	1.61	2.07	3.68	0.93	2.47	3.40	25.0	10.6	16.4	7.3	4.5	5.7	-42.2	19.3	-7.0
Mizoram	N	0.030	0.020	0.050	0.070	0.050	0.120	0.050	0.040	0.090	-25.0	233.3	8.7	133.3	150.0	140.0	-28.6	-20.0	-25.0
	P <sub>2</sub> O <sub>5</sub>	0.050	0.020	0.070	0.070	0.040	0.110	0.040	0.040	0.080	108.3	53.8	89.2	40.0	100.0	57.1	-42.9	0.0	-27.3
	K <sub>2</sub> O	0.020	0.010	0.030	0.020	0.003	0.023	0.010	0.020	0.030	100.0	400.0	150.0	0.0	-70.0	-23.3	-50.0	566.7	30.4
	Total	0.10	0.05	0.15	0.16	0.09	0.253	0.090	0.003	0.093	35.1	138.1	57.9	60.0	86.0	68.7	-43.8	-96.8	-63.3
Nagaland	N	0.150	0.030	0.180	0.050	0.020	0.070	0.210	0.210	0.420	36.4	0.0	28.6	-66.7	-33.3	-61.1	320.0	950.0	500.0
	P <sub>2</sub> O <sub>5</sub>	0.130	0.020	0.150	0.060	0.020	0.080	0.190	0.190	0.380	44.4	0.0	36.4	-53.8	0.0	-46.7	216.7	860.0	375.0
	K <sub>2</sub> O	0.020	0.002	0.022	0.003	—	0.003	0.090	0.003	0.093	233.3	ERR	266.7	-85.0	-100.0	-86.4	2900.0	ERR	3000.0
	Total	0.300	0.052	0.352	0.113	0.040	0.153	0.490	0.403	0.893	45.6	4.0	37.5	-62.3	-23.1	-56.5	333.6	907.5	483.0

Orissa	N	44.8	45.8	90.6	43.0	44.9	87.9	75.0	50.0	125.0	-1.8	10.4	4.0	-4.0	-2.0	-3.0	74.4	11.4	42.0
	P <sub>2</sub> O <sub>5</sub>	18.0	19.5	37.5	19.0	20.1	39.1	18.0	15.0	33.0	5.3	18.9	11.9	5.6	3.1	4.3	-5.3	-25.4	-15.0
	K <sub>2</sub> O	11.0	12.7	23.7	11.4	13.1	24.5	10.0	8.0	18.0	13.4	24.5	19.1	3.6	3.1	3.4	-12.3	-38.9	-26.5
	Total	73.8	78.0	151.8	73.4	78.1	151.5	103.0	73.0	176.0	1.9	14.8	8.0	-0.5	0.1	-0.2	40.3	-6.5	16.5
Sikkim	N	0.48	0.26	0.74	0.48	0.30	0.78	0.70	0.53	1.23	14.3	23.8	17.5	0.0	15.4	5.4	45.8	76.7	57.0
	P <sub>2</sub> O <sub>5</sub>	0.29	0.29	0.58	0.30	0.29	0.59	0.37	0.36	0.73	16.0	7.4	11.5	3.4	0.0	1.7	23.3	24.1	23.0
	K <sub>2</sub> O	0.09	0.02	0.11	0.09	0.02	0.11	0.03	0.07	0.10	125.0	-5.0	81.7	0.0	5.3	0.0	-66.7	250.0	-9.0
	Total	0.86	0.57	1.43	0.87	0.61	1.48	1.10	0.96	2.06	21.1	13.8	18.1	1.2	7.2	3.6	26.4	57.4	39.0
Tripura	N	2.37	2.18	4.55	2.10	2.30	4.40	1.84	4.16	6.00	117.4	-8.0	31.5	-11.4	5.5	-3.3	-12.4	80.9	36.4
	P <sub>2</sub> O <sub>5</sub>	0.64	0.68	1.30	0.90	1.60	2.50	1.01	1.44	2.45	146.2	0.0	41.3	40.6	142.4	92.3	12.2	-10.0	-2.0
	K <sub>2</sub> O	0.43	0.56	0.99	0.50	0.70	1.20	0.44	0.72	1.16	152.9	1.8	37.5	16.3	25.0	21.2	-12.0	2.9	-3.0
	Total	3.44	3.40	6.84	3.50	4.60	8.10	3.29	6.32	9.61	126.3	-5.0	34.1	1.7	35.3	18.4	-6.0	37.4	18.0
West	N	114.1	189.6	304.0	118.0	229.6	347.6	122.5	256.0	378.5	18.4	18.3	18.3	3.1	21.1	14.3	3.8	11.5	8.9
	P <sub>2</sub> O <sub>5</sub>	43.30	70.50	113.8	41.20	87.70	128.9	49.70	96.80	145.7	20.3	25.2	23.8	-4.8	24.4	13.3	20.6	9.5	13.0
	K <sub>2</sub> O	38.50	42.90	81.4	29.70	55.00	84.7	39.60	68.60	108.2	89.7	9.2	36.6	-22.9	28.2	4.1	33.3	24.7	27.0
	Total	196.2	303.0	499.2	188.9	372.3	561.2	211.8	420.6	632.4	28.3	18.4	22.1	-3.7	22.9	12.4	12.1	13.0	12.0
Tea Board (N.E)	N	8.3	14.4	22.7	13.4	17.3	30.7	7.7	12.3	19.9	7.8	-0.7	2.3	61.4	20.1	35.2	-42.8	-29.2	-35.1
	P <sub>2</sub> O <sub>5</sub>	1.0	4.8	5.8	1.6	5.8	7.4	1.1	3.9	5.0	-37.5	166.7	70.6	60.0	20.8	27.6	-30.6	-32.9	-32.4
	K <sub>2</sub> O	5.8	7.3	13.1	7.7	8.1	15.8	7.4	11.4	18.8	7.4	-3.9	0.8	32.8	11.0	20.6	-4.3	40.6	18.7
	Total	15.1	26.5	41.6	22.7	31.2	53.9	16.2	27.5	43.7	2.7	10.9	7.8	50.3	17.7	29.6	-28.9	-11.8	-19.0
North	N	1067.9	1443.5	2511.4	937.8	1340.2	2278.0	1280.8	1567.0	2847.8	-0.3	3.7	2.0	-12.2	-7.2	-9.3	36.6	16.9	25.0
	P <sub>2</sub> O <sub>5</sub>	152.5	575.1	727.6	139.6	564.4	704.0	214.1	662.1	876.2	-8.9	11.8	6.7	-8.4	-1.9	-3.2	53.4	17.3	24.5
	K <sub>2</sub> O	39.7	92.0	131.2	28.9	74.3	103.2	37.9	95.4	133.3	-2.6	43.1	25.5	-26.4	-19.2	-21.4	31.4	28.4	29.2
	Total	1259.6	2110.6	3370.2	1106.3	1978.9	3085.2	1532.8	2324.5	3857.3	-1.5	7.1	3.7	-12.2	-6.2	-8.5	38.6	17.5	25.0
Haryana	N	126.9	200.2	327.1	111.9	188.8	300.7	143.9	239.1	383.0	2.8	15.7	10.4	-11.8	-5.7	-8.1	28.6	26.6	27.4
	P <sub>2</sub> O <sub>5</sub>	15.5	66.5	82.0	18.6	69.8	88.4	33.5	87.8	121.3	9.2	20.0	17.8	20.0	5.0	7.8	80.1	25.8	37.2
	K <sub>2</sub> O	1.7	4.1	5.8	1.9	3.0	4.9	2.3	3.4	5.7	-15.0	-2.4	-6.5	11.8	-26.8	-15.5	21.1	13.3	16.3
	Total	144.1	270.8	414.9	132.4	261.6	394.0	179.7	330.3	510.0	3.2	16.4	11.5	-8.1	-3.4	-5.0	35.7	26.3	29.4
Himachal Pradesh	N	10.8	8.5	19.3	10.9	7.2	18.1	12.4	8.2	20.6	9.1	7.6	8.4	0.9	-15.3	-6.2	13.8	13.9	13.8
	P <sub>2</sub> O <sub>5</sub>	0.7	3.3	4.0	0.8	3.3	4.1	0.7	4.2	4.9	0.0	22.2	17.6	14.3	0.0	2.5	-12.5	27.3	19.5
	K <sub>2</sub> O	0.4	2.4	2.8	0.5	2.5	3.0	0.4	3.1	3.5	0.0	14.3	12.0	25.0	4.2	7.1	-20.0	24.0	16.7
	Total	11.9	14.2	26.1	12.2	13.0	25.2	13.5	15.5	29.0	8.2	11.8	10.1	2.5	-8.5	-3.4	10.7	19.2	15.1
Jammu & Kashmir	N	16.8	5.8	22.6	17.6	10.7	28.3	27.6	11.9	39.5	-1.2	-31.0	-11.0	4.8	84.5	25.2	56.8	11.2	39.6
	P <sub>2</sub> O <sub>5</sub>	3.7	2.8	6.5	4.3	4.0	8.3	7.1	4.7	11.8	-14.0	-20.0	-16.7	16.2	42.9	27.7	65.1	17.5	42.2
	K <sub>2</sub> O	0.7	0.5	1.2	1.0	1.2	2.2	1.7	1.3	3.0	-30.0	-73.7	-58.6	42.9	140.0	83.3	70.0	8.3	36.4
	Total	21.2	9.1	30.3	22.9	15.9	38.8	36.4	17.9	54.3	-4.9	-34.1	-16.1	8.0	74.7	28.1	59.0	12.6	39.9
Punjab	N	354.6	448.4	803.0	349.3	441.8	791.1	348.7	446.8	795.5	0.8	3.0	2.0	-1.5	-1.5	-1.5	-0.2	1.1	0.6
	P <sub>2</sub> O <sub>5</sub>	63.9	225.8	289.5	63.9	233.3	297.2	68.4	233.4	301.8	0.0	1.0	0.8	0.0	3.4	2.7	7.0	0.0	1.5
	K <sub>2</sub> O	9.6	13.5	23.1	9.5	13.7	23.2	7.5	12.1	19.6	-2.0	-2.9	-2.5	-1.0	1.5	0.4	-21.1	-11.7	-15.5
	Total	428.1	687.5	1115.6	422.7	688.8	1111.5	424.6	692.3	1116.9	0.6	2.2	1.6	-1.3	0.2	-0.4	0.4	0.5	0.5

(Continued)

Table 14—Seasonwise consumption of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and total by states and their percentage increase 1986-87 to 1988-89 (April-March) (Concluded)

Zone/State	Nutrient	Consumption ('000 tonnes)									±% over the previous year								
		1986-87			1987-88@			1988-89@			1986-87			1987-88@			1988-89@		
		Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi+	Total	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi+	Total
Uttar Pradesh	N	555.7	774.1	1329.8	444.8	685.2	1130.0	745.7	854.8	1600.5	-1.8	1.6	0.	-20.0	-11.5	-15.0	67.6	24.8	41.6
	P <sub>2</sub> O <sub>5</sub>	68.3	275.6	343.9	51.6	252.6	304.2	104.1	330.1	434.2	-18.7	20.9	10.2	-24.5	-8.3	-11.5	101.7	30.7	42.7
	K <sub>2</sub> O	26.7	71.3	98.0	15.9	53.8	69.7	26.0	75.2	101.2	-1.1	69.8	42.0	-40.4	-24.5	-28.9	63.5	39.8	45.2
	Total	650.7	1121.0	1771.7	512.3	991.6	1503.9	875.8	1260.1	2135.9	-3.9	8.6	3.7	-21.3	-11.5	-15.1	71.0	27.1	42.0
Chandigarh	N	0.41	0.49	0.90	0.29	0.80	1.09	0.39	0.82	1.21	24.2	-9.3	3.4	-29.3	63.3	21.1	34.5	2.5	11.0
	P <sub>2</sub> O <sub>5</sub>	0.05	0.12	0.17	0.17	0.19	0.36	0.04	0.15	0.19	25.0	-14.3	-5.6	240.9	58.3	111.8	-76.5	-21.1	-47.2
	K <sub>2</sub> O	0.004	0.004	0.008	0.040	0.020	0.060	0.004	0.024	0.028	0.0	-80.0	-66.7	900.0	400.0	650.0	-90.0	20.0	-53.3
	Total	0.46	0.61	1.08	0.50	1.01	1.51	0.43	1.00	1.43	24.1	-12.3	0.4	7.8	64.5	40.1	-13.2	-1.6	-5.4
Delhi	N	2.69	6.01	8.70	3.00	5.70	8.70	2.09	5.42	7.51	25.1	19.0	20.8	11.5	-5.2	0.0	-30.3	-4.9	-13.7
	P <sub>2</sub> O <sub>5</sub>	0.31	1.21	1.52	0.22	1.22	1.44	0.25	1.72	1.97	14.8	-13.6	-9.0	-29.0	0.8	-5.3	13.6	41.0	36.8
	K <sub>2</sub> O	0.10	0.18	0.28	0.03	0.08	0.11	0.04	0.25	0.29	66.7	6.0	16.7	-70.0	-55.6	-60.7	33.3	212.5	168.6
	Total	3.10	7.40	10.50	3.25	7.00	10.25	2.38	7.39	9.77	25.0	11.6	15.3	4.8	-5.4	-2.4	-26.8	5.6	-4.7
South	N	647.9	691.5	1339.1	630.6	722.5	1353.1	1006.1	833.5	1839.6	-6.7	6.3	-0.4	-2.6	4.5	1.0	59.5	15.4	36.0
	P <sub>2</sub> O <sub>5</sub>	309.5	275.3	584.8	337.0	298.4	635.4	459.1	315.4	774.5	-12.7	7.7	-4.1	8.9	8.4	8.7	36.2	5.7	21.9
	K <sub>2</sub> O	189.2	196.5	385.7	212.7	201.7	414.4	291.1	235.6	526.7	-11.6	8.9	-2.2	12.4	2.6	7.4	36.9	16.8	27.1
	Total	1146.3	1163.3	2309.6	1180.3	1222.6	2402.9	1756.3	1384.5	3140.8	-9.2	7.1	-1.7	3.0	5.1	4.0	48.8	13.2	30.7
Andhra Pradesh	N	303.0	280.1	583.1	302.7	317.1	619.8	458.0	458.5	916.5	-5.8	13.2	2.5	-0.1	13.2	6.3	51.3	44.6	47.9
	P <sub>2</sub> O <sub>5</sub>	130.2	111.2	241.4	143.8	126.5	270.3	196.6	147.5	344.1	-12.9	19.3	-0.5	10.4	13.8	12.0	36.7	16.6	27.3
	K <sub>2</sub> O	35.3	41.7	77.0	39.8	36.8	76.6	47.1	59.3	106.4	-11.5	13.9	0.7	12.7	-11.8	-0.5	18.3	61.1	38.9
	Total	468.5	433.0	901.5	486.3	480.4	966.7	701.7	665.3	1367.0	-8.3	14.8	1.5	3.8	10.9	7.2	44.3	38.5	41.4
Karnataka	N	179.1	122.5	301.6	169.9	116.5	286.4	288.5	149.5	438.0	-0.2	5.4	2.0	-5.1	-4.9	-5.0	69.8	28.3	52.9
	P <sub>2</sub> O <sub>5</sub>	99.4	61.8	161.2	106.5	55.4	161.9	153.2	77.0	230.2	-9.4	12.8	-2.0	7.1	-10.4	0.4	43.8	39.0	42.2
	K <sub>2</sub> O	61.4	41.6	103.0	72.6	37.5	110.1	80.9	50.7	131.6	-1.4	25.3	7.9	18.2	-9.9	6.9	11.4	35.2	19.5
	Total	339.9	225.9	565.8	349.0	209.4	558.4	522.6	277.2	799.8	-3.3	10.6	1.8	2.7	-7.3	-1.3	49.7	32.4	43.2
Kerala	N	33.7	27.1	60.8	36.7	34.1	70.8	47.8	30.0	77.8	3.4	1.5	2.5	8.9	25.8	16.4	30.2	-12.0	9.9
	P <sub>2</sub> O <sub>5</sub>	20.5	15.4	35.9	26.8	22.5	49.3	29.5	20.0	49.5	4.1	4.8	4.4	30.7	46.1	37.3	10.1	-11.1	0.4
	K <sub>2</sub> O	31.6	23.1	54.7	36.5	25.9	62.4	54.0	32.0	86.0	10.9	20.9	14.9	15.5	12.1	14.1	47.9	23.6	37.8
	Total	85.8	65.6	151.4	100.0	82.5	182.5	131.3	82.0	213.3	6.2	1.4	7.1	16.9	25.8	20.5	31.3	-0.6	16.9
Tamil Nadu	N	127.5	257.3	384.8	117.3	250.4	367.7	207.4	190.0	397.4	-7.1	6.5	1.6	-8.0	-2.7	-4.4	76.8	-24.1	8.1
	P <sub>2</sub> O <sub>5</sub>	58.1	85.2	143.3	58.6	92.2	150.8	78.3	69.0	147.3	-7.3	3.0	-1.4	0.9	8.2	5.2	33.6	-25.2	-2.3
	K <sub>2</sub> O	58.7	87.7	146.4	61.6	98.8	160.4	106.8	91.0	197.8	-12.5	14.0	1.7	4.9	12.7	9.6	73.4	-7.9	23.3
	Total	244.3	430.2	674.5	237.5	441.4	678.9	392.5	350.0	742.5	-8.5	7.2	0.9	-2.8	2.6	0.7	65.3	-20.7	9.4
Pondichery	N	4.23	4.48	8.71	3.91	4.22	8.13	4.26	5.37	9.63	24.8	-2.6	9.0	-7.6	-5.8	-6.7	9.0	27.3	18.5
	P <sub>2</sub> O <sub>5</sub>	1.30	1.68	2.98	1.21	1.75	2.96	1.43	1.80	3.23	12.1	5.0	8.0	-6.9	4.2	-0.7	18.2	2.9	9.1
	K <sub>2</sub> O	2.19	2.38	4.57	1.96	2.44	4.40	2.29	2.52	4.81	17.7	8.2	12.6	-10.5	2.5	-3.7	16.8	3.3	9.3
	Total	7.72	8.54	16.26	7.08	8.41	15.49	7.98	9.69	17.67	20.4	1.7	9.8	-8.3	-1.5	-4.7	12.7	15.2	14.1

