Adhoc Study No.62

THE EFFECT OF SUPPLY OF FERTILISERS IN SMALL BAGS ESPECIALLY IN LOW CONSUMPTION RAINFED AREAS TO INCREASE FERTILISER CONSUMPTION

(A STUDY IN RAIGARH DISTRICT, MADHYA PRADESH)

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CHAPTER I

INTRODUCTION

1.1 Introductory

The importance of fertiliser use in the agricultural production is well known. The fertilisers provide 3 important elements of nitrogen, phosphorus and potash and many micronutrients.

With the introduction of high yielding varieties of paddy, wheat, maize, jowar and bajra in 1966-67, the use of fertilisers suddenly increased. The success of the High Yielding Varieties Programme (HYVP) depended mainly on fertilisers as the new varieties were highly responsive to the fertiliser use.

The consumption of fertilisers increased from year to year during the postgreen revolution period and the demand is ever increasing. Government is making all out efforts to meet the demand of fertilisers by encouraging the indigenous production. However, part of the demand is still met by way of imports.

Several Extension methods are being adopted by Govt. as well as non governmental agencies to popularise the use of fertilisers. These include supply of fertilisers on loan, supply at subsidised rates and concessions to small and marginal farmers. A large number of demonstration plots are laid to show the proper and optimum use of fertilisers for different soil and crop conditions.

Even with all these efforts the consumption of fertilisers differs between regions, between irrigated and unirrigated farming and between big and well to do farmers and small and marginal farmers belonging to the weaker sections including scheduled castes and tribes.

It was thought that some measure should be adopted so that the consumption of fertilisers among the small and marginal farmers could be increased. One of the opinions was that the small and marginal farmers needed small quantities of fertilisers without any compromise to its quality. It was expressed that the distribution of fertilisers to this vulnerable section in loose packings could be disadvantageous to them both in terms of quality and quantity. With this point of view Government directed the manufacturers of fertilisers to pack the fertilisers in small bags of 25kg. for the benefit of the small and marginal farmers. The scheme was introduced in the year 1988-89.

In order to assess the impact of use of fertilisers in small bags the Directorate of Economics and Statistics, Ministry of Agriculture, Govt.of India, asked all the Agro-Economic Research Centres to conduct a study titled "The effect of supply of fertilisers in small bags especially in low consumption rainfed areas to increase fertiliser consumption".

Accordingly, this Centre conducted the study in Raigarh district of Madhya Pradesh. The selection of the district was made after analysing the districtwise data on fertiliser consumption in general and in small bags in particular. Opinion of the State Govt. officials as well as the officials of the fertiliser manufacturing companies was sought for the selection of the district.

1.2 The Objectives

The specific objectives of the study were :

(i) To study the present level of fertiliser consumption by size of operational holdings and its deviation and reasonsfor not using the recommended doses of fertilisers.

(ii) To measure the impact of supply of small bags of fertiliser on the farms in low consumption rainfed area where it is intended to increase the fertiliser consumption.

(iii) To identify the farm level constraints in the use of small bags of fertiliser and suggest measures for improvement, and,

(iv) To identify the administrative problems in distributing the fertiliser bags.

1.3 Sample Design

As mentioned earlier the study was conducted in Raigarh district of M.P. It is one of the rainfed

districts where the consumption of fertilisers was very low. In Raigarh district 3 blocks viz. Pusore, Raigarh and Sarangarh were selected. These also had lowest consumption of fertilisers. From each of the selected 3 blocks 50 beneficiaries were selected representing all the three size groups of marginal, small and other farmers. Thus the total sample comprised 150 farmers.

1.4 Reference Year

The agricultural year 1990-91 was the reference year for the study. The effect of fertilisers in small bags was studied by the method of comparison over time. Thus, the data were collected for 3 years; 1988-89 being the year with consumption of fertilisers in the usual size bags, the year 1989-90 with consumption of fertilisers in small bags in a big way and 1990-91, the year when the impact could be gauged.

1.5 Field Investigation

Data were collected at the state, district, block and the farmers' levels. The state level data were collected at Bhopal from the offices of the State Govt. and the offices of the fertiliser companies. At the district level the data regarding the method of distribution of fertilisers in small bags, the network of distribution and the consumption data within the district were collected. Data from the selected beneficiaries were collected in schedules specificially prepared for the study.

The data were collected from January, 91 to April, 91.

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CHAPTER -II

SELECTED DISTRICT AND BLOCKS

2.1 Location

Raigarh is the eastern most district of Madhya Pradesh and lies between $21^{\circ}20'$ and $23^{\circ}15'$ north latitudes and $82^{\circ}56'$ and $84^{\circ}24'$ east longitudes. It is bounded on the north by Surguja district of Madhya Pradesh and Ranchi District of Bihar. On the East lies Ranchi district of Bihar and Sundargarh and Sambalpur districts of Orissa. On the South and South west lies Raipur district of Madhya Pradesh and on the west it is surrounded by Bilaspur and Surguja districts of Madhya Pradesh.

The boundary of the district is irregular and the shape of the district is an elongated long narrow vertical belt. From the south west to north east its length is 219kms. Its width varies from only 13 kilometres on the southern boundary of Raigarh tehsil to about 60kms. in the centre. The width shrinks again in the north on the boundaries that separate Patthalgaon and Kansabel blocks and Tapkara and Duldula blocks. From both these sections the width expands towards the north.

The district varies from the lofty forest clad plateau of the north to the treeless dreary, dusty plains of Raigarh and Sarangarh in the south.

2.2 Physiography

Physiographically the latitude $22^{\circ}15'$ north divides the district into two broad divisions. The northern being

predominantly hilly region and the southern predominantly plain country. Mahanadi river can also be taken to be dividing the district into two regions. The northern region having a general slope towards the south and the southern region having a general slope towards the north.

2.3 Rivers

The important rivers of the district are :

1. The Mahanadi :

It rises in Sihawa hills in Raipur district. It crosses Raigarh district in the south.

2. The Mand :

The Mand rises in Surguja district. It flows through the hilly sandstone country and its channel is deeply cut through the sandstone rock in a series of alternative rapids and pools. It then enters the plain country near about Dharamjaigarh of Raigarh district.

3. The Ib :

Another principal tributory of Mahanadi is the Ib which flows through Pandrapat plateau in Jashpur tehsil.

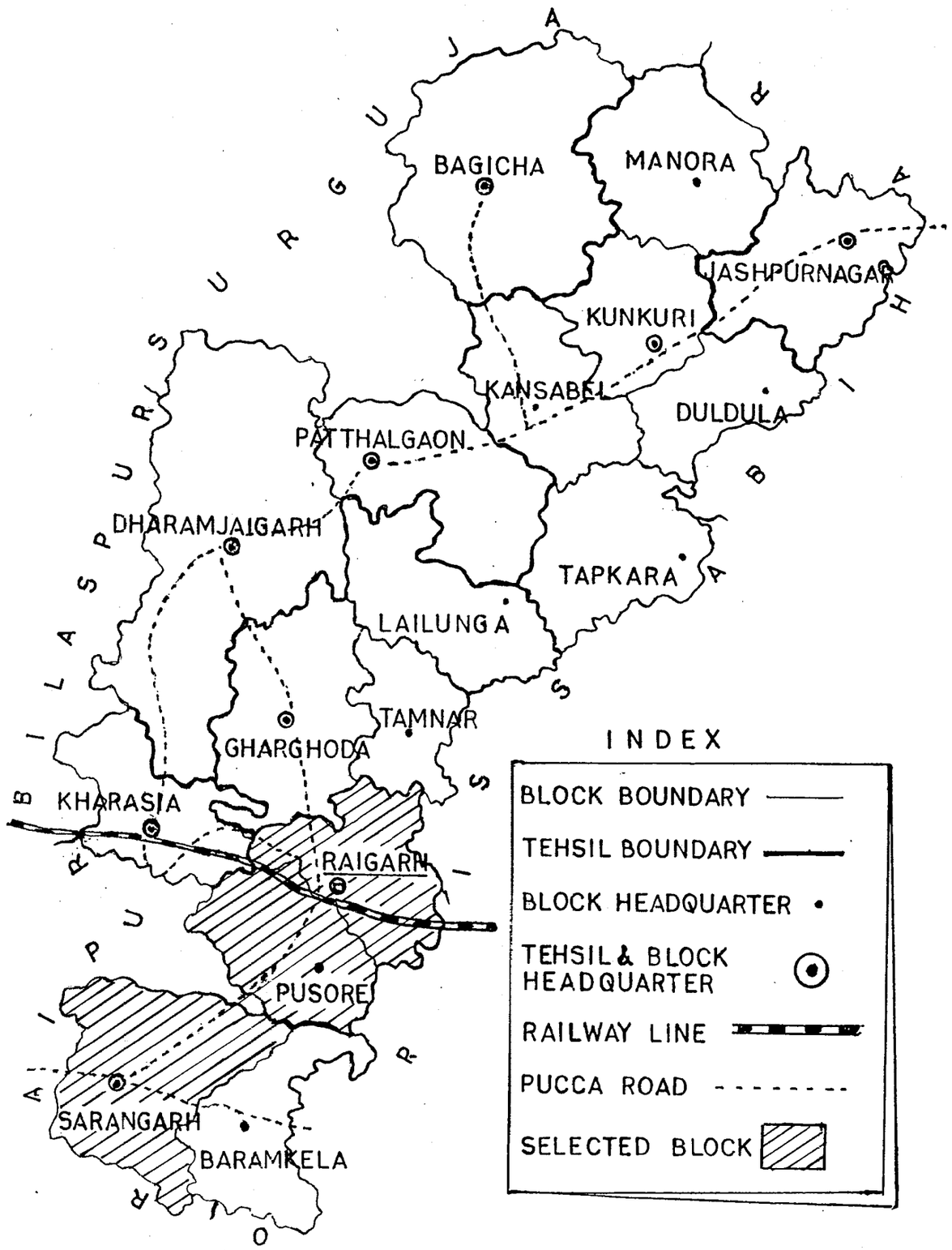
4. The Kanhar :

It rises in this district and flows north for a short distance and then turns north west running parallel to the northern boundary of the district for a small part of its length.

2.4 Climate

The climate of the district is characterised by a hot dry summer and well distributed rainfall in the south-west monsoon season. It has three distinguishable seasons.

