



## CROPPING REGIONS AND TRENDS IN DISTRICT BHIWANI

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### Abstract

In the developing agricultural sciences, the significance of combinational study of different elements in knowledge of cropland use can hardly be over emphasised. To know and to analyses uneven position of individual crop in themselves as their integral multifaceted, the study of crop combination regions becomes indispensable. The study more reveal the important features of undeveloped landscape of an areas. As a matter of fact crops associate with/one another not by additional chance but as a result of purposeful choice, and the choice is not random, but on the other hand selected on the basis of ecological circumstances, such as climate, hydrologic and odaphic controls, and economic influence and social events existing at that time. The study of crop association, therefore not only concerned with agricultural human answer is involved in diversified and complex collective surroundings. Various statistical methods have been applied to demarcate crop regions in this paper.

**Keywords:** *Soil, Agriculture, Bhiwani, Soil Culture, Cropping Trends, Wheat, Gowar, Bajra, Oilseed.*

### INTRODUCTION

The method was generally based on single crop giving out, but such crop regions presented over generalized, over cut down picture of agricultural regions e.g., corn belt, cotton belt and wheat belts in different parts of the world. The demerits of such single crop regions have very well been decorated by weaver in his article “crop combination regions in Middle western regions of United States of America”<sup>1</sup>. The cities an example of Corn Belt, where in corn is not a regularly pre-eminent crop. As a matter of fact in some parts of Corn Belt, the land location of corn in relative to other crops is more nearly similar to that in other parts of Corn Belt itself.

On the foundation of the scale of level of importance for selected crops designed from the signify or average for the cultivator.’ East Pakistan’ (now called Bangle Dash), the areas of very high, high, medium, low, very low significance were demarcate, and group into district regions by Johnson .It might remove good for a lot of calculations in respect of a very large number of small unites likepargana or block in a region. A small improvement on the above method was introduced by Nelson who calculated the standard deviation from the mean for each task in the following manner: average plus

1. Standard deviation (S.D.), average plus
2. Standard deviation (2 S.D.), average plus
3. Standard deviation (3 S.D.).All the values so obtained are group together provide of path, they are more than the average and rated as 1, 2, 3, or (high, medium and low).This technique may be appropriate where an over all picture of requisite for the whole region. But in these cases no deliberation is given to leading crops of individual units. It often happen that leading crops are barred while the lower ranking crops are included in the combination. It would be more proper, to group these crops of the unit, which have a positive deviation from the average of all the crops in the same unit itself



In 1954 weaver adopted a statistical formula for crop combination analysis of the agriculturally important region of Middle West in U.S.A. The method commonly known as minimum deviation was calculate in terms of real percentages all the probable combinations in the unit taken into consideration, against a theoretical standard was 100% in a single crop, 50% in each of two crops for two crop combination, 33.3 percent in each of three crops for three crop combination and so on.

Weaver's method suffers from certain limits. It involves a good deal of numerical calculation, and tends to produce a highly widespread picture in areas having large number of variant or areas where the first ranking crop has a very large percentage. Doi modified Weaver's method by substituting  $d^2/n$  with  $d^2$  or the sum of the aqua red differences, and therefore the combination formed by major crops only.

