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A DISTRICT-LEVEL ANALYSIS OF FERTILISER CONSUMPTION IN INDIA

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Abstract

A district-level analysis of fertiliser consumption/ha based on data for 346 districts is presented. During 1984-85, the number of districts with a nutrient consumption of 10 kg/ha or less was 95 for N, 214 for P and 302 for K. Mean farm-level investment in fertilisers varied from Rs 3/ha to Rs 1600/ha among districts with an all-India mean of Rs 228/ha. Such analyses may be useful in the formulation of area-wise on-target fertiliser promotion programmes.

Introduction

The overall consumption of fertiliser nutrients in India reached 46 kg/ha of gross cropped area in 1984-85. This was made up of 31 kg N, 10.7 kg P_2O_5 and 4.7 kg K_2O in the proportion of 100:35:15. District-level data on total nutrients consumed are periodically published in the Fertiliser Statistics compiled by the Fertiliser Association of India which have formed the data base for this study.

There are very few analyses which provide a consolidated picture of the levels of fertiliser usage per hectare attained by different districts, their stage of development, the levels of investments made by the farmers in different parts of the country, lessons to be learnt from the high consumption districts and the programmes which could improve fertiliser usage in low consumption districts.

This paper reports on the distribution of districts according to the levels attained in consumption of N, P and K per unit cropped area. It is part of a larger study which aims to examine such variations in the intensity of fertiliser use and factors affecting them. For example, there are 40 districts in which mean usage of nutrients has reached or crossed 100 kg/ha mark. A study of the characteristics of such districts could help to develop models which may be useful for fertiliser development programmes for low-consumption

areas in future keeping in view that a consumption figure of 25 million tonnes by 2000 AD is currently being mentioned.

Methodology

The study is based on the district-level nutrient consumption data for 1984-85. Such data were available for 16 states. Some states and territories which either had small cultivated area or a minor share in fertiliser use have not been included. In all the study is based on data from 346 districts of India.

Nitrogen-use Pattern

India is the fourth largest producer as well as user of nitrogenous fertilisers. The N-use level among the districts varied from negligible to about 140 kg/ha. There were still 95 districts in 1985 which used 10 kg or less of N/ha (Table 1). In almost half the districts, N-use was 20 kg or less (the level usually recommended for the N-fixing legumes as a starter). Three-fourth of the districts had not yet crossed 40 kg N/ha mark.

Districts with very low N consumption were predominantly in the states of Assam, Bihar, H.P., Kerala, Madhya Pradesh, Orissa and Rajasthan. Fifteen districts have reached 100 kg N/ha (farm investment of Rs 500/ha and above in N) out of which 8 were in Punjab, 4 in Andhra Pradesh, 2 in Haryana and 1 in Tamil Nadu.

Phosphorus-use Pattern

Overall P-usage in India reached 10.7 kg P_2O_5/ha, that is about one-third of N. Over 60 per cent districts consumed 10 kg P_2O_5/ha or less (Tandon, 1986). The district-level pattern of P-consumption shows that in 114 or one-third of the total districts, P-usage was less than 5 kg P_2O_5/ha (Table 2). Inspite of the fact that India is the 4th largest user of phosphatic fertilisers, consumption has not yet crossed 20 kg P_2O_5/ha in 90 per cent of the districts.

Barring the states of Tamil Nadu and Punjab, all states have several districts where P-usage is less than 10 kg/ha. This varies from 33 per cent districts in Kerala to 91-100 per cent districts in Assam and Madhya Pradesh. It is striking that in 12 out

Table 1—Distribution of districts according to the level of N-usage in India during 1984-85

State	Range in N consumption in kg/ha						
	5	6-10	11-20	21-40	41-60	61-100	101-150
Andhra Pradesh	0	1	1	12	2	2	4
Assam	10	0	0	0	0	0	0
Bihar	2	3	6	13	6	3	0
Gujarat	0	1	5	8	3	1	0
Himachal Pradesh	1	2	5	4	0	0	0
Haryana	1	0	1	5	3	0	2
Karnataka	1	1	3	11	1	2	0
Kerala	0	1	8	3	0	0	0
Maharashtra	1	4	11	7	1	1	0
Madhya Pradesh	13	13	16	3	0	0	0
Orissa	5	6	1	1	0	0	0
Punjab	0	0	0	0	0	4	8
Rajasthan	13	6	4	3	0	0	0
Tamil Nadu	0	1	0	2	5	6	1
Uttar Pradesh	6	2	3	12	17	17	0
West Bengal	0	1	2	9	1	2	0
Total	58	42	66	93	39	38	15

*District-level data not available for Jammu and Kashmir State.

