

M&E Report No. 99

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**EVALUATION
SURVEY
RABI 2005-06**

**DIRECTORATE OF AGRICULTURE
(MONITORING & EVALUATION CELL)
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FORWARD

The present report on Evaluation Survey Rabi 2005-06 is 99th in the series brought out by the Monitoring & Evaluation Unit of the Directorate of Agriculture, Rajasthan based on survey conducted during Rabi 2005-06.

The report gives an assessment of the status of programme implemented and impact of the extension system in terms of adoption of farm technologies, level of application of different inputs like fertilizer, improved seed, pesticides and ultimate impact on yield level etc.

It is hoped that findings of the report will be of immense help to the extension functionaries working at different levels and those who are responsible for implementation of Agriculture Department Programme in the State.

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Commissioner Agriculture,
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SUMMARY FINDINGS

WHEAT

- 1 5042 crop cutting experiments were conducted during Rabi 2005-06 on the fields of mandal and non mandal farmers. The average yield of mandal and non mandal farmers was 30.11 qt/ha and 28.54 qt/ha respectively.
- 2 The percentage yield gap between mandal and non mandal farmers was 5.50 which is almost stationary since last 5 years.
- 3 Average yield of mandal farmers in Bharatpur Div was found 36.15 qts/ha, which was highest amongst the different Div. The average yield of Jalore Div. was found 21.72 qts/ha which was lowest amongst Div.
- 4 Av. application of N was 77.88 kg./ha. by mandal farmers and it was used in 99 % fields.
- 5 Av. application of P was 40.44 kg./ha by mandal farmers and it was used in 94 % fields.
- 6 About 89 % of Mandal farmers were using HYV varieties of seed.
- 7 HYV seed variety like RAJ-1482,RAJ-3077 and LOK-I were sown by 62% farmers.

BARELY

- 1 126 crop cutting experiments were conducted during Rabi 2005-06 on the fields of mandal and non mandal farmers. The average yield of mandal and non mandal farmers was 24.85 qt/ha and 22.92 qt/ha respectively.
- 2 The percentage yield gap between mandal and non mandal farmers was 8.42 during 2005-06.
- 3 The crop cutting experiments were conducted only in Bhilwara Div.

- 4 Av. application of N was 66.77 kg./ha. by mandal farmers and it was used in 76 % fields.
- 5 Av. application of P was 38.24 kg./ha by mandal farmers and it was used in 65 % fields.
- 6 About 57 % of Mandal farmers were using HYV varieties of seed.
- 7 HYV seed variety like RD-2052, RD-57 and RD-103 were sown by 30 % farmers.

GRAM

- 1 884 crop cutting experiments were conducted during Rabi 2005-06 on the fields of mandal and non mandal farmers. The average yield of mandal and non mandal farmers was 9.02 qt/ha and 8.28 qt/ha respectively.
- 2 The percentage yield gap between mandal and non mandal farmers was 8.93 which is almost stationary since last 5 years.
- 3 Average yield of mandal farmers in Sikar Div was found 10.35 qts/ha, which was highest amongst the different Div. The average yield of Kota Div. was found 8.48 qts/ha which was lowest amongst Div.
- 4 Av. application of N was 7.89 kg./ha. by mandal farmers and it was used in 71 % fields.
- 5 Av. application of P was 19.36 kg./ha by mandal farmers and it was used in 73 % fields.
- 6 About 21 % of Mandal farmers were using HYV varieties of seed.
- 7 HYV seed variety like Dahod yellow, C-235 and GNG-146 were sown by 17% farmers.

MUSTARD

- 1 2646 crop cutting experiments were conducted during Rabi 2005-06 on the fields of mandal and non mandal farmers. The average yield of mandal and non mandal farmers was 14.30 qt/ha and 13.60 qt/ha respectively.
- 2 The percentage yield gap between mandal and non mandal farmers was 5.14 which is less than last year.
- 3 Average yield of mandal farmers in Jodhpur Div was found 15.78 qts/ha, which was highest amongst the different Div. The average yield of Udaipur Div. was found 10.10 qts/ha which was lowest amongst Div.
- 4 Av. application of N was 57.54 kg./ha. by mandal farmers and it was used in 96 % fields.
- 5 Av. application of P was 34.12 kg./ha by mandal farmers and it was used in 93 % fields.
- 6 About 95 % of Mandal farmers were using HYV varieties of seed.
- 7 HYV seed variety like T-59, BIO-902 and PUSA BOLD were sown by 57% farmers.

EVALUATION REPORT RABI 2005-06

CHAPTER-I

INTRODUCTION :-

Rajasthan is the largest State of India having 76.62 % population living in the rural areas and their economy is mostly based on Agriculture. The geographical area of the State is 342 lac ha. The gross cropped area during the year 2005-06 was recorded 217.83 lac hect. The total cropped area in Rabi was 73.77 lac hect. Irrigated area in Rabi was 62.79 lac ha.

The main crops of Rabi season are Wheat, Mustard, Gram and Barley which contribute about 55.98 lac hac . area under Rabi season.

Rainfall :-

The behavior of the monsoon in Rajasthan is usually erratic and uncertain. Normally it enters in the State in the last week of June. During the year 2005-06, the state received only 553.60 mm rainfall against normal rainfall of 575 .1 m.m. thus rain fall during the year was 3.74% less than normal rain fall. The district wise and month wise rainfall in the state is given in the table No.-1:-

Table No.-1
Normal Annual Rainfall(575.1mm)

(Rainfall in MM.)

RAINFALL DURING 2005-06							
S.No.	District	June 05	July 05	August 05	Sept.05	Total rainfall from june to sept.05	Total rainfall from june 05 may.06
1	Ajmer	51.40	158.80	71.80	193.20	475.20	478.6
2	Alwar	155.00	234.00	44.00	190.00	623.00	692.0
3	Banswara	94.00	340.00	133.00	373.00	940.00	940.00
4	Baran	51.80	441.60	93.80	607.40	1194.6	1226
5	Barmer	12.00	20.00	42.00	38.00	112.00	157.00
6	Bharatpur	38.00	809.00	53.00	82.00	982.00	1016.50
7	Bhilwara	22.00	149.00	48.00	209.00	428.00	444.00
8	Bikaner	13.00	139.00	0.00	108.00	260.00	291.00
9	Bundi	52.00	213.00	19.80	240.00	524.80	544.80
10	Chittorgarh	56.80	296.20	179.00	433.50	965.50	980.10
11	Churu	106.00	75.00	6.00	69.00	256.00	294.00
12	Dausa	97.00	347.00	25.00	111.00	580.00	653.00
13	Dholpur	84.50	446.20	122.00	70.00	722.70	737.30
14	Dungarpur	92.00	163.00	107.00	210.00	572.00	572.00
15	Ganganagar	9.00	37.00	0.00	25.00	71.00	74.00
16	Jaipur	75.00	204.00	12.00	108.10	399.10	410.10
17	Jailsalmer	28.00	43.00	2.00	19.50	92.50	198.50
18	Jalore	22.80	62.40	37.40	170.00	292.60	292.60

S.No.	District	June 05	July 05	August 05	Sept.05	Total rainfall from june to sept.05	Total rainfall from june 05 may.06
19	Jhalawar	126.00	434.00	61.00	173.00	794.00	804.00
20	Jhunjhunu	97.00	154.00	12.00	80.00	343.00	346.00
21	Jodhpur	35.00	128.00	45.00	45.00	253.00	255.00
22	Kota	30.60	370.00	40.00	123.00	563.60	578.60
23	Nagaur	69.00	290.00	0.00	115.00	474.00	474.00
24	Pali	16.00	89.00	152.00	137.00	394.00	418.40
25	Rajsamand	18.00	192.00	266.00	152.00	628.00	640.00
26	S.Madhopur	220.00	578.00	74.00	107.00	979.00	987.00
27	Sikar	123.00	229.00	0.00	81.00	433.00	452.00
28	Sirohi	87.00	198.20	218.00	314.30	817.50	862.50
29	Tonk	81.50	154.40	14.60	142.00	720.00	728.00
30	Udaipur	43.00	232.00	138.00	307.00	392.50	409.00
31	Hanumangarh	37.00	48.00	8.00	117.00	210.00	277.00
32	Karauli	70.50	316.40	32.40	57.60	476.90	480.90
	State Average	64.50	237.20	64.30	165.20	531.20	553.60

The rainfall during 2005-06 was almost at par with the normal rainfall .It is revealed that due to wide spread and 165.20 mm rain fall in the month of September 05, cropped area during Rabi season increased significantly.