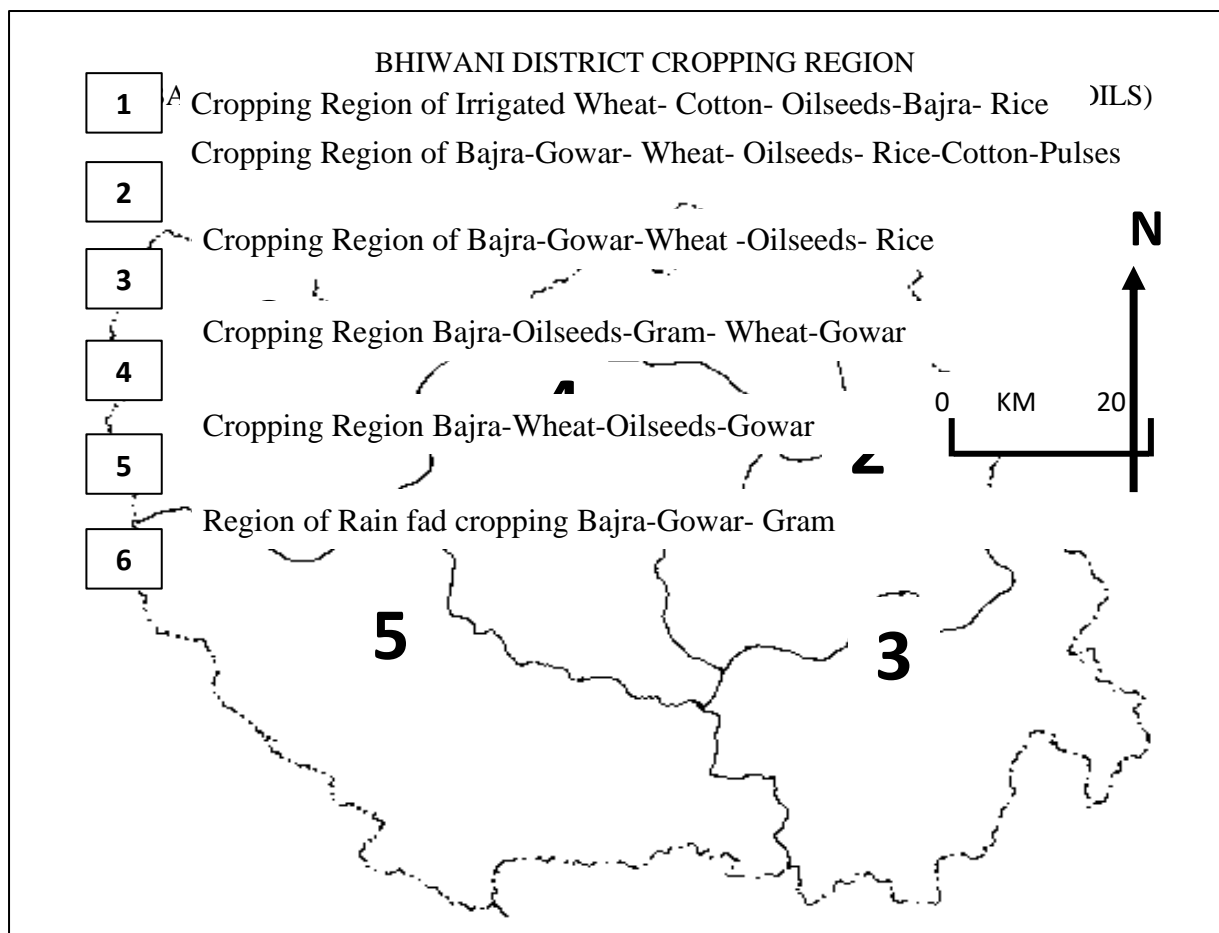
As a result of statistical dispensation of data according to Doe's method, an attempt has been made to delineate the crop combination regions in Ganga region with their distributional change that have taken place during a period of fifty years.

### 6.1 Cropping region of district Bhiwani

The regions delineated on the basis of crop combinations, intensity of irrigation, and suitability of the soils can be defined as cropping regions. The area under investigation is divided in to five cropping regions. Major characteristic of the five cropping regions are given in the following table.

Sr. no	Crop combination	Irrigation intensity	Soil
1	Wheat-Cotton-Oilseed	Over 90%	Loam
	Bajra-Rice		
2	Bajra- Gowar-Wheat-Oilseeds		
	Rice- Cotton- Pluses	Over 70 %	Sandy loam
3	Bajra-Gowar-Wheat		
	Oilseeds- Rice.	60 to 70%	Sandy loam
4	Bajra-Oilseeds-Gram		
	Wheat-Gowar.	30 to 60%	Sandy loam
5	Bajra-Wheat-Oilseeds-Gowar	Above 60 %	Sandy
6	Bajra-Gowar-Gram	Below 30%	Sandy

## Changing Pattern of Agricultural Land-use In Bhiwani District (1985-2010)



### Cropping Region of Irrigated Wheat-Cotton-Oil Seeds-Bajra-Rice:-

This region covers 10 per cent of the total area of the district. The irrigation intensity is over 90% and the main source of irrigation is canal. The soil in their cropping region is loam.