Table 2—Distribution of districts according to the level of P-usage in India during 1984-85

State	Range in P consumption, kg P_2O_5/ha						
	5	6-10	11-20	21-40	41-60	61-100	100-150
Andhra Pradesh	3	3	11	3	2	0	0
Assam	10	0	0	0	0	0	0
Bihar	10	19	4	0	0	0	0
Gujarat	3	6	4	5	0	0	0
Himachal Pradesh	10	1	0	1	0	0	0
Haryana	2	6	3	1	0	0	0
Karnataka	2	3	8	6	0	0	0
Kerala	0	4	7	1	0	0	0
Maharashtra	11	11	3	0	0	0	0
Madhya Pradesh	21	20	4	0	0	0	0
Orissa	12	0	1	0	0	0	0
Punjab	0	0	1	6	5	0	0
Rajasthan	22	1	3	0	0	0	0
Tamil Nadu	0	2	7	5	0	0	1
Uttar Pradesh	8	17	31	1	0	0	0
West Bengal	0	7	6	2	0	0	0
Total	114	100	93	31	7	0	1

*District-level data not available for Jammu and Kashmir State.

of 13 Orissa districts, mean P-use is less than 5 kg/ha inspite of widespread P-deficiencies and sizable research on soil and fertiliser P in that state. Eight districts in India had crossed 40 kg P_2O_5/ha out of which 5 were in Punjab, 2 in Andhra Pradesh and 1 in Tamil Nadu.

Potassium-use Pattern

Overall potash use in India is 4.7 kg K_2O/ha, that is 15 per cent of N-use level. It ranges from negligible to over 100 kg K_2O/ha in the Nilgiris. In 74 per cent districts, K-use is less than 5 kg K_2O/ha (comparable to N-use of 1966-67). On the whole the intensity of potash usage is 18 years behind N and 9 years behind P. In only 15 districts has K-use crossed 20 kg K_2O/ha, 9 out of which are in the state of Tamil Nadu (Table 3). It is interesting to note that in Kerala and Tamil Nadu, mean usage of potash is higher than that of phosphate.

In a large number of districts in Kerala, Karnataka and Tamil Nadu, the N:K ratio is narrower than 100:25 (4:1) while in Punjab and Haryana the N:K ratios are as wide as 100:03. Thus as regards the N:K consumption ratio, the scenario is quite in contrast in the north compared to the southern parts of India. For instance, the entire state of Punjab consumed as much potash as was consumed in the Guntur district of Andhra Pradesh alone.