Andaman & Nicobar Islands	N	0.050	0.030	0.080	0.090	0.150	0.240	0.110	0.140	0.250	66.7	200.0	100.0	80.0	400.0	200.0	22.2	-6.7	4.0
	P <sub>2</sub> O <sub>5</sub>	0.030	0.010	0.040	0.070	0.100	0.170	0.070	0.120	0.190	50.0	0.0	33.3	133.3	900.0	325.0	0.0	20.0	11.0
	K <sub>2</sub> O	0.002	0.020	0.022	0.230	0.250	0.480	0.030	0.080	0.110	-50.0	100.0	-26.7	11400.0	1150.0	2081.8	-87.0	-68.0	-77.0
	Total	0.082	0.060	0.142	0.390	0.500	0.890	0.210	0.340	0.550	17.1	100.0	42.0	375.6	733.3	526.8	-46.2	-32.0	-38.0
West Bengal	N	648.6	474.8	1123.4	652.6	534.1	1186.7	831.3	680.7	1512.0	4.3	-4.1	0.6	0.6	12.5	5.6	27.4	27.4	27.4
	P <sub>2</sub> O <sub>5</sub>	278.1	234.1	512.2	293.2	255.6	548.7	350.2	363.3	713.5	6.6	10.9	8.5	5.4	9.2	7.1	19.5	42.2	30.0
	K <sub>2</sub> O	106.3	61.5	167.8	103.8	72.3	175.8	118.6	87.1	205.7	-4.5	12.0	0.9	-2.4	17.1	4.8	14.3	21.0	17.0
	Total	1033.0	770.3	1803.3	1049.6	861.7	1911.3	1300.2	1131.1	2431.3	3.9	1.2	2.8	1.6	11.9	6.0	23.9	31.3	27.2
Gujarat	N	144.1	111.4	255.5	139.8	150.3	290.1	207.0	191.3	398.3	-2.2	-19.9	-10.8	-3.0	34.9	13.5	48.1	27.3	37.3
	P <sub>2</sub> O <sub>5</sub>	53.7	58.1	111.8	66.5	53.8	120.3	61.3	88.8	150.1	-10.8	18.3	2.3	23.8	-7.4	7.6	-7.8	65.1	24.0
	K <sub>2</sub> O	18.0	17.0	35.0	16.8	15.1	31.9	18.0	22.6	40.6	7.8	93.2	37.3	-6.7	-11.2	-8.9	7.1	49.7	27.3
	Total	215.8	186.5	402.3	223.1	219.2	442.3	286.3	302.7	589.0	-3.8	-5.3	-4.5	3.4	17.5	9.9	28.3	38.1	33.3
Madhya Pradesh	N	151.7	138.0	289.4	153.1	140.1	293.2	201.2	185.4	386.6	15.5	10.6	13.1	1.1	1.5	1.3	31.4	32.3	31.9
	P <sub>2</sub> O <sub>5</sub>	88.4	85.4	173.8	89.5	97.0	186.5	120.7	137.7	258.4	19.0	6.1	12.3	1.2	13.6	7.3	34.9	42.0	38.0
	K <sub>2</sub> O	18.1	12.0	30.1	16.4	12.0	28.4	23.7	15.4	39.1	15.3	12.1	14.0	-9.4	0.0	-5.6	44.5	28.3	37.0
	Total	257.9	235.4	493.3	259.0	249.1	508.1	345.6	338.5	684.1	16.6	9.0	12.9	0.4	5.8	3.0	33.4	35.9	34.0
Maharashtra	N	293.0	105.0	398.0	309.3	141.9	451.2	349.2	166.0	515.2	1.7	-13.9	-2.9	5.6	35.1	13.4	12.9	17.0	14.0
	P <sub>2</sub> O <sub>5</sub>	116.0	44.0	160.0	115.5	62.6	178.1	139.4	76.0	215.4	7.4	4.8	6.7	-0.4	42.3	11.3	20.7	21.4	20.0
	K <sub>2</sub> O	68.0	30.0	98.0	68.6	42.4	111.0	74.2	45.5	119.7	-10.5	-6.3	-9.3	0.9	41.3	13.3	8.2	7.3	7.0
	Total	477.0	179.0	656.0	493.4	246.9	740.3	562.8	287.5	850.3	1.1	-8.7	-1.8	3.4	37.9	12.9	14.1	16.4	14.0
Rajasthan	N	58.7	119.6	178.3	48.8	100.8	149.6	72.0	137.0	209.0	11.6	10.5	10.9	-16.9	-15.7	-16.1	47.5	35.9	39.0
	P <sub>2</sub> O <sub>5</sub>	19.0	46.0	65.0	20.6	41.4	62.0	27.5	60.0	87.5	13.8	18.6	17.1	8.4	-10.0	-4.6	33.5	44.9	41.0
	K <sub>2</sub> O	1.5	2.1	3.6	1.1	2.0	3.1	1.5	3.0	4.5	0.0	-32.3	-21.7	-26.7	-4.8	-13.9	36.4	50.0	45.0
	Total	79.2	167.7	246.9	70.5	144.2	214.7	101.0	200.0	301.0	11.9	11.7	11.8	-11.0	-14.0	-13.0	43.3	38.7	40.0
Goa, Daman & Diu	N	1.19	0.77	1.96	1.50	0.90	2.40	1.67	0.92	2.59	-50.4	-18.1	-41.3	26.1	16.9	22.4	11.3	2.2	7.0
	P <sub>2</sub> O <sub>5</sub>	0.81	0.55	1.36	0.90	0.70	1.60	1.14	0.74	1.88	-47.7	-9.8	-37.0	11.1	27.3	17.6	26.7	5.7	17.0
	K <sub>2</sub> O	0.72	0.35	1.07	0.90	0.50	1.40	1.20	0.59	1.79	-47.4	-20.5	-40.9	25.0	42.9	30.8	33.3	18.0	27.0
	Total	2.72	1.67	4.39	3.30	2.10	5.40	4.01	2.25	6.26	-48.9	-16.1	-39.9	21.3	25.7	23.0	21.5	7.1	15.0
Dadra & Nagar Haveli	N	0.180	0.040	0.200	0.100	0.100	0.200	0.260	0.070	0.330	-10.0	100.0	0.0	-44.4	150.0	-9.1	160.0	-30.0	65.0
	P <sub>2</sub> O <sub>5</sub>	0.180	0.020	0.200	0.180	0.050	0.230	0.190	0.050	0.240	63.6	-50.0	33.3	0.0	150.0	15.0	5.6	0.0	4.0
	K <sub>2</sub> O	0.004	0.001	0.005	0.010	0.010	0.020	0.010	0.010	0.020	-60.0	-97.7	-88.8	150.0	1328.6	325.5	0.0	0.0	0.0
	Total	0.364	0.061	0.425	0.290	0.160	0.450	0.460	0.130	0.590	13.7	-32.6	3.6	-20.3	163.6	6.0	58.6	-18.8	31.0
All India	N	2703.6	3069.1	5772.7	2533.2	3135.1	5668.3	3533.8	3660.6	7194.4	-0.1	3.9	2.0	-6.3	2.2	-1.8	39.5	16.8	26.0
	P <sub>2</sub> O <sub>5</sub>	844.5	1261.1	2105.6	848.1	1314.9	2163.0	1151.6	1547.9	2699.5	-3.9	12.0	5.0	0.4	4.2	2.7	33.8	17.7	24.0
	K <sub>2</sub> O	409.1	451.1	860.2	403.1	461.4	864.5	531.1	542.5	1073.6	-2.2	15.7	6.5	-1.5	2.3	0.5	31.8	17.6	24.0
	Total	3957.2	4781.3	8738.5	3784.4	4911.4	8695.8	5216.5	5751.0	10967.5	-1.2	7.0	3.1	-4.4	2.7	-0.5	37.8	17.1	26.0

@ = Provisional      † = Review meetings of the Dept. of Agriculture, Ministry of Agriculture, New Delhi.

Source: Ministry of Agriculture, New Delhi.

Note: Fertiliser consumption by plantation crops in the South Zone is included in the total of respective states.

Table 15—States according to descending order of contribution to total increase in consumption (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O) 1988-89 over 1987-88 and 1987-88 over 1986-87

Ranking in terms of increase in consumption—1988-89 over 1986-87	State	1988-89@ over 1987-88@			Ranking in terms of increase in consumption—1987-88 over 1986-87	State	1987-88@ over 1986-87		
		Increase in absolute terms ('000 MT)	Share in contribution to total increase (%)	Cumulative share (%)			Increase in absolute terms ('000 MT)	Share in contribution to total increase (%)	Cumulative share (%)
1.	Uttar Pradesh	632.0	27.8	27.8	1.	Maharashtra	84.3	26.6	26.6
2.	Andhra Pradesh	400.3	17.6	45.4	2.	Andhra Pradesh	65.2	20.6	47.2
3.	Karnataka	241.4	10.6	56.0	3.	West Bengal	62.0	19.6	66.8
4.	Madhya Pradesh	176.0	7.7	63.7	4.	Gujarat	40.0	12.6	79.4
5.	Bihar	149.1	6.6	70.3	5.	Kerala	31.1	9.8	89.2
6.	Gujarat	146.7	6.4	76.7	6.	Madhya Pradesh	14.5	4.6	93.8
7.	Haryana	116.0	5.1	81.8	7.	Jammu & Kashmir	8.5	2.7	96.5
8.	Maharashtra	110.0	4.8	86.6	8.	Assam	7.0	2.1	98.6
9.	Rajasthan	86.3	3.8	90.4	9.	Tamil Nadu	4.4	1.4	100.0
10.	West Bengal	71.2	3.1	93.5					
11.	Tamil Nadu	63.6	2.8	96.3					
12.	Kerala	30.8	1.4	97.7					
13.	Orissa	24.3	1.1	98.8					
14.	Jammu & Kashmir	15.5	0.7	99.5					
15.	Punjab	5.4	0.2	99.7					
16.	Himachal Pradesh	3.8	0.2	99.9					
17.	Assam	2.4	0.1	100.0					
<b>Sub Total</b>		<b>2275.0</b>					<b>317.0</b>		
<b>Negative growth rate</b>									
					1.	Orissa	0.3	0.1	0.1
					2.	Himachal Pradesh	0.9	0.2	0.3
					3.	Punjab	4.1	1.1	1.4
					4.	Karnataka	7.4	2.0	3.4
					5.	Haryana	20.9	5.6	9.0
					6.	Rajasthan	32.4	8.6	17.6
					7.	Bihar	41.6	11.1	28.7
					8.	Uttar Pradesh	267.8	71.3	100.0
<b>Sub Total</b>							<b>375.4</b>		
<b>All-India net increase@</b>		<b>2271.7<sup>+</sup></b>					<b>- 42.7<sup>+</sup></b>		

\* = Includes small states, UTs/plantations.

@ = Provisional.

Note: For consumption figures, see Table 14.

On account of extremely unfavourable monsoon during 1987-88, only 9 states could survive its wrath in terms of consumption—Maharashtra attaining the highest increase with U.P. at the other end recording the maximum decrease. During 1988-89, U.P. recovered its top position by attaining the highest increase of 632 thousand tonnes among the 17 major states. Likewise, A.P. (400 thousand tonnes) and Karnataka (241 thousand tonnes) achieved record increases, the three taken together accounting for 56 per cent of the total increase. The impact of favourable weather during 1988-89 could be gauged from the fact that the 9 states recording a cumulative increase of 317 thousand tonnes during 1987-88, achieved an increase of 1016 thousand tonnes during 1988-89, accounting for 45 per cent of the total increase. The remaining 8 states, which recorded decrease during 1987-88, took a larger share of increase viz. 55 per cent during 1988-89 (1255 thousand tonnes). Punjab is the only state where consumption has remained virtually stagnant for the last 4

years viz., since 1984-85. Despite preceding 3 years having been particularly unfavourable, Punjab could face the vagaries of Nature only because it has developed over the years a very strong agricultural base through adoption of technology transfer coupled with modifications in the cropping pattern.

Table 16 lists the 17 major states in descending order of their share in total consumption during 1988-89 and 1987-88. As in the past U.P. continued to account for approx. 20 per cent share and occupy the first position. On account of stagnation in consumption in Punjab and sharp increase in A.P., the latter improved its position from 3rd to the second. Similarly, Karnataka, M.P. and Bihar improved their position during the year. On the other hand, Tamil Nadu and West Bengal alongwith Punjab went down rank-wise. The remaining 9 states (excluding U.P. being at the top) maintained the same position as in 1987-88.

## Statewise Comments

### Total Nutrients

#### EAST ZONE

##### 1. Assam

Fertiliser consumption for agricultural use continued to remain relatively at a low level in Assam compared to other major states despite the state having good potential. Entire fertile Brahmaputra valley is inundated almost every year due to floods resulting in extensive damage to crops. Having been persistently confronted with this problem, the State Government urged Assam State Agricultural University to make some location specific research to develop a variety of paddy which is flood resistant, short duration and high yielding. The State Govt. also appointed a Committee for implementation and coordination of National Project on Development of Fertiliser Use in low consumption rainfed areas in Dibrugarh and Lakhimpur districts.