The area under Wheat, cotton and oilseeds steadily increased during 1985- 2010. The rice became a new crop particularly during 1985-2010; the area under wheat 20% in 1985 and 23.1% in 2000 and 31% in 2010. It increased 11% in 25 years due to development of irrigation facilities. The yield of wheat per hectare should be increased, for high yielding varieties of cereal crops. The Gram area covers 22.5 % in 1985 and 3.6% in 2000 while in 2010 only 2% of the cropped area. It decreased 20% cropped area of the region. Due to development of underground water like sprinkler irrigation facilities the area of wheat increased and gram decreased. Gram is Rabi crop and it is sown in the month of October, November when weather is sufficiently cool. It is sown in the drier areas with or without irrigation. In Rabi cropping the area of Wheat and oilseeds was increased and Gram was decreased in 2010. In Kharif cropping the area of Cotton and Rice was increased and Bajra and Gowar was decreased in 2010. The area of non-food grain was increased and food grain was decreased. Other important crops were Rice, Jowar and pulses also occupy a sizeable area.



Economically, Cotton and Oilseeds were the most important crops of this cropping region. Its areas had been increasing. Geographically speaking, it can be suggested that the areas where soil is fertile, developed means of irrigation have been favoring superior crops.

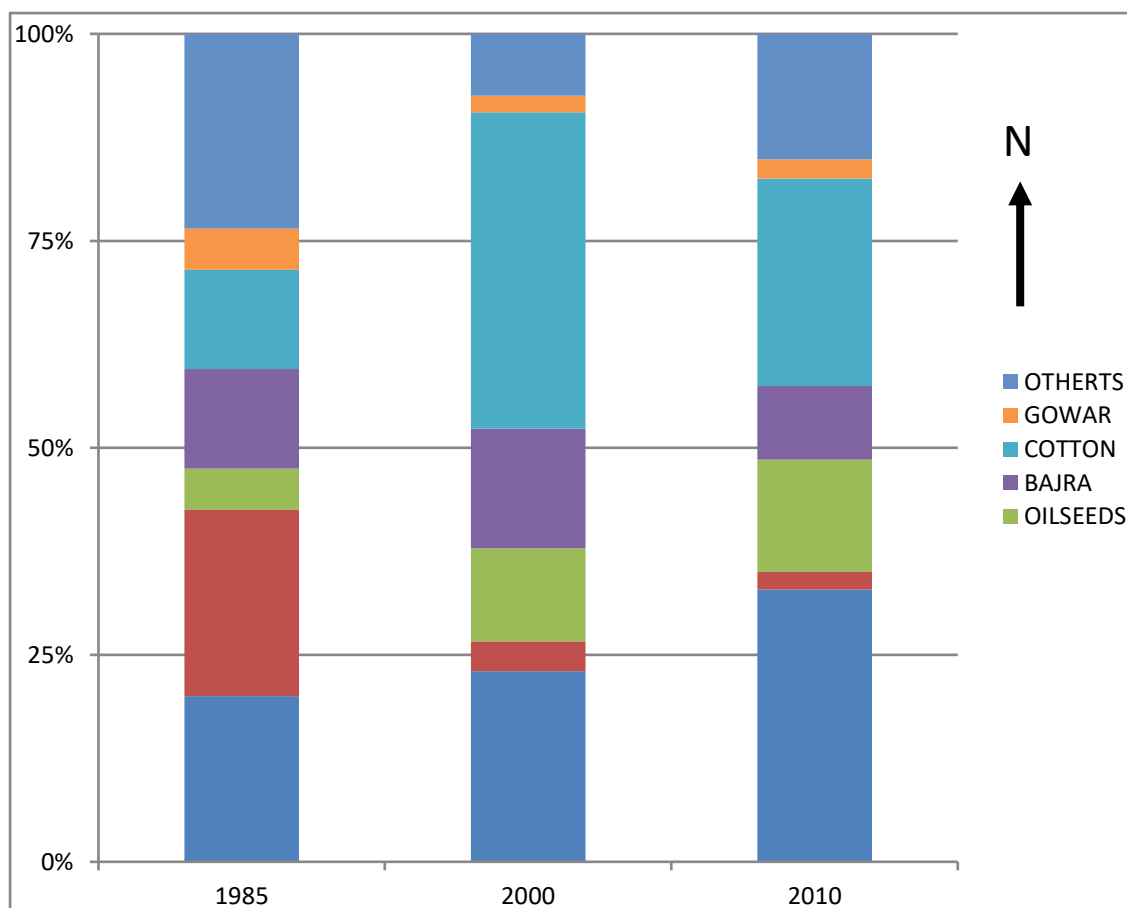