RAIGARH DISTRICT



(i) The summer season starts from about the festival of Holi in March but the mercury rises to its peak in May and first part of June with the mean daily maximum temperature at 43°C and the mean daily minimum at 20°C.

(ii) The rainy season is from the mid-June to September

(iii) The winter season is from last week of November to February.

The intervening period of October and November is the post monsoon or retreating monsoon period.

2.4.1 Rainfall

The district gets most of the rainfall from south-west monsoon. The normal rainfall of the district is 1,619.7 mm. Of this more than 85 per cent (87.26 per cent) occurs between June to September in 53 rainy days of the total of 66 rainy days of the year (Table 2.1)

Table 2.1 Distribution of Rainfall and number of rainy days, Raigarh district.

Month	Normal rainfall		No.of rainy days	
	mm.	Percentage	No.	Percentage
June	230.9	14.26	14	21.22
July	487.5	30.10	19	28.79
August	455.3	28.11	13	19.70
September	239.5	14.79	7	10.61
October	66.5	4.10	4	6.06
November	15.8	0.98	3	4.55
December	4.9	0.30	2	3.03
January	20.1	1.24	1	1.51
February	33.3	2.05	1	1.51
March	21.5	1.33	1	1.51
April & May	44.4	2.74	1	1.51
Total	1619.7	100.00	66	100.00

2.5 Population

The total population of the district according to 1981 census was 1,443.2 thousand. The district is rural in character as more than 90 per cent (91.6 per cent) of its population is rural. During the last 80 years the percentage of rural population has scaled down from 97.20 showing that the process of urbanisation has been extremely slow (Table 2.2)

Table 2.2 Rural and urban population, 1901-81, Raigarh district

(Unit- '000)

S.No.	Year	Total population	Rural	Percentage to total	Urban	Percentage to total
1	1901	428.8	416.8	97.20	12.0	2.78
2.	1911	555.2	541.7	97.57	13.5	2.43
3.	1921	579.5	564.5	97.41	15.0	2.59
4.	1931	691.2	668.6	96.73	22.6	3.27
5.	1941	787.6	775.5	98.46	12.1	1.54
6.	1951	853.1	805.7	94.44	47.4	5.56
7.	1961	1041.2	981.3	94.25	59.9	5.75
8.	1971	1278.7	1202.8	94.06	75.9	5.94
9.	1981	1443.2	1322.1	91.61	121.1	8.39

The decadal growth rate during the census 1971-81 was 12.86 per cent. The rate was quite high (59.52 per cent) in urban areas as compared to 9.92 in rural areas. This phenomenon of higher growth rate in urban areas was observed in two out of 8 decades. (Table 2.3)

Table 2.3 Decadal growth of Population, Raigarh district, since 1901

S. No.	Census Year	Percentage decennial growth rate		
		Total	Rural	Urban
1.	1901-11	+ 2.48	+ 29.98	+ 11.88
2.	1911-21	+ 4.39	+ 4.20	+ 12.24
3.	1921-31	+ 19.27	+ 18.44	+ 50.56
4.	1931-41	+ 13.93	+ 13.01	+ 41.28
5.	1941-51	+ 8.32	+ 6.35	+ 54.84
6.	1951-61	+ 22.06	+ 22.14	+ 0.75
7.	1961-71	+ 22.81	+ 22.56	+ 26.80
8.	1971-81	+ 12.86	+ 9.92	+ 59.52

2.5.1 Sex ratio

Female population per thousand male population was 1,006 in the district. This slight upper hand of female population existed althrough the last 8 decades (Table 2.4).

Table 2.4 Male and female population, Raigarh district.

S. No.	Year	Total population	Males	Females	Female population per '000 male population
1.	1901	428.8	213.00	215.8	1013
2.	1911	555.2	275.6	279.6	1014
3.	1921	579.5	287.3	292.2	1017
4.	1931	691.2	342.2	349.0	1020
5.	1941	787.6	391.7	395.9	1011
6.	1951	853.1	423.4	429.7	1015
7.	1961	1041.2	517.9	523.3	1010
8.	1971	1278.7	636.9	641.8	1008
9.	1981	1443.2	719.6	723.6	1006

2.5.2 Literacy

The literacy percentage of the district was 26.37. As in the case of other regions of the country, the percentage of literacy among rural population was remarkably lower (23.83 per cent) as compared to the urban population (54.00 per cent). A very wide difference was noticed between literacy among female population (14.44 per cent) and male population (38.36 per cent). (Table 2.5)

Table 2.5 Literacy percentage, Raigarh district, 1981

Particulars	Male	Female	Total
1. Total Population			
Rural	655.8	662.2	1322.1
Urban	63.7	57.4	121.1
Total population	719.5	723.7	1443.2
2. Literate population			
Rural	233.3	81.8	315.1
Urban	42.7	22.7	65.4
Total	276.0	104.5	380.5
3. Percentage of literate population			
Rural	35.57	12.28	23.83
Urban	67.03	39.55	54.00
Total	38.36	14.44	26.37

Thus, the literacy percentage was lowest among rural female population (12.28 per cent) and highest among urban male population (67.03 per cent).

Of the total population about 40 per cent (40.78 per cent) were the workers and the remaining 60 per cent(59.22 per cent) were non workers. (Table 2.6)

Table 2.6 Workers and Non-workers, Raigarh district, 1981

(Unit- '000)

Particulars	1981	
	Number	Percentage
Workers	588.5	40.78
Non-workers	854.7	59.22
Total Population	1443.2	100.00

As already mentioned Raigarh is rural district and this is clearly seen from the break up of working population. As high as 85 per cent of the workers were engaged in agricultural pursuits. Of these 58.56 per cent were cultivators and 27.17 per cent were agricultural labourers. (Table 2.7)

Table 2.7 Break up of main workers, Raigarh district,1981

S.No.	Particulars	Percentage to total workers
1.	Cultivators	58.65
2.	Agricultural labourers	27.17
3.	Household Industry	3.40
4.	Other Workers	10.78
	Total	100.00

M.P. State Govt. has declared 12 districts as tribal districts. The basis of this declaration is the percentage of tribal population in the district. When arranged in the descending order according to the percentage of the tribal population, Raigarh stands 6th with 48.7 per cent tribal population. While the scheduled castes population formed 10.7 per cent, other castes population formed 40.8 per cent. (Table 2.8)

Table 2.8 Caste composition of population, Raigarh district, 1981

Particulars	Number (Thousand)	Percentage to total
1. Scheduled castes	154.0	10.6
2. Scheduled tribes	700.1	48.6
3. Others	589.1	40.8
Total	1443.2	100.00

2.6 Land Use

Of the total geographical area of 1,298.4 thousand hectares the net area sown was 41.98 per cent. Forest occupied 29.58 per cent, land not available for cultivation, 14.61 per cent and other uncultivated land excluding fallow, 7.74 per cent. Thus, it is observed that about 1/3 of the geographical area of the district was under forest. Land not available for cultivation was also significant. (Table 2.9)

Table 2.9 Land utilisation, Raigarh district, 1989-90

S. No.	Particulars	Area (thousand hectares)	Percentage to total geographical area (%)
1.	Forest	384.1	29.58
2.	Land not available for cultivation	189.7	14.61
	a) Land put to non-agricultural uses	71.6	5.51
	b) Barren and uncultivated land	118.1	9.10
3.	Other uncultivated land excluding fallow	100.5	7.74
	a) Permanent pastures and other grazing land	100.3	7.72
	b) Land under miscellaneous trees crops and groves	0.2	0.02
4.	Culturable waste land	15.3	1.18
5.	Fallow land	63.8	4.91
	a) Current fallow	34.4	2.65
	b) Old fallow	29.4	2.26
6.	Net area sown	545.0	41.98
Total geographical area		1298.4	100.00

2.7 Operational Holdings

The distribution of agricultural holdings is highly skewed in the country and Raigarh district is no exception to the phenomenon. While marginal and small holdings [illegible]ice formed 57.1 per cent of total number of holdings these occupied only 16.1 per cent of the area. On the other side of the distribution scale medium and large holdings together formed 21.9 per cent of the total number but these larger

size of holdings occupied disproportionately high percentage (63.8 per cent) of the total area (Table 2.10).

Table 2.10 Number and area of operational holdings, Raigarh district, 1985-86

Size group (Hectares)	Number of holdings		Area of holdings	
	Number	Percentage	Area (Hectares	Percentage
Marginal (0-1)	27,32,924	35.9	12,14,197	5.5
Small (1-2)	16,12,622	21.2	23,52,791	10.6
Semi Medium (2-4)	15,92,537	21.0	44,49,702	20.1
Medium (4-10)	12,91,817	17.0	78,85,488	35.6
Large (10 and above)	3,73,244	4.9	62,53,124	28.2
Total	76,03,144	100.00	2,21,55,302	100.00

2.8 Soil Types

The soils of the district can be classified into 5 groups viz; Matasi, Kanhar, Dorsa, Bhata and Rakhar.

1. Matasi

It is yellow in colour and also varies from brown to red. It is a paddy soil par excellence. It is not retentive of moisture, but with heavy rainfall gives a far better outturn than any other soil. Matasi can not grow a second crop and when unembanked is fit for little more than kodon and requires long resting fallows. The best matasi is found in the valleys cf Mahanadi and Mand rivers and popularly known as Dudhia matasi. This type of soil is found in Sarangarh, Raigarh, Gharghoda and Udaipur blocks.

2. Kanhar

Kanhar is the black clay very retentive of moisture. As it is apt to suffer from water logging, it is a good soil for wheat but not for paddy. However, it is capable of growing a second crop and from this point of view is certainly the most valuable soil in the district. It is generally found at the foot of the hill ranges of Jashpur Tahsil.

3. Dorsa

Dorsa is a mixture of kanhar and matasi and as the name itself suggests (do meaning two and rasa meaning extracts) it is good soil for paddy but gives only a moderate outturn of wheat or second crop.

4. Bhata

The Bhata is a poor detritus of laterite, and red in colour. It does not have much consistency and hardly retains any moisture. With a heavy rainfall, a crop of kodo can be grown over this but otherwise it is the poorest soil in the district.