During 1988-89, a nominal increase (2500 tonnes) in consumption of fer-

Table D—Seasonwise Foodgrains Production vis-a-vis Fertiliser Consumption—  
1988-89 and 1987-88

Item	1988-89			1987-88			+ % Increase in 1988-89 over 1987-88
	Target	Achievement	% achievement	Target	Achievement	% achievement	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)=(2)/(5)
<b>i. Foodgrains production</b>							
i. Kharif	92.50	95.00	103%	90.50	73.89	82%	20%
ii. Rabi	74.07	76.68	104%	69.50	64.52	93%	19%
<b>I. Total (i+ii)</b>	<b>166.57</b>	<b>171.68</b>	<b>103%</b>	<b>160.00</b>	<b>138.41</b>	<b>87%</b>	<b>24%</b>
<b>Out of which</b>							
i. Rice	67.95	70.00	103%	64.00	56.43	88%	24%
ii. Wheat	52.32	52.32	100%	50.00	45.10	90%	16%
<b>II. Oil seeds</b>	<b>15.65</b>	<b>15.50</b>	<b>99%</b>	<b>14.00</b>	<b>12.38</b>	<b>88%</b>	<b>25%</b>
<b>III. Fertiliser consumption</b>							
i. Kharif		5.22	—	—	3.78	—	38%
ii. Rabi		5.75	—	—	4.92	—	17%
<b>III Total (i+ii)</b>	<b>10.20</b>	<b>10.97</b>	<b>108%</b>	<b>10.30</b>	<b>8.70</b>	<b>84%</b>	<b>26%</b>

P=Provisional



Table 16 - States according to descending order of share of consumption to all-India consumption 1988-89 and 1987-88

Ranking		States	Share of all-India total (%)	
1987-88@	1988-89@		1988-89@	1987-88@
1.	1.	Uttar Pradesh	19.5	17.3
3.	2.	Andhra Pradesh	12.5	11.1
2.	3.	Punjab	10.2	12.8
4.	4.	Maharashtra	7.8	8.5
7.	5.	Karnataka	7.3	6.4
5.	6.	Tamil Nadu	6.8	7.8
6.	7.	Madhya Pradesh	6.2	5.6
9.	8.	Bihar	5.8	5.6
8.	9.	West Bengal	5.8	6.6
10.	10.	Gujarat	5.4	5.1
11.	11.	Haryana	4.7	4.5
12.	12.	Rajasthan	2.7	2.5
13.	13.	Kerala	1.9	2.1
14.	14.	Orissa	1.6	1.7
15.	15.	Jammu & Kashmir	0.5	0.4
16.	16.	Himachal Pradesh	0.3	0.3
17.	17.	Assam	0.2	0.3

@ = Provisional

Notes: 1. For consumption figures, see Table 14.  
2. Share of all-India consumption relates to ranking of states in individual years.

tiliser nutrients was recorded with the total consumption having gone up to 26,300 tonnes. Seasonwise share in consumption of nutrients changed from 43:57 during 1987-88 to 46:54 during 1988-89. It is interesting to note that the quantum increase in consumption during 1987-88 was the highest (7000 tonnes) as compared that recorded during 1986-87 and 1988-89 over the respective preceding years.

The performance of monsoon was fairly good during 1988-89 season although agricultural operations, particularly for paddy were deferred to some extent during Kharif '88 due to floods in certain areas. During South-West monsoon (June-September) period of 1988, the state received 17 per cent excess rainfall from normal level. Similarly, rainfall during North-East monsoon period (October-December '88) was 47 per cent more than the normal. State Government implemented vigorously various

agricultural schemes, viz., Special Rice Production Programme, Special Foodgrains Production Programme (3 districts), Special Jute Development Programme, National Oilseeds Development Project. A reformed extension scheme with Training and Visit (T&V) approach was also adopted in the state. All these programmes by the State Government and various other extension and promotional work by the Fertiliser Industry helped in raising foodgrains production and fertiliser consumption to the present level.

#### 2. Bihar

Bihar regained the top position in fertiliser use in the East-zone during 1988-89 with total nutrients consumption touching a figure of 0.635 million tonnes (only during 1987-88, it recorded a fall in consumption over 1986-87 level). Compared to previous year, this level of consumption during 1988-89 represents a 30.7 per

cent increase. Seasonwise share in fertiliser consumption was restored to 43:57 during 1988-89 which was violated to 29:71 during the previous year due to steep fall in consumption during Kharif 1987.

The South-West monsoon, which normally arrives by the third week of June, broke a little early this year facilitating large scale sowing of maize and raising of paddy nursery. During June-September '88, Bihar plains received rainfall to the tune of 1184 mm which was 15 per cent more than the normal level. Rainfall in Bihar plateau was 158 mm which was by and large normal. Excess rainfall inundated certain parts of North Bihar but damage to the crops was marginal. During North-East monsoon period (Oct.-Dec. '88), both the regions faced deficiency in rainfall. Nevertheless, this did not affect the agricultural operations in the State as the normal rainfall level during this period is not very high.

The State Government made all out efforts to raise agricultural production in the State. The Special Foodgrains Production Programme launched in 18 districts (200 Blocks) in the State received a boost. Under this programme, emphasis is laid on raising the productivity of rice, wheat, maize and gram crops. Farmers in these blocks were provided with seeds, fertilisers and agricultural implements. Other on-going agricultural programmes, viz., Special Rice Production Programme, National Oilseeds Development Programme and National Pulses Development Programme were in operation in full swing. Short-term loans to the tune of Rs. 17.20 crores on fertilisers were disbursed among institutional agencies during the year 1988-89.

#### 3. Orissa

Having witnessed stagnation in fertiliser consumption growth during both the seasons (Kharif & Rabi) of 1987-88, it recorded 16.2 per cent increase during 1988-89 over the previous year. With total consumption of fertiliser nutrients at 0.176 million tonnes during the year 1988-89, seasonwise share reversed to 59:41 compared to 48:52 during 1987-88 mainly due to Kharif 1988 recording a steep upswing.

The arrival of monsoon was well in time and the pattern of rainfall was favourable especially in the coastal districts. During South-West monsoon period (June-Sept, '88) total rainfall was 1044 mm which was by and large normal. During October-Dec, '88 period, actual rainfall was 59 mm which was 68 per cent lower than the normal. Coupled with this, closure of canals for repairs in Puri and Sambalpur districts brought down the coverage under summer paddy.

Nevertheless, efforts made by the State Govt. and promotional work undertaken by fertiliser manufacturers helped in raising agricultural production and fertiliser consumption in the State. Special Rice Production Programme was implemented in 63 Blocks. In addition to these, Special Foodgrains Production Programme (5 districts) and National Oilseeds Development Programme were adopted in the State. Under these programmes, farmers were provided seeds, fertilisers, improved implements, plant protection equipments etc. Besides these measures, State Govt. disbursed short-term loan worth Rs. 7.90 crores among the institutional agencies for distribution of fertilisers.

#### 4. West Bengal

The State continued to record positive growth rate in fertiliser consumption successively for the last couple of years in both Kharif and Rabi seasons with the exception of Kharif 1987 when it marginally declined over Kharif '86. Consumption of total fertiliser nutrients was of the order of 0.632 million tonnes during 1988-89 registering a growth rate of 12.7 per cent over the previous year. As bulk of the consumption takes place during Rabi season, Kharif: Rabi share stood at 33:67 during 1988-89 with minor variations in previous years.

During June-Sept, '88, Sub-Himalayan West Bengal Region received rainfall to the tune of 94 mm and Gangetic West Bengal Region 1232 mm recording 9 per cent and 13 per cent excess over normal levels respectively. Due to heavy rainfall in July/Aug, '88, river water inundated crops partly in North Bengal

Table 17 - Forms in which fertilisers are despatched  
1987-88 and 1988-89 (April-March)

Fertilisers	Grade	('000 tonnes)	
		Despatches (Pool + non-Pool)	
		1987-88	1988-89 <sup>@</sup>
<b>I. Straight Nitrogenous</b>			
1. Ammonium sulphate	20.6% N	541.8	619.5
2. Urea	46% N	10211.5	12565.1
3. Calcium ammonium nitrate	25% N	436.9	485.6
4. Ammonium chloride	25% N	100.0	99.1
<b>I Total N</b>		<b>4943.1</b> (86.9)	<b>6053.7</b> (84.9)
<b>II. Straight Phosphatic</b>			
1. Single superphosphate	16% P <sub>2</sub> O <sub>5</sub>	2351.3	2929.5
2. Triple superphosphate	46% P <sub>2</sub> O <sub>5</sub>	0.5	—
<b>II Total P<sub>2</sub>O<sub>5</sub></b>		<b>376.4</b> (21.2)	<b>468.7</b> (18.4)
<b>III. Straight Potassic</b>			
1. Muriate of potash	60% K <sub>2</sub> O	1452.4	1694.4
2. Sulphate of potash	50% K <sub>2</sub> O	14.3	17.8
<b>III Total K<sub>2</sub>O</b>		<b>661.0*</b> (75.2)	<b>730.2*</b> (71.2)
<b>IV. NP NPK Fertilisers</b>			
1. Ammonium phosphate sulphate	16-20-0	64.1	88.3
	20-20-0	512.2	581.5
2. Diammonium phosphate	18-46-0	1875.9	3149.0
3. Urea ammonium phosphate	28-28-0	258.1	328.5
	14-35-14	10.0	6.3
4. Nitrophosphate	15-15-15	327.6	370.1
	20.7-20.7-0	289.7	307.0
5. Other NP & NPK fertilisers	17-17-17	330.9	620.0
	19-19-19	142.4	166.8
	14-28-14	5.1	3.4
	10-26-26	212.4	236.6
	12-32-16	178.3	248.6
<b>IV. Total</b>	<b>N</b>	<b>747.1</b>	<b>1074.1</b>
	<b>(through NP NPK fertilisers)</b>	<b>(13.1)</b>	<b>(15.1)</b>
	<b>P<sub>2</sub>O<sub>5</sub></b>	<b>1401.4</b>	<b>2074.9</b>
		<b>(78.8)</b>	<b>(81.6)</b>
	<b>K<sub>2</sub>O*</b>	<b>213.3</b>	<b>295.3</b>
		<b>(24.8)</b>	<b>(28.8)</b>
<b>Material Total</b>		<b>19315.4</b>	<b>24547.1</b>
<b>Grand Total</b>	<b>Nutrient</b>	<b>N</b>	<b>5690.2</b>
<b>(I+II+III+IV)</b>			<b>(100.0)</b>
		<b>P<sub>2</sub>O<sub>5</sub></b>	<b>1777.8</b>
			<b>(100.0)</b>
		<b>K<sub>2</sub>O</b>	<b>879.3</b>
			<b>(100.0)</b>

\* = Direct despatches to states.

( ) = Percentage share of total nutrient.

\* = K<sub>2</sub>O component in NPKs is through MOP which is totally imported.

@ = Provisional.

**Table 18—Zonewise Consumption, Production and Surplus Deficit of N and P<sub>2</sub>O<sub>5</sub>—1987-88 and 1988-89**

(Unit: '000 tonnes)

Zone	N		P <sub>2</sub> O <sub>5</sub>	
	1 87-88	1988-89	1987-88	1988-89
<b>East</b>				
1. Consumption	850	995	275	335
2. Production	668	609	286	405
3. Surplus (+)/Deficit (-)	-182	-386	+11	+70
<b>North</b>				
1. Consumption	2278	2848	704	876
2. Production	1115	1584	155	180
3. Surplus (+)/Deficit (-)	-1163	-1264	-549	-696
<b>South</b>				
1. Consumption	1353	1840	635	775
2. Production	846	1189	446	705
3. Surplus (+)/Deficit (-)	-507	-651	-189	-70
<b>West</b>				
1. Consumption	1187	1512	549	713
2. Production	2837	3330	778	963
3. Surplus (+)/Deficit (-)	+1650	+1818	+229	+250
<b>All India</b>				
1. Consumption	5668	7195	2163	2699
2. Production	5466	6712	1665	2253
3. Surplus (+)/Deficit (-)	-202	-483	-498	-446

Note: (1) Consumption figures are provisional.  
(2) Entire requirement of K<sub>2</sub>O is met through imports.

**Table 19—Cropwise achievement and targets of high yielding varieties (HYVs) coverage—1983-84, 1985-86 and 1986-87 to 1989-90**

('000 hectare)

Crop	1983-84	1985-86	1986-87	1987-88	1988-89		1989-90
					Target	Anticipated achievement	
Paddy	21740	23473	24026	22250	27300	27201	28642
Wheat	19390	19075	19192	19692	21015	20674	21326
Maize	1910	1798	2190	2146	2409	2184	2539
Jowar	5280	6082	5500	6060	6986	6670	7805
Bajra	5420	4992	5271	3955	6394	5840	6678
<b>Total</b>	<b>53740</b>	<b>55420</b>	<b>56179</b>	<b>54103</b>	<b>64254</b>	<b>62569</b>	<b>66790</b>

Source: Directorate of Economics and Statistics, Ministry of Agriculture, New Delhi.

districts and partly in the districts of Nadia and Murshidabad. The estimated area of crop damage was about 65,000 hectares of winter paddy, 50,000 hectares of autumn paddy and 3,000 hectares of pulses. The area under pulses dropped during both Kharif and Rabi seasons of 1988-89 which was replaced by oilseeds. North-East monsoon was deficient in both the Regions.

With a view to make fertilisers available in wider areas, nearly 375 additional fertiliser sale points were opened in the State, total number rising to 23,431. During the year, short-term loans to the tune of Rs. 26.10 crores were disbursed among institutional agencies by the State Govt. To boost fertiliser consumption in inaccessible areas, a number transport subsidy schemes were adopted by the State Govt. for:

- (i) carrying fertilisers to inaccessible areas of Sunderbans and Darjeeling at the rate of Re. 1 per tonne per KM.
- (ii) carrying DAP from South Bengal to North Bengal districts by road from Calcutta and Haldia docks at the rate of Rs. 17 per tonne except Malda district for which the rate was Rs. 10 per tonne.

Besides these, 21 Blocks of Sunderban and Darjeeling districts were provided with:

- (i) Special transport subsidy at the rate of Rs. 17 per tonne for any approved chemical fertiliser in straight form.
- (ii) Additional transport subsidy at the following rates:—
  - (a) per Km by truck at the rate of Re. 0.35 per quintal
  - (b) by landrover/Jeep at the rate of Re. 0.50 per quintal and
  - (c) by pony or headload at the rate of Re. 1 per quintal

Among various on-going agricultural development programmes, Special Rice Production Programme (70 Blocks) and Special Foodgrains Production Programme in 7 districts (207 Blocks) deserve special mention. These measures helped in raising fertiliser consumption level on a

sustained basis and hence agricultural production in the State.

#### NORTH ZONE

##### 1. Haryana

After suffering a severe setback in fertiliser consumption during 1987-88 as a result of acute drought condition, the State recorded 29.4 per cent increase during 1988-89. Consumption of total fertiliser nutrients increased to 0.510 million tonnes in which Kharif:Rabi share was 35:65.

Weather condition during 1988-89 as a whole was extremely favourable for agricultural operations in the State. Actual rainfall was of the order of 885 mm during June-Sept. '88 which shows 77 per cent excess over normal level. Excess rainfall, particularly during September resulted in floods which caused damage to the crops in the North-Western part of the State. To mitigate the loss, the State Govt. gave subsidy on Rabi seeds of wheat, gram and barley at the rate of 25%, on fertilisers urea & DAP at the rate of Rs. 27.50 per bag of 50 kg capacity and Rs. 25 per 100kg of SSP in affected areas where 50% crops were damaged. While the ratio of N:P consumption at 3.5:1 during 1988-89 was satisfactory, the consumption of  $K_2O$  continues to be very poor giving an overall ratio of 67:21:1 (treating  $K_2O$  as unity). This emphasises the need for greater use of basic fertilisers. With a view to propagate the use of balanced fertilisation, a subsidy of Rs. 1.92 crores on phosphatic fertilisers and zinc sulphate was given by the State Govt. to the farmers of seven paddy growing districts, viz., Karnal, Kurukshetra, Ambala, Jind, Sirsa, Hissar and Sonapat. This measure helped to some extent in raising consumption of phosphatic fertilisers during both the seasons of 1988-89. Upto December '88, State Government opened 436 additional sale points for distribution of fertilisers covering w.e.f. addition to these measure Government implemented centrally sponsored schemes helped in increasing fertiliser consumption and agricultural production in the State. Notable among these are Special Rice Production Programme, Special Foodgrains Production Pro-

gramme (7 districts), National Oilseeds Development Programmes, Intensive Cotton Development Programme, etc.

##### 2. Himachal Pradesh

Consumption of fertilisers continued to remain at a low level in comparison to other major states essentially because of the hilly terrains making many areas inaccessible for extension promotion work and transportation of inputs. Nevertheless, various measures adopted by the State Government have led to increased fertiliser consumption and agricultural production in the State.

During 1988-89, fertiliser consumption increased from 25,200 to 29,000 tonnes during the previous year. Seasonwise share of consumption (Kharif:Rabi) was 47:53 during the year under review. It is interesting to mention that the 80-85 per cent consumption of  $P_2O_5$  &  $K_2O$  each is during the Rabi season as against N which has 55-60 per cent share during Kharif season alone. Performance of weather was exceedingly well during South-West Monsoon period. State received rainfall of 1460 mm which was 40 per cent more than the normal level. Heavy rains during September '88 accounted for a considerable loss to the crop.