**Cropping Region No 1, Table No 1**

	WHEAT	GRAM	OILSEEDS	BAJRA	COTTON	GOWAR	OTHERS
1985	20	22.5	5	12	12	5	23.5
2000	23.1	3.6	11.3	14.5	38.3	2	7.5
2010	31	2	12.8	8.4	23.6	2.2	14.3

**THE REGION OF IRRIGATED WHEAT-COTTON- OILSEEDS- BAJRA– RICE CROPPING TRENDS 1985 TO 2010**

**Fig No 01**

**(2) Cropping Region of Bajra-Gowar- Wheat- Oilseeds- Rice-Cotton-Pulses:-**



The cropping sub- region covered 14.5 per cent of the total area of the district. The irrigation intensity ranged over 70 per cent and the main source of irrigation has been canals, tube-wells, and sprinkler-seats. The soils of this cropping region are sandy and sandy-loam.

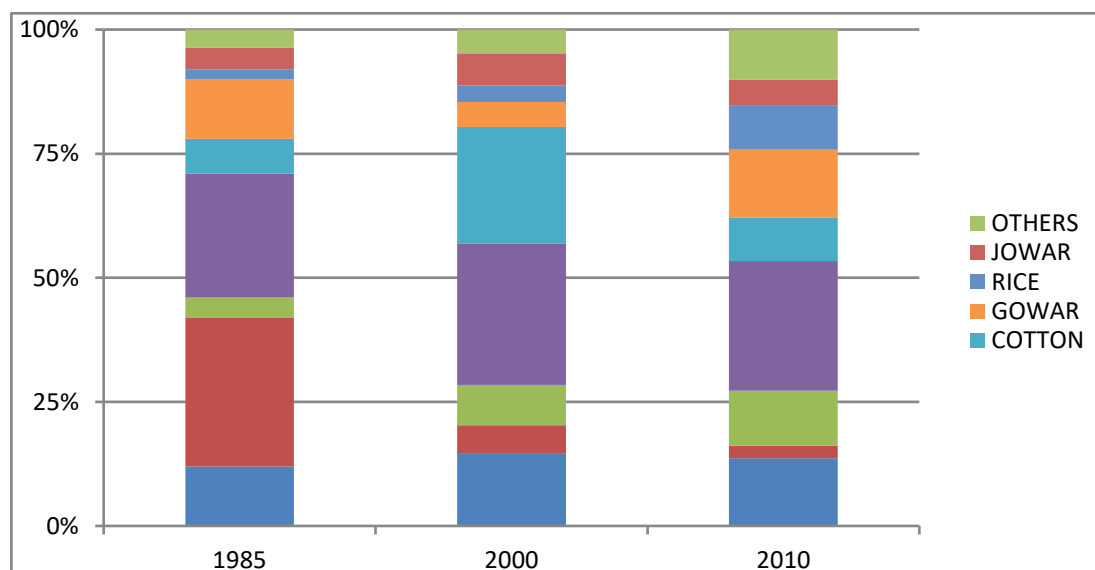


The area under Wheat, Oilseeds, Rice and Cotton increased during 1985 to 2010. The area Under Wheat was 12% in 1985 and 14.7% in 2000, it became 14.1 per cent in 2010. It increase slightly but Oilseeds covered 4% in 1985 and 8.1% in 2000 and 11.5% in 2010. It increase near about 7% in 25 years. Gram was covered 30% cropped area in 1985 or 5.6% in 2000 and 2.6% in 2010. It decreases 28% rapidly last 25 years in this region due to low production of per hectares. Rice covered 2% in 1985 and 3.3% in 2000 or 9.1% in 2010 of total cropped area .Cotton covered 7% in 1985 and 23.5 in 2000 or 8.7% in 2010. Gram, Pulses Jowar hectare- age decreased during 1985-2010. there was significant change in Gram cropping during 1985 to 2010 there was slight change in Bajra or Guwar cropping.