5. Kacchar

The admixture of fertile silt and sand found on the banks of rivers and large streams. Kachar which is an excellent soil for garden crops provided irrigation facili ties are available.

2.9 Cropping Pattern

The gross cropped area of the district was 579.9 thousand hectares. Raigarh was one of the districts of Chhattisgarh plain well known for the cultivation of the rice and therefore, aptly, called the "rice bowl" of the

state. Paddy, was, therefore, the most largely cultivated crop of the district contributing 70.64 per cent of the cropped area. The next important group of crops was other pulses contributing 10.67 per cent. Although, crop statistics does not mention it is lathyrus or teora which dominated the pulses. The only other crop of some importance was niger which occupied 4.40 per cent of the area (Table 2.11).

Table 2.11 Cropping Pattern, Raigarh district, 1989-90

(Area- thousand hectares)

Crop	Area	Percentage to gross cropped area
Paddy	409.5	70.62
Wheat	2.4	0.41
Maize	8.6	1.48
Jowar	0.3	0.05
Other Cereals	28.9	4.99
Total Cereals	449.7	77.55
Gram	3.2	0.55
Arhar	2.0	0.35
Other Pulses	61.9	10.67
Total Pulses	67.1	11.57
Total Foodgrains	516.8	89.12
Groundnut	15.3	2.63
Sesamum	2.7	0.47
Rapeseed and Mustard	6.5	1.12
Niger	25.5	4.40
Other Oilseeds	1.0	0.17
Total Oilseeds	51.0	8.79
Sugarcane	1.0	0.17
Total Fruits & Vegetables	9.2	1.59
Total Spices	0.7	0.12
Other crops	1.2	0.21
Gross Cropped area	579.9	100.00

2.10 Irrigation and Irrigated Crops

Of the cropped area of 579.9 thousand hectares, 35.0 thousand hectares were irrigated. The irrigation was done mainly from canals (55.72 per cent). Other sources like pumps on nalahs and rivers contributed 15.43 per cent of the irrigated area. Tanks provided irrigation to 10.57 per cent of the area. All these sources were dependent on rainfall and the irrigation provided by them can be termed as protective type. It helped to protect the withering kharif crops in the ripening stage in the months of September & October. The only perennial source of irrigation was tubewells which provided irrigation to 11.71 per cent of the irrigated area (Table 2.12).

Table 2.12 Sources of Irrigation, Raigarh district, 1989-90

Source	Area (thousand hectares)	Percentage to total
Canals	19.5	55.72
Wells	2.3	6.57
Tubewells	4.1	11.71
Tanks	3.7	10.57
Others	5.4	15.43
Total	35.0	100.00

Since paddy was the most important crop, it formed the highest percentage of the irrigated area (68.29). Comparatively low proportion (11.43 per cent) was claimed by groundnut and fruits and vegetables (10.00 per cent). Wheat, groundnut, fruits and vegetables and spices were the crops irrigated to a large extent. Wheat was irrigated to

the extent of 70.83 per cent. Groundnut was irrigated to the extent of 25.97 per cent, fruits and vegetables to the extent of 38.46 per cent, and spices, 28.57 per cent.

It is thus observed that irrigation was not much developed in the district nor helped many crops (Table 2.13).

Table 2.13 Irrigated crops, Raigarh district, 1989-90

Crops	Gross cropped area (thousand hectares)	Irrigated cropped area (thousand hectares)	Percentage to total	Percentage of irrigated cropped area to area of the crop
Paddy	409.6	23.9	68.29	5.83
Wheat	2.4	1.7	4.86	70.83
Jowar	0.3	-	-	-
Other Cereals	37.4	-	-	-
Total Cereals	449.7	25.6	73.15	5.69
Gram	3.2	-	-	-
Arhar	2.0	-	-	-
Other Pulses	61.9	0.4	1.14	0.65
Total Pulses	67.1	0.4	1.14	0.60
Groundnut	15.4	4.0	11.43	25.97
Sesamum	2.7	-	-	-
Rapeseed & Mustard	6.5	0.1	0.28	1.54
Linseed	0.9	-	-	-
Niger	25.5	-	-	-
Total Oilseeds	51.0	4.1	11.71	8.04
Sugarcane	1.0	1.0	2.86	100.00
Total Fruits & Vegetables	9.1	3.5	10.00	38.46
Total Spices	0.7	0.2	0.57	28.57
Other Crops	1.3	0.2	0.57	15.38
Gross Cropped Area	579.9	35.0	100.00	6.04

2.11 Productivity of Crop

The yield of paddy, the most important crop of the district, was 895kg./hectare, slightly more than the state average. The yields of wheat, maize and arhar were also more in the district than the state average. On the other hand the yields of gram, soybean and other oilseeds were lower in the district (Table 2.14).

Table 2.14 Yield per hectare of important crops, Raigarh district and Madhya Pradesh, 86-87

(Unit- Kg./hectare)

Crop	Madhya Pradesh	Raigarh district
Paddy	877	895
Wheat	1271	1476
Jowar	681	993(only kharif)
Maize	902	1109
Kodo-kutki	179	284
Gram	668	526
Tur	951	1364
Urd	151	161
Pea	335	356
Lentil	213	266
Soybean	562	560
Til (Sesamun)	94	75
Ramtil	145	167
Rapeseed & Mustard	631	379
Linseed	266	213

Source : Agricultural Statistics, M.P., Directorate of Agriculture, Govt. of M.P.

2.12 Selected Blocks

As mentioned earlier, Raigarh, Pusore, and Sarangarh blocks were selected for the study. These are the southern blocks and agriculturally comparatively developed blocks. These constituted 22.15 per cent of the district population. The performance of the blocks could be described slightly better than the district average, as far as the literacy percentage was concerned since the percentage of literacy for the selected blocks was 26.53 against 23.61 for the district (Table 2.15).

Table 2.15 Population and literacy status of the three selected blocks, Raigarh district, 1981

(Population-thousand)

Particulars	Raigarh block			Pusore block		
	Male	Female	Total	Male	Female	Total
1. Total Population	39.4	39.8	79.2	44.2	45.2	89.4
2. Literate Population	17.6	6.2	23.8	19.7	6.8	26.5
Percentage of literate population	44.67	15.58	30.05	44.57	15.04	29.64

Particulars	Sarangarh block			Total for the three blocks		
	Male	Female	Total	Male	Female	Total
1. Urban total Population	61.1	63.2	124.3	144.7	148.2	292.9
2. Literate population	21.7	5.7	27.4	59.0	18.7	77.7
Percentage of literate population	35.52	9.02	22.04	40.77	12.62	26.53

Particulars	Raigarh district		
	Male	Female	Total
1. Urban total population	655.8	666.2	1322.1
2. Literate population	233.1	79.0	312.1
Percentage of literate population	35.54	11.86	23.61

The ratio of workers to non-workers was same for the selected blocks and for the selected district. (Table 2.16)

Table 2.16 Workers and Non-workers in selected blocks and Raigarh district, 1981

Pargiculars	Raigarh block		Pusore block		Sarangarh block	
	Number	Percen-tage	Number	Percen-tage	Number	Percen-tage
Workers	33.6	44.68	34.9	42.67	57.9	48.66
Non-Workers	41.6	55.32	46.9	57.33	61.1	51.34
Total Population	75.2	100.00	81.8	100.00	119.0	100.00

Particulars	Total for the three blocks		Raigarh district	
	Number	Percentage	Number	Percentage
Workers	126.4	45.80	552.7	45.78
Non-workers	149.6	54.20	654.6	54.22
Total Population	276.0	100.00	1207.3	100.00

Cultivators formed 53.09 per cent of the workers in the selected blocks. In the district as a whole the percentage was 61.86. Agricultural labourers formed 37.18 per cent of the working population of the selected blocks. The percentage was lower (28.39) in the case of Raigarh district. (Table 2.17)

Table 2.17 Break up of main workers of the selected three blocks, Raigarh district, 1981

Particulars	Raigarh block		Pusore block		Sarangarh block		Total of the three blocks		Raigarh district	
	Number	Percentage to total workers	Number	Percentage to total workers	Number	Percentage to total workers	Number	Percentage to total workers	Number	percentage to total workers
1.Cultivators	14.9	44.35	17.6	50.43	34.6	59.76	67.1	53.09	341.9	61.86
2.Agril. labourers	14.0	41.67	13.4	38.40	19.6	33.85	47.0	37.18	156.9	28.39
3.Household Industry	1.3	3.87	1.1	3.15	1.1	1.90	3.5	2.77	18.3	3.31
4.Other Workers	3.4	10.11	2.8	8.02	2.6	4.49	8.8	6.96	35.6	6.44
Total	33.6	100.00	34.9	100.00	57.9	100.00	126.4	100.00	552.7	100.00

2.13 Cropping Pattern

The only significant different between the cropping pattern of the selected blocks and that of the district as a whole was that the percentage of area under paddy was higher in the case of selected blocks (82.98 as compared to 70.62). Further, while the percentage of area under pulses was higher (11.57), for the district as a whole it was lower in the case of groundnut (2.63) as compared to the blocks (5.64). (Table 2.18)

The selected blocks were more advantageously placed as far as irrigation was concerned. Paddy was irrigated to higher extent (13.36 per cent) in the selected blocks as compared to the district (5.84 per cent). The vegetables were also irrigated to a larger extent as compared to the district. (Table 2.19)

Table 2.18 Cropping pattern of selected blocks and Raigarh district, 1989-90

(Area in thousand hectares)