During Oct.-Dec. '88, the State received 149 mm rainfall which was 28 per cent more than the normal level. The State Department of Agriculture provided 135 tonnes of HYV seeds of paddy to cover an area of 92,000 hectares. Out of 0.296 million hectares covered under the maize crop, 96,000 hectares have been brought under HYV as the State has divergent agro-climatic conditions in maize growing pockets. 202 tonnes of HYV of pioneer maize seed and minikits of various oilseeds were provided to the farmers. In addition to 7.5 per cent discount on urea authorised by GOI, the State Government provided 40 per cent subsidy on all fertilisers during the year.

##### Jammu & Kashmir

The total consumption of fertiliser nutrients during 1988-89 was of the order of 54,300 tonnes recording approximately 40 per cent increase over

the previous year. Bulk of the increase (87%) took place during Kharif '88. Accordingly, Kharif:Rabi share in consumption changed from 59:41 during 1987-88 to 67:33 during 1988-89.

Weather was extremely favourable during South-West monsoon period. During June-September '88, state recorded rainfall to the tune of 1352 mm which was 61 per cent excess from normal level. As a result of copious rains during Kharif '88, area under rice, maize and Rabi crops increased during 1988-89. Increase in fertiliser consumption was also more prominent during the Kharif season.

During Oct.-December '88 period, however, actual rainfall was 68 mm which was 55 per cent lower than the normal level.

State Government implemented various agricultural developmental programmes which helped in raising fertiliser consumption during the year. Besides these:

(i) consistent efforts of the staff of Agri. Dept. deployed under National Agriculture Extension Project (T&V) with a view to educate the farmers about scientific methods of cultivation,

(ii) monitoring of the fertiliser supply and offtake by a special task force constituted for the purpose, and

(iii) overall favourable weather conditions helped in boosting fertiliser consumption during the year.

##### 4. Punjab

During 1988-89 Punjab came down from second to the third position in fertiliser consumption in the country next to U.P. and A.P. as a result of stagnant growth rate since 1985-86. In a situation of an all round increasing trend during 1988-89, the State experienced only a marginal growth of 0.5 per cent in fertiliser consumption. The Kharif:Rabi share continued to remain at 38:62 maintaining stagnation in consumption since 1985-86.

The performance of South-West monsoon was exceedingly good and the State received 976 mm rainfall which was 100 per cent excess from normal level. The excess rainfall

Table 20—Consumption of plant nutrients per unit of cropped area—1986-87 to 1988-89

Zone/State	(kg/ha)											
	1986-87				1987-88@				1988-89@			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total
<b>East</b>	<b>24.3</b>	<b>8.5</b>	<b>5.3</b>	<b>38.1</b>	<b>25.8</b>	<b>8.3</b>	<b>5.2</b>	<b>39.3</b>	<b>30.2</b>	<b>10.2</b>	<b>6.3</b>	<b>46.7</b>
Arunachal Pradesh	1.5	0.4	0.3	2.2	0.7	0.6	0.3	1.6	0.9	0.5	0.2	1.6
Assam	2.3	0.8	1.3	4.4	3.2	1.5	1.5	6.3	3.7	1.7	1.5	6.9
Bihar	34.3	11.0	4.8	50.1	34.2	8.3	3.7	46.2	42.0	13.1	5.2	60.3
Manipur	23.7	6.2	1.0	30.9	25.6	8.3	0.8	34.7	32.7	11.4	1.5	45.6
Meghalaya	8.8	6.8	1.0	16.4	9.2	7.0	1.1	17.3	8.2	6.4	1.4	16.0
Mizoram	0.70	0.99	0.42	2.11	1.7	1.5	0.3	3.5	1.3	1.1	0.4	2.8
Nagaland	0.91	0.76	0.11	1.78	0.4	0.4	0.02	0.8	2.1	1.9	0.5	4.5
Orissa	9.8	4.1	2.5	16.4	9.5	4.2	2.8	16.4	13.5	3.6	1.9	19.0
Sikkim	5.5	4.4	0.8	10.7	5.8	4.4	0.8	11.0	9.2	5.4	0.7	15.3
Tripura	10.8	3.1	2.3	16.2	10.4	5.9	2.8	19.1	14.2	5.8	2.7	22.7
West Bengal	38.1	14.2	10.2	62.5	43.5	16.1	10.6	70.2	47.4	18.2	13.5	79.2
<b>North</b>	<b>63.1</b>	<b>18.3</b>	<b>3.3</b>	<b>84.7</b>	<b>57.2</b>	<b>17.7</b>	<b>2.6</b>	<b>77.5</b>	<b>71.5</b>	<b>22.0</b>	<b>3.3</b>	<b>96.8</b>
Haryana	58.4	14.6	1.0	74.0	53.7	15.8	0.9	70.3	68.4	21.7	1.0	91.1
Himachal Pradesh	19.8	4.1	2.9	26.8	18.6	4.2	3.1	25.9	21.1	5.0	3.6	29.7
Jammu & Kashmir	21.9	6.3	1.2	29.4	27.5	8.1	2.1	37.7	28.3	11.5	2.9	52.7
Punjab	112.2	40.4	3.2	155.8	110.5	41.5	3.2	155.2	111.1	42.2	2.7	156.0
Uttar Pradesh	53.2	13.8	3.9	70.9	45.2	12.2	2.8	60.2	64.1	17.4	4.1	85.6
Chandigarh	225.0	42.5	2.0	269.5	272.5	90.0	15.0	377.5	362.5	47.5	7.0	357.0
Delhi	107.4	18.8	3.5	129.7	107.4	17.8	1.4	126.6	92.7	24.3	3.6	120.6
<b>South</b>	<b>40.6</b>	<b>17.7</b>	<b>11.6</b>	<b>69.9</b>	<b>41.0</b>	<b>19.2</b>	<b>12.5</b>	<b>72.7</b>	<b>55.7</b>	<b>23.5</b>	<b>15.9</b>	<b>95.1</b>
Andhra Pradesh	48.2	20.0	6.4	74.6	51.2	22.3	6.3	79.8	75.7	28.4	8.9	113.0
Karnataka	27.1	14.5	9.2	50.8	25.7	14.5	9.9	50.1	39.3	20.7	11.8	71.8
Kerala	21.2	12.5	19.1	52.8	24.7	17.2	21.8	63.7	27.1	17.3	30.0	74.4
Tamil Nadu	56.4	21.0	21.5	98.9	53.9	22.1	23.5	99.5	58.3	21.6	29.0	108.9
Pondicherry	189.3	64.8	99.3	353.4	176.7	64.3	95.7	336.7	209.3	70.2	104.6	384.1
A&N Islands	1.9	0.9	0.5	3.3	5.8	4.0	11.4	21.2	6.0	4.5	2.6	13.1
<b>West</b>	<b>15.7</b>	<b>7.2</b>	<b>2.3</b>	<b>25.2</b>	<b>16.6</b>	<b>7.7</b>	<b>2.5</b>	<b>26.8</b>	<b>21.1</b>	<b>10.0</b>	<b>2.9</b>	<b>34.0</b>
Gujarat	26.4	11.5	3.8	41.5	29.9	12.4	3.3	45.6	41.1	15.5	4.2	60.8
Madhya Pradesh	12.6	7.6	1.3	21.5	12.7	8.1	1.2	22.0	16.8	11.2	1.7	29.7
Maharashtra	9.4	7.8	4.8	31.9	22.0	8.7	5.4	36.1	25.1	10.5	5.8	41.4
Rajasthan	9.8	3.6	0.2	13.6	8.2	3.4	0.2	11.8	11.5	4.8	0.2	16.5
Goa Daman & Diu	12.4	8.8	6.8	27.8	15.2	10.1	8.9	34.2	16.4	11.9	11.3	39.6
Dadra & Nagar Haveli	8.5	7.7	0.2	16.4	7.7	8.8	0.8	17.3	12.7	9.2	0.8	22.7
<b>All-India</b>	<b>32.6</b>	<b>11.8</b>	<b>4.9</b>	<b>49.4</b>	<b>32.0</b>	<b>12.2</b>	<b>4.8</b>	<b>49.1</b>	<b>40.6</b>	<b>15.2</b>	<b>6.1</b>	<b>61.9</b>

@—Provisional

Note: Figures for consumption of plant nutrients per hectare have been worked out on the basis of latest gross cropped area available for the year 1985-86.

caused floods in certain areas during September '88, with the result, nearly 40,000 hectares could not be sown during the ensuing Rabi. According to preliminary estimates, while the production of foodgrains during Kharif '88 remained below the target due to floods, the Rabi foodgrains production is likely to be according to the target in view of the State having received normal rainfall during the season besides having good irrigation system.

The State Government continued to make all out efforts to ensure timely and adequate supply of basic inputs to boost foodgrains production. The Department of Agriculture organised various extension campaigns at the district, block and village levels for the farmers. Arrangement was made to supply 4.5 lakh tonnes of fertilisers and to cover its cost crop loan of Rs. 20 crore was provided to the farmers. The State Govt. continued to implement various agricultural developmental programmes sponsored by the Centre and State. Notable among these are Special Foodgrains Production Programme (3 districts), National Oilseeds Development Programme, Intensive Cotton Development Programme, Reclamation of alkali soils, etc.

##### 5. Uttar Pradesh

The State once again maintained the prime position in fertiliser consumption in the north zone as well as in the country. With the total nutrient consumption at 2.136 million tonnes during 1988-89, the State for the first time crossed the 2 million tonne mark. It is interesting to note that the share of U.P. alone in all-India consumption works out to 19.5 per cent. The fertiliser consumption recording a growth of 42 per cent after having witnessed steep fall in the previous year due to drought. Kharif:Rabi share in consumption (N+P<sub>2</sub>O<sub>5</sub> + K<sub>2</sub>O) smoothened from 34:66 in 1987-88 to 41:59 during 1988-89 due mainly to increase in consumption by 71 per cent in the Kharif season. Deployment of mobile vans in all districts and sale of urea had salutary effect on consumption of N which alone went up by 0.3 million tonnes during Kharif 1988.

Table 21—Consumption ratio of N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O—  
1986-87 to 1988-89

Zone/State	1986-87		1987-88@		1988-89@	
	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>	N	P <sub>2</sub> O <sub>5</sub>
<b>East</b>	<b>4.6</b>	<b>1.6</b>	<b>5.0</b>	<b>1.6</b>	<b>4.8</b>	<b>1.6</b>
Arunachal Pradesh	4.4	1.2	2.0	1.8	4.7	2.3
Assam	1.8	0.7	2.2	1.0	2.5	1.1
Bihar	7.1	2.3	9.3	2.3	8.0	2.5
Manipur	22.8	6.0	33.4	10.8	22.2	7.7
Meghalaya	8.5	6.4	8.2	6.2	5.8	4.5
Mizoram	1.7	2.3	5.2	4.8	3.0	2.7
Nagaland	8.2	6.8	23.3	26.7	2.2	4.1
Orissa	3.8	1.6	3.6	1.6	6.9	1.8
Sikkim	6.7	5.3	7.1	5.4	12.3	7.3
Tripura	4.6	1.3	3.7	2.1	5.2	2.1
West Bengal	3.7	1.4	4.1	1.5	3.5	1.3
Tea Board (NE)	1.7	0.4	1.9	0.5	1.1	0.3
<b>North</b>	<b>19.1</b>	<b>5.6</b>	<b>22.1</b>	<b>6.8</b>	<b>21.4</b>	<b>6.6</b>
Haryana	56.4	14.1	61.4	18.0	67.2	21.3
Himachal Pradesh	6.9	1.4	6.0	1.4	5.9	1.4
Jammu & Kashmir	18.8	5.4	12.9	3.8	13.2	3.9
Punjab	34.8	12.5	34.1	12.8	40.6	15.4
Uttar Pradesh	13.6	3.5	16.2	4.4	15.8	4.3
Chandigarh	112.5	21.3	18.2	6.0	43.2	6.8
Delhi	31.1	5.4	79.1	13.1	25.9	6.8
<b>South</b>	<b>3.5</b>	<b>1.5</b>	<b>3.3</b>	<b>1.5</b>	<b>3.5</b>	<b>1.5</b>
Andhra Pradesh	7.6	3.1	8.1	3.5	8.6	3.2
Karnataka	2.9	1.6	2.6	1.5	3.3	1.7
Kerala	1.1	0.7	1.1	0.8	0.9	0.6
Tamil Nadu	2.6	1.0	2.3	0.9	2.0	0.7
Pondicherry	1.2	0.7	1.8	0.7	2.0	0.7
A & N Islands	3.6	1.8	0.5	0.4	2.3	1.7
<b>West</b>	<b>6.7</b>	<b>3.1</b>	<b>6.8</b>	<b>3.1</b>	<b>7.4</b>	<b>3.5</b>
Gujarat	7.3	3.2	9.1	3.8	9.8	3.7
Madhya Pradesh	9.6	5.8	10.3	6.6	9.9	6.6
Maharashtra	4.1	1.6	4.1	1.6	4.3	1.8
Rajasthan	49.5	18.1	48.3	20.0	46.4	19.4
Goa, Daman & Diu	1.8	1.3	1.7	1.1	1.4	1.1
Dadra & Nagar Haveli	44.0	40.0	10.0	11.5	16.5	12.0
<b>All India</b>	<b>6.7</b>	<b>2.4</b>	<b>6.6</b>	<b>2.5</b>	<b>6.7</b>	<b>2.5</b>

Note: K<sub>2</sub>O is taken as unity.  
@ Provisional.

The pattern of rainfall during the South-West monsoon period was by and large normal. During June-September '88 period, Eastern U.P., Plains of Western U.P. and Hills of Western U.P. received rainfall to the tune of 889, and 938 mm, respectively.

The State Government launched a massive campaign for distribution of adequate quantity of quality seeds, fertilisers, pesticides and agricultural implements to the farmers to meet actual foodgrains production target fixed for the year. During Kharif '88, the actual food production exceeded the target fixed at 12.3 million tonnes and the target for Rabi 1988-89 at 21.1 million tonnes seems within reach. Due to various promotional and extension efforts, the number of sale points increased from 28,798 (as on 31-3-88) to 35,557 (as on 31-12-88). The State Govt. continued to implement various agricultural developmental programmes. 102 Blocks were covered under Special Rice Production Programme in which emphasis was laid on spread of improved rice production technology through training of farmers. Besides this, Special Foodgrains Production Programme (38 districts), National Pulses Development Programme, National Oilseeds Development Project and Oilseeds Thrust Project were also implemented. Under these programmes, farmers were provided with various inputs in the form of fertilisers, improved agricultural implements and pesticides. An EEC supported project on Integrated Watershed Management relating to Ramganga, Chambal and Jamuna made progress in these areas, developing infrastructural facilities and micro level planning. Various measures taken up by the State Govt. and the Fertiliser Industry helped in raising fertiliser consumption in the State.

#### SOUTH ZONE

##### 1. Andhra Pradesh

The year 1988-89 was a landmark in the history of fertiliser consumption in Andhra Pradesh. After UP and Punjab, it is the 3rd State to have crossed 1 million tonne mark during 1988-89. The State was elevated to the second position in fertiliser consumption, relegating Punjab to the

3rd position during the year under report due to the latter witnessing stagnation in consumption since 1985-86. With total nutrient consumption at 1.367 million tonnes, the State accounted for 12.5% share in all India consumption. However, Kharif:Rabi share did not change appreciably during 1988-89 which was 51:49, Kharif consumption being slightly higher than the Rabi.

South-West monsoon was slightly delayed but the state received copious rains which was well spread during this period. Coastal Andhra Pradesh, Telengana and Rayalaseema regions received rainfall to the tune of 859, 1258 and 726 mm, respectively during June-Sept. '88 period. The excess rainfall received during the last week of July 1988 resulted in floods in Godavari basin inundating both rainfed and irrigated crops in 0.49 and 0.23 million hectares.

North-East monsoon (Oct.-Dec.) was deficient and the state received only 85 mm rainfall as against the normal 223 mm during the Rabi season. But this did not seriously affect agricultural operations as there was moisture in the soil and water in the irrigation channels to sustain agricultural production through fertiliser use.