**Cropping Region No 2, Table No 2**

	WHEAT	GRAM	OIL SEEDS	BAJRA	COTTON	GOWAR	RICE	JOWAR	OTHERS
1985	12	30	4	25	7	12	2	4.3	3.3
2000	14.7	5.6	8.1	28.5	23.5	5	3.3	6.5	2.6
2010	14.1	2.6	11.5	27	8.7	14.2	9.1	5.4	9.9

**THE REGION OF BAJRA-GOWAR WHEAT-OILSEEDS-RICE-COTTON AND PULSES CROPPING TRENDS 1985 TO 2010**



**(3) Cropping Region of Bajra-Gowar-Wheat -Oilseeds- Rice:-**

This cropping sub- region covered 17.5 per cent of the total area of the district. The irrigation intensity 60 to 70 per cent and the main source of irrigation have been canals, tube-wells, and sprinkler-seats. The soils of this cropping region are sandy and sandy-loam.



The area under wheat, Oilseeds, cotton and rice were increased during 1985 to 2010. But gram, Jower, guwar and pulses were decrease the cropped area in this region. The area under Rabi crops wheat, gram and oilseeds were as 8% in 1985 and 11.8% in 2000 or 13.7% in 2010 under wheat cropping that increased 5.7% from 1985 to 2010. But gram crop area was decrease 30% from 1985 to 2010. The area under oilseeds was 4% in 1985 and 9.1% in 2000 or 12.2% in 2010 its area increased 8.2% from 1985 to 2010. The Kharif crops were cultivated with the onset of the south-west monsoon. The main crops were Bajra, guwar, rice cotton and kharif pulses. The area under rice was increased 8% from 1985 to 2010 due to development of irrigation facilities. Bajra crop covered 40% area of this cropping region in 2010. Guwar crop area increased slowly but decrease in 2010. The area was 10% in 1985 and 17.4% in 2000 or 15.5% in 2010. The area under cotton crop was 2% in 1985 and 4.4% in 2000 or 2.2% in 2010.

In this region the soil building crops decreased and soil depleting crops increased like gram and guar were decreased and rice and wheat crops increased. Economically, rice, cotton, and oilseeds were important crops. By developing irrigation facilities these crops can gain area where soil is fertile.

**Cropping Region No 3, Table No 03**

	Wheat	Gram	Oil Seeds	Bajra	Cotton	Gowar	Rice	Others
1985	8	33	4	36	2	10	0.2	6.8
2000	11.8	3.3	9.1	47.7	4.4	17.4	0.6	5.5
2010	13.5	1	12.2	40.1	2.2	15.5	8.0	5.3