Rabi Cropped Area :

The area under important Rabi crops during last five years is given in the Table No.-2 :-

Table No.-2

(Area in Lac Ha.)

Important Crops	Yearwise Area under Rabi crops					Percentage variation during 2005-06 vis-à-vis previous year i.e. 2004-05
	2001-02	2002-03	2003-04	2004-05	2005-06	
Wheat	22.87	18.00	21.03	20.10	21.24	(+) 5.67
Barley	1.74	1.92	1.82	1.75	2.01	(+) 15.43
Gram	9.70	4.49	11.17	10.35	10.81	(+) 4.54
Rape & Mustard	17.60	11.91	20.63	32.86	35.59	(+) 8.31

The above data reveals that area under wheat, barley, gram and mustard was increased during 2005-06 as compared with last year.

CHAPTER – II

Object, Sampling Plan and Coverage

1. Object

The main objectives of the evaluation survey are as under :-

1. To assess the overall impact of Extension Program on the productivity level of main crops for both categories of farmers i.e. mandal farmers as well as other farmers.
2. To evaluate the degree of acceptance of various recommended practices by the farmers.
3. To assess the variety wise productivity and impact of fertilizer over productivity on different crops.

2. Sampling Plan

Multistage stratified random sampling procedure has been adopted for selection of samples with equal probability of selection. The subdistrict has been taken as strata. In each subdistrict (strata), 50 Kisan Mandal are selected at random with equal probability of selection as first stage sampling unit subject to conditions that: -

1. From one VEW circle only one Kisan mandal is to be selected.
2. From one AAO circle, not more than a fixed number (allotted to subdistrict) is to be selected.

In the selected Kisan Mandal, one mandal farmer and one other farmer are selected randomly from the list of mandal/other farmers as the second stage sampling unit. The third stage for selection is the selection of fields of particular crop for both categories of farmers and a plot of size 5x5 Sqr. Mtr. as the ultimate stage of sampling unit. Crop cutting experiments are conducted by the Agriculture Supervisors on two major crops of their circle.

3. Coverage :

All the 63 sub districts covered under the National Agriculture Extension Program have been included in the evaluation survey. The total number of experiments conducted for both the categories of farmers is indicated in the table No.-2.1 :-

Table No.-2.1

Cropwise Number of CC Experiments conducted during 2005-2006

<u>CROP</u>	Planned	Conducted	%
Wheat	5404	5042	93
Rape and Mustard	2778	2646	95
Gram	1066	884	83
Barely	204	126	62
Total	9452	8698	92

The above data reveals that during rabi 2005-06 season 9452 CC experiments were planned and 8698 experiments were conducted. Thus 92 % experiments were conducted on different crops.

Inspection of Crop Cutting Experiments :-

Inspection by senior officers are very essential to check up unbiased results. Looking to this, targets were fixed to inspect crop cutting experiments by Assistant Director of Agriculture (Extn.) , Agriculture Officers, Assistant Agriculture Officers and also by Investigators. Divisionwise targets and achievement related to Assistant Director of Agriculture (Extn.) and Agriculture Officers are given in the following table No.-2.2

Table No.-2.2

Inspecting Officer	Division	Target	Achievement					
			Wheat	Mustard	Barley	Gram	Total	%
Assistant Director (Extension)	Jaipur	48	16	18	0	2	36	75
	Bharatpur	40	19	16	0	0	35	87
	Udaipur	24	8	0	0	10	18	75
	Jodhpur	24	8	8	0	0	16	67
	Kota	64	26	10	0	16	52	81
	Bhilwara	72	31	15	12	2	60	83
	Jalore	24	6	6	0	0	12	50
	Sikar	32	14	12	2	0	28	88
	S. Ganganagar	24	8	8	0	0	16	67
	Total	352	136	93	14	30	273	78
Agriculture Officer (Extension)	Jaipur	88	38	29	0	3	70	80
	Bharatpur	120	34	35	0	0	69	58
	Udaipur	40	20	0	0	16	36	90
	Jodhpur	24	6	6	0	0	12	50
	Kota	64	26	17	0	14	57	89
	Bhilwara	64	31	14	16	0	61	95
	Jalore	24	6	6	0	0	12	50
	Sikar	56	14	9	7	0	30	53
	S.Ganganagar	48	20	20	0	0	40	83
	Total	528	195	136	23	33	387	73

The Above table reveals that achievements of inspection by Assistant Director(Ex) were 78% and in Jalore div only 50 % inspection were made. Similarly the achievements of inspection made by Agriculture officers were 73% and in Jodhpur,Jalore and Sikar div only 50-53 % inspection were made.

CHAPTER – III

CROP – WHEAT

Wheat is an important Rabi cereal crop, which is extensively grown in all the districts of the State. During 2005-06, it was sown in an area of 21.24 lac hectares which was 21.11 % of the total Rabi cropped area i.e. 78.35 lac ha. The cropped area and irrigated area under Wheat crop during last five years are given in the table No.-3.1 :-

Table No.- 3.1

(Area in lac hect.)

S.No	Year	Cropped Area	Irrigated area	Irrigated area in percentage
1	2001-2002	22.87	22.61	98.86
2	2002-03	18.00	17.95	99.72
3	2003-04	21.03	20.76	98.72
4	2004-05	20.10	19.83	98.66
5	2005-06	21.24	21.03	99.01

The above table reveals that cropped area and irrigated area under wheat crop during Rabi 2005-06 were 21.23 lac hectare and 21.03 lac ha. respectively which were more than last year.

Average Yield :

In order to assess the impact of new agriculture technology being disseminated to the farmers by extension agency for improving productivity of crops, crop cutting experiments were conducted on the field of mandal and other farmers in different districts of the State. The State Level average yields for both the categories of farmers as obtained from the survey are presented in the table given below :-

Table No.-3.2

(Average Yield in Qt./Ha.)

S.No.	Year	Average Yield			Yield gap in percentage mandal over other farmer
		Mandal farmer	Other farmer	Overall	
1	2001-02	32.55	30.51	31.53	6.69
2	2002-03	29.46	27.61	28.53	6.70
3	2003-04	31.77	30.12	30.95	5.48
4	2004-05	31.03	29.31	30.17	5.86
5	2005-06	30.11	28.54	29.33	5.50

The above data reveals that, the yield during 2005-06 was. 30.11 qt/ha for mandal farmers and 28.54 qt/ha for other farmers. The yield was less than last two year. The yield gap between mandal and other farmers was 5.50 % during the year which was almost stationary since last 5 years.

Division-wise performance as compared to State level estimates was also analyzed and are given below in table No. 8.

Table No.-3.3

(Average Yield in Qt./hect.)

S.No.	Division	Average Yield		
		Mandal farmer	Others farmer	% yield gap
1.	Jaipur	30.56(270)	28.41(270)	7.57
2.	Sikar	30.41(184)	28.43(184)	6.96
3	Bharatpur	36.15(543)	34.89(543)	3.61
4	Jalore	21.72(232)	21.17(232)	2.60
5.	Jodhpur	28.02(95)	26.96(95)	3.93
6.	Kota	32.00(312)	30.21(312)	5.93
7	Bhilwara	31.32(364)	29.16(364)	7.41
8.	Udaipur	21.86(303)	20.75(303)	5.35
9	Ganganagar	32.52(176)	30.57(176)	6.37
10	Bikaner	23.67(41)	21.93(41)	7.93
	STATE AVERAGE	30.11 (2520)	28.54 (2520)	5.50

NOTE :- Figures in bracket denote the No of CC experiments conducted..

The above table reveals that minimum average yield of wheat crop was 21.72 qtl / hect, in Jalore Div. whereas maximum average yield was 36.15 qtl/hect in Bharatpur Div. during 2005-06 for the mandal farmres. There is a great variation in average yield from division to division. This variation is directly related with local environmental conditions yet departmental efforts should also be made by persuading farmers for adopting new technology of agriculture, improved practices and full adoption of recommended doses of fertilizer and other inputs where the yield level is very low.

Varietal Performance :-

The varietywise and divisionwise average yields, percentages of its adoption is presented in the table No.-3.4 .