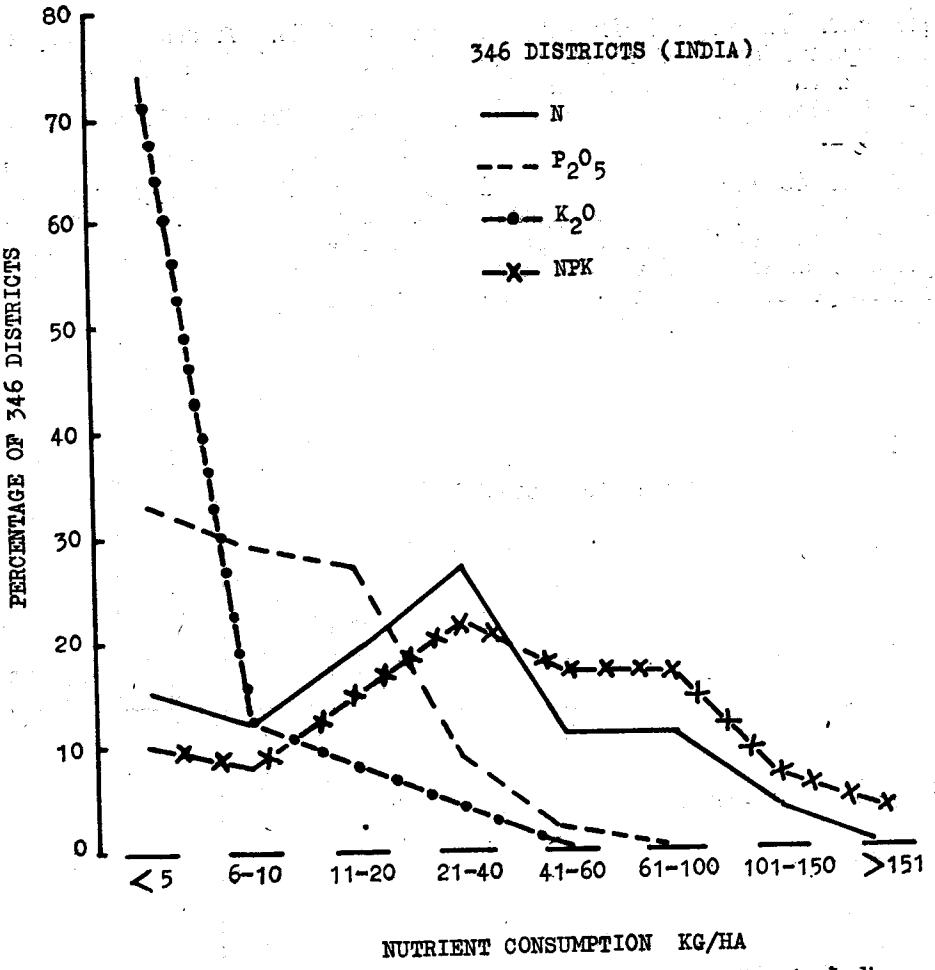

Figure 1—District level pattern of fertiliser consumption in India (1984-85)

Table 3 –Distribution of districts according to the level of K-usage in India during 1984-85

State	Range in K consumption, kg K_2O/ha						
	5	6-10	11-20	21-40	41-60	61-100	101-150
Andhra Pradesh	14	5	2	1	0	0	0
Assam	10	0	0	0	0	0	0
Bihar	26	6	1	0	0	0	0
Gujarat	15	1	2	0	0	0	0
Himachal Pradesh	10	1	1	0	0	0	0
Haryana	12	0	0	0	0	0	0
Karnataka	3	6	8	2	0	0	0
Kerala	0	3	8	1	0	0	0
Maharashtra	19	5	1	0	0	0	0
Madhya Pradesh	45	0	0	0	0	0	0
Orissa	12	1	0	0	0	0	0
Punjab	9	3	0	0	0	0	0
Rajasthan	26	0	0	0	0	0	0
Tamil Nadu	1	1	4	7	1	0	1
Uttar Pradesh	53	4	0	0	0	0	0
West Bengal	2	9	2	2	0	0	0
Total	257	45	29	13	1	0	1

*District-level data not available for Jammu and Kashmir State.

NPK-use Pattern

A consolidated picture of NPK usage/ha for the 346 districts is presentd in Figure 1. In about 60 per cent districts of India, the nutrient consumption is below the national average. There are still 112 districts where fertiliser use has not reached 20 kg nutrients/ha. It is clear that different parts of the country represent different stages of development in fertiliser use which is related to overall agricultural development. Such factors should be taken into account while formulating area-wise on-target fertiliser promotion and training pro-

grammes. The stages in fertiliser use development for selected states to cover a range in nutrient consumption (17-151 kg|ha) are illustrated in Figure 2.

About 40 districts have attained nutrient consumption of 100 kg|ha or more. These districts account for 11 per cent of the total cropped area and 32 per cent of the total fertiliser used in India. A detailed study of these districts is in progress.

Expenditure on Fertilisers

An Indian farmer spent on an average Rs 228 ($ 19)|ha on fertilisers during 1984-85. The amount varied 44 fold among major states, from Rs 18|ha in Assam to Rs 790|ha in Punjab.