THE REGION OF BAJRA-GOWAR-WHEAT OILSEEDS AND RICE CROPPING TRENDS 1985 TO 2010

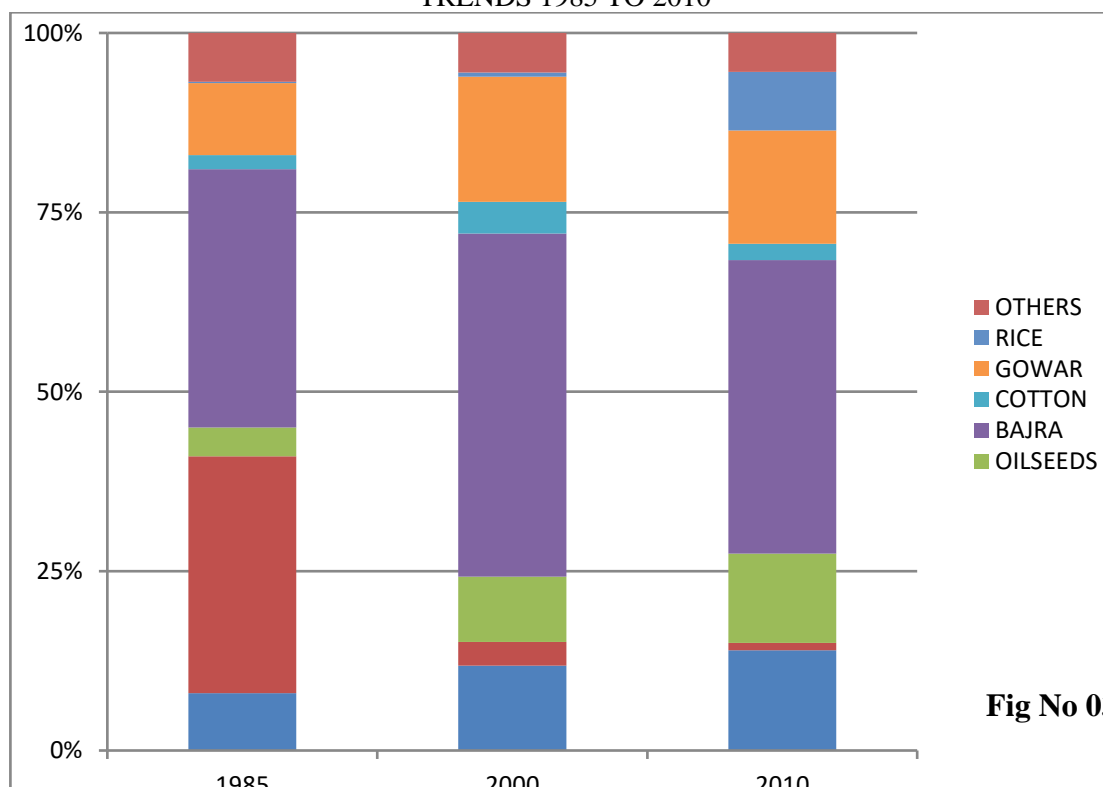


Fig No 03



#### (4) Cropping Region Bajra-Oilseeds-Gram- Wheat-Gowar:-

This cropping region covered 20 per cent of the total area of the district. The irrigation intensity ranged 30 to 60 per cent and the main source of irrigation has been canals, tube-wells, and sprinkler-seats. The soils of this cropping region are sandy and sandy-loam.