Crop	Raigarh block		Pusore block		Sarangarh block		Total for three blocks		Raigarh district	
	Area	Percentage to gross cropped area	Area	Percentage to gross cropped area	Area	Percentage to gross cropped area	Area	Percentage to gross cropped area	Area	Percentage to gross cropped area
Paddy	23.9	80.47	28.2	87.58	34.7	81.26	86.8	82.98	409.5	70.62
Maize	-	-	-	-	-	-	-	-	8.6	1.48
Other Cereals	0.5	1.68	0.2	0.62	0.2	0.47	0.9	0.86	31.6	5.45
Total Cereals	24.4	82.15	28.4	88.20	34.9	81.73	87.7	83.84	449.7	77.55
Total Pulses	2.8	9.43	1.5	4.66	4.1	9.60	8.4	8.03	67.1	11.57
Total Foodgrains	27.2	91.58	29.9	92.86	39.0	91.33	96.1	91.87	516.8	89.12
Total Fruits & Vegetables	0.6	2.02	0.5	1.55	0.5	1.17	1.6	1.53	9.2	1.59
Sugarcane	0.1	0.33	0.1	0.31	-	-	0.2	0.19	1.0	0.17
Spices	-	-	-	-	0.1	0.23	0.1	0.10	0.7	0.12
Groundnut	1.3	4.38	1.6	4.97	3.0	7.03	5.9	5.64	15.3	2.63
Other Oilseeds	0.5	1.68	0.1	0.31	0.1	0.23	0.7	0.67	35.7	6.16
Total Oilseeds	1.8	6.06	1.7	5.28	3.1	7.26	6.6	6.31	51.0	8.79
Other non-food Crops	-	-	-	-	-	-	-	-	1.2	0.21
Total Non-food crops	1.8	6.06	1.7	5.28	3.1	7.26	6.6	6.31	52.2	9.00
Total Food crops	27.9	93.94	30.5	94.72	39.6	92.74	98.0	93.69	527.7	91.00
Gross cropped area	29.7	100.00	32.2	100.00	42.7	100.00	104.6	100.00	579.9	100.00

Table 2.19 Percentage of irrigated area to area under the crops in selected blocks, Raigarh district, 1989-90

Crop	Raigarh block			Pusore block			Sarangarh block		
	Area under the crop	Irrigated croped area	Percentage of Irrigated area to area under the crop	Area under the crop	Irrigated cropped area	Percentage of Irrigated area to area under the crop	Area under the crop	Irrigated cropped area	Percentage of Irrigated area to area under the crop
Paddy	23.9	1.8	7.53	28.2	1.2	4.26	34.7	8.6	24.78
Wheat	0.1	0.1	100.00	0.1	0.1	100.00	-	-	-
Total Cereals	24.0	1.9	7.92	28.3	1.3	4.59	34.7	8.6	24.78
Total Pulses	2.8	0.1	3.57	1.5	0.1	6.67	4.1	0.1	2.44
Sugarcane	0.1	0.1	100.00	0.1	0.1	100.00	-	-	-
Total Vegetables	0.4	0.3	75.00	0.5	0.4	80.00	0.5	0.3	60.00
Total Spices	-	--	-	-	-	-	-	-	-
Total Oilseeds	1.8	0.7	38.90	1.6	0.7	43.75	3.0	1.0	33.30
Total	29.1	3.1	10.70	32.0	2.6	8.10	42.3	10.0	23.60

Contd.....

Table 2.19 Continued.....

Crop	Total of the 3 selected blocks			Raigarh district		
	Area under the crop	Irrigated area	Percentage of Irrigated area to area under the crop	Area under the crop	Irrigated area	Percentage of Irrigated area to area under the crop
Paddy	86.8	11.6	13.36	409.5	23.9	5.84
Wheat	0.2	0.2	100.00	2.4	1.7	70.83
Total Cereals	87.0	11.8	13.56	411.9	25.6	76.67
Total Pulses	8.4	0.3	3.57	67.1	0.4	0.60
Sugarcane	0.2	0.2	100.00	1.0	1.0	100.00
Total Vegetables	1.4	1.0	71.42	7.8	3.5	44.87
Total Spices	-	-	-	0.7	0.2	28.60
Total Oilseeds	6.4	2.4	37.50	50.9	4.1	8.06
Total	103.4	15.7	15.18	539.4	34.8	6.45

CHAPTER-III

RESULTS AND DISCUSSION

As mentioned earlier 50 farmers from each of the 3 selected blocks formed the sample of the study. Thus, the total sample comprised 150 farmers. These belonged to different categories like, marginal, small, semi medium, medium and large size groups.

3.1 Size of Farms

Nearly one third (34.00 per cent) farmers belonged to small size and another 28.67 per cent farmers belonged to marginal size group. Twenty eight (18.67 per cent) were of the semi medium size. Thus, more than 80 per cent of the farmers had holdings below 4.00 hectares each. However, the area commanded by different groups was inversely proportional to the size. Thus, marginal farmers commanded 6.85 per cent of the area whereas the small size farmers commanded 18.03 per cent. Semi medium size farmers occupied 19.62 per cent of the area and the medium farms, 24.10 per cent. The average size of the selected farms was 2.57 hectares. It was 0.61 hectare in the marginal size group and was 13.47 hectares in the case of big farms. (Table 3.1)

Table 3.1 Number and area of selected farms by size groups

Size group (Hectares)	No.of farms		Operated area		Average size
	No.	Percentage to total	Area	Percentage to total	
0 - 1.00	43	28.67	26.43	6.85	0.61
1.00 - 2.00	51	34.00	69.59	18.03	1.36
2.00 - 4.00	28	18.67	75.73	19.62	2.70
4.00 -10.00	19	12.66	93.05	24.10	4.90
10.00& above	9	6.00	121.21	31.40	13.47
Total	150	100.00	386.01	100.00	2.57

3.2 Size of Farms and Caste Groups

The distribution of farmers by castes in different groups showed that the farmers belonging to scheduled castes were size/either from marginal size group or small size group. Similarly scheduled tribes farmers were mostly from marginal and small size groups of farms. Their proportion decreased with the increase in the size of farms. On the other hand the proportion of farmers belonging to other castes increased with the size of farms. All the selected farms belonging to the category of large farms were of other castes.

It showed even - in the predominantly tribal area ownership of holdings was in favour of other caste groups.

3.3 Literacy

The literacy percentage increased with the size of farms. Actually all of the selected farmers belonging to medium and large sizes were literates. This observation, however, seems to be of universal application. (Table 3.2)

Table 3.2 Details of family members of selected farmers

Size group (Hectares)	Castes				No. of		
	S.C.	S.T.	Others	Total	Literates	Illiterate	Total
0 - 1.0	2 (4.65)	15 (34.88)	26 (60.47)	43 (100.00)	29 (67.44)	14 (32.56)	43 (100.00)
1.0 - 2.0	4 (7.84)	13 (25.49)	34 (66.67)	51 (100.00)	41 (80.39)	10 (19.61)	51 (100.00)
2.0 - 4.0	-	6 (21.43)	22 (78.57)	28 (100.00)	27 (96.43)	1 (3.57)	28 (100.00)
4.0 -10.0	-	1 (5.26)	18 (94.74)	19 (100.00)	19 (100.0)	-	19 (100.00)
10.0& above	-	-	9 (100.00)	9 (100.00)	9 (100.0)	-	9 (100.00)
Total	6 (4.00)	35 (23.33)	109 (72.67)	150 (100.00)	125 (83.33)	25 (16.67)	150 (100.00)

Note- Figures in parantheses show percentage to total.

3.4 Size of Family, Education, Workers & Non Workers

The 150 selected families had a total number of 791 family members. Thus, the average size of family was of 5 members or so (5.27). The number of members per family increased from 4.60 in the marginal size group to 7.67 in the large size group with the increase in the size of farms.

The average number of educated adults per family was 2.17. This increased from 1.23 in the marginal size group to 5.44 in the large size group with the increase in the size of farms (Table 3.3).

Table 3.3 Educational status of family members

Size group (hectares)	No.of families	No.of family members	Members per family	Educated adults	Educated adults per family
0 - 1.0	43	198	4.60	53	1.23
1.0 - 2.0	51	250	4.90	87	1.71
2.0 - 4.0	28	163	5.82	73	2.61
4.0 -10.0	19	111	5.84	64	3.37
10.0& above	9	69	7.67	49	5.44
Total	150	791	5.27	326	2.17

The total number of workers on the selected farms was 473. Thus, the average number of workers per family was 3.15. The number increased from 2.67 in the smallest size group to 4.56 in the largest size group. (Table 3.4)

Table 3.4 Workers and non workers on the selected farms

Size group (Hectares)	No.of families	Total No.of workers	Workers per family
0 - 1.0	43	115	2.67
1.0 - 2.0	51	160	3.14
2.0 - 4.0	28	98	3.50
4.0 - 10.0	19	59	3.11
10.0 & above	9	41	4.56
Total	150	473	3.15

3.5 Ownership of Operated Area

Of the total operated area of 386.01 hectares, owned area was 365.45 hectares and remaining 20.56 hectares was leased in land. The leased in land, therefore, formed 5.33 per cent of the operated area.

The proportion of leased in area was higher in the smaller three size groups. It was highest (12.46 per cent) in the small size group, the second highest (9.84 per cent) in the marginal size group and 9.60 per cent in the semi medium size group (Table 3.5).

Table 3.5 Ownership of operated area, selected farms

Size group (Hectares)	Owned area	Leased in area	Total operated area
0 - 1.0	23.83 (90.16)	2.60 (9.84)	26.43 (100.00)
1.0 - 2.0	60.92 (87.54)	8.67 (12.46)	69.59 (100.00)
2.0 - 4.0	68.44 (90.40)	7.27 (9.60)	75.71 (100.00)
4.0 - 10.0	91.05 (97.83)	2.02 (2.17)	93.07 (100.00)
10.0& above	121.21 (100.00)	-	121.21 (100.00)
Total	365.45 (94.67)	20.56 (5.33)	386.01 (100.00)

3.6 Irrigation

The status of irrigation on the selected farms showed that irrigated area formed slightly less than half of the operated area. However, this average does not represent the status in different size groups. In all the size groups except the largest one the percentage of irrigated area varied between 32 to 38 per cent. However, in the largest size group the percentage of irrigated area suddenly shot up to 73.29. This indicated that large farmers were better off as far as irrigation was concerned. (Table 3.6)

Table 3.6 Irrigation on selected farms

Size group (Hectares)	Irrigated area (Hectares)	Unirrigated area (Hectares)	Total operated area (Hectares)
0 - 1.00	9.92 (37.53)	16.51 (62.47)	26.43 (100.00)
1.00 - 2.00	22.64 (32.53)	46.95 (67.47)	69.59 (100.00)
2.00 - 4.00	26.80 (35.39)	48.93 (64.61)	75.73 (100.00)
4.00 - 10.00	34.87 (37.47)	58.18 (62.53)	93.05 (100.00)
10.00 & above	88.83 (73.29)	32.38 (26.71)	121.21 (100.00)
Total	183.06 (47.42)	202.95 (52.58)	386.01 (100.00)