Table No.-3.4**Varietywise average Yield of mandal farmers in Qtls/Ha.**

Variety	Divi. ↓ →	Jaipur	Sikar	Bharatpur	Jodhpur	Kota	Bhilwara	Udaipur	Ganganagar	Bikaner	Jajore	State level
RAJ-1482	Av.Yield	31.97	30.51	34.96	31.48	0.00	0.00	24.68	32.92	22.88	22.88	30.68
	% of farmers	11	10	32	5	0	0	2	17	3	20	19
RAJ-3077	Av.Yield	31.20	30.09	36.47	28.46	31.30	29.54	29.57	32.05	0.00	21.53	29.85
	% of farmers	21	10	22	7	9	8	3	7	4	9	21
WH-147	Av.Yield	37.51	34.25	0.00	0.00	31.75	30.75	20.65	0.00	0.00	0.00	33.00
	% of farmers	13	29	0	0	44	13	1	0	0	0	5
LOK-1	Av.Yield	26.03	0.00	0.00	0.00	32.39	31.87	23.56	0.00	0.00	0.00	30.44
	% of farmers	5	0	0	0	32	47	16	0	0	0	22
RAJ-3765	Av.Yield	33.32	29.41	0.00	0.00	0.00	0.00	21.87	0.00	0.00	0.00	30.23
	% of farmers	59	22	0	0	0	0	19	0	0	0	2
PBW-343	Av.Yield	39.15	31.25	37.28	0.00	0.00	0.00	0.00	31.93	0.00	0.00	35.61
	% of farmers	2	7	72	0	0	0	0	18	1	0	6
OTHER HYV	Av.Yield	27.79	31.96	36.40	26.06	32.89	31.39	19.36	32.61	22.12	22.89	32.06
	% of farmers	4	2	45	6	9	10	3	8	2	11	14
AVERAGE HYV	Av.Yield	31.30	31.22	36.20	28.72	32.16	31.50	23.85	32.52	23.67	22.54	31.10
	% of farmers	11	7	24	4	14	16	6	8	2	8	89
LOCAL	Av.Yield	21.32	22.94	27.96	21.30	8.09	27.37	20.44	0.00	0.00	18.83	20.77
	% of farmers	6	6	1	3	1	5	60	0	0	18	11
OVER ALL	Av.Yield	30.67	30.36	36.15	28.02	32.00	31.32	21.86	32.52	23.67	21.72	30.11
	% of farmers	100	100	100	100	100	100	100	100	100	100	100

The above table reveals that yield of HYV Seed Variety was found 31.10 qt/ha whereas av. Yield of local variety was 20.77 qt/ha.. About 11 % cultivators are sowing local varieties. Yield of varieties like PBW-343 and WH-147 was found better than other. But max. percentage of farmers i.e.22 % were found sowing LOK-1 variety followed by 21 % RAJ-3077 and 19 % RAJ-1482

Use of Chemical fertilizer :-

The balanced use of chemical fertilizer is an important factor for improving the productivity level of the crop. The data of fertilizer consumption in terms of nutrients N and P are presented in the table No.3.5 :-

Table No.-3.5**Consumption of N and P in Kg./Hect.**

categories of farmer	N Nutrients					P Nutrients				
	2001-02	2002-03	2003-04	2004-05	2005-06	2001-02	2002-03	2003-04	2004-05	2005-06
Mandal Farmers	81.62 (98)	82.21 (98)	84.81 (98)	82.54 (98)	77.88 (99)	44.21 (92)	43.08 (92)	44.53 (92)	43.70 (92)	40.44 (94)
Others Farmers	82.31 (98)	79.77 (97)	82.02 (97)	80.03 (98)	76.25 (98)	43.96 (89)	42.95 (90)	43.37 (91)	42.55 (90)	40.39 (93)

Note :- Figures in bracket denote the percentage of fields in which fertilizer was applied.

The above data reveals that in Wheat crop 98- 99% Mandal and other farmers are using N nutrients and 93 to 95 % farmers were found using P, during 2005-2006. Application of "N" was found 77.88 Kg./Ha. and "P" was found 40.44 Kg./Ha. by mandal farmers.

In order to study the effects of fertilizer at micro level, division wise average application of fertilizer by mandal / other farmers was examined and are given in below Table No. -3.6:-

Table No.-3.6**Average application of "N" and "P" Nutrients by mandal farmers during the year 2005-06**

SN	DIV.	MANDAL FARMER				OTHER FARMER			
		Use of N		Use of P		Use of N		Use of P	
		Kg/ha	% users	Kg/ha	% users	Kg/ha	% users	Kg/ha	% users
1.	Jaipur	61.48	100	33.89	96	58.67	100	33.11	100
2.	Bharatpur	92.39	98	45.47	96	92.53	100	46.81	97
3	Sikar	61.88	100	38.68	95	54.72	100	34.72	97
4	Jalore	64.62	97	48.12	92	65.30	96	47.25	89
5	Jodhpur	68.93	99	45.18	95	67.44	93	44.21	89
6	Kota	97.47	99	47.92	98	95.08	94	49.80	96
7.	Bhilwara	91.39	99	45.32	94	90.81	99	45.31	94
8.	Udaipur	25.12	83	13.30	83	24.01	81	12.48	81
9.	Ganganagar	112.57	100	42.28	100	111.42	100	40.72	99
10	Bikaner	111.00	100	40.00	100	104.00	100	41.00	100
	STATE AVERAGE	77.88	99	40.44	94	76.25	98	40.39	93

The above table reveals that per ha. consumption of 'N' nutrient was below than

State average in Jaipur, Sikar, Jodhpur, Udaipur and Jalore divisions. The average Consumption by mandal farmers of P Nutrient at State Level was 40.44 Kg./ha. and in Jaipur, Sikar, Udaipur and Bikaner divisions it was below than the State Average.

The extension agency of the districts, where consumption of fertilizer was recorded below should make efforts to increase per hectare consumption of fertilizer so that high productivity level of the crop be achieved.

Impact of different dose of fertiliser

The impact of different doses of chemical fertilizers on yield was also analysed for high, medium, low and zero doses of fertilizer level for the last five years for mandal farmers. The State Level data is presented in the table No.-3.7 given below :-

Table No.-3.7

Effect of different dose of fertilizer on yield(Qtl/Ha.) in Mandal Farmers

S.N	DIV.	High dose		Medium dose		Low dose		Very low dose		No fertiliser		Overall	
		Av. Yield	%	Av. Yield	%	Av. Yield	%	Av. Yield	%	Av. Yield	%	Av. Yield	%
1	Jaipur	34.94	38	32.25	31	25.68	21	19.58	10	0.00	0	30.56	100
2	Bharatpur	36.82	60	35.32	30	34.81	7	36.20	1	24.40	2	36.15	100
3	Jodhpur	30.26	54	28.30	29	20.69	15	11.90	1	25.00	1	28.02	100
4	Kota	33.98	52	31.34	33	27.99	12	21.24	2	23.00	1	32.00	100
5	Bhilwara	33.75	60	28.72	28	25.45	9	21.52	2	23.09	1	31.32	100
6	Udaipur	20.37	6	20.98	5	24.65	24	21.30	48	20.20	17	21.86	100
7	Ganganagar	32.69	24	32.93	69	27.46	6	29.02	1	0.00	0	32.52	100
8	Skar	31.62	9	31.33	65	28.86	24	23.07	2	0.00	0	30.41	100
9	Jalore	24.66	36	21.59	32	18.42	27	21.61	3	18.64	2	21.73	100
10	Bikaner	25.55	25	23.06	72	23.20	3	0.00	0	0.00	0	23.67	100
11	State level 2005-06	33.61	41	30.70	35	25.65	15	21.23	8	20.47	1	30.11	100
12	2004-05	32.71	32	29.05	46	26.35	17	22.61	3	20.00	2	29.31	100
13	2003-04	35.22	35	31.41	40	27.97	20	26.56	3	23.58	2	31.77	100
14	2002-03	32.57	33	29.81	42	25.39	20	23.44	3	18.98	2	29.46	100
15	2001-02	34.08	54	31.86	30	30.20	13	27.44	1	21.71	2	32.55	100

NOTE :- Percentage indicates percentage of fertilized fiels.

The doses of chemical fertilizers as compared to recommendations for the crop according Agro Climatic zones have been categorized as under :-

1. Above recommended dose of chemical Fertilizer	--- High Doses
2. upto 66 % of recommended dose to recommended dose of the Chemical Fertilizer.	-- Medium Doses
3. 25% to 66% of recommended Dose of Chemical Fertilizer	--- Low Doses
4. up to 25% of recommended dose	---- very low dose

The above data reveals that there is tendency to give more fertilizes in wheat crop with comparison to recommended dose, it was found that 41 % farmers were giving more than recommended dose of fertilizer. The percentage of farmers who were giving more than recommended dose was found highest in Bharatpur div (60%) and Bhilwara (60%), followed by Jodhpur (54%) and Kota (52%). Beside this 15 % farmers were found giving low dose, 8% very low dose and 1% farmers were giving no fertiliser. Thus all such farmers who are either giving more than recommended dose or lower than recommended dose should be persuaded to apply proper dose of fertilizer.