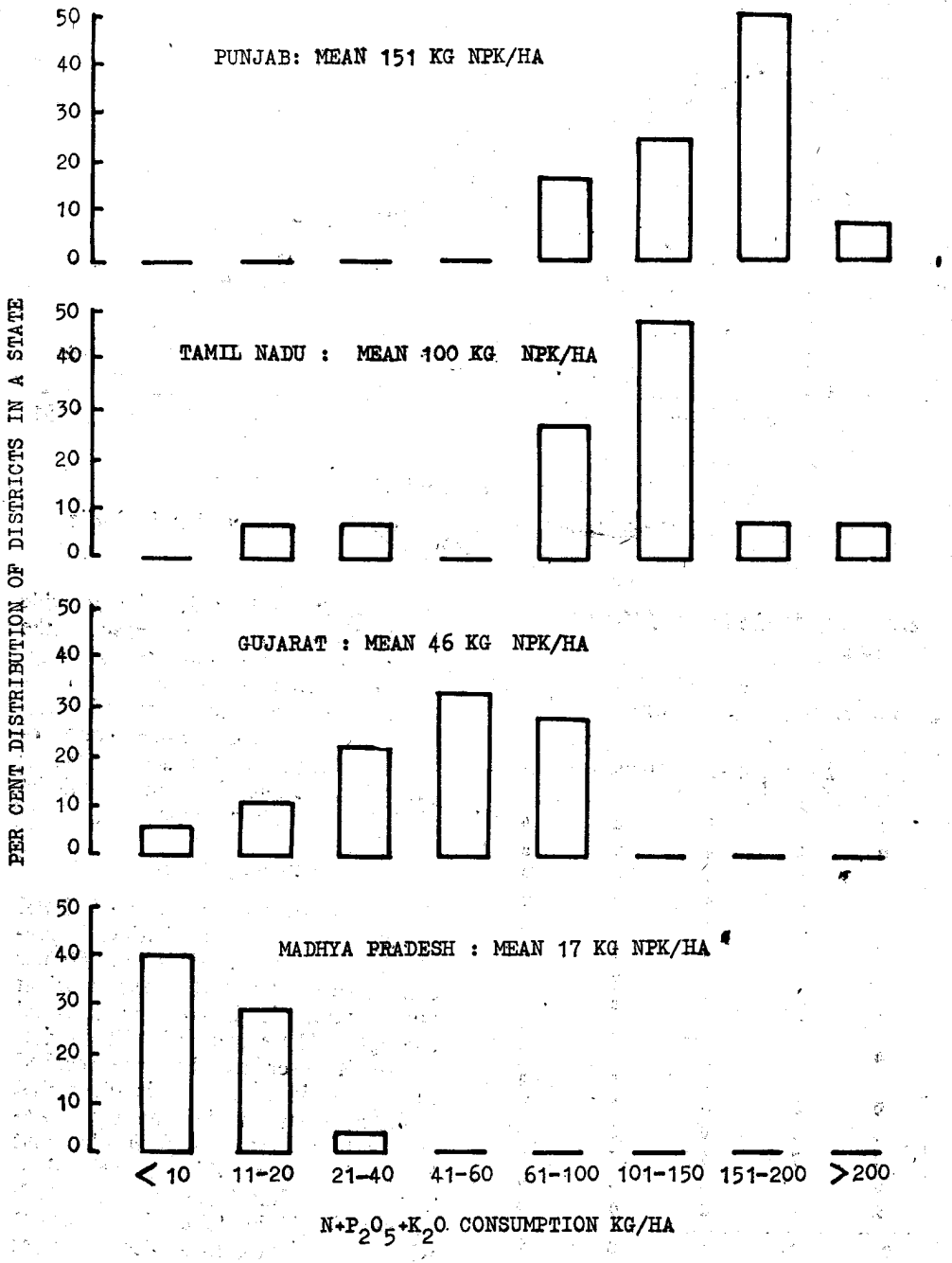

Figure 2—District level NPK-use pattern in four states of India at different stages of fertiliser use development.