Note : Figures in parentheses shows percentage to total

Of the different sources of irrigation other sources such as nalahs and rivers from which the water is pumped with the help of diesel and electric pumps are most important and constituted 48.03 per cent of the irrigated area. Tanks, the second important sources of irrigation contributed 40.53 per cent of the irrigated area. There was variation in the contribution of the different sources in different size groups. Thus, the proportion of area contributed by tanks was smaller in the smaller size groups, whereas, the proportion of canals in those size groups was quite high. "Other" sources although dominated in all the size groups, the dominance was very significant in the smallest size group. (Table 3.7)

Table 3.7 Sourcewise percentage of irrigated area on selected farms

Sources	Size group					
	0-1.0	1.0-2.0	2.0-4.0	4.0-10.0	10.0& above	All farms
Canals	20.83	15.19	25.68	-	1.82	7.63
Wells	-	16.83	3.02	2.32	-	2.97
Tubewells	-	-	3.02	-	-	0.44
Tanks	14.23	27.56	22.28	46.62	49.89	40.53
Others	65.39	40.42	45.99	51.06	48.29	48.43
Total	100.00	100.00	100.00	100.00	100.00	100.00

3.7 Cropping Pattern

Paddy dominated the cropping pattern of the selected farms. Nearly, 90 per cent (89.15 per cent) of the cropped

area was under paddy. This was constituted by nearly 60 per cent (58.40) by high yielding varieties and the remaining 30 per cent (30.75) under local varieties. Among other crops only groundnut (3.18 per cent) and urd (3.42 per cent) contributed more than 3.00 per cent of the cropped area. The number of crops grown increased with the size of farms and the proportion of area under crops other than paddy also increased with the size of farms indicating thereby that the diversification in cropping increased with the size of farms (Table 3.8).

3.8 Fertilizer Consumption from 1988-89 to 1990-91

The consumption of fertilisers in the three years was 1,052.74, 1,168.29 and 1,391.03 quintals respectively. The percentage increase in the second reference year was 10.98 and in the third year 32.13.

In the year 1988-89 there was no use of fertilisers in small bags. In 1989-90 the quantity used was 33.00 qtls. In the year 1990-91 the consumption suddenly increased to 143.75 qtls or a percentage increase of 334.85.

3.9 Fertiliser Consumption per Hectare of Operated Area

The total consumption of fertilisers per hectare was 2.73 quintals in 1988-89. It increased to 3.03 quintals in 89-90 and 3.60 in 1990-91. (Table 3.9). Generally the fertiliser consumption per hectare was higher on the larger size groups. However, this was otherwise in the case of fertilisers in small bags. The fertiliser consumption per hectare in small bags was generally higher on smaller farms.

Table 3.8 Area under different crops on selected farms

Crop	0.00to 1.00		1.00to 2.00		2.00to 4.00		4.00to10.00		10.00& above		Total	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1. Paddy (HYV)	25.30	63.45	57.14	52.37	76.83	67.05	72.11	52.17	82.54	60.78	313.92	58.40
2. Paddy (Local)	12.02	30.15	40.58	37.19	25.56	22.31	50.54	36.57	36.58	26.94	165.28	30.75
Total Paddy	37.32	93.60	97.72	89.56	102.39	89.36	122.65	88.74	119.12	87.72	479.20	89.15
3. Groundnut(HYV)	1.45	3.65	4.03	3.70	2.53	2.21	4.23	3.06	4.85	3.57	17.09	3.18
4. Maize (HYV)	-	-	0.20	0.18	-	-	1.07	0.78	1.21	0.89	2.48	0.46
5. Moong (Local)	-	-	1.45	1.33	1.50	1.31	3.15	2.28	4.45	3.28	10.55	1.96
6. Kodo (Local)	0.10	0.25	-	-	-	-	-	-	-	-	0.10	0.02
7. Urd (Local)	-	-	3.45	3.16	6.25	5.45	5.21	3.77	3.43	2.53	18.34	3.42
8. Wheat (Hyv)	-	-	-	-	0.51	0.45	-	-	0.20	0.15	0.71	0.13
9. Sugarcane(HYV)	0.50	1.25	-	-	-	-	-	-	-	-	0.50	0.09
10.Vegetable(HYV)	0.50	1.25	2.26	2.07	1.40	1.22	1.90	1.37	1.42	1.05	7.48	1.39
11.Fodder Jowar (Local)	-	-	-	-	-	-	-	-	0.71	0.52	0.71	0.13
12.Fodder Maize (Local)	-	-	-	-	-	-	-	-	0.40	0.29	0.40	0.07
Total	39.87	100.00	109.11	100.00	114.58	100.00	138.21	100.00	135.79	100.00	537.56	100.00

Table 3.9 Fertilisers Consumption, by size groups.

(Figures- quintals)

Size group	1988-89	1989-90			1990-91		
	NPK and Combination	NPK and Combination	Small bags	Total	NPK and Combination	Small bags	Total
0.00 to 1.00	61.64 (2.33)	63.14 (2.39)	1.75 (0.07)	64.89 (2.46)	67.91 (2.57)	18.75 (0.70)	86.66 (3.28)
1.00 to 2.00	157.60 (2.26)	159.65 (2.29)	4.25 (0.06)	163.90 (2.36)	204.21 (2.93)	23.50 (0.34)	227.71 (3.27)
2.00 to 4.00	217.50 (2.87)	223.50 (2.95)	9.50 (0.13)	233.00 (3.08)	245.10 (3.24)	40.25 (0.53)	285.35 (3.77)
4.00 to 10.00	257.50 (2.77)	279.00 (3.00)	5.75 (0.06)	284.75 (3.06)	282.01 (3.03)	26.25 (0.28)	308.26 (3.31)
10.00& Above	358.50 (2.96)	410.00 (3.38)	11.75 (0.10)	421.75 (3.48)	448.30 (3.70)	35.00 (0.29)	483.30 (3.99)
Total	1052.74 (2.73)	1135.29 (2.94)	33.00 (0.09)	1168.29 (3.03)	1247.53 (3.23)	143.75 (0.37)	1391.03 (3.60)

* No fertilisers in small bags

Note- Figures in parantheses are fertiliser consumption per hectare of operated area.

The reason was better acceptance of small bags on small farms. This was, in turn, due to need for small quantity and smaller investment needed.

It was noticed that the percentage of consumption of small bags of fertilisers in the total consumption of fertilisers was 2.82 in 1989-90 and increased to 10.32 in 1990-91.

The increase was larger in the smaller size groups than the larger ones. It was also noticed that there was not much difference in the proportion of small bags between different size groups in 1989-90. In the second year however, the difference was marked. The proportion of S.B.F. (small bags of fertilisers) was much higher on smaller farms than the larger farms. Thus, we find that not only the consumption per hectare of small bags was higher on smaller farms but also the proportion of small bags of fertilisers to total consumption was larger on smaller farms. (Table 3.10)

Table 3.10 Proportion of fertilizer consumption in traditional and small bags

Size group	1989-90			1990-91		
	NPK and combination	Small bags	Total	NPK and combination	Small bags	Total
0.00 to 1.00	97.30	2.70	100.00	78.36	21.64	100.00
1.00 to 2.00	97.41	2.59	100.00	89.68	10.32	100.00
2.00 to 4.00	95.92	4.08	100.00	85.89	14.11	100.00
4.00 to 10.00	97.98	2.02	100.00	91.48	8.52	100.00
10.00 & above	97.21	2.79	100.00	92.76	7.24	100.00
Total	97.18	2.82	100.00	89.68	10.32	100.00

3.10 Fertiliser Consumption from 1988-89 to 1990-91

In 1988-89 the fertiliser consumption on the selected farms was limited to traditional types of fertilizers. Fertiliser use in small bags was not in vogue. Further, nearly entire quantity (99.03 per cent) of fertilisers was used for paddy. Groundnut, vegetables and maize accounted for a very negligible quantity. (Table 3.11)

Table 3.11 Percentage of fertiliser application excluding small bags*, 1988-89

Crop	0 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 10.0	10.0 & above	Total
Paddy	100.00	98.76	99.77	98.54	98.88	99.03
Groundnut	-	-	0.23	1.07	0.42	0.45
Vegetables	-	0.10	-	-	0.70	0.25
Maize	-	1.14	-	0.39	-	0.27
Total	100.00	100.00	100.00	100.00	100.00	100.00

*No small bags of fertilisers in 1988-89

In 1989-90 more than 99 per cent of the fertiliser quantity was for paddy both in the case of traditional types and small bags of fertilisers. The use of fertilisers for groundnut, vegetables and urd was localised to the farmers above 2.00 hectares (Tables 3.12 and 3.13)

Table 3.12 Percentage of fertiliser application excluding small bags, 1989-90

Crop	0 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 10.0	10.0 & above	Total
Paddy	100.00	100.00	99.44	99.28	99.03	99.36
Groundnut	-	-	0.56	0.72	0.49	0.46
Vegetables	-	-	-	-	0.24	0.09
Urd	-	-	-	-	0.24	0.09
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.13 Percentage of fertiliser application in small bags, 1989-90

Crop	0to 1.0	1.0to 2.0	2.0to 4.0	4.0to 10.0	10.0& above	Total
Paddy	100.00	100.00	100.00	95.65	100.00	99.24
Maize	-	-	-	4.35	-	0.76
Total	100.00	100.00	100.00	100.00	100.00	100.00

In 1990-91, of the traditional types of fertilisers, more than 90 per cent (91.12) was applied to paddy crop alone. Therein again, nearly 75 per cent (73.50) was used for high yielding varieties and 17.62 per cent was for local varieties. Other crops which utilised the remaining 10 per cent of the quantity were : groundnut, maize, moong, urd, vegetables, wheat and sugarcane. (Table 3.14)