The total area under paddy increased from 3.31 million hectares during 1987-88 to 3.93 million hectares during 1988-89. Area under groundnut registered a steep increase from 1.90 to 2.26 million hectares during 1988-89. Nearly 2,727 additional fertiliser sale points were opened with the total number rising to 15,235 during the year.

Several agricultural development programmes including Special Foodgrain Production Programme (8 districts) and promotional work undertaken by the State Government and the Fertiliser Industry helped in increasing fertiliser consumption in the State. Some of these are listed below:—

- (i) Rs. 334 crores was disbursed as cooperative crop loans during 1988-89 as against Rs. 226 crores in the previous year.
- (ii) Nearly 1.52 lakh mini-kits (oil-seeds, pulses and coarse crop seeds) were distributed to small and marginal farmers.
- (iii) Under the National Oilseeds Development Programme, 13 districts were covered under groundnut, 7 under sesamum, 6 under sunflower, 5 under safflower and 3 under castor.

Table 22—Fertiliser consumption vis-a-vis growth and production of foodgrains—pre and post HYV era

Period	Area Sown (million hect.)		Average yield of foodgrains (kg/ha)	Fertiliser consumption per unit of gross cropped area (kg./ha)	Total foodgrains production (million/tonnes)	Total fertiliser consumption (N+P+K) (million tonnes)
	Net	More than once				
<b>1. 1951-52 to 1965-66 (pre HYV era)</b>						
1965-66	136	19	629	5.05	72.3	0.785
1951-52	119	14	536	0.55	52.0	0.066
(i) Increase	17	5	93	4.5	20.3	0.719
<b>(ii) From 1966-67 onwards</b>						
1987-88	141@	36@	1166P	49.04P	138.4P	8.696P
1966-67+	137	20	644	7.00	74.2	1.101
(ii) Increase	4	16	522	42.04	64.2	7.595

+ = HYVs were introduced in 1966-67.

P = Provisional.

@ = For 1985-86 (latest available).

- (iv) 132 micro watersheds were taken up in the dryland farming system.
- (v) Nearly 462 seed-cum-fertiliser drills and 4,569 other improved agricultural implements were distributed among the farmers.

## 2. Karnataka

Fertiliser consumption, after remaining stagnant during the previous three years (1985-86 to 1987-88) recorded a spectacular growth of 43.2 per cent during the year 1988-89. Consumption of total fertiliser nutrients went up to 0.800 million tonnes from 0.56 million tonnes in the preceding three years. Increase in consumption being more prominent during Kharif '88, Kharif:Rabi share changed from 62:38 during 1985-86 to 1987-88 to 65:35 during 1988-89. In fact, 72% of the increase was accounted for by Kharif '88 season.

South-West monsoon, as a whole, brought normal rainfall to the State. Dry spell was experienced during June and partly in July but the excess rainfall received during August and September resulted in an overall normal level of rainfall. However, uneven spacing of rains did adversely affect agricultural operations in some areas. Coastal Karnataka, North Interior Karnataka and South Interior Karnataka received rainfall of 3287, 711 and 958 mm, respectively during June-September '88 which was 8, 37 and 21 per cent above normal level. As against this, the performance of the North-East monsoon (October-Dec. 88) was extremely poor but it did not affect the Rabi agricultural operations as, the excess rainfall received during August and September helped in improving the water storage levels in reservoirs and minor irrigation sources like tanks, wells, etc.

During 1988-89, there was a marginal increase in area under paddy, groundnut and cotton. However, there was a significant reduction in the area under jowar. It is interesting to mention that the HYV area under paddy increased by 10 per cent from 0.75 million hect. in 1987-88 to 0.98 million hect. in 1988-89. 707 additional sale points were opened with total number rising to 1,000 by the beginning of March '89. Cooperative crop loan also had a significant

growth (63%) during the year under review. Nearly Rs. 227 crores was disbursed as cooperative crop loan as against Rs. 139 crores last year.

In addition to several on-going development programmes a few new programmes were initiated in the State, viz., Special Foodgrain Production Programme (9 districts), National Project on Development of Fertiliser Use and opening of Additional Retail Outlets under Centrally Sponsored Scheme. Coupled with these continuous promotional and developmental thrust generated by the industry contributed largely in sizeable growth in fertiliser consumption in the state.

## 3. Kerala

The state recorded a sustained growth rate in fertiliser consumption for the fourth year in succession with consumption of total fertiliser nutrients reaching 0.213 million tonnes during 1988-89. Compared to 1987-88, the growth in fertiliser consumption was approximately 17 per cent during 1988-89. Virtually, the entire increase took place during Kharif '88 resulting in Kharif:Rabi share at 62:38 during 1988-89 as against the normal trend of 57:43.

During June-Sept. '88, the state received 2118 mm rainfall which was by and large normal. Rainfall during North-East monsoon period was highly deficient. Nevertheless, there was improvement on all agricultural fronts during the year under review. HYV paddy area increased from 0.35 million hectares during 1987-88 to 0.45 million hectares during 1988-89. The number of fertiliser sale points increased from 7578 in April '88 to 8365 by the end of February '89.

A few agricultural developmental programmes were introduced in addition to the on-going programmes. A large number of minikits of oilseeds, millets, pulses, coconut, etc., were distributed during 1988-89. Under the Integrated Programme for Development of Spices, 47,498 input minikits, nearly 20 lakh cuttings of pepper vines, 46,000 seedlings of clove and 15,863 nutmeg seedlings were distributed. Under the Small and Marginal Farmers Schemes, 33,000 minikits for pulses, 42,000 for sesamum, 750 for millets and 46,498 for coconut

(under the Tribal Plan) were distributed.

Besides these, the state initiated action to introduce a new programme "Group Farming System" under the auspices of Krishibhawan for increasing paddy production. Under this scheme, farmers having contiguous paddy fields would be required to make collective cultivation from sowing to harvest operations as a group. To begin with, contiguous paddy fields covering 60,000 hect. arcs and 2 lakh small & marginal farmers would be involved. The main objective is to reduce cost of cultivation and increase the net income from paddy cultivation. These measures would continue to help in a sustained and balanced growth in fertiliser consumption and agricultural production in the state.

## 4. Tamil Nadu

The state recorded 9.4 per cent increase in fertiliser consumption during 1988-89 after recovering from stagnation in growth in the preceding three years (1984-85 to 1987-88) mainly because of adverse weather conditions. Consumption level went up to 0.743 million tonnes during 1988-89 from 0.679 million tonnes in the previous year. Weather being extremely favourable during Kharif '88 season, fertiliser consumption registered a record increase of 65.3 per cent over Kharif '87, whereas consumption during Rabi 88-89 declined by 20.7 per cent over Rabi 87-88 due to inclement weather. Consequently, Kharif:Rabi share in consumption changed significantly from 35:65 during 1987-88 to 53:47 during 1988-89. It is interesting to mention that whereas consumption during the Kharif season recorded a declining trend, Rabi recorded an increase during 1985-86 to 1987-88, the trend reversed during 1988-89 due to near drought condition during the Rabi.

The South-West monsoon (June-Sept. '88) was delayed but it was widespread and copious with the exception of Nilgiris. During June-Sept. '88, the State received rainfall of the order of 402 mm which accounts for a 24 per cent excess over the normal level. This helped considerably in the cultivation of "Samba" paddy and millets. The total area under HYV paddy during 1988-89 remained at



1.9 million hectares though HYV maize showed some improvements.

The North-East monsoon (Oct.-Dec. '88) was, more or less, a failure with the total rainfall being only 216 mm as against the normal of 447 mm resulting in a decline in consumption during Rabi 1988-89. Consequently, during 1988-89, the areas under paddy and millets declined.

Disbursement of cooperative crop loans increased by approx. 10 per cent from Rs. 187 crores during 1987-88 to Rs. 205 crores during 1988-89 and the number of sale points increased from 15,522 (as on 1-4-88) to 17,138 (as on 1-1-89).

The state Government continued to implement various development programmes viz. Special Foodgrain Pro-

duction Programme (8 districts), Integrated Dryland Agricultural Development Programme, Sugarcane Development Programme, Intensive Cotton Development Programme, Intensive Agricultural Area Programme etc. In addition to these, the state continued the scheme of providing production incentives in terms of fertilisers, seeds and pesticides @ Rs. 35 per quintal of paddy supplied to the centres of Tamil Nadu Civil Supplies Corp., by the farmers in Thanjavur and parts of Tiruchirapalli and South Arcot districts.

#### WEST ZONE

##### 1. Gujarat

The State recorded an all time high level of consumption at 0.589 million tonnes of total nutrients (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O) during 1988-89 (+33% growth) having suffered a set back in the preceding three years due to prolonged drought. Normally, consumption during the Kharif season is slightly higher than the Rabi. However, this year, the consumption during Rabi season having been higher, Kharif:Rabi share in consumption reversed from 51:49 to 49:51 during 1988-89. It is interesting to mention that on account of inclement weather for the last three years and delayed rains during Kharif '88, P<sub>2</sub>O<sub>5</sub> could not be applied fully with the result, P<sub>2</sub>O<sub>5</sub> recorded a decline during the Kharif season (-8%). This was more than compensated during Rabi 88-89.

The South-West monsoon was a bit delayed and its behaviour was erratic in the beginning. However,

Table 23—Fertiliser consumption vs foodgrains production 1962-63 to 1988-89

Year	Fertiliser consumption (all nutrients) ('000 tonnes)	Gross cropped area (million hectares)	Gross area under HYV crops (million hectares)	Gross irrigated area (million hectares)	Weather (for purposes of agricultural production)	Foodgrains production (million tonnes)
1962-63	452	156.8	—	29.5	Average	80.2
1963-64	544	157.0	—	29.7	Average	80.6
1964-65	773	159.2	—	30.7	V. Good	89.4
1965-66	785	155.3	—	30.9	V. Poor	72.9
1966-67	1,101	157.4	1.9	32.7	V. Poor	74.2
1967-68	1,539	163.7	6.0	33.2	Good	95.1
1968-69	1,761	159.5	9.3	35.5	Average	93.0
1969-70	1,982	162.3	11.4	37.0	Good	99.5
1970-71	2,257	165.8	15.4	38.2	V. Good	108.4
1971-72	2,657	165.2	18.2	39.4	Average	105.2
1972-73	2,768	162.2	22.3	39.1	V. Poor	97.0
1973-74	2,839	169.9	26.0	40.3	Poor	104.7
1974-75	2,573	164.2	27.3	41.7	V. Poor	99.8
1975-76	2,894	171.0	31.9	43.4	Good	121.0
1976-77	3,411	167.3	33.6	43.6	Poor	111.2
1977-78	4,286	172.3	38.9	46.0	Good	126.4
1978-79	5,117	174.8	40.1	(50.6) 48.3	Good	131.9
1979-80	5,255	169.7	38.4	(52.6) 49.2	V. Poor	109.7
1980-81	5,516	173.1	43.1	(54.1) 49.9	Poor	129.6
1981-82	6,067	177.0	46.5	(56.0) 51.6	Poor	133.3
1982-83	6,387	173.4	47.5	(58.2) 52.1	Poor	129.5
1983-84	7,710	180.2	53.7	(58.6) 53.9	Good	152.4
1984-85	8,211	176.4*	54.1	(60.5) 54.1	Average	145.5
1985-86	8,474	177.3*	55.4	(62.4) 54.0	Poor	150.4
1986-87	8,732		56.2	(64.4)*	Poor	143.4
1987-88	8,696*		54.1	(63.3)*	V. Poor	138.4*
1988-89	10,968*		62.6† 65.0†	(69.7)†	V. Good	170-172* 166.6†

\* = Provisional

† = Anticipated achievement

T = Target

() = Cumulative utilisation

Source: (Economic Survey, G.O.I)

widespread rains received from the second week of July and heavy rains during August and late September resulted in floods in certain areas. Gujarat region received rainfall to the tune of 1342 mm, Saurashtra 874 mm and Kutch region 3213 mm recording 37, 62 and 12 per cent higher than normal level respectively. Against the foodgrain production target of 3.815 million tonnes, actual achievement was 3.84 million tonnes during Kharif '88. The State Government took up ambitious development programmes to maximise foodgrains production during Rabi 1988-89 as well. Production anticipated during Rabi 1988-89 was 2.21 million tonnes. Oilseeds production may also touch a record level of 3.62 million tonnes during 1988-89 exceeding the target of 3.4 million tonnes. The increase in  $P_2O_5$  consumption during Rabi 1988-89 (+65%) was particularly due to increase in area under crops like pulses, potato, oilseeds and wheat.

The State Government and fertilizer Industry effectively implemented the National Project on Development of Fertiliser Use in Low Consumption Rainfed Areas in five districts, viz., Surendranagar, Ahmedabad, Panchmahal, Bharuch and Banaskantha. Aggregate consumption of  $N+P_2O_5+K_2O$  went up by more than 70 per cent during 1988-89 compared to 1987-88 in these selected districts.

881 additional sale points were opened in the State out of which private channel accounted for 426 and cooperative 455. In addition to these, various agricultural developmental programmes were carried out. Special Foodgrain Production Programme was implemented in 7 districts. National Oilseeds Development Programme, National Pulses Development Programme and Intensive Cotton Development Programme continued with full zeal. With a view to make an impact of agricultural development in Adivasi dominated areas, the State Government implemented a scheme under which Adivasi farmers were provided with input kits containing seeds and fertilisers free of cost. On account of very good link between the various input agencies, positioning, adequate availability, distribution of inputs, various agricultural developmental programmes led in raising the overall fertiliser consumption in the State.

## 2. Madhya Pradesh

The state witnessed a spectacular increase in fertiliser consumption (35 per cent) during 1988-89 with the total nutrients consumption having gone up to 0.681 million tonnes compared to 0.508 million tonnes in the previous year. Increase was more or less equal in both the seasons resulting in Kharif:Rabi share remaining at 51:49 as in the previous years. It is interesting to mention that the state has been recording sustained increase in consumption of each nutrient in both Kharif and Rabi seasons with the exception of  $K_2O$  which showed a declining trend during both the seasons of 1987-88.

South-West monsoon broke in the state during 3rd week of June. Nevertheless, full fledged sowing operation started throughout the state only in the first week of July when the state received copious rains. During June-September, western and eastern MP received rainfall of the order of 899 mm and 1050 mm respectively. Districts in eastern MP particularly Raipur, Durg, Rewa, Siddhi and Shahdol received slightly deficient rainfall. On account of uneven and untimely rainfall, transplantation and Biasi operations on paddy crop were affected in certain areas. Consequently against the target of 5.30 million tonnes, paddy production was 4.88 million tonnes. With the overall good rainfall in other areas, oilseeds production at 1.68 million tonnes however, surpassed the target of 1.41 million tonnes set for Kharif '88. Rabi season could not begin in full swing on account of inadequate moisture in the soil which in turn, was due to inadequate rains during September so crucial for Rabi crops. Rainfall was also deficient during this season, particularly in Jabalpur, Rewa and Raipur divisions. Consequently, production of foodgrains during Rabi season is estimated at 6.83 million tonnes against the target of 6.98 million tonnes.

The Central and State Governments in cooperation with the Fertiliser Industry implemented numerous agricultural developmental programmes which contributed towards increasing fertiliser consumption in the state. Notable among these are Special Foodgrains Production Programme adopted in 30 districts. National Pulses

Development Project in 21 districts, National Oilseeds Thrust Programme in 27 districts, National Oilseed Development Programme in 22 districts, National Project on Development of Fertiliser Use in low consumption rainfed areas in 7 districts. In addition to these, the State Govt. took up a few other schemes (listed below) which helped in boosting fertiliser consumption in the state:

- i. Transport subsidy to the MP State Cooperative Marketing Federation for transport of fertilisers from block level to interior areas.
- ii. Rice minikits worth Rs. 0.715 million and millet minikits worth Rs 0.828 million were distributed during 1988-89.
- iii. Nearly 7210 additional fertiliser sale points were opened in the state out of which private channel accounted for 3167 points.
- iv. Additional credit worth Rs. 25 crores was disbursed by cooperative banks and Rs. 13 crores by nationalised banks.