It is also important to note that there is significant difference in the yield of farmers who are using proper dose with comparison to those who are not using proper dose and hence recommendation for use of proper dose of fertilizer needs proper and effective persuasion by field staff.

The effect of Basal dose and top dressing in case of mandal farmers

Application of basal dose and top dressing is also an important impact point. Data was collected to study the impact of basal dose and top dressing and its adoption rate the same has been presented in the following table.

Table no 3.8

(Average yield in qtl. /ha.)

S. N.	DIV.	Only Basal dose		Basal+top dressing		Only top dressing		No fertiliser		overall	
		Av yield	%	Av yield	%	Av yield	%	Av yield	%	Av yield	%
1	Jaipur	18.86	6	31.55	90	24.36	4	0.00	0	30.56	100
2	Bharatpur	34.29	1	36.27	95	34.66	3	24.40	2	36.16	100
3	Jodhpur	0.00	0	28.39	95	20.69	4	25.00	1	28.03	100
4	Kota	25.89	2	32.14	96	35.20	1	23.00	1	32.01	100
5	Bhilwara	11.66	1	31.91	93	24.09	5	23.09	1	31.32	100

S. N.	DIV.	Only Basal		Basal+top dressing		Only top dressing		No fertiliser		overall	
		Av yield	%	Av yield	%	Av yield	%	Av yield	%	Av yield	%
6	Udaipur	17.25	3	22.44	80	15.95	11	20.21	17	21.86	100
7	Ganganagar	28.62	1	32.54	99	0.00	0	0.00	0	32.52	100
8	Sikar	22.31	2	30.70	93	30.89	5	0.00	0	30.41	100
9	Jalore	20.64	5	21.86	87	21.97	6	18.64	2	21.72	100
10	Bikaner	0.00	0	23.67	100	0.00	0	0.00	0	23.67	100
11	2005-06	20.68	2	30.70	92	26.98	5	20.47	1	30.11	100
8	2004-05	28.19	2	31.56	91	26.10	5	21.59	2	31.03	100
9	2003-04	28.01	2	32.25	91	27.94	5	23.60	2	31.77	100
10	2002-03	23.38	1	30.14	92	27.94	5	18.93	2	24.96	100
11	2001-02	27.01	3	32.12	90	23.04	5	21.71	2	32.55	100

Figures in bracket denote percentage of fields in which fertilizer was applied.

The above data reveals that only basal dose in wheat crop was given by only 2% farmers. 92% farmers applied both basal dose as well as top dressing. 5 % farmers applied only top dressing and 1% farmers gave no fertiliser. On analysis of yield data it was found that yield of those farmers who applied both basal dose and top dressing was highest i.e. 30.70 qt/ha, whereas yield of those farmers who gave either top dressing or basal dose was only 20.68 qt/ha and 21.67 qt/ha respectively.

1. Irrigation :-

Wheat crop is mostly grown under irrigated conditions. Only 2-3 per cent fields in Wheat crops are grown under unirrigated conditions. The comparative average yields under irrigated and unirrigated conditions for both categories of farmers are given in the table No.-3.9

Table No.-3.9

Effect of Irrigation on yield (Yield in qtl/ha.)

Year	Mandal Farmers		Others Farmers	
	Irrigated	Unirrigated	Irrigated	Unirrigated
2001-02	32.65(99)	16.00(1)	30.66(99)	14.26(1)
2002-03	29.53(99)	10.29(1)	27.67(99)	6.11(1)
2003-04	31.87(99)	18.91(1)	30.23(99)	30.12(1)
2004-05	31.09(99)	15.73(1)	29.38(99)	16.72(1)
2005-06	30.26(99)	17.91(1)	28.70(99)	16.43(1)

Note :- Figures in bracket denotes percentage of fields.

At state level 99 % mandal farmers as well as other farmers have grown Wheat under irrigated conditions. The percentage of irrigated fields during last four years was stationary. In Wheat crop irrigation is major factor for enhancing productivity level. The productivity of mandal and other farmers for irrigated fields during 2005-06 was found 30.26 qt/ha and 28.70 qt/ha respectively

Effect of number of irrigation's on yield during 2005-06 for mandal farmers.

Number of irrigation in case of wheat is also an important factor which contributes significant effect on yield, though it is depended on availability of water. the effect of No. of irrigation's on yield was studied and is given in below table.

Table No 3.10

Div.	IRRIGATIONWISE AVERAGE YIELD IN QT./HA							
	0	1	2	3	4	5	6&above	overall
Jaipur	20.74(2)	21.60(1)	21.33(1)	18.80(3)	27.67(14)	27.97(26)	34.09(53)	30.65(100)
Bharatpur	28.00(1)	31.00(1)	23.91(1)	29.89(5)	35.35(37)	37.93(38)	36.67(17)	36.15(100)
Jodhpur	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	28.02(100)	28.02(100)
Kota	8.01(1)	24.96(2)	31.13(7)	32.67(37)	32.94(35)	29.71(14)	33.32(5)	32.00(100)
Bhilwara	0.00(0)	7.31(1)	15.00(1)	25.32(9)	30.78(27)	31.81(43)	35.46(19)	31.32(100)
Udaipur	17.99(7)	21.94(1)	13.05(2)	20.11(8)	22.03(37)	22.87(35)	23.48(10)	21.86(100)
Ganganagar	0.00(0)	0.00(0)	28.80(1)	28.22(2)	31.18(7)	32.79(52)	32.70(38)	32.51(100)
Sikar	0.00(0)	0.00(0)	0.00(0)	31.87(2)	24.01(7)	26.34(13)	31.16(78)	30.05(100)
Jalore	11.65(1)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	21.77(99)	21.72(100)
Bikaner	0.00(0)	0.00(0)	0.00(0)	0.00(0)	21.47(20)	23.32(58)	26.56(22)	23.67(100)
2005-06	17.91(1)	23.15(1)	25.19(1)	29.18(9)	30.62(23)	31.42(29)	29.63(36)	30.11(100)
2004-05	19.72(1)	15.69(1)	26.79(2)	29.45(9)	31.48(30)	31.59(28)	31.36(29)	31.09(100)
2003-04	20.97(1)	18.90(2)	24.96(2)	28.84(10)	31.53(26)	33.03(29)	32.55(32)	31.77(100)
2002-03	10.29(1)	16.94(1)	22.66(2)	26.47(11)	28.86(26)	30.72(28)	30.98(31)	29.46(100)
2001-02	15.49(1)	28.98(1)	26.52(2)	30.72(10)	32.48(25)	33.22(29)	33.20(32)	32.55(100)

Note :- Figures in bracket show percentage of fields.

The data related to zero one and 2 irrigations is based on 1% experiments hence no conclusion could be drawn on the basis of these. However it is revealed that about 56 % farmers were using 5 or more than it No of irrigations.

CHAPTER –IV

Crop – Barley

Barley is another important Rabi cereal crop of the State. During Rabi 2005-06 , it was sown in an area of 2.02 lac hectares, which was 2.58 % of the total Rabi cropped area i.e 78.35 lac ha. The cropped area and irrigated area of Barley crop for the last 5 years in the State is given in Table No.-4.1:-

Table No.-4.1

CROPPED AND IRRIGATED AREA OF BARLEY CROP

(Area in lac ha.)

<u>S.No.</u>	<u>Year</u>	<u>Area under crop</u>	<u>Irrigated area under crop</u>	<u>Irrigated area in percentage</u>
1	2001-02	1.74	1.68	96.55
2	2002-03	1.92	1.83	95.31
3	2003-04	1.82	1.73	95.05
4	2004-05	1.75	1.66	94.86
5	2005-06	2.02	1.95	96.53

During 2005-06 , total irrigated area under Barley crop was 1.95 lac hectares which was 96.5 % of total area sown under Barley crops.