Table 3.14 Percentage of fertiliser application excluding small bags 1990-91

Crop	0to 1.0	1.0to 2.0	2.0to 4.0	4.0to 10.0	10.0& above	Total
Paddy (HYV)	68.94	61.89	80.30	61.17	81.75	73.50
Paddy (Local)	23.91	31.55	9.37	30.94	9.65	17.62
Groundnut(HYV)	5.67	2.96	5.81	3.70	3.55	4.49
Maize (HYV)	-	0.67	0.24	0.74	0.11	0.32
Moong(Local)	-	0.90	1.02	0.98	2.39	1.36
Urd (Local)	-	1.57	1.43	1.33	1.05	1.10
Vegetable(HYV)	0.74	0.45	1.22	1.15	1.05	1.29
Wheat (HYV)	-	-	0.61	-	0.45	0.28
Sugarcane(HYV)	0.74	-	-	-	-	0.04
Total	100.00	100.00	100.00	100.00	100.00	100.00

As regards fertilisers in small bags it was noted that more than 99 per cent of the quantity was used for paddy crop. The other crops in which it was used only sparingly were groundnut and sugarcane. Of the quantity used for paddy 80 per cent (79.66) was for H.Y. Varieties and the remaining 20 per cent for local varieties (Table 3.15)

Table 3.15 Percentage of fertiliser application in small bags, 1990-91

Crop	0to1.0	1.0to 2.0	2.0 to 4.0	4.0to10.0	10.0& above	Total
Paddy (HYV)	77.34	69.15	84.47	75.24	85.71	79.66
Paddy (Local)	21.33	29.79	15.53	24.76	14.29	20.00
Groundnut (HYV)	-	1.06	-	-	-	0.17
Sugarcane (HYV)	1.33	-	-	-	-	0.17
Total	100.00	100.00	100.00	100.00	100.00	100.00

3.11 Use of Fertilisers in Small Bags in 1990-91

The selected 150 farmers used only urea in small bags. No other fertiliser was used in small bags. The weight of a small bag of urea in all the cases was 25 Kg. each and the price per bag was uniformly Rs.59. In all these cases the supplier was the local dealer and the producer was GNFC. The total quantity of fertilisers used in small bags was 143.75qtls. or 0.96 qtl per farm. The total value of this quantity was Rs.33925 @ Rs.59 per bag or Rs.236 per qtl. The quantity per farm increased from 44 kg.in the smallest size group to 3.89 qtls in the largest size group with the increase in the size of farms (Table 3.16)

Table 3.16 Consumption of fertilisers in small bags,1990-91

(Quantity-Quintals)

Size group	No.of farmers	Fertiliser used in small bags		Quantity per farm
		Quantity	Value (Rs.)	
0.0 to 1.0	43	18.75	4425.00	0.44
1.0 to 2.0	51	23.50	5546.00	0.46
2.0 to 4.0	28	40.25	9499.00	1.44
4.0 to 10.0	19	26.25	6195.00	1.38
10.0 above	9	35.00	8260.00	3.89
Total	150	143.75	33925.00	0.96

3.12 Consumption of Fertilisers per Hectare of Cropped Area

The quantity of fertilisers consumed per hectare of cropped area was 91 kg. This comprised 57 kg. of N, 23 kg.of P and 11 kg. of K. Evidently, the consumption level was quite low.

One of the objectives of this study was to compare the actual consumption in relation to the recommended doses. It was noted that for high yielding varieties of paddy the consumption of N, P & K was 75, 29 and 16 kg. per hectare. Against this the recommended doses were 60, 40 and 25 kg.per hectare respectively. It can be concluded that the application of nitrogenous fertilisers was not only according to the recommended doses but also, higher. However, the quantity of P and K was much lower than the recommended doses. This makes the application of fertilisers on the selected farms, imbalanced.

In the case of local paddy the recommended doses for N,P & K were 40,30 and 20 kg. per hectare respectively. Against

this the doses applied were 35, 12 and 3kg. respectively.

Apart from paddy only groundnut and urd had some relevance as far as the coverage was concerned.

In the case of groundnut the recommended doses of N,P &K were 30, 60 and 20 kg. respectively. On the other hand doses actually applied were 36, 41 and 21 kg. respectively. While the use of N was higher than the recommended dose that of P was two thirds of the recommended dose. The quantity of K was equal to that of recommended dose.

In the case of urd the doses used were far below the recommended doses. While the recommended doses were 15 to 20kg. of N and 30 to 35 kg. of P, the doses actually used were 9kg. of N and 8kg. of P and 2kg. of K.

Thus, it is observed that the recommended doses were generally not followed on the selected farms. The emphasis was more on N as compared to P and K, thereby, resulting in an imbalanced application of fertilisers. (Table 3.17)

Table 3.17 Consumption of fertiliser nutrients per hectare of cropped area, and recommended doses

(Qty.in kg/hectare)

Crop	Actual Consumption				Recommended doses of NPK for different crops			
	N	P	K	Total	N	P	K	Total
1. Paddy (HYV)	75	29	16	119	60	40	20	120
2. Paddy (Local)	35	12	3	50	40	30	20	90
3. Total Paddy	61	23	11	95	50	35	20	65
4. Groundnut (HYV)	36	41	21	98	30	60	20	110
5. Maize (HYV)	28	11	2	41	100	60	40	200
6. Moong (Local)	22	22	4	47	20	45	-	65
7. Urd (Local)	9	8	2	19	20	35	-	55
8. Wheat (HYV)	94	66	32	193	100	50	30	180
9. Sugarcane (HYV)	24	16	-	40	300	75	25	400
10. Vegetable(HYV)	47	17	10	74	-	-	-	-
Total	57	23	11	91	-	-	-	-

3.13 Proportion of Fertiliser Cost in Total Input

In the earlier paragraphs it was noted that the application of fertilisers in most of the crops was lower than the recommended doses. It was not intended to undertake a detailed input-output analysis of the farms. However, the proportion of the value of fertilisers specifically in small bags to the total cash expenses per hectare would indicate the weightage given to the fertiliser application.

In the case of high yielding varieties of paddy the cost (cash expenses) per hectare was Rs.1,568.37. It increased from Rs.967.71 in the smallest size group to Rs.2,426.19 in the largest group.

Of the total cost slightly more than 60 per cent was on all items except fertilisers and the remaining 38 per cent on fertilisers.

Again, the proportion of value of small bags of fertilisers was only 5.49 per cent. As was expected this proportion was highest (13.98 per cent) in the smallest size group and decreased to 3.54 per cent in the largest size group. (Table 3.18).

In the case of local varieties of paddy the cost per hectare (Rs.775.70) was nearly half of that of high yielding varieties. The fertiliser application was also lower. Therefore the proportion of value of fertilisers to total cost was lower (33.78 per cent) (Table 3.19)

Groundnut was an important crop as regards fertilizer application. Of the cost per hectare of Rs.1,183.06 as high as 41.02 per cent was on the fertilizers. (Table 3.20)

Table 3.18 Value of paid out cost per hectare for paddy (HYV) 1990-91

Particulars	0.00to 1.00		1.00 to 2.00		2.00 to 4.00		4.00 to 10.00		10.00& above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1. Out of pocket expenses for seed, manures, irrigation charges, hired human labours, hired bullock labours and other cash and kind expenses	532.65	55.04	672.35	59.15	759.52	57.93	949.87	67.19	1492.95	61.53	961.94	61.33
2. Traditional fertilisers												
2.1 Urea	171.23	17.69	226.81	19.95	256.93	19.60	239.63	16.95	421.61	17.38	283.87	18.10
2.2 Super Phosphate	97.52	10.08	110.89	9.75	108.08	8.24	107.84	7.63	163.99	6.76	122.39	7.80
2.3 Muriate of Potash	7.26	0.75	15.60	1.37	27.73	2.12	25.09	1.77	43.02	1.77	27.28	1.74
3. Combination	23.81	2.46	43.90	3.86	54.30	4.14	26.44	1.87	218.84	9.02	86.81	5.54
4. Small bags	135.26	13.98	67.12	5.90	104.44	7.97	64.64	4.57	85.78	3.54	86.08	5.49
Total	967.71	100.00	1136.66	100.00	1311.01	100.00	1413.50	100.00	2426.19	100.00	1568.37	100.00

Table 3.19 Value of paid out cost per hectare for paddy (local), 1990-91

Particulars	0.00to 1.00		1.00 to 2.00		2.00 to 4.00		4.00 to 10.00		10.00 & above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1. Out of pocket expenses for seed, manures, irrigation charges, hired human labours and other cash and kind expenses	409.40	55.22	446.87	63.93	218.30	52.75	593.37	68.16	718.70	75.51	513.76	66.22
2. Traditional fertilisers												
2.1 Urea	158.14	21.33	116.81	16.71	82.15	19.85	173.33	19.91	141.06	14.82	137.11	17.67
2.2 Super phosphate	56.07	7.56	59.14	8.46	51.64	12.48	88.33	10.15	53.80	5.65	11.05	8.44
2.3 Muriate of potash	-	-	5.12	0.73	0.52	0.13	8.62	0.99	3.66	0.38	4.78	0.62
3. Combination	39.28	5.29	30.39	4.35	3.54	0.85	6.97	0.80	2.28	0.24	13.50	1.74
4. Small bags	78.54	10.59	40.71	5.82	57.70	13.94	30.35	3.49	32.26	3.39	41.04	5.29
Total	741.42	100.00	699.04	100.00	413.88	100.00	870.61	100.00	951.76	100.00	775.70	100.00

Table 3.20 Value of paid out cost per hectare for Groundnut (H.Y.V.) 1990-91

Particulars	0.00to 1.00		1.00to 2.00		2.00 to 4.00		4.00 to 10.00		10.00& above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1) Out of packet expenses for seed, manures, irrigation charges, hired human labours, Hired Bullock labour and other cash and kind.	398.62	53.79	765.01	58.48	955.73	56.45	256.03	43.84	982.05	66.91	697.78	58.98
2. Traditional fertilisers												
2.1 Urea	124.14	16.75	260.25	19.89	237.15	14.01	141.84	24.29	103.92	7.08	171.61	14.51
2.2 Super Phosphate .	172.14	23.23	121.49	9.29	388.93	22.97	164.54	28.18	207.84	14.16	200.54	16.95
2.3 Muriate of Potash	46.21	6.23	23.28	1.78	111.23	6.57	21.54	3.69	35.92	2.45	41.40	3.50
3. Combination	-	-	123.59	9.45	-	-	-	-	137.93	9.40	68.29	5.77
4. Small bags	-	-	14.64	1.11	-	-	-	-	-	-	3.45	0.29
Total	741.10	100.00	1308.25	100.00	1693.04	100.00	583.95	100.00	1467.67	100.00	1183.06	100.00

In the case of urd the total cost per hectare was quite low (Rs.190.37). This crop also needed very little cost in the form of cash expenses other than fertilisers, (Rs.89.15). Naturally the proportion of value of fertilisers applied soared to 53.17 per cent. It may be mentioned that no fertiliser in the form of combination or small bags was applied to this crop. (Table 3.21)

It can, therefore, be concluded that the small bags of fertilisers had a definite impact in the first three size groups having holding size below 4.00 hectares. In the larger two size groups where the holding size was more than 4.00 hectares the impact was negligible as the proportion of value of small bags of fertilisers to the total cost was less than 5 per cent.