## 3. Maharashtra

Positive growth rate of 13 and 15 per cent in fertiliser consumption was achieved during 1987-88 and 1988-89 in succession in Maharashtra. The year 1988-89 ended with a consumption level at 0.850 million tonnes compared to 0.740 million tonnes during 1987-88. Among the three nutrients, highest growth rate was achieved (21 per cent) in  $P_2O_5$  consumption owing to increased area under oilseeds and pulses. Increase in consumption was more prominent during Kharif '88 and seasonwise share was 66:34 during 1988-89. Same proportion was observed during 1987-88.

Arrival of South-West monsoon was in time (during mid June) but its intensity was feeble in the beginning except Konkan and parts of Vidarbha regions where widespread and moderate rains were received. Thereafter, July and 2nd fortnights of August & September witnessed brisk rainfall throughout the State. Adequate rains particularly during September brightened the prospects for Rabi crops. During June-September 1988, Madhya Maharashtra, Marathwada and Vidarbha regions received rainfall to the tune of 994, 1169 and 1227 mm

respectively. Consequently, Kharif foodgrain production was 7.55 million tonnes. From 2nd week of October onwards there was a break in the rains but the favourable weather facilitated sowing of Rabi crops. However, during the entire North-east monsoon period (October-December '88), Madhya Maharashtra and Marathwada regions received deficient rainfalls while Vidarbha region experienced good rainfall. Rabi crop condition in irrigated area was good but in the rainfed area it was unsatisfactory, particularly in parts of Pune and Kolhapur divisions. Foodgrains production during Rabi 1988-89 is estimated at 3.51 million tonnes. Besides, the State is expected to achieve a record level of 1.78 million tonnes of oilseeds production during the year.

The State Govt. implemented various agricultural development schemes which helped in accelerating growth of fertiliser consumption and agricultural production. Important among these are: Special Foodgrains Thrust Programme (12 districts), Oilseeds Production Thrust Programme (22 districts), National Oilseeds Development Programme (14 districts) and National Pulses Development Project. Minikits of Seeds and fertilisers were distributed to the farmers under these programmes. In addition to these, state govt. also implemented National Project on Development of Fertiliser Use in Low Consumption Rainfed Areas in 8 districts viz., Aurangabad, Nanded, Parbhani, Akola, Satara, Thane, Sholapur and Amra-

vati. In these districts, aggregate increase in consumption of fertilisers was 28.4 per cent during 1988-89 compared to the previous year.

Continued efforts by the Fertiliser Industry and the Institutional Agencies helped in opening 2,629 additional retail outlets in the state during the year out of which 2,205 are managed by the private channel and Aggro Service Centres and the balance by the Coop. channel.

#### 4. Rajasthan

The state achieved a consumption level of 0.301 million tonnes of fertiliser nutrients during 1988-89 recording an increase of 40 per cent over the previous year. Growth was particularly high during 1988-89 as consumption in the previous year 1987-88 registered a fall (sliding back to 1985-86 level) due to acute drought situation. Nevertheless, even compared with the consumption level from a normal year the level achieved during 1988-89 was commendable, each nutrient recording a higher quantum increase during Rabi than in Kharif. Kharif:Rabi share in consumption continued to remain more or less at 34:66 during the three years.

Rainfall during South-West monsoon period (June-September '88) was nearly normal. Western and Eastern Rajasthan recorded rainfall of the order of 250 and 483 mm, respectively. Water in canals and tanks rose to the normal level which had plu-

mmeted to a very low level in the previous year due to acute drought. However, rainfall during Oct.-Dec. '88 was deficient in both Western and Eastern Rajasthan. State Govt. continued to implement various agricultural development programmes/schemes which helped considerably in raising agricultural production in the state. Special Foodgrains Production Programme (14 districts) was implemented covering three focus crops, viz., wheat, maize and gram. While wheat Production Programme was implemented in 9 districts, maize and gram were covered in 6 and 8 districts, respectively with some districts having more than one programme running concurrently. The National Project on Development of Fertiliser Use in Low Consumption Rainfed Areas adopted in 6 districts made encouraging progress. Both the Fertiliser Industry and the State Govt. actively participated in the adopted districts to open additional retail outlets and took up block demonstrations and farmers' training etc. Development of micro watersheds and rainfed farming were also given adequate importance during the year under report. Besides the development of a large number of watersheds in the state, efforts were also made to propagate dryland farming outside the watersheds.

#### 5. ESTIMATES OF FERTILISER CONSUMPTION FOR 1989-90

High yielding variety (HYV) requires larger quantity of fertiliser.

Table 24—International prices of urea, DAP and MOP

Year	Range of f.o.b. price (bulk)		
	Urea	DAP	MOP
1982	128-151	195-202	63-95
1983	113-125	167-220	72-91
1984	139-179	170-230	85-95
1985	85-170	158-220	70-85
1986	63-108	125-205	50-75
1987	79-130	137-210	60-75
1988	95-146	172-230	79-100
1989 (upto May '89)	100-155	174-230	95-105

For best results, presence of adequate moisture is necessary which helps in producing higher crop yield with the use of proper dose of fertiliser. Over the years, not only the use of high yielding variety under irrigated and assured rainfall condition has spread but also, the adoption of scientific method for cultivation gradually expanded aided by the better availability of credit facility for agriculture. All these efforts are directed towards the dedicated objective of achieving the foodgrains production target of 175.00 million tonnes fixed for the year 1989-90. This is generating the necessary 'push' to the greater use of fertiliser set at 12.00 million tonnes for the terminal year of the VII Five Year Plan. It would be recalled that on account of the first three years having been unfavourable, weatherwise (1985-86 to 1987-88), the Mid-Term Appraisal of the VII Plan re-determined the foodgrains production and fertiliser consumption targets for 1989-90 at 175 and 12 million tonnes as against the original level of 183 and 14 million tonnes, respectively.

On account of extremely favourable weather witnessed during 1988-89, the grim agricultural situation in previous years (depleting the foodgrains stocks to an alarmingly low level) turned for the better with foodgrains production and fertiliser consumption rising to an estimated 170-172 and 10.97 million tonnes, respectively. This records an increase of 32 and 2.3 million tonnes, respectively over the previous year 1987-88 (Table 23).

The weather reports for June and July 1989 strongly indicate that the South-West monsoon has so far been favourable in most of the 35 sub-divisions (Table E).

Only 7 sub-divisions recorded deficient rains viz., West U.P., Hills of West U.P., West M.P., East Rajasthan, Haryana, Punjab and H.P. Their contribution to foodgrains production and fertiliser consumption is significant. These areas too particularly, Haryana, Punjab, H.P., East Rajasthan and Hills of West U.P. experienced some rains during the week of August. Though in this stage, it is difficult to precisely estimate the quantum and spread of rainfall during the entire South-West mon-

Table E—Weather during June and July 1988 & 1989

Month	No. of sub-divisions having excess/normal rainfall	
	1988	1989
June	19	32
June & July	34	28

soon period (June-Sept.), it is more than likely that the foodgrains production target of 175 million tonnes for 1989-90 would not only be hit but exceeded in an overall congenial atmosphere of favourable weather and ample fertiliser availability.

As outlined in the VII Plan document viz., fertiliser use and crop response ratio of 1:8 and 70 per cent of fertiliser use on foodgrains; quantity of fertiliser required to produce 175 million tonnes of foodgrains works out to as shown in Table F.

Thus, depending upon the likely actual of foodgrains production setting between 170 and 172 million tonnes during 1988-89, the fertiliser use requirement for food and other crops would vary between 11.86 and 11.51 million tonnes of nutrients (N + P<sub>2</sub>O<sub>5</sub> + K<sub>2</sub>O) for 1989-90.

The indigenous production capacity along with ample stocks of N lying in the country are adequate to meet

this level of fertiliser requirement. However, deficit in P<sub>2</sub>O<sub>5</sub> generated on account of factors mentioned elsewhere, would have to be met through imports.

It may be mentioned that the "Sub-Group on Demand Projections for the VIII Plan and Beyond" have recommended 12.50 million tonnes of fertiliser nutrients use (N-7.90, P<sub>2</sub>O<sub>5</sub>-3.40 and K<sub>2</sub>O-1.20 million tonnes) for 1989-90. However, the National Informatics Centre of the Planning Commission has suggested a figure of 11.87 million tonnes with N-7.54, P<sub>2</sub>O<sub>5</sub>-2.98 and K<sub>2</sub>O-1.35 million tonnes for the year.

#### 6. IMBALANCE BETWEEN CONSUMPTION & DOMESTIC PRODUCTION

The year 1988-89 was a year of achievement regarding production and consumption of fertilisers. The extremely favourable monsoon during June-Sept. '88 (88 per cent of districts had excess or normal rainfall), coupled with easy availability, was conducive to increase in fertiliser consumption. The commissioning of 3 giant gas-based plants and the improved performance in a number of existing units accounted for a substantial increase in production. In the case of nitrogen, the deficit between consumption and production increased during 1988-89 as compared to 1987-88 on account of increase in con-

Table F—Fertiliser use requirement (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O) for food and other crops for 1989-90

Foodgrains production		Additional fertiliser required			Total* fertiliser use requirement during 1989-90	Nutrientwise breakup		
Target for 1989-91	Likely actual for 1988-89	Additional required to achieve the target	to achieve the target <sup>1</sup>	for food and other crops <sup>2</sup>		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
175	170	5	0.625	0.893	11.86	7.56	3.05	1.25
	or 172	3	0.375	0.536	11.51	7.46	2.90	1.15

<sup>1</sup>—Fertiliser use and crop response ratio 1:8

<sup>2</sup>—Assuming 70% fertiliser is on foodgrains

\*—Over the 1988-89 estimated level of 10.97 million tonnes.

sumption being higher than increase in production. The increase in consumption over 1987-88 (1.527 million tonnes) was offset to a considerable extent by the increase in production (1.246 million tonnes) resulting in the lowering of nitrogen stocks with the manufacturers as compared to the previous year (Table 10). Likewise for phosphate, the deficit between consumption and production during 88-89 slightly declined as compared to 87-88 owing to the increase in production (0.588 million tonnes) being marginally higher than the increase in consumption (0.536 million tonnes). Despite this small addition, the phosphate stocks with the manufacturers continued to remain quite low (Table 10). The gap would have been further reduced but for the shortage of imported phosphoric acid in the last quarter of the year which affected the production of  $P_2O_5$ . Zonewise surplus (+)/deficit (-) situation differed widely (Table 18).

#### Nitrogen (N)

All zones witnessed significant increases in consumption while on the production front, except east, all zones recorded an increase. Like previous years, west continued to be the surplus zone, the extent of surplus increasing significantly due to commissioning of NFL Vijaipur. It is the only zone where increase in production was more than the increase in consumption resulting in the increase in surplus by 0.168 million tonnes over the previous year. Contrary to this, in north and south zones, the deficit widened due to higher increase in consumption than in production. IFFCO-Aonla & Indo-Gulf Fert., Jagdishpur in the north and Godavari Fert., Kakinada, in the south were commissioned during the year. In east zone, production declined marginally due to various technological reasons and constraints which coupled with sharp increase in consumption, widened the gap between the two.

#### Phosphate ( $P_2O_5$ )

Despite increases in both consumption and production in all the four zones, east and west zones continued to maintain surplus which increased marginally by 59,000 and 21,000 ton-

nes over the previous year mainly due to improved production performance of the existing units. Increase in production was the highest in the south zone, which more than offset the increase in consumption resulting in a drop in the gap from 0.189 to 0.070 million tonnes. On the other hand, in north zone, production increased only marginally (the entire production being as SSP whereas, consumption recorded the highest increase resulting in a further increase in the deficit during 1988-89 which is the highest among all the zones.

### 7. AGRONOMIC ASPECTS OF FERTILISER CONSUMPTION

Fertiliser is the key input in agricultural production. However, its consumption in a particular season or year is mainly governed by its availability at the right time, weather condition, irrigation facilities, availability of soil moisture and fertiliser responsive seed, promotional activities and assistance from various institutional agencies and finally farmers' economic condition. Fertiliser consumption in India during 1988-89 exceeded all previous records. The main reason was the favourable weather conditions coupled with the concerted efforts made by Government and other agencies connected with the agricultural and fertiliser sectors. Record fertiliser consumption also resulted in a record production of foodgrains and oilseeds. The factors contributing to such a phenomenal increase in consumption in a single year are briefly discussed in the following paragraphs.

#### Weather condition

We have no control over weather under field conditions but advance weather forecasting is very important to chalk out the future strategy both for the planner and the farmer. Last year, advance forecasting of good weather helped the farmer in planning and executing farm operation in advance.

#### Higher water availability

After several seasons of poor rainfall, the country had excellent rains last year. Of the 35 meteorological sub-divisions, 32 sub-divisions (88% of the districts) received excess to normal rains (Table 11). Rainwater

was harvested through various methods such as collection in ponds, reservoirs, dams, etc., water conservation in soil profile itself, recharging groundwater and watershed management in rainfed areas. Thus, the good weather was harnessed using HYVs, expanding irrigation facilities and increasing the use of fertilisers.

Irrigation facilities which play crucial role in the consumption of fertilisers are expanding. We had cumulative irrigation utilisation capacity of 58.6 million hectares in 1983-84. It increased to 69.7 million hectares in 1988-89. An average increase of 2.2 million hectares per annum in the irrigated area has led to increased consumption of fertilisers.

#### High yielding varieties

High yielding, fertiliser responsive varieties are available for rice, wheat, maize, jowar and bajra. It is evident from Table 19 that increasing area has been brought under HYVs but a slight decrease in area under HYVs in 1987-88, particularly under paddy and bajra, is noticed compared to previous year. This is attributed to the short supply of quality seed due to severe drought during the year. In other words, production could have been further enhanced if we had adequate amount of good quality seeds.

It clearly shows that impact of drought is not only confined to current season but also affect the succeeding seasons. Necessary measures need to be taken to increase seed production even in aberrant weather conditions to meet future seed needs.

#### Thrust programme

Taking forecast of good weather into account, the GOI decided to launch some thrust programmes in 1988-89. These programmes included Special Foodgrain Production Programme, National Pulses and Oilseeds Development Programme, Intensive Jute and Cotton Development Programme, Wasteland Development and Reclamation of Alkali Soils. All these efforts put together led to higher consumption of fertilisers. Besides, it was felt that, in a way, increased fertiliser consumption is synonymous to increased agricultural production. Therefore, the following steps were

taken to increase fertiliser consumption:

- i) Ensuring adequate supply of fertilisers
- ii) Promotion of support service through the District Lead fertiliser scheme
- iii) Opening of additional retail outlets in remote, hilly and inaccessible areas
- iv) Extension/promotional support by fertiliser industry.

Fertilisers were made available at affordable prices in order to promote their use. Fertiliser production and distribution system were geared up.

The system of Lead Fertiliser Suppliers both at district and state levels introduced from Rabi 1986-87 is being continued and now covers all the states and UTs. Lead Suppliers help the state governments in assessing the demand for fertilisers and also undertake some promotional activities. They prepare action plans and chalk-out strategy for increased fertiliser consumption for each district.

Extension/promotional support by fertiliser industry—Indian fertiliser industry has played a key role in increasing agricultural production and productivity through its multifaceted promotional and extension activities. Some of the important programmes in this direction are:

#### General

##### a) Village adoption

Village adoption is a relatively recent concept of disseminating agricultural technologies. The entire village is treated as a unit instead of a field of a particular farmer and the work is continued for a few years with the aim of increasing the crop yields and maximising income of each farmer of the village. All the major fertiliser companies have adopted this method of farm technology transfer both in irrigated and rainfed areas.

##### b) Dryland project

Under this, the farmers are educated, convinced and trained to implementation of dryfarming technology to conserve maximum possible soil

moisture for optimum crop growth. GSFC, RCF, SFC, SPIC and HFC and many others have undertaken significant work in various parts of the country.

##### c) Crop seminars

Many industries organised crop seminars in different states. These seminars aim at disseminating new farm technology for the enhancement of

profit per unit time. The participants in such seminars are farmers besides district authorities and officials of the Dept. of Agriculture and agricultural universities and institutes. Minikits of HYV seeds and small bags of fertilisers are also distributed to farmers at such occasions.