4.1 Average Yields

For assessment of yield crop cutting experiments were conducted in Barley crop of both mandal and other farmers. The data collected from evaluation survey was analyzed and the productivity level for mandal and other farmers has been worked out and is presented in the table No.-4.2-

Table No.-4.2

Average Yields in Qtls/Hectare

<u>S.No.</u>	<u>Year</u>	<u>Average Yield</u>		<u>Yield gap of mandal over other farmers (inpercentage)</u>
		<u>Mandal Farmers</u>	<u>Other Farmers</u>	
1	2001-02	23.97	22.46	6.72
2	2002-03	22.32	19.98	11.71
3	2003-04	23.18	21.99	5.41
4	2004-05	22.07	20.41	8.13
5	2005-06	24.85	22.92	8.42

The above table reveals that during 2005-06, average yield of Barley crop of mandal and other farmers was 24.85 qt/ha and 22.92 qtl/hect respectively and the percentage yield gap was 8.42 %. The division wise average yield of Barley is given below :

Table No.-4.3

Divisionwise average yield of mandal farmers

	(Yield in qtl./ha)				
	2001-02	2002-03	2003-04	2004-05	2005-06
Jaipur	24.72 (40)	-	-	-	-
Udaipur	22.42 (55)	-	-	-	-
Bhilwara	24.70 (76)	22.32 (53)	23.18 (78)	22.07 (55)	24.85 (63)
STATE AVERAGE	23.97 (171)	22.32 (53)	23.18 (78)	22.07 (55)	24.85 (63)

Note :- Figures in bracket denote the number of crop cutting experiments.

The crop cutting experiments were conducted only in Rajasmand district and yield was found 24.85 qt/ha in case of mandal farmers, which was higher than last year.

VARIETY WISE YIELD

Survey data was also analyzed seed variety wise and its effect on yield of mandal farmers was studied, the results are presented in following table.

Table No.-4.4

VARIETY WISE AV. YIELD IN QTL/HA OF MANDAL FARMERS

DIV	RD-2052	RD-57	RD-103	OTHER HYV	OVER ALL HYV	LOCAL	OVER ALL
BHILWARA	30.56 (11)	21.84 (11)	18.28 (8)	29.02 (27)	26.43 (57)	22.74 (43)	24.85 (100)
STATE	30.56 (11)	21.84 (11)	18.28 (8)	29.02 (27)	26.43 (57)	22.74 (43)	24.85 (100)

Note—figures in brackets denotes percentage of fields.

The above data reveals that 57% sample mandal farmers adopted HYV variety of seed and

yield of such farmers was 26.43 qt/ha as comparison to 22.74 qt/ha for those who adopted local variety.

4.3 Use of Chemical Fertilizers

The use of Chemical fertilizer has also helped in increasing the productivity of crop.

The data of per hectare consumption of Nitrogenous and Phosphatic fertilizers by the farmers for last 5 years presented in the table No.-4.5

Table No.-4.5

S.No.	Year	Av.Consumption of Fertilizer in terms of Nutrients			
		<u>'N' Nutrients</u>		<u>'P' Nutrients</u>	
		(Kg./ha)		(Kg./ha)	
		Mandal faemer	Others faemer	Mandal faemer	Others faemer
	2001-02	58(86)	53(77)	41(61)	40(54)
2	2002-03	62(81)	60.(75)	33(38)	22(51)
3	2003-04	53(83)	58(74)	13(59)	21(41)
4	2004-05	55(80)	56(84)	35(48)	27(58)
5	2005-06	67(76)	62(81)	38(66)	36(70)

Note :- The figures in bracket show percentage of fields in which fertilizer was applied.

The above data reveals that consumption in Kg./Ha. of N & P for mandal farmers increased during the year 2005-06 as compared to last year. Consumption of "N" and "P" in Kg./Ha. by mandal farmers was 67 Kg/Ha. and 38 Kg/Ha respectively. For other farmers consumption of 'N' was 62 Kg./Ha. and consumption of P was 36 Kg/Ha.

The percentage of fields in Which 'N' was used found to be 76 to 81 % and for 'P' it was 65 to 70 %, during 2005-06

To evaluate the impact, the data was analyzed for high, medium, low and zero doses of fertilizer for last four years and are presented in the table given below :-

Table No4.6

Districtwise Average Yields in Qtls/Hectare in Mandal farmers

Div.	Doses of Fertilizers					
	High	Medium	Low	Very low	No Fertilizer	overall
2001-02	24.92 (37)	20.61 (18)	24.04 (16)	22.08 (6)	18.89 (23)	23.97 (100)
2002-03	27.44 (26)	18.92 (40)	23.63 (15)	--	21.00 (19)	22.32 (100)
2003-04	24.22 (36)	23.89 (31)	25.22 (14)	20.92 (3)	18.26 (16)	23.18 (100)
2004-05	27.81 (18)	24.34 (44)	21.81 (16)	24.36 (2)	16.91 (20)	22.08 (100)
2005-06	27.91 (29)	25.17 (48)	25.42 (3)	26.70 (3)	18.55 (17)	24.85 (100)

Note :- Figures in brackets indicate percentage of fields in which fertilizer was applied.

The doses of chemical fertilizers as compared to normal recommendations for the crop have been categorized as under: -

1. Above recommended dose of chemical Fertilizer :	--- High Doses
2. 66 to 100 % of recommended dose of the Chemical Fertilizer :	--- Medium Doses
3. 25% -66% of recommended Dose of Chemical Fertilizer :	--- Low Doses
4. up to 25% of recommended dose	---- very low dose

Above table indicates that 29 % farmers were using high dose of fertilizer i.e. more than recommended dose and about 23 % farmers were either giving no fertilizer or low to very low dose. Extension workers should concentrate on all such type of groups and should persuaded them to apply proper doses of fertilizer.

4.4 The effect of Basal dose and top dressing

Application of basal dose and top dressing is also an important impact point . Data was collected to study the impact of basal dose and top dressing and its adoption rate the same has been presented in the following table.

Table no 4.7

The effect of Basal dose and top dressing,yield in kg/ha in Mandal farmers

S. N.	DIV.	Only basal		Basal+top dressing		Only top dressing		No fertiliser		overall	
		yield	%	yield	%	yield	%	yield	%	yield	%
1	Bhilwara	0.00	0	27.13	66	22.34	17	18.55	17	24.85	100
2	2005-06	0.00	0	27.13	66	22.34	17	18.55	17	24.85	100
3	2002-03	0.00	0	23.89	58	19.38	23	21.00	19	22.32	100
4	2003-04	19.89	5	25.57	58	21.26	21	18.26	16	23.18	100
5	2004-05	15.30	6	24.42	68	21.28	6	16.91	20	22.08	100

Note : % indicates percentage of fertilized fields.

The above data reveals that only basal dose in Barely crop was given by only 0% farmers. 66% farmers applied both basal dose as well as top dressing.17% farmers applied only top dressing and 17 % farmers gave no fertilizer. The yield of farmers who applied both basal dose and top dressing was highest i.e. 27.13 qt/ha

4.5 Irrigation :-

Barely crop is mostly grown under irrigated conditions. Usually only 2-3 per cent fields are grown under unirrigated conditions. The comparative average yields under irrigated and unirrigated conditions for both categories of farmers are given in the table No. 4.8

Table No.-4.8

Effect of Irrigation on yield (Yield in qtl/ha.) in Bhilwara DIV.

<u>Year</u>	<u>Mandal Farmers</u>		<u>Others</u>	
	<u>Irrigated</u>	<u>Unirrigated</u>	<u>Irrigated</u>	<u>Unirrigated</u>
2002-03	22.32(100)	--	19.98(100)	--
2003-04	23.18(100)	--	20.79(100)	--
2004-05	22.07(100)	--	20.41(100)	--
2005-06	24.85(100)	--	22.92(100)	--

Note :- Figures in bracket show percentage of fields.

At state level 100 % mandal farmers as well as other farmers have grown barely under irrigated conditions.

CHAPTER – V

Rabi Pulses – Gram

Gram is the only important Rabi pulses being sown extensively in the State. The total cropped area during Rabi 2005-06 under gram crop was 10.81 lac ha., which was 13.80 % of total cropped area under Rabi crops. The total cropped area, irrigated area of Gram crop for the last five years is shown in the table given below :-

Table No.-5.1

(Area in lac hect.)

Crop :- Gram

<u>.No.</u>	<u>Year</u>	Total cropped area	Irrigated area	Irrigated area in percentage
1	2001-02	9.70	4.89	50.41
2	2002-03	4.49	0.03	0.67
3	2003-04	11.17	3.95	35.36
4	2004-05	10.35	3.29	31.79
5	2005-06	10.81	3.63	33.58

Gram is generally grown under unirrigated conditions 33.58 % of area under Gram was irrigated during 2005-06.

5.1 Average Yield :-

For assessment of the impact of new agricultural technology being disseminated to the farmers by the extension agency, the data of evaluation survey was collected and analyzed for both the categories of farmers and is presented in the table No.-24 Total 1022 crop cutting experiments were conducted in the Gram crop for assessment of yield as well as yield gap between mandal and non mandal farmers.