The proportion of value of small bags of fertilisers to total value of fertilisers further supported this observation. (See appendix tables A 3.1 to A 3.4)

3.14 Knowledge and Opinion

The maximum number of selected farmers attributed Rural Agricultural Extension Officer (RAEC) as source of information on small bags of fertilisers. Neighbours came next and Agricultural Extension Officer was the third important source of information. As many as 107 (71.33 per cent) came to know about the small bags during the reference year. Another, 34 (22.67 per cent) knew about it in the previous year. The farmers using small bags during the reference year numbered 134 (89.33 per cent) and the remaining 16 (10.67 per cent) used it a year earlier.

This clearly indicated that knowledge and adoption of small bags was only a recent phenomenon.

Table 3.21 Value of paid out cost per hectare for urd (Local) 1990-91

Particulars	0.00 to 1.00		1.00to 2.00		2.00to 4.00		4.00to 10.00		10.00& above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1. Out of pocket expenses for seed, manures, irrigation charges, hired human labours, hired bullock labours and other cash & kind expenses.	-	-	86.96	55.56	48.00	38.46	86.37	46.25	170.55	48.82	89.15	46.83
2. Traditional fertilisers												
2.1 Urea	-	-	34.78	22.22	38.40	30.77	46.06	24.67	76.97	22.03	47.11	24,75
2.2 Super Phosphate	-	-	34.78	22.22	38.40	30.77	41.46	22.20	97.96	28.04	49.73	26.12
2.3 Muriate of Potash	-	-	-	-	-	-	12.86	6.88	3.91	1.12	4.38	2.30
3. Combination	-	-	-	-	-	-	-	-	-	-	-	-
4. Small bags	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	156.52	100.00	124.80	100.00	186.76	100.00	349.39	100.00	190.37	100.00

Only one kind of small bags of fertilisers was in vogue. It was the urea manufactured by Gujarat Narmada Valley Fertilisers Company (GNFC) in the packings of 25kg. each.

With regard to reasons for acceptance of SBF the selected farmers weighed three reasons equally; these were:- Small in weight and therefore convenient in transportation and the assurance regarding the quality of the product. A very few assigned economy as a reason for acceptance.

The selected farmers opined that they were fully satisfied with the SBF use and emphatically opined in favour of its future use. The most prominent reason of the farmers' satisfaction was the convenience in transportation. Another reason was its easy availability. The selected farmers also experienced that fertiliser was free from adultration.

Among the opinions and suggestions offered by the selected farmers the most important was that the SBF should be made available through cooperative societies against cooperative and commercial bank loans. A very large section of the respondents wanted a subsidy on SBF. A significant number of respondents desired that other fertilisers should also be made available in small bags. A section of marginal and small farmers demanded the small bags to be sold in 10Kg. packings. (Table 3.22 & 3.23)

3.15 Farm Level Constraints

There were no farm level constraints in the use of small bags of fertilisers. Only economic constraint as might be faced for the use of traditional types of fertilisers existed. But this can not be attributed to the small bags specifically.

Table 3.22 Knowledge and opinion of the selected farmers about Small bags of fertilisers

Size group	Source of information (see codes below)						Year of information			Year of first use of SBF			Type of SBF	Qty. used (Qt.s)	Use of S B F	
	1	2	3	4	5	6	88-89	89-90	90-91	88-89	89-90	90-91			Crop	Area (Hect.)
0.00- 1.00	32	32	23	11	11	1	3	13	27	-	4	39	GMFC urea	18.25	Paddy, HYV Sugarcane, HYV	21.44 0.50
1.00- 2.00	38	35	20	17	11	9	6	10	35	-	3	48	"	23.50	Paddy, HYV Groundnut, HYV	49.28 1.41
2.00- 4.00	27	17	17	5	3	8	-	6	22	-	6	22	"	39.00	Paddy HYV Groundnut HYV Moong Local Wheat HYV	55.43 0.20 0.20 0.51
4.00-10.00	18	7	10	6	7	5	-	5	14	-	3	16	"	25.75	Paddy, HYV	49.57
10.00&above	9	5	6	3	4	5	-	-	9	-	-	9	"	18.25	Paddy, HYV Maize, HYV	75.27 0.26
Total	124	96	76	42	36	28	9	34	107	-	16	134	GMFC Urea	124.75	Paddy, HYV Groundnut, HYV Moong Local Wheat, HYV Maize, HYV Sugarcane HYV Total	250.99 1.61 0.20 0.51 0.26 0.50 254.07

Source of information codes:- RAEO=1, Neighbour=2, A.E.O=3, ADO=4, SADO=5, Others=6

Table 3.23 Experience and suggestions regarding the use of small bags fertilisers

Size group	Reasons for accepting small bags (see codes below)					Reasons for satisfaction (See codes below)					Whether he would use SBF in future		Benefits of SBF (See codes below)				Farmers opinion and suggestions				
	1	2	3	4	5	1	2	3	4	5	Yes	No	1	2	3	4	1	2	3	4	5
0.00- 1.00	43	43	43	20	2	31	41	5	15	4	43	-	11	42	26	11	26	33	29	6	8
1.00- 2.00	51	51	51	16	3	39	51	9	15	4	51	-	11	48	39	9	40	41	36	6	7
2.00- 4.00	28	28	28	5	2	22	28	6	11	-	28	-	5	28	23	3	24	21	14	2	2
4.00-10.00	19	19	19	7	-	13	18	5	11	2	19	-	7	14	8	8	12	13	16	2	1
10.00&above	9	9	9	4	1	5	9	4	3	-	9	-	2	9	7	1	8	6	4	-	-
Total	150	150	150	52	8	110	147	29	55	10	150	-	36	141	103	32	110	114	99	16	18

A= Reasons for acceptance codes:- Weight=1, Convenience of transportation=2, Quality=3, Economy=4, Others=5

B= Reasons for satisfaction codes: Esier to purchase=1, Easy in transportation=2, Quality is good=3, Free from adultration=4, Economical to small farms=5

C= Benefits of SBF codes :- Easier to purchase=1, Easy in transportation=2, Quality is good=3, Free from adultration=4, Proper weighment=5

D= Farmers Opinion and suggestions codes:- SBF should be packed in stronger bags=1
Other fertilisers should also be made available in small bags=2
SBF should be 10 kg. in weight=3,
SBF shoulde be sold through Cooperative societies=4,
Subsidy should be provided by the Government=5

3.16 Administrative Problems

No administrative problems were faced by the farmers because the SBF was available in adequate quantities all the year around. Since these were sold by private dealers against cash payment no formalities as regards application for loan, preparation and sanction of loan case and finance were undergone by the farmers.

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CHAPTER IV

SUMMARY AND CONCLUSIONS

4.1 The importance of fertiliser is well established. However, the difference in its application is observed between irrigated and unirrigated areas and between small and big farmers. The Govt. is making efforts to promote consumption of fertilisers on small and marginal holdings. One of the measures taken in this direction was distribution of fertilisers in small bags. The objective was to provide fertilisers to the weaker sections in small quantities without hampering the quality.

The Directorate of Economics and Statistics, Ministry of Agriculture, Govt.of India, asked all the Agro-Economic Research Centres to conduct a study titled "The effect of fertilisers in small bags especially in low consumption rainfed areas to increase fertiliser consumption".

This Centre selected Raigarh district which is a rainfed district. It is a backward district dominated by tribal population. The consumption of fertilisers in the district in general is low but the district had a good record as far as the distribution of small bags of fertilisers was concerned.

4.1.1 The specific objectives of the study were :

1. To study the present level of fertiliser consumption by size of operational holdings and its deviation and reasons for not using the recommended doses of fertilisers.

2. To measure the impact of supply of small bags of fertilisers on the farms in low consumption rainfed areas where it is intended to increase the fertiliser consumption.

3. To identify the farm level constraints in the use of small bags of fertilisers and and suggest measures for improvement, and

4. To identify the administrative problems in distributing the fertiliser bags.

4.1.2 In Raigarh district 3 blocks viz., Pusore, Raigarh and Sarangarh were selected. These also had low consumption of fertilisers but larger number of small bags of fertilisers distributed. From each of the selected 3 blocks 50 beneficiaries were selected. Thus the sample comprised 150 farmers respresenting all the three size groups of marginal, small and "other" categories of farms.

The reference year was 1990-91. The field work was done from January, 91 to April, 91.

4.2 Raigarh is the eastern most district of Madhya Pradesh bordering the states of Bihar and Orissa. The total geographical area of the district was 1,298.4 thousand hectares. Of this forest occupied about 30.0 per cent and the net sown area was 42.00 per cent. Raigarh is one of the districts of Chhattisgarh Plain which is known as "Rice bowl" of the state. In Raigarh district paddy contributed 70.00 per cent of the cropped area. Besides paddy, pulses were important group of crops contributing

11.00 per cent. Only 6.00 per cent of the cropped area of the district was irrigated. Paddy was the only crop receiving irrigation.

The total population of the district in 1981 was 1,443.2 thousand. More than 90.00 per cent of this was rural. Moreover, 48.7 per cent population was tribal. The literacy percentage in the district was 26.37. This was still lower (23.83 per cent) for rural population. Of the total population 41.00 per cent were workers. Of the total workers 58.65 per cent were cultivators and 27.17 per cent, agricultural labourers, indicating the dependence of 85.82 per cent of workers on agriculture.