##### d) Farmer's day/field day

To solve the current problems of farmers by discussion, farmers are

Table 25—MMTC's prices of imported rock (Jordan 70/72 per cent TPL) for consumers—1986-87 to 1988-89

Price effective from	Price on			Difference (4)-(2-3)
	Shipload delivery	Ex-jetty delivery@	Difference	
1. April, 1986	638 (+9)	788 (+8)	+150 [-1]	
2. July, 1986	595 (-43)	745 (-43)	+150 [-]	
3. October, 1986	627 (+32)	811 (+66)	+184 [+34]	
4. January, 1987	672 (+45)	856 (+45)	+184 [-]	
5. April, 1987	643 (-29)	821 (-35)	+178 [-6]	
6. July, 1987	649 (+6)	813 (-8)	+164 [-14]	
7. October, 1987	671 (+22)	836 (+23)	+165 [+1]	
8. January, 1988	690 (+19)	862 (+26)	+172 [+7]	
9. April, 1988	837 (+147)	1069 (+207)	+232 [+60]	
10. July, 1988	930 (+93)	1159 (+90)	+229 [-3]	
11. October, 1988	952 (+22)	1181 (+22)	+229 [-]	
12. January, 1989	1051 (+99)	1308 (+127)	+257 [+28]	
13. April, 1989	1130 (+79)	1364 (+56)	234 [-23]	

( ) = Increase/decrease over the previous notified shipload or ex-jetty prices.

@ = Only for Calcutta port.

[ ] = Increase/decrease between ex-jetty and shipload prices.

taken to a demonstration field where benefit of the modern technology is shown to them.

e) *Kisan melas*

For the benefit of farmers, crop seminar-cum-kisan melas are organised. Various topics like improved package of practices for cereals, millets, pulses and oilseeds, role of soil testing and plant protection measures are discussed.

*Special programmes*

*Project approach*

Instead of having isolated work it is always better to have a project approach for a particular area. The planning should be such that after educating the farmers the project should be self supporting. Indo-British Fertiliser Education Project and Indo-EEC Fertiliser Education Projects are some examples.

*Dryland horticulture*

Areas wherein production of field crop is limited by paucity of rainfall or physical features of the land, dryland horticulture is being advocated. Saplings of different fruit crops are being supplied by the industry.

*Agroforestry*

Lands not suited to crop cultivation are being put under agroforestry. IFFCO has undertaken in a big way agroforestry programme.

*Watershed management*

Integrated development of watershed, embracing conservation and productivity, is the key to environmentally sound and sustainable agricultural development. With a view to increase and stabilise productivity in rainfed areas, the Govt. has accorded high priority for development of rainfed agriculture on watershed basis. The objective of watershed management encompasses efficient utilisation of resources namely soil, water, crop, livestock, fishery and human population for sustained prosperity of the area. IFFCO, HFC and SPIC have done good work in this regard.

*National project on development of fertiliser use in low consumption rainfed areas*

It has been felt that the consumption is very low in rainfed areas. The

Table 26—RSMM's prices of Udaipur rock for consumers 1986-87 to 1988-89 (April-March)

Price effective from	Price f.o.r. despatching station (on cash basis)		
	1" chips	Ground and bagged material	Differential
(1)	(2)	(3)	(4)=(3-2)
1. 1-4-1986	696 (+18)	796 (+18)	+100 [—]
2. 13-8-1986	696 (—)	816 (+20)	+120 [+20]
3. 3-9-1986	653 (-43)	773, 847* (-43)	+120 [—]
4. 7-11-1986	685 (+32)	805, 847* (+32)	+120 [—]
5. 20-12-1986	685 (—)	822, 847* (+17)	+137 [+17]
6. 20-1-1987	730 (+45)	867, 847* (+45)	+137 [—]
7. 20-5-1987	701 (-29)	838, 847* (-29)	+137 [—]
8. 3-8-1987	707 (+6)	844, 847* (+6)	+137 [—]
9. 1-10-1987	737 (+30)	874, 847* (+30)	+137 [—]
10. 15-1-1988	748 (+11)	885, 847* (+11)	+137 [—]
11. 1-4-1988	949 (+192)	1030* (+183)*	— [—]
12. 1-7-1988	1048 (+108)	1150* (+120)*	— [—]
13. 1-10-1988	1070 (+22)	—	— [—]
14. 1-1-1989	1169, 1180@ (+99)	1283*	— [—]
15. 1-4-1989	1248, 1259@ (+70)(+79)	1369* (+86)*	— [—]

( ) = Increase/decrease over the previous notified prices @ = +1" chips.

\* = Beneficiated rock.

[ ] = Increase/decrease between the prices of ground and chips materials.

Note: 1. Royalty is extra which has gone up from Rs. 5 to Rs. 15 per tonne w.e.f. 23-7-1981 for chips and ground materials, further enhanced to Rs. 45 per tonne w.e.f. 5-5-1987.

2. Royalty for beneficiated rock is fixed at Rs. 25 per tonne w.e.f. 3-9-1986.

main reasons for low fertiliser consumption are non-availability of fertilisers in time and in proximity, risk involved in agriculture and lack of awareness besides paucity of soil moisture and poor economic status of the farmers. Rainfed agriculture contributes about half of the total production and we cannot afford to ignore these areas. Therefore, the GOI decided to open additional retail outlets in these areas, block demonstrations and farmers' training.

Various promotional activities by the concerned agencies resulted in increased use of fertilisers thereby, increasing the foodgrain production. The pattern of fertiliser use in the year under review is presented in Table 20.

#### Plant nutrients consumption

The fertiliser consumption in terms of nutrients per hectare of gross cropped area over the last three years indicates an increase of 12.8 kg/ha during 1988-89 compared to the previous year.

This is the record increase in per hectare consumption of fertiliser nutrients in a year. The consumption of N increased consistently over the preceding years and in 1988-89 the increase was 8.6 kg/ha as compared to the previous year. The consumption of  $P_2O_5$  and  $K_2O$  increased correspondingly by 3.0 and 1.2 kg/ha during the same period. The factors that contributed to the record increase in consumption were excellent monsoon, better coordination between agriculture, irrigation and electricity departments, availability of soft term loan, the Government and industry sponsored extension activities towards increased use of fertiliser.

During the year under review, there was a considerable increase in (kg/ha) consumption in all the zones (Table 20). The maximum increase during 1988-89 over the previous year was witnessed in South Zone (22.4 kg/ha) followed by North Zone (19.3 kg/ha), East Zone (7.4 kg/ha) and West Zone (7.2 kg/ha). The trend in consumption between the zones continued to be as in previous years. North Zone with a consumption level of 22.4 kg/ha continued to lead the others. The reasons for higher increase in Northern Zone include higher area

under HYV and irrigation facilities, better physical and institutional infrastructure like roads, markets, credit institutions and, above all, the necessary dynamic character of the farmers to take advantage of the new farm technology.

Consumption of nitrogen per hectare continued to increase in East, West and South Zones while in North Zone, there was a slight decrease in 1987-88. During the year under review there was an increase in N consumption kg/ha in all the zones. In the case of  $P_2O_5$  the consumption increased in all the zones. Consumption of  $K_2O$  in all the zones, which was almost static in the preceding years, increased appreciably in the year under review (1988-89).

It is encouraging to note that there was a continuous increase in the per hectare consumption of nutrients in the country though it was still far below the desired level of consumption.

#### Nutrient consumption ratio

The consumption ratio of major plant nutrients, viz., N,  $P_2O_5$ , ( $K_2O$  with unity) remained almost the same during 1986-87 to 1988-89 (Table 21).

To achieve the desirable average ratio of 4:2:1 under Indian condition for maintaining high soil fertility and productivity, we have still to stimulate further the consumption of  $P_2O_5$  and  $K_2O$ . Effective promotional measures have, therefore, to be taken by the Government and all other concerned agencies to educate the farmer on the importance of balanced use of fertiliser which is an important prerequisite to efficient use of fertilisers.

From the above, it is clear that the pattern of rainfall, timely availability of inputs, particularly quality seed and fertilisers, policies of the Government and the extension support by the concerned agencies are the major factors deciding the consumption level of fertilisers. It will not be an exaggeration if we say that the growth in fertiliser consumption is synonymous to agricultural growth in India.

## 8. IMPACT OF FERTILISER USE ON FOODGRAINS PRODUCTION

Indian Agriculture has made an impressive growth and come a long way since the early fifties. The introduction of HYVs in mid 60's and consistent development of irrigation facilities, backed by judicious use of fertiliser, marked a major breakthrough in enhancing the productivity as well as production of foodgrains. Needless to say that the full impact of area extension under HYVs and irrigation, coupled with technology transfer, is realised in presence of fertiliser which constitutes the single most important input in boosting the foodgrains production.

Before the introduction of HYVs, increase in foodgrains production was witnessed through the expansion of net area under cultivation. With the introduction of HYVs, productivity received due emphasis it deserves towards increasing the foodgrains production. Attempts to increase the crop yield per hectare fructified through intensive as well as extensive use of fertiliser. Table 22 amply depicts this situation and establishes that there is a positive co-relation between the fertiliser use and foodgrains production particularly, under favourable weather conditions. The time series data presented in Table 23 supports this axiom though, there have been some years when foodgrains production had either declined or marginally increased despite reasonable increase in fertiliser consumption mainly due to inclement weather. There is a nexus between favourable weather, fertiliser consumption and foodgrain production with other factors remaining more or less the same.

This nexus is vitiated under unfavourable weather conditions as 70 per cent of the area is still rainfed which contributes approx. 45 per cent of total foodgrains production. It would be of interest to note that, with the advent of HYVs, its extension in ever expanding irrigated and assured rainfall areas and intensive manuring of crops in such areas, higher foodgrains production holds promise through improvement in productivity.

It will be seen from Table 23 that the foodgrains production during unfavourable weather years in 50's and



Table 27—MMTC's prices of sulphur for consumers—1986-87 to 1988-89 (April-March)  
(For Fertiliser Industry)

(Rs./tonne)

Price effective from	Price on				
	Shipload delivery	Ex-jetty delivery	Ex-godown delivery	Differential	
(1)	(2)	(3)	(4)	(5)=(3-2)	(6)=(4-3)
1. April 1986	2023 (—)	2163 (-1)	2188 (-1)	+140 [-1]	+20 [-]
2. July 1986	1958 (-65)	2098 (-65)	2118 (-65)	+140 [-]	+20 [-]
3. October 1986	1795 (-163)	2028 (-70)	2048 (-70)	+233 [+98]	+20 [-]
4. January 1987	1838 (+43)	2075 (+47)	2095 (+47)	+237 [+4]	+20 [-]
5. April 1987	1658 (-180)	1863 (-212)	1949 (-146)	+205 [-32]	+86 [+66]
6. July 1987	1459 (-199)	1634 (-229)	1720 (-229)	+175 [-30]	+86 [-]
7. October 1987	1539 (+80)	1715 (+81)	1801 (+81)	+176 [+1]	+86 [-]
8. January 1988	1599 (+60)	1784 (+69)	1870 (+69)	+185 [+9]	+86 [-]
9. April 1988	1665 (+66)	1850 (+66)	1948 (+78)	+185 [-]	+98 [+12]
10. July 1988	1800 (+135)	2001 (+151)	2090 (+142)	+201 [+16]	+89 [-9]
11. October 1988	2021 (+221)	2227 (+226)	2316 (+226)	+206 [+5]	+89 [-]
12. January 1989	2053 (+32)	2280 (+63)	2355 (+39)	+227 [+21]	+75 [-14]
13. April 1989	2207 (+154)	2418 (+188)	2507 (+152)	+211 [-16]	+89 [+14]

( ) = Increase/decrease over the previous notified shipload, ex-jetty or ex-godown prices.

[ ] = Increase/decrease between ex-jetty and shipload prices as well as between ex-godown and ex-jetty prices.

early 60's used to fall to a much lower level (troughs) than what is currently witnessed in the 80's. This is due to the fact that, over the years, the impact of unfavourable weather on foodgrains production got significantly reduced due to the increase in fertiliser consumption supported by HYV area, irrigation, etc. Likewise, peaks in favourable weather years are successively becoming higher and higher. This supports the point that a strong agricultural base has been established over the years—thanks to the consistent efforts made towards transfer of technology which is bearing fruit.

Continuing efforts would have to be made to promote greater use of fertiliser not only in irrigated and assured rainfall areas but also in rainfed and dryland areas which hold promise to augment foodgrains productivity and, hence, production.

Productivity level varying considerably from one area to another, there is scope for improving the same through proper use of fertiliser and farming technology improvised to suit such areas which would ultimately raise the foodgrains production at the National level.

#### 9. CREDIT SCENE

The credit scene during the year presented an encouraging picture. In the Union Budget for 1988-89, a reduction of 1-1½ per cent on crop loans upto Rs. 7500 was announced besides raising the provision of finance for agricultural sector to 17 per cent of the total direct advances by public sector banks. Considering continued difficulties of the industry in view of high levels of stocks despite good weather, the facility of adhoc cash credit accommodation allowed by the RBI also continued during 1988-89. Also, taking cognizance of fundamental changes in the marketing scene involving increased stocking responsibilities on the manufacturers, the RBI also constituted a Sub-Group, including FAI and some industry representatives, to look into the receivable norms for the Fertiliser industry. The Group has submitted its Report to the RBI on the basis of which existing norms are to be liberalised. Meanwhile, the Budget for 1989-90 offered some

more concessions for the agricultural sector involving 2 per cent reduction in interest on advances in the range of Rs. 10,000-25,000 and a further step up of 1 per cent in the provision of agricultural loans as a percentage of total direct advances of the public sector banks to 18 per cent.

#### 10. TAXATION

On the taxation side, the industry got some relief by way of issue of relevant notification to exempt some of the inputs and intermediates such as reformed gas, SO<sub>2</sub> and SO<sub>3</sub> used captively in the process of manufacture of fertilisers. This ended a three-year period of incessant problems arising from biased interpretation of the Central Excise Tariff Act (CETA), 1985 by local excise authorities in different parts of the country. While the Budget has sought to impose 8 per cent employment surcharge to mop up resources for financing the Jawahar Rojgar Yojana, it is expected that the consequential burden of this will be compensated through appropriate adjustment in fixation of the retention price as in the immediate past, when for the year 1988-89 the 5 per cent drought relief surcharge, introduced in 1987-88, was suitably compensated in fixation of pre-tax return.

#### 11. PRICING

Notwithstanding fairly brisk oil-take of fertilisers in an overall situation of good weather as also continued improvement in the performance of the industry in terms of higher capacity utilisation and energy efficiency etc., the Industry's financial health suffered mainly because of the changes in the basic parameters of pricing i.e. capacity utilisation norm, depreciation and normative production levels applicable with retrospective effect i.e. 1.4.1988. The impact of change in the pricing policy has been severe for the new units i.e. those commissioned after 1.4.1982, which were also required to refund heavy amounts in respect of the provisional subsidy received during 1988-89 on the basis of retention prices relevant to the Fourth Pricing Period. This not only meant significant erosion in profitability, but also, precipitated a serious li-

quidity crisis. The recently commissioned units have also suffered heavily under the revised parameters of pricing creating problems even with regard to timely repayment of loan instalments to the financial institutions.

The FAI has made detailed representation to the Government and it is hoped that a rational view would be taken to avoid adverse impact on the continued health and growth of the industry.

#### 12. PRICES

##### *Imported fertilisers*

International prices of fertilisers have been highly volatile, particularly since the sharp growth in fertilisers consumption in the developing countries and centrally Planned Economies during the last two decades. Notwithstanding creation of large indigenous capacities in these countries, wide gap between consumption and production continues to persist. International price of fertilisers is largely influenced by the global demand-supply balance which, in turn, is influenced by the level of imports by the major importing countries. India is one of the major importers of fertilisers in the form of urea, DAP and MOP.

Table 24 presents the international price of urea, DAP and MOP from 1981 to the first half of 1989. Price of urea and DAP started declining from May 1986 and was the lowest towards the end of 1986. Thereafter, it started increasing from January 1987 and, since then, the rising trend has continued. During 1988, the price of urea went up to \$95-146—an increase of \$16 a tonne compared to 1987. Although India did not purchase urea during 1988 except a nominal quantity (0.11 million tonnes) under bilateral agreement and yen credit, entry of China influenced the rise in price. A further increase of \$5-10 was observed during the first half of 1989. DAP price at \$172-230 per tonne witnessed an increase of the order of \$20-35 a tonne during 1988 compared to 1987 as India bought nearly 0.86 million tonnes of DAP during 1988-89. However, during first half of 1989 DAP price range did not change compared to 1988.