Average yield of mandal and other farmers

Table No.-5.2

(Average yield in qtl/ha)

S.No.	Year	Average Yield		% yield gap Mandal over others
		Mandal	Non-Mandal	
1	2001-02	10.29	9.61	7.07
2	2002-03	8.89	8.00	11.12
3	2003-04	10.01	9.14	9.52
4	2004-05	9.78	9.06	7.94
5	2005-06	9.02	8.28	8.93

The above table reveals that the average yields of mandal and other farmers during 2005-06 was 9.02 qtl/ha. and 8.28 qtl/ha respectively which is less than last year. There is no significant trend in the percentage yield gap, it is because the Gram is mostly taken in unirrigated fields and its yield depends on availability of moisture in the soil.

To study the impact of extension programme on the productivity level, division-wise evaluation data of farmers was further analyzed and is presented in the table No. -5.3 given on the subsequent page.

Table No.-5.3
AVERAGE YIELD OF MANDAL AND OTHER FARMERS (IN QTL/HECT.)

S.No.	Division	Average Yield		
		Mandal	others	% yield gap
1.	Jaipur	8.51 (45)	7.35 (45)	15.78
2.	Sikar	10.35 (53)	9.31 (53)	11.17
3	Kota	8.48 (126)	7.91 (116)	7.20
4	Bhilwara	9.70 (23)	9.00 (23)	7.78
5	Udaipur	9.03 (205)	8.35 (205)	8.14
	STATE AVERAGE	9.02 (442)	8.28 (442)	8.94

NOTE :- Figures in bracket denote the No of cc experiments conducted.

The highest level of average yield i.e. 10.35 qtl/hect was reported in Sikar Div. and lowest average yield i.e. 8.48 Qt./Hect. was recorded in Kota Div.. The Extension agencies of those districts where average yield is less than state average should thresh-out the reasons of low productivity of the crop and initiate necessary measures to improve the productivity level of the crop.

5.2 Use of Chemical Fertilizer :-

Use of chemical fertilizer is one of the important input for increasing the productivity level of the crop. The use of phosphoric fertilizers in Gram crop and its effect on productivity level was also examined. The results obtained from the evaluation survey data are presented in the Table No.-5.4

Table No.-5.4
Average Consumption of Phosphatic Fertilizers and its percentage users
(Consumption in Kg./Ha.)

Categories of farmers	Consumption of P nutrients				
	2001-02	2002-03	2003-04	2004-05	2005-06
Mandal Farmers	31.6 (69)	33.75 (65)	27.68 (61)	29.34 (64)	19.36 (73)
Other Farmers	26.7 (62)	30.67 (60)	29.12 (56)	29.00 (55)	18.01 (69)

Note :- Figures in bracket denote the percentage of fields in which fertilizer was applied.

The consumption of phosphatic fertilizer was 19.36 kg/ha and 18.01 kg/ha during the year 2005-06 for mandal and other farmers. Though the consumption in terms of kg/ha was lesser than previous years but in terms of percentage of users it was higher than last four years.

In order to study the effects of fertilizers at division levels, the divisionwise data collected from the Evaluation Survey were analyzed and given in the following table :-

Table No.-5.5
Average Application of N and P Nutrients by Mandal Farmers
during 2005-06

SN	DIV.	MANDAL FARMER				OTHER FARMER			
		Use of N		Use of P		Use of N		Use of P	
		Kg/ha	% users	Kg/ha	% users	Kg/ha	% users	Kg/ha	% users
1.	Jaipur	8.07	98	18.27	100	6.43	98	12.06	100
2.	Sikar	10.65	72	20.31	72	10.12	66	19.69	66
3.	Kota	12.12	72	32.09	80	13.13	70	31.89	78
4.	Bhilwara	14.71	74	36.82	74	15.00	65	37.73	65
5.	Udaipur	3.47	64	8.69	64	2.72	59	6.97	59
	STATE AVERAGE	7.89	71	19.36	73	7.67	67	18.01	69

The above table reveals that the average consumption by Mandal farmers of N nutrient during 2005-06 was 7.89 Kg./Ha. and that of 'P' was 19.36 Kg./Ha. The lowest consumption 3.47 Kg./Ha. was in Udaipur Div. Similarly the consumption of 'P' was highest in Bhilwara div. (36.82 Kg./Ha.) and lowest in Udaipur div. (8.69 Kg./Ha.). The extension agency of such districts where consumption is less than state average should initiate necessary action to increase the consumption of nutrients.

5.3 Av. Yield with different dose of fertiliser

Data was collected to analysed the effect of different dose of fertiliser on yield.divisionwise survey data has been given in following table.-

Table no. 5.6
Effect of different doses of chemical fertiliser on yield for mandal farmers.
(in qtls/ha)

S. N.	DIV.	Highdose		Medium dose		Low dose		Very low		No fertiliser		Overall	
		Av Yield	%	Av Yield	%	Av Yield	%	Av Yield	%	Av Yield	%	Av Yield	%
1	Jaipur	11.00	10	7.95	24	8.94	24	5.80	2	8.19	40	8.51	100
2	Kota	8.46	18	8.79	24	7.72	36	8.70	4	9.51	18	8.48	100
3	Bhilwara	11.20	9	9.40	30	9.10	35	0.00	0	10.34	26	9.70	100
4	Udaipur	0.00	0	0.00	0	10.57	2	9.57	62	8.03	36	9.03	100
5	Sikar	11.10	17	11.11	17	9.99	15	12.41	2	9.86	24	10.35	100
6	2005-06	9.55	8	9.08	12	8.44	16	9.53	31	8.69	33	9.02	100
7	2004-05	9.58	4	11.33	16	9.84	15	9.53	32	9.25	33	9.78	100
8	2003-04	9.70	6	11.50	16	10.04	16	9.83	26	9.53	36	10.01	100
9	2002-03	10.19	9	9.88	20	9.05	13	8.24	24	8.38	34	8.89	100

Note-- % denotes percentage of fertilized fields

The survey data reveals that 8% farmers applied high dose (more than recommended dose) of fertilizer. But the important point to note is that their yield was just 9.55 qt/ha, which is almost at par with the yield of the farmers who applied medium dose(9.08 qt/ha). It is further revealed that in Kota and Sikar div yield of such farmers who applied higher dose was less than those who applied medium dose of fertilizer. Thus efforts are needed by extension workers to concentrate on both category of farmers who are applying more than recommended dose and also on those who are applying less than recommended dose.

5.4 Use of High Yielding Varieties :-

Use of high yielding/improved varieties of Gram helped in increasing the productivity level of the crop. In general C-235, Dahod yellow varieties of Gram are commonly grown by the farmers in the State. The performance of high yielding varieties and local varieties are given in the table No.-5.7 given below :-

Table No.-5.7

Seed Varietywise Yield (In Qtl/Ha.)

<u>Division</u>	Dahod yellow	C-235	RSG-44	GNG-663	BG-372	GNG-146	Other HYV	Total HYV	LOCAL	<u>Over all</u>
1. Jaipur	0.00 (0)	10.69 (20)	12.02 (2)	9.31 (9)	0.00 (0)	0.00 (0)	3.23 (4)	9.49 (35)	7.97 (65)	8.51 (100)
2. Kota	10.17 (5)	0.00 (0)	0.00 (0)	7.75 (3)	0.00 (0)	0.00 (0)	11.52 (5)	10.07 (15)	8.22 (85)	8.48 (100)
3. Bhilwara	6.59 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	6.59 (3)	9.84 (97)	9.70 (100)
4Sikar	0.00 (0)	11.84 (26)	12.02 (6)	11.27 (19)	--	--	9.64 (9)	11.33 (60)	10.26 (40)	10.99 (100)
5. Udaipur	11.38 (18)	11.16 (1)	--	--	--	--	--	11.37 (19)	9.41 (81)	9.77 (100)
State	10.87 (7)	11.39 (5)	12.02 (1)	9.78 (5)	0.00 (0)	0.00 (0)	9.52 (3)	10.58 (21)	9.28 (79)	9.02 (100)

Note- figures in bracket denotes percentage of fields

The survey data reveals that improved varieties like Dahod yellow, C-235, RSG-44 etc. gave much more yield than local variety. Yet in case of gram only 21% sample farmer were using HYV seed. The overall yield of HYV variety was 10.58 qt/ha whereas yield of local varieties were 9.28qt/ha.