The distribution of agricultural holdings in the district is quite skewed. While marginal and small holdings formed 57.10 per cent of the total number occupied only 16.10 per cent of the area. On the other hand medium and large holdings together formed 21.90 per cent of the total number but occupied a very high percentage (63.80 per cent) of the total area.

The yield of paddy, the staple crop of the district was 8.95 quintals per hectare which was slightly more than the state average. The yields of wheat, maize, and arhar were also more in the district than the state average. In the case of other crops the yields were lower than the state averages.

4.2.1 The selected blocks of Raigarh, Pusore and Sarangarh are southern blocks of the district and agriculturally more developed ones. The literacy percentage was higher in the selected blocks. Paddy and groundnut occupied a larger percentage in the selected blocks but pulses occupied a lower percentage.

Paddy and vegetables were irrigated to a larger extent in the selected blocks than the district.

4.3 Fifty farmers in each of the selected three blocks formed the sample. The total sample was 150 farmers. More than 80 per cent of the farmers had holdings below 4.00 hectares each. The average size of holdings was 2.57 hectares.

4.3.1 The distribution of farmers by castes and size groups showed that the scheduled caste farmers were generally marginal farmers. The The scheduled castes and scheduled tribes farmers made up small size groups and large farms were owned by other castes group. The literacy percentage increased with the size of farms. The average size of family was of five members. It generally increased with the size of farms. Similarly, the average number of educated adults increased with the size of farms. The operated area of the selected farms was 386.01 hectares of which 5.33 per cent was leased-in area. Slightly less than half of the operated area was irrigated. In all the size groups except the largest one the percentage of irrigated area varied between 32 to 38. In the largest size group it was 73.21.

Paddy 89.15 per cent, grcundnut (3.18 per cent) and urd (3.42 per cent) were the important crops of the district. The diversification of crops was observed in the large size groups.

4.3.2 In the following paragraphs the observations regarding the fertiliser consumption are summarised with specific reference to objectives. The first objective was to study the fertiliser consumption by size of holdings.

It was noted that th fertiliser consumption in 1990-91 was 1,391.03 quintals. Of this the consumption in small bags of fertilisers was 143.75 quintals. The consumption per hectare was 3.60 quintals. It was higher on larger size groups. In the case of small bags the fertiliser consumption per hectare was higher on smaller farms. The reason was better acceptance of small bags on small farms. This was, in turn, due to need for small quantity and smaller investment. The percentage of consumption of small bags in total consumption was 10.32.

It was observed that not only the consumption per hectare of small bags was higher on smaller farms but also the proportion of small bags of fertilisers to total consumption was larger on smaller farms.

Of the traditional types of fertilisers more than 90per cent were applied to paddy crop alone. There again, 73.50 per cent was used for high yielding varieties and 17.62 per cent for local paddy. Crops other than paddy which were applied fertilisers were groundnut, maize, moong, urd, vegetables, wheat and sugarcane.

In the case of small bags of fertilisers more than 99 per cent was applied to paddy crop only. Of this 80 per cent was for H.Y.V. paddy and 20 per cent for local paddy.

The only fertiliser in small bags was urea manufactured by Gujarat Narmada Valley Fertiliser Company (GNFC). The weight of each bag was 25 kg. and price was Rs.59.00. In all the cases the supplier was the local dealer and the producer was GNFC. The total quantity of fertilisers used in small bags was 143.75 quintals or 0.96 quintal per farm. The total value of this quantity was Rs.33,925 @ Rs.59 per bag or Rs.236 per qtl.

The quantity per farm increased from 44 kg. in the smallest size group to 3.89 qtls. in the largest size group with the increase in the size of farms.

4.3.3 A comparison of the quantity of fertilisers used and the recommended dose was one of the objectives of the study. The fertiliser consumed per hectare of cropped area was 91kg. This comprised 57 kg.of N, 23kg.of P, and 11 kg.of K. Thus the consumption level was quite low.

For high yielding varieties of paddy the consumption of N,P and K was 75, 29, and 16 kg.per hectare respectively. The recommended doses on the other hand were 60, 40 and 25 kg. per hectare respectively.

It can be concluded that the application of nitrogenous fertilisers was not only according to the recommended doses but also higher. However, the quantity of P and K was much lower than the recommended doses. This makes the application of fertilisers on the selected farms imbalanced.

In the case of local paddy the recommended doses for N,P,K were 40, 30,20 kg. per hectare respectively. Against this, the doses applied were 35, 12 and 3 kg. respectively.

Thus it is observed that the recommended doses were generally not followed on the selected farms. The emphasis was more on N as compared to P and K, thereby, resulting in an imbalanced application of fertilisers.

The reason for not using the recommended doses of fertilisers were mainly two:firstly, the farmers did not have the thorough knowledge of recommended doses. The importance of proportionate application of N, P& K was not known. Since the

response of N was quick and evident emphasis was more on nitrogen. The other reason was high prices of fertilisers.

4.3.4 As far as the impact of supply of small bags of fertilisers, it was noted that in the year 1988-89 there was no use of fertiliser in small bags. In 1989-90 the quantity used was 33 quintals and in the year 1990-91 the consumption of small bags increased to 143.75 quintals or a percentage increase of 334.85.

The impact was more on marginal and small farms for whom the small bags were meant. The data on cash inputs indicated that the small bags of fertilisers had a definite impact in the first three size groups having holding size below 4.00 hectares. In the larger two size groups where the holding size was more than 4.00 hectares the impact was negligible as the proportion of value of small bags of fertilisers to the total cost was less than 5 per cent. The proportion of value of small bags of fertilisers to total value of fertilisers further supported this observation.

4.3.5 Among the sources of information about small bags the important agencies were Rural Agricultural Extension Officers, Neighbourers and Agricultural Extension Officers, in that order.

With regard to reasons for acceptance of SBF the selected farmers weighed three reasons equally, these were, small in weight and therefore convenient in transportation and the assurance regarding the quality of the product. A very few assigned economy as a reason for acceptance.

The selected farmers opined that they were fully satisfied with the SBF use and emphatically opined in favour of its future use.

Currently, the small bags of fertilisers are manufactured by few private firms. These included IFFCO, GSFC & GNFC. These are distributed through the marketing network of the respective companies. In our field survey we did not experience any kind of constraints in the use of small bags of fertilisers. The small bags were easily available at the special distributing centres of companies' dealers and in adequate quantity. No difficulty was faced by any of the selected farmers.

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Table A 3.1 Value of fertilisers per hectare for paddy (HYV) 1990-91

Particulars	0.00to 1.0		1.00 to 2.00		2.00 to 4.00		4.00 to 10.00		10.00 and above		Total	
	value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1.Traditional fertilisers												
1.1 Urea	171.23	39.36	226.81	48.85	256.93	46.59	239.63	51.68	421.61	45.18	283.87	46.81
1.2 Super Phosphate	97.52	22.41	110.89	23.88	108.08	19.60	107.84	23.26	163.99	17.57	122.39	20.18
1.3 Muriate of Potash	7.26	1.67	15.60	3.36	27.73	5.03	25.09	5.41	43.02	4.61	27.28	4.50
2.Combination	23.81	5.47	43.90	9.45	54.30	9.85	26.44	5.70	218.84	23.45	86.81	14.32
3.Small bags	135.26	31.09	67.12	14.46	104.44	18.93	64.64	13.94	85.78	9.19	86.08	14.19
Total	435.08	100.00	464.32	100.00	551.48	100.00	463.64	100.00	933.24	100.00	606.43	100.00

Table A 3.2 Value of fertilisers per hectare for Paddy (Local) 1990-91

Particulars	0.00 to 1.00		1.00 to 2.00		2.00 to 4.00		4.00 to 10.00		10.00 and above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1.Traditional fertilisers												
1.1 Urea	158.14	47.63	116.81	46.32	82.15	46.80	173.33	56.35	141.06	60.53	137.11	66.08
1.2 Super Phosphate	56.07	16.89	59.14	23.45	51.64	29.42	88.33	28.72	53.80	23.08	11.05	5.33
1.3 Muriate of potash	-	-	5.12	2.03	0.52	0.29	8.62	2.80	3.66	1.57	4.78	2.30
2.Combination	39.28	11.83	30.39	12.05	3.54	2.01	6.97	2.27	2.28	0.98	13.50	6.51
3.Small bags	78.54	23.65	40.71	16.14	37.70	21.48	30.35	9.86	32.26	13.84	41.05	19.78
Total	332.03	100.00	252.17	100.00	175.55	100.00	307.60	100.00	233.06	100.00	207.49	100.00

Table A3.3 Value of fertilisers per hectare for groundnut (HYV) 1990-91

Particulars	0.00 to 1.00		1.00 to 2.00		2.00 to 4.00		4.00 to 10.00		10.00 and above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1.Traditional fertilisers												
1.1 Urea	124.14	36.25	260.25	47.91	237.15	32.16	141.84	43.25	103.92	21.40	171.61	35.36
1.2 Super Phosphate	172.14	50.26	121.49	22.36	388.93	52.75	164.54	50.18	207.84	42.80	200.54	41.32
1.3 Muriate of potash	46.21	13.49	23.28	4.29	111.23	15.09	21.54	6.57	35.92	7.40	41.40	8.53
2.Combination	-	-	123.59	22.75	-	-	-	-	137.93	28.40	68.29	14.07
3.Small bags	-	-	14.64	2.69	-	-	-	-	-	-	3.45	0.71
Total	342.49	100.00	543.25	100.00	737.31	100.00	327.92	100.00	485.61	100.00	485.29	100.00

Table A 3.4 Value of fertilisers per hectare for urd (Local) 1990-91

Particulars	0.00 to 1.00		1.00 to 2.00		2.00 to 4.00		4.00to 10.00		10.00 and above		Total	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1.Traditional fertilisers												
1.1 Urea	-	-	34.78	50.00	38.40	50.00	46.06	45.89	76.97	43,04	47.11	46.54
1.2 Super Phosphate	-	-	34.78	50.00	38.40	50.00	41.46	41.30	97.96	54.78	49.73	49.13
1.3 Muriate of potash	-	-	-	-	-	-	12.86	12.81	3.91	2.18	4.38	4.33
2.Combination	-	-	-	-	-	-	-	-	-	-	-	-
3.Small bags	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	69.56	100.00	76.80	100.00	100.38	100.00	178.84	100.00	101.22	100.00