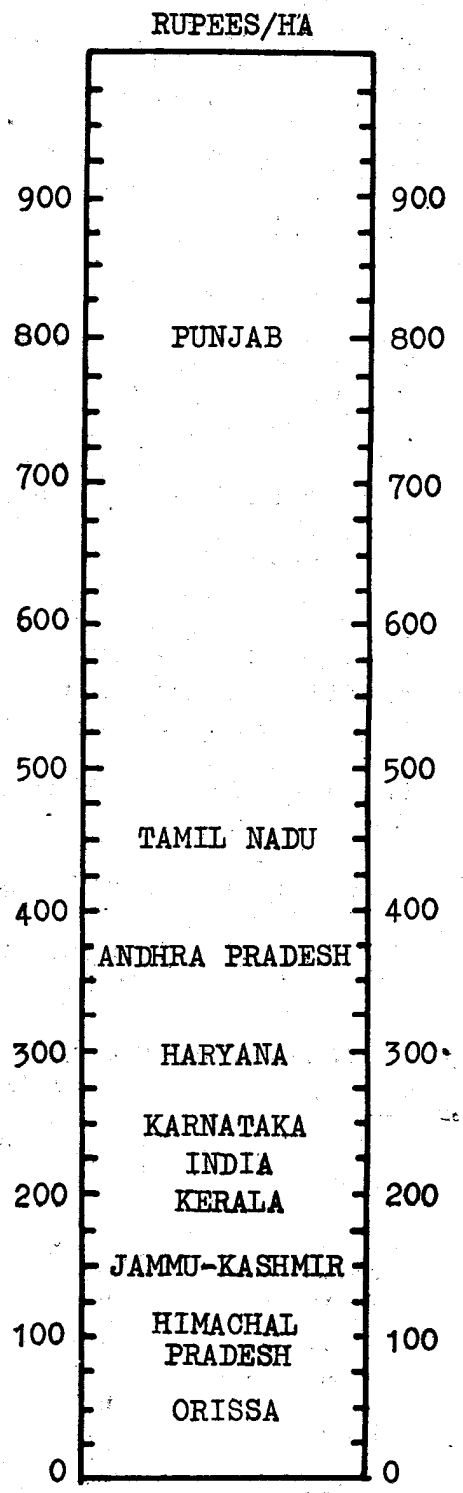

Figure 3—Average value of fertilisers purchased (Rs|ha) in major states of India (1984-85). Details in Table 4.

Table 4—Lowest and highest district-level expenditure on fertilisers in different states of India during 1984-85

State	Lowest District		Highest District		State Mean	
	Kg/ha*	Rs/ha**	Kg/ha*	Rs/ha	Kg/ha*	Rs/ha**
Andhra Pradesh	12.1	60	210	1,027	73.0	367
Assam	0.6	3	6.3	28	4.0	18
Bihar	7.7	38	115	558	35.9	176
Gujarat	8.0	41	96.4	445	46.3	236
Himachal Pradesh	7.3	34	82.5	399	22.9	111
Haryana	5.3	28	128	654	57.7	292
Jammu and Kashmir	NA	NA	NA	NA	29 6	150
Karnataka	8 9	47	128	615	51.5	244
Kerala	24.4	104	77.9	351	44.6	195
Madhya Pradesh	1.9	10	49.5	247	17.1	88
Maharashtra	5.0	23	120	542	28.5	135
Orissa	1.1	5	43.5	209	12.9	63
Punjab	87.0	441	202	1,041	151	790
Rajasthan	1.4	7	36.0	187	11.2	59
Tamil Nadu	22.6	100	360	1,557	99.4	449
Uttar Pradesh	3.3	18	137	680	65.1	328
West Bengal	21.4	99	154	705	54.8	259
All-India	0.6	3	360	1,557	46.4	228

*Kg $N+P_2O_5+K_2O$/ha gross cropped area.

**Calculated from mean prices of (Rs/kg) N=5, P_2O_5=6, K_2O=2.

The mean expenditure on fertilisers among districts varied from Rs 3 to Rs 1557/ha (Table 4). Differences between the lowest-spending and the highest-spending districts were smallest in Kerala and Punjab while the range was widest in the states of Madhya Pradesh and Uttar Pradesh. Average expenditure on fertilisers is also shown on the fertiliser-investment scale (Figure 3). There was a 2.7-fold difference in the money spent by farmers to buy fertiliser in the neighbouring states of Punjab and Haryana, a 4-fold difference between Orissa and West Bengal and a 1.5-fold difference among the states of Kerala and Tamil Nadu.

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