CHAPTER NO. - VI

RAPE AND MUSTARD

Oilseed play a vital role in the economy of the State and great emphasis is being given on improving the productivity of the oilseed crops. Rape and Mustard (R&M) Taramira and linseed are the important Rabi oil seed crops grown in the State.

Rape and Mustard sown in 35.58 lac hectares area during Rabi 2005-06 which was 45.41 % of the total area under Rabi crops. The total cropped area and irrigated area under Rape and Mustard crop for the last five years is presented in the table No. –6.1 given below :-

Table No.-6.1

(Area in Lac Hect.)

Sr.No.	Total cropped Area	Irrigated Area	Irrigated Area in percentage
2001-02	17.60	15.05	85.51
2002-03	11.91	10.05	84.38
2003-04	20.63	18.04	87.44
2004-05	32.86	27.02	82.20
2005-06	35.58	29.36	81.87

Above table reveals that cropped area under Mustard was 35.58 lac hac during 2005-06. It was highest since last 5 years. 81.87 % of the area under Mustard crop was irrigated.

6.1 Average Yield :-

In order to assess the impact of new agricultural technology adopted by the farmers, crop cutting experiments were conducted to assess the productivity of the Rape and Mustard crop. The Table No. – 3.2 presents the year wise average yield of the both categories of farmers.

Table No.-3.2

Average Yield in Qtls./hectare

S.No.	Year	Average Yields obtained by		% Yield Gap
		Mandal Farmers	Other Farmers	
1	2001-02	14.35	13.32	7.73
2	2002-03	11.42	10.54	8.34
3	2003-04	15.71	14.72	6.72
4	2004-05	13.24	12.41	6.69
5	2005-06	14.30	13.60	5.14

The above table reveals that average yield of mustard crop is fluctuating from year to year. The average yield of mandal farmer was 14.30 qtl/hect., and for non mandal farmers was 13.60 qt/ha during 2005-06. However the yield during the year 2005-06 was better than last year. Percentage yield gap between mandal and other farmers has also fluctuating and varied from 5.14 to 8.34 %. During the year 2005-06, the yield gap was found to be 5.14 %.

The survey data was further analyzed divisionwise and division wise yield are indicating in the table given below:-

Table No.-3.3

**Division wise Average Yield (Qtls/Ha.)
during 2005-06**

S.No.	Division	Average Yield		
		Mandal	others	% yield gap
1.	Jaipur	11.73 (221)	11.21 (221)	4.91
2.	Sikar	11.54 (130)	11.00 (130)	4.63
3	Bharatpur	15.08 (546)	14.43 (546)	4.50
4	Jalore	11.89 (233)	10.69 (233)	11.22
5.	Jodhpur	15.78 (97)	15.07 (97)	4.71
6.	Kota	15.20 (193)	14.45 (193)	5.19
7	Bhilwara	14.40 (249)	13.31 (249)	8.19
8.	Udaipur	10.10 (68)	8.82 (68)	14.51
9	Ganganagar	14.04 (181)	13.17 (181)	6.60
10	Bikaner	11.14 (40)	10.18 (40)	9.43
	STATE AVERAGE	14.30 (1958)	13.60 (1958)	5.14

Note :- Figures in bracket denote the No of cc experiments conducted.

The highest average yield during the year was 15.78 qtl./ha. in Jodhpur Div. whereas lowest average yield was recorded 10.10 qtl./hect in Udaipur Div. The extension agency of such districts ,where average yield is less than State average should thresh out the reasons of low productivity and initiate necessary action to increase the productivity level of the crop.

6.2 Use of Chemical Fertilizer :-

The balance use of chemical fertilizer is important for enhancing the productivity of the crop. To assess the impact of chemical fertilizer on productivity level of Rape and Mustard crop, the survey data of average consumption of chemical fertilizers for both categories of farmers was analyzed and presented in the Table No. -3.4 given below :-

Table No.-3.4
Av Consumption in Kg./per Hectare

Categories of farmer	N Nutrients					P Nutrients				
	2001-02	2002-03	2003-04	2004-05	2005-06	2001-02	2002-03	2003-04	2004-05	2005-06
Mandal Farmers	58 (96)	59 (98)	58 (96)	57 (96)	58 (96)	36. (91)	36 (93)	35 (91)	35 (92)	34 (93)
Other Farmers	58 (95)	57 (97)	57 (95)	55 (95)	57 (96)	35. (89)	34 (90)	35 (90)	34 (90)	34 (93)

Note :- Figures in bracket indicates percentage of adoption.

The above table shows that per hectare consumption of nitrogenous fertilizer was 58 Kg/ha. by the mandal and 57 qt/ha.by other farmers during the year. The percentage of adoption of N by the mandal and other farmers was 96 and 96 respectively.

It is also evident from above data that per hectare consumption of Phosphatic fertilizer was 34 Kg./Hect. for mandal and other farmers. The percentage of adoption by mandal and other farmers was 93 % and 93 % respectively.

The divisionwise use of chemical fertilizer was also analyzed and are presented in the table No.-3.5 as given below :-

Table No.-3.5
Divisionwise Av.consumption of chemical fertilizers in terms of Nutrients in Mandal Farmers.

SN	DIV.	MANDAL FARMER				OTHER FARMER			
		Use of N		Use of P		Use of N		Use of P	
		Kg/ha	% users	Kg/ha	% users	Kg/ha	% users	Kg/ha	% users
1.	Jaipur	39.17	94	28.57	92	34.81	100	26.35	96
2.	Bharatpur	62.32	99	37.36	96	63.90	99	37.18	96
3	Sikar	45.60	100	31.06	90	50.55	82	34.79	96
4	Jalore	47.07	95	37.13	86	45.43	96	34.97	84
5	Jodhpur	52.53	99	39.72	90	51.89	99	40.33	87
6	Kota	73.61	99	38.04	99	70.40	98	38.83	98
7.	Bhilwara	62.03	96	32.98	94	63.88	96	33.51	93

SN	DIV.	MANDAL FARMER				OTHER FARMER			
		Use of N		Use of P		Use of N		Use of P	
		Kg/ha	% users	Kg/ha	% users	Kg/ha	% users	Kg/ha	% users
8.	Udaipur	12.23	45	7.15	45	19.95	66	9.36	44
9.	Ganganagar	73.18	99	30.09	98	69.73	99	28.64	99
10	Bikaner	78.00	100	30.00	100	75.00	100	27.00	99
	STATE AVERAGE	57.54	96	34.12	93	57.23	96	33.85	93

The above table shows that in Udaipur division the consumption of Nitrogenous fertilizers during 2005-06 was recorded as 12.23 Kg. per hectare which was lowest. The lowest phosphoric fertilizer consumption was also in Udaipur division which was 7.15 kg/hectare.. The extension agency of such district where combustion of chemical fertilizer is less than State average should gear up their efforts to increase the fertilizer consumption as per departmental recommendation.

The impact of different doses of chemical fertilizers on yield was also analyzed for high, medium, low and zero doses of fertilizer for both the categories of farmers. The State Level data is presented in the table No.-36 given below :-

Table No.-3.6

Effect of different dose of fertilizer on yield(Qtl/Ha.) of Mandal Farmers

S.N	DIV.	High dose		Medium dose		Low dose		Very low dose		No fertiliser		Overall	
		Av Yield	%	Av Yield	%	Av Yield	%	Av Yield	%	Av Yield	%	Av Yield	%
1	Jaipur	14.76	28	13.55	26	9.86	29	5.29	11	7.03	6	11.73	100
2	Bharatpur	15.73	48	14.91	39	13.62	11	13.77	1	8.83	1	15.08	100
3	Jodhpur	16.64	27	16.11	33	15.00	36	14.80	3	13.20	1	15.78	100
4	Kota	16.89	50	14.57	32	12.09	15	9.67	3	0.00	0	15.20	100
5	Bhilwara	16.27	51	14.20	25	11.95	18	7.43	3	7.77	3	14.40	100
6	Udaipur	0.00	0	14.95	1	16.80	10	10.86	34	8.25	55	10.11	100
7	Ganganagar	13.94	47	14.15	47	13.93	6	0.00	0	0.00	0	14.04	100
8	Sikar	12.48	50	11.41	22	9.84	21	11.78	1	8.48	6	11.54	100
9	Jalore	11.92	33	11.39	32	9.62	27	9.59	4	8.41	4	10.89	100
10	Bikaner	11.22	35	11.13	60	10.20	5	0.00	0	0.00	0	11.14	100
11	State level 2005-06	15.53	42	14.72	32	12.62	18	10.41	4	8.58	4	14.30	100

NOTE :- % denoted the percentage of fertilized fields

The doses of chemical fertilizers as compared to recommendations for the crop have been categorized as under :-

1 Above recommended dose of chemical Fertilizer ----	--- High Doses
2 66 to 100 % of recommended dose of the Chemical Fertilizer.	--- Medium Doses
3 25% to 66% of recommended Dose of Chemical Fertilizer ---	--- Low Doses
4 up to 25% of recommended dose	---- very low dose

. The percentage of cultivators using high dose of fertilizer was 42 %, such cultivators should be persuaded to apply chemical fertilizer as per departmental recommendations. There were 26 % farmers who were applying no dose to low or very low dose of fertilizer, such farmers should also be contacted and persuaded to apply proper dose of fertilizer.