**Table 28—Current maximum sale prices of fertilisers in terms of material and nutrient—effective 31-1-1986 (vis-a-vis 29-9-83 and 11-7-81)**

Material	Maximum selling price (Rs./tonne net)			Increase/decrease in material prices				Maximum selling price		
	Effective from			31-1-86 over 29-6-83		29-6-83 over 11-7-81		Effective from		
	11-7-81	29-6-83	31-1-86 (current)	Amount (Rs./tonne net)	Per cent	Amount (Rs./tonne net)	Per cent	11-7-81	29-6-83	31-1-86 (current)
(1)	(2)	(3)	(4)	(5)=(4-3)	(6)	(7)=(3-2)	(8)	(9)	(10)	(11)
		<b>Material</b>						<b>Nutrient N</b>		
1. Ammonium sulphate (20.6% N)	Decontrolled w.e.f. 8-6-80	1,500 <sup>1</sup>	1,650	150	10.0			Decontrolled w.e.f. 8-6-80	7.28 <sup>1</sup>	8.01
2. a) Calcium ammonium nitrate (26% N)		1,615 <sup>2</sup>	1,770	155	9.6				6.21 <sup>3</sup>	6.81
b) Calcium ammonium nitrate (25% N)		1,550	1,700	150	9.7				6.20	6.80
3. Ammonium chloride (25% N)	—	1,550 <sup>3</sup>	1,700	150	9.7			6.20 <sup>3</sup>	6.80	
4. Urea (46% N)	2,350	2,150	2,350	200	9.3	-200	-8.5	5.11	4.67	5.11
								<b>Nutrient P<sub>2</sub>O<sub>5</sub></b>		
5. a) SSP (61% WS P <sub>2</sub> O <sub>5</sub> )										
—Powder	940 <sup>4</sup>	850	950	100	11.8	-90	-9.6	5.87 <sup>4</sup>	5.31	5.94
—Granular	1,070 <sup>4</sup>	1,000	1,100	100	10.0	-70	-6.5	6.69 <sup>5</sup>	6.25	6.88
b) SSP (14% WS P <sub>2</sub> O <sub>5</sub> )										
—Powder	820 <sup>5</sup>	750	820	70	9.3	-70	-8.5	5.86 <sup>5</sup>	5.36	5.86
6. TSP (46% P <sub>2</sub> O <sub>5</sub> )										
—Powder	2,400	2,200	2,400	200	9.1	-200	-8.3	5.22	4.78	5.22
—Granular	2,600	2,400	2,600	200	8.3	-200	-7.7	5.65	5.22	5.65
7. Urea ammonium phosphate										
24-24-0	3,050	2,800	3,050	250	8.9	-250	-8.2	7.60	7.00	7.60
28-28-0	3,600	3,350	3,600	250	7.5	-250	-6.9	7.75	7.29	7.75
14-35-14	3,400	3,150	3,400	250	7.9	-250	-7.4	6.80	6.33	6.80
8. Ammo. phosphate sulphate										
16-20-0	2,300	2,150	2,300	150	7.0	-150	-6.5	7.41	7.01	7.41
20-20-4	2,600	2,400	2,600	200	8.3	-200	-7.7	7.89	7.33	7.89
9. Diammonium phosphate										
18-46-0	3,600	3,350	3,600	250	7.5	-250	-6.9	5.63	5.46	5.83
10. Nitrophosphate with potash										
15-15-15	2,100	1,950	2,100	150	7.7	-150	-7.1	6.72	6.33	6.72
11. Nitrophosphate										
20-20-0	2,400	2,200	2,400	200	9.1	-200	-8.3	6.29	6.33	6.89
12. NP/NPK fertilisers										
17-17-17	2,600	2,400	2,600	200	8.3	-200	-7.7	8.01	7.45	8.01
14-28-14	3,050	2,800	3,050	250	8.9	-250	-8.2	7.25	6.66	7.25
19-19-19	2,950	2,750	2,950	200	7.3	-200	-6.8	8.25	7.80	8.25
10-26-26	2,950	2,750	2,950	200	7.3	-200	-6.8	7.21	6.78	7.21
12-32-16	3,250	3,000	3,250	250	8.3	-250	-7.7	7.16	6.62	7.16
								<b>Nutrient K<sub>2</sub>O</b>		
13. MOP (60% K <sub>2</sub> O)	1,300	1,200	1,300	100	8.3	-100	-7.7	2.17	2.00	2.17
14. SOP (50% K <sub>2</sub> O)	2,100	1,950	2,100	150	7.7	-150	-7.1	4.20	3.90	4.20

<sup>1</sup>=w.e.f. 21-8-84    <sup>2</sup>=w.e.f. 7-9-84    <sup>3</sup>=w.e.f. 19-4-85    <sup>4</sup>=w.e.f. 23-3-82    <sup>5</sup>=w.e.f. 13-7-82

Note:—1. Prices of all fertilisers are under statutory control w.e.f. 19-4-85

2. w.e.f. 31-1-86 prices of all fertilisers have been reverted to the level of 11-7-81 except SSP (powder and granular) containing 16% w.s. P<sub>2</sub>O<sub>5</sub>.

Table 29—Economics of application of N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O on paddy and wheat

Particulars	1971-72	1974-75	1979-80	1980-81	1981-82	1983-84	1985-86	1986-87	1987-88	1988-89	1989-90
<b>A. FERTILISER &amp; FOODGRAINS PRICES (Rs./kg)</b>											
<b>Nutrient prices (Rs./kg)</b>											
1. N—based on urea	2.01	4.35	3.15	4.35	5.11	4.67	5.11	5.11	5.11	5.11	5.11
2. P <sub>2</sub> O <sub>5</sub> —based on SSP	2.89	5.33	3.54	4.72	4.88						
to		to	to	to	to	5.31	5.94	5.94	5.94	5.94	5.94
—based on DAP	3.53	5.93	4.60	5.62	6.11						
—based on complex	1.86	4.83	3.55	4.93	5.83	5.46	5.83	5.83	5.83	5.83	5.83
to	2.46	5.00	4.18	5.81	6.72	6.33	6.72	6.72	6.72	6.72	6.72
to	2.87	9.92	4.98	6.98	8.25	7.80	8.25	8.25	8.25	8.25	8.25
3. K <sub>2</sub> O—based on MOP	0.89	2.05	1.34	1.83	2.17	2.00	2.17	2.17	2.17	2.17	2.17
<b>Output prices (Rs./kg)</b>											
4. Procurement prices of paddy	0.53	0.74	0.95	0.95	1.05	1.22	1.42	1.46	1.50	1.60	1.75
5. Procurement prices of wheat	0.76	1.05	1.15	1.17	1.30	1.51	1.62	1.66	1.73	1.79	1.88
<b>B. PHYSICAL RETURNS</b>											
<b>Paddy</b>											
6. Kg of paddy required to buy 1 kg N	3.79	5.88	3.32	4.58	4.87	3.83	3.60	3.50	3.41	3.19	2.92
7. Kg of paddy required to buy 1 kg P <sub>2</sub> O <sub>5</sub>											
—as SSP	5.45	7.20	3.73	4.97	4.65						
to	4.64	5.65	4.00	4.80	4.70	4.35	4.18	4.07	3.96	3.71	3.39
—as DAP	3.51	6.83	3.74	5.19	5.55	4.48	4.11	3.99	3.89	3.64	3.33
—as complex	4.64	6.76	4.40	6.12	6.40	5.19	4.73	4.60	4.48	4.20	3.84
to	5.60	13.41	5.24	7.85	7.86	6.39	5.81	5.65	5.50	5.16	4.71
8. Kg of paddy required to buy 1 kg K <sub>2</sub> O	1.68	2.77	1.41	1.93	2.07	1.64	1.53	1.49	1.45	1.36	1.24
<b>Wheat</b>											
9. Kg of wheat required to buy 1 kg N	2.64	4.14	2.74	3.72	3.93	3.09	3.15	3.08	2.95	2.95	2.79
10. Kg of wheat required to buy 1 kg P <sub>2</sub> O <sub>5</sub>											
—as SSP	3.80	5.08	3.08	4.03	3.75						
to	4.64	5.65	4.00	4.80	4.70	3.52	3.67	3.58	3.43	3.43	3.25
—as DAP	2.45	4.80	3.09	4.21	4.48	3.62	3.60	3.51	3.37	3.37	3.19
—as complex	3.24	4.76	3.63	4.97	5.17	4.19	4.15	4.05	3.88	3.88	3.67
to	3.91	9.45	4.33	5.97	6.35	5.17	5.09	4.97	4.77	4.77	4.51
11. Kg of wheat required to buy 1 kg K <sub>2</sub> O	1.17	1.95	1.17	1.56	1.67	1.32	1.34	1.31	1.25	1.25	1.19
<b>C. GROSS FINANCIAL RETURN ON EVERY RUPEE INVESTED IN FERTILISERS (Rs)</b>											
<b>Paddy</b>											
12. Return from nutrient N	2.64	2.04	3.62	2.62	2.47	3.13	3.33	3.43	3.52	3.76	4.11
13. Return from nutrient P <sub>2</sub> O <sub>5</sub>											
—based on SSP	1.10	0.97	1.88	1.41	1.51						
to	0.90	0.87	1.45	1.18	1.20	1.61	1.67	1.72	1.77	1.89	2.06
—based on DAP	1.71	1.07	1.87	1.35	1.26	1.56	1.70	1.75	1.80	1.92	2.10
—based on complex	1.29	1.04	1.59	1.14	1.09	1.35	1.48	1.52	1.56	1.67	1.82
to	1.07	0.52	1.34	0.95	0.89	1.09	1.20	1.24	1.27	1.6	1.48
14. Return from nutrient K <sub>2</sub> O	2.38	1.80	3.54	2.60	2.42	3.05	3.27	3.36	3.48	3.69	4.03
<b>Wheat</b>											
15. Return from nutrient N	3.73	2.90	4.38	3.23	3.05	3.88	3.80	3.90	4.06	4.06	4.30
16. Return from nutrient P <sub>2</sub> O <sub>5</sub>											
—based on SSP	1.58	1.38	2.27	1.74	1.86						
to	1.29	1.24	1.75	1.46	1.49	1.99	1.91	1.96	2.04	2.04	2.16
—based on DAP	2.45	1.52	2.27	1.66	1.56	1.94	1.95	1.99	2.08	2.08	2.20
—based on complex	1.85	1.26	1.65	1.21	1.16	1.43	1.45	1.48	1.54	1.54	1.63
to		0.64	1.39	1.01	0.95	1.16	1.18	1.21	1.26	1.26	1.33
17. Return from nutrient K <sub>2</sub> O		2.56	4.29	3.20	3.00	3.78	3.73	3.82	3.99	3.99	4.22

For 1971-72, incremental response of extra product per additional kg of nutrient) for paddy and wheat assumed for analysis are:  
 For 1974-75 and thereafter: P<sub>2</sub>O<sub>5</sub>=6 K<sub>2</sub>O=4  
 P<sub>2</sub>O<sub>5</sub>=7 K<sub>2</sub>O=5  
 Note: Prices of fertilisers mentioned against years 1971-72 and 1974-75 are as on 1st April.

**Raw materials**

Production of phosphatic fertilisers is largely dependent on imported raw materials or intermediates in the form of phosphate rock and sulphur or phosphoric acid and ammonia. Despite reserves of indigenous rock available at various places, viz., Jhamarkotra (Rajasthan); Meghnagar, Hirapur and Sagar (MP); Maton (Rajasthan); Lalitpur (UP); Mussoorie (UP) and Purulia (W. Bengal) only Jhamarkotra rock is technically suitable to provide minimum phosphate content for production of single super phosphate. Rock from other sources is primarily used for mixture manufacture. Mussoorie Phos. and Purulia rock are used for direct application on soils. Currently, only a quarter of the total requirement of phosphate rock is available from domestic sources and the balance demand is met through imports which is being canalised by MMTC. Table 25 shows the trends in prices of imported rock as notified quarterly by MMTC for the period April '86 to April '89. It is interesting to note that shipload delivery price of imported rock which remained between Rs. 627 and Rs. 690 per tonne during April '86 to January '88 went up sharply to Rs. 837 during April/June 88 and as high as Rs. 1130 per tonne during April/June 89. Ex-jetty price which was higher by Rs. 150 per tonne than shipload price went up steadily to Rs. 234 per tonne effective April 89.

Table 26 shows the changes in the prices of Jhamarkotra rock from 1986-87. A steady increase in price of Jhamarkotra rock was observed from 1987-88 with a sharp rise particularly from April 88. The price of 1/2" chips at Rs. 730 per tonne during January 87 went up to Rs. 940 per tonne during April 88 and Rs. 1248 effective April 89. Price of Jhamarkotra rock has been increasing exactly by the same amount as the increase in the price of imported rock.

Almost the entire requirement of sulphur is met through imports except a nominal quantity available from petroleum refineries. Table 26 shows the changes in prices of sulphur from 1986-87 to 1988-89. Ex-jetty price came down from Rs. 2163 per tonne during April/June 86 to Rs. 1634 per tonne during July/September 87 only

to rise again upto Rs. 2418 per tonne during April/June 89. The difference between ex-jetty and ex-godown price at Rs. 20 per tonne upto January 87 went up abruptly to Rs. 86 from April 87 and Rs. 89 from April 89.

**Domestic fertiliser prices**

Table 28 shows the current maximum sale price of all fertilisers (statutorily controlled) effective January 31, 1986 and compared with corresponding previous prices effective June 29, 1983 and July 11, 1981. With a view to boost up fertiliser consumption, Govt. of India allowed 7.5 per cent discount on notified urea price during the year 1988-89. This brought down the urea price to Rs. 2173.75 per tonne to the farmers.

The table also provides fertiliser prices in terms of nutrients N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O.

**13. ECONOMICS OF FERTILISER USE**

Table 29 shows the changes in the cost/benefit ratio in relation to the application of fertilisers. This has been analysed both in terms of physical return and gross financial return.

It may be observed from the table that with the consistent rise in procurement prices of paddy and wheat and fertiliser prices having remained unchanged since January 31, 1986, the economics of application of fertiliser has become more favourable to the farmers.

In terms of physical return, the ratio of kgs of agricultural produce (paddy/wheat) required to purchase a kg of nutrient has successively reduced compared to the previous period. Similarly, gross financial return, i.e. the ratio of the value of additional crop output to the value of additional nutrient use has become consistently higher than in the past. It may be interesting to mention that during the last two decades, this ratio was the most favourable during

1979-80. However, with the revision in procurement price of paddy during 1989-90, the derived ratio surpassed the one achieved during 1979-80. Similarly, ratio of wheat nearly reached the level attained during 1979-80.

**14. SPECIAL FOODGRAINS PRODUCTION PROGRAMME**

After a critical review of the foodgrains production in the mid-term appraisal of the Seventh Plan, the target of foodgrains production at 166.6 million tonnes for 1988-89 and 175.2 million tonnes for the terminal year of the Seventh Plan (1989-90) were fixed by the Govt. of India. With a view to achieve this target, a Special Foodgrains Production Programme (SFPP) was launched from Kharif 1988 in 169 districts in 14 states, viz., Andhra Pradesh (8), Assam (3), Bihar (18), Gujarat (7), Haryana (7), Karnataka (9), Tamil Nadu (8), UP (38), MP (30), Maharashtra (12), Orissa (5), Punjab (3), Rajasthan (14), and West Bengal (7). Special emphasis was laid on increasing the production of five principal crops viz., Rice, Wheat, Maize, Arhar and Gram in the potential areas taking district as a unit for planning. The objective under SFPP is to concentrate efforts in potential districts with adequate irrigation facilities and/or high rainfall, better input management and optimising irrigation efficiency. The following strategy is being implemented to boost production in the potential areas:

- Increased fertiliser use by 20 kgs of nutrient/ha.
- Use of improved/high yielding variety of seeds.
- Better management of weeds and timely control of pests and diseases.
- Harvesting ground water resources and efficient use of irrigation water.
- Increased flow of short-term and long-term credit.