6.3 The effect of Basal dose and top dressing

Application of basal dose and top dressing is also an important impact point. Data was collected to study the impact of basal dose and top dressing and its adoption rate the same has been presented in the following table.

Table no 3.7

(Average yield in qtls/ ha)

S. N.	DIV.	Only basal		Basal+top		Only top		No fertiliser		overall	
		Av. yield	%	Av. yield	%	Av. yield	%	Av. yield	%	Av. yield	%
1	Jaipur	8.46	26	13.39	66	12.65	2	7.03	6	11.73	100
2	Bharatpur	10.37	5	15.47	91	13.71	3	8.83	1	15.08	100
3	Jodhpur	12.40	2	16.14	88	13.43	9	13.20	1	15.78	100
4	Kota	9.98	12	15.97	87	12.15	1	0.00	0	15.20	100
5	Bhilwara	7.74	6	15.13	88	12.83	4	7.94	2	14.40	100
6	Udaipur	11.55	7	12.47	38	0.00	0	8.24	55	10.10	100
7	Ganganagar	0.00	0	14.06	98	13.85	1	12.23	1	14.04	100
8	Sikar	6.85	5	12.12	85	9.37	4	8.48	6	11.54	100
9	Jalore	9.27	5	11.23	81	9.87	10	8.41	4	10.89	100
10	Bikaner	0.00	0	11.14	100	0.00	0	0.00	0	11.14	100
11	2005-06	10.02	8	14.98	85	13.97	3	8.65	4	14.30	100
8	2004-05	11.04	8	13.74	85	12.07	3	7.95	4	13.24	100
8	2003-04	12.55	8	16.42	84	13.46	5	9.25	3	15.71	100
9	2002-03	10.80	8	11.67	87	8.92	4	7.18	1	11.42	100

Note : % indicates the percentage of fertilized fields.

The survey data reveals that “only basal dose” was given by 8% farmers while 85 % farmers applied basal dose + top dressing. 3 % farmers applied only top dressing. The yield of farmers who applied both basal dose and top dressing was highest i.e. 14.98 qt/ha . At state level ,only 4 % farmers were such who did not applied chemical fertilizer, but percentage of such farmers in Udaipur div. was 55 %. The reasons of such high percentage of non adoption of chemical fertilizer in Udaipur div. should be find out by field machinery.

6.4 Effect of Irrigation :-

During Rabi 2005-06, --- lac hectare of Mustard crop area was sown under irrigated conditions and it was ---- % of the total area sown under mustard crop. In order to assess the performance of mustard crop under irrigated and un irrigated conditions, the yield data was further analyzed and results of productivity level under both the conditions” irrigated as well as unirrigated” are presented in the table No.-3.8 as given below :-

Table No.-3.8

Average Yield under Irrigated and Unirrigated Conditions.
(Average Yields in qtls/hect.)

<u>Year</u>	<u>Mandal Farmers</u>			<u>Other Farmers</u>		
	<u>Irrigated</u>	<u>Unirrigated</u>	<u>Yield gap in %</u>	<u>Irrigated</u>	<u>Unirrigated</u>	<u>Yield Gap in %</u>
2001-02	14.51 (96)	9.68 (4)	49.90	13.47 (96)	8.84 (4)	52.38
2002-03	11.51 (98)	7.79 (2)	47.75	10.63 (97)	7.52 (3)	41.36
2003-04	16.08 (94)	9.86 (6)	62.77	15.06 (93)	9.94 (7)	51.50
2004-2005	13.55 (93)	9.07 (7)	49.7	12.68 (93)	8.63 (7)	46.8
2005-06	14.68 (93)	9.06 (7)	62.03	14.00 (93)	8.18 (7)	71.15

Note :- Figures in bracket denote the percentage of fields.

Significant difference has been observed in the yield of irrigated and unirrigated fields. During 2005-06 the percentage of irrigated fields was 93% for mandal and other farmers.

6.5 Use of High Yielding Varieties :-

Use of High Yielding Varieties seed also plays a vital role in increasing the productivity level. During 2005-06, 95 % of mandal farmers have used high yielding varieties of seed at State level. The data of average yield of HYV and local varieties along with percentage of fields which are presented in the table No.-3.9 :-

Table No.-3.9
Varietywise Average Yields of mandal farmers (in qtl/ha)

Division	T-59	RH-30	PUSA-BOLD	BIO-902	VARUNA	ROHINI	OTHER HYV	OVERALL HYV	LOCAL	OVERALL
Jaipur	12.11 (25.)	9.39 (8)	10.90 (3)	12.54 (40)	0.00 (0)	0.00 (0)	11.76 (16)	11.96 (92)	8.95 (8)	11.73 (100)
Bharatpur	13.94 (023)	0.00 (0)	0.00 (0)	15.15 (24)	0.00 (0)	15.94 (24)	15.21 (28)	15.07 (99)	15.73 (1)	15.08 (100)
Jodhpur	0.00 (0)	14.17 (5)	14.97 (9)	16.46 (68)	0.00 (0)	0.00 (0)	14.08 (18)	15.78 (100)	0.00 (0)	15.78 (100)
Kota	0.00 (0)	0.00 (0)	16.14 (48)	14.09 (38)	12.84 (9)	0.00 (0)	18.66 (5)	15.20 (100)	0.00 (0)	15.20 (100)
Bhilwara	14.62 (55)	0.00 (0)	0.00 (0)	14.18 (12)	0.00 (0)	0.00 (0)	14.33 (32)	14.47 (99)	5.54 (1)	14.40 (100)
Udaipur	8.26 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	12.21 (41)	11.52 (49)	8.78 (51)	10.11 (100)
Gangagar	13.53 (3)	0.00 (0)	13.79 (11)	0.00 (0)	0.00 (0)	0.00 (0)	14.19 (82)	14.12 (96)	11.74 (4)	14.04 (100)
Sikar	11.96 (21)	12.90 (17)	12.27 (3)	11.70 (34)	0.00 (0)	0.00 (0)	9.67 (22)	11.52 (97)	8.62 (43)	11.43 (100)
Jalore	0.00 (0)	11.00 (7)	9.79 (10)	11.20 (49)	0.00 (0)	0.00 (0)	11.33 (24)	11.06 (90)	9.33 (10)	10.88 (100)
Bikaner	9.10 (12)	0.00 (0)	11.02 (62)	0.00 (0)	0.00 (0)	0.00 (0)	12.44 (26)	11.14 (100)	0.00 (0)	11.14 (100)
2005-06	13.62 (19)	11.46 (3)	14.04 (9)	13.09 (29)	12.84 (1)	15.94 (6)	13.82 (28)	13.64 (95)	9.51 (5)	13.44 (100)
2004-05	13.14 (13)	12.76 (6)	13.65 (11)	13.32 (27)	13.82 (1)	13.91 (6)	13.50 (30)	13.39 (95)	10.39 (5)	13.24 (100)
2003-04	14.74 (15)	16.07 (6)	17.21 (17)	15.42 (30)	13.70 (1)	18.43 (6)	15.46 (20)	15.86 (95)	12.70 (5)	15.71 (100)
2002-03	11.08 (20)	11.22 (7)	12.73 (7)	11.32 (36)	13.30 (2)	0.00 (0)	11.51 (24)	11.47 (96)	10.34 (4)	11.42 (100)

Note :- Figures in bracket denotes percentage.

The above data indicates that HYV varieties were sown by 95 % sample farmers. The average yield by HYV seed was found 13.64 qt./ha whereas by local variety yield was found 9.51 qt./ha. The most popular variety was found BIO-902 (29%) followed by T-59 (19%). Maximum yield was obtained by ROHINI variety (15.94 qt./ha) but it was sown by only 6 % farmers and only in Bharatpur div. District wise average yield of mandal and other farmers is given at annexure A1 to A4. Graphs showing trend of yield for mandal and other farmers have been given at annexure B1 to B4.