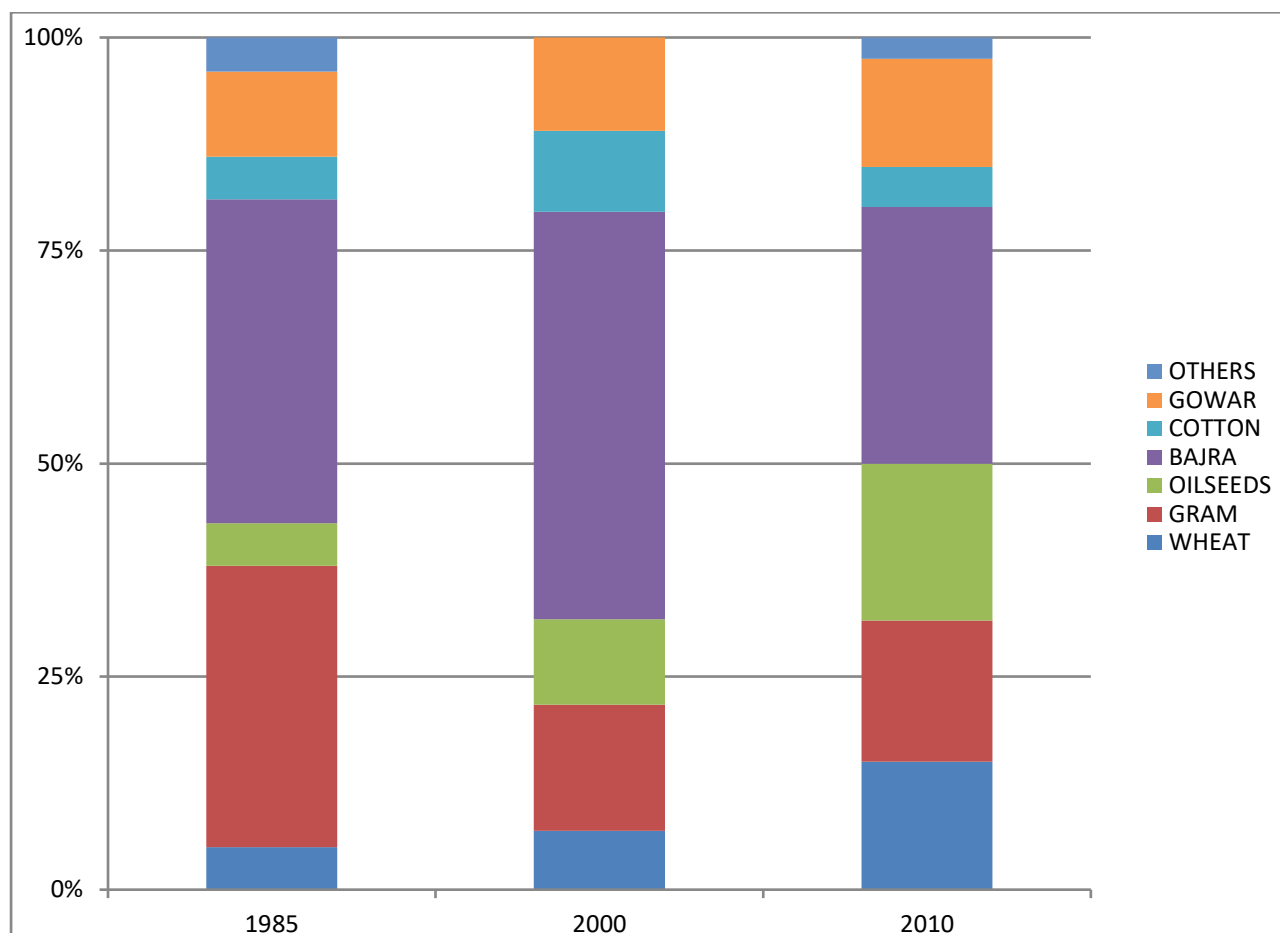
The area under wheat, oilseeds, cotton and guwar were increased, and gram, Bajra and pulses were decrease during 1985 to 2010. The area under wheat was 5 percent in 1985 and 6.7% in 2000 and 15 % in 2010. It increased nearly ten percent during 1985 to 2010, due to development of irrigation facilities. In this cropping region the area under gram crop was 33% in 1985 and 14.3 % in 2000 and 16.6 in 2010. The area of gram was decreased 17% during 1985 to 2010 due to under ground water irrigation facilities. Oilseeds were second ranking crop in this region during 2010. It covered 5% in 1985 and 9.7% in 2000 or 18.4 in 2010. It increased nearly 13.4 percent during 1985 to 2010, due to development of irrigation facilities.

Bajra was first ranking crop in this region during 2010. It covered 38% in 1985 and 46% in 2000 or 30.1 in 2010. It increased nearly 8.3 percent during 1985 to 2000, due to development of irrigation facilities. The area of Bajra was decreased 16.2% in 2010 due to development of irrigation facilities and rice and cotton were increased. Economically gram, wheat, Bajra and oilseeds were the most important crops of the region. It suggested that the areas where soil is fertile, the facilities of irrigation had increased; the inferior crops should be replaced by superior crops.

#### **Cropping Region No 4, Table No 04.**

Year	Wheat	Gram	Oil seeds	Bajra	Cotton	Gowar	Others
1985	5	33	5	38	5	10	4
2000	6.7	14.3	9.7	46.3	9.2	10.6	3
2010	15	16.6	18.4	30.1	4.7	12.7	2.5

#### **THE REGION OF BAJRA-OILSEEDS-GRAM WHEAT AND GOWAR CROPPING TRENDS 1985 TO 2010**



**(5) Cropping Region Bajra-Wheat-Oilseeds-Gowar**

This cropping region covered 22 per cent of the total area of the district. The irrigation intensity ranged above 60 per cent and the main source of irrigation has been canals, tube-wells, and sprinkler-seats. The soils of this cropping region are sandy and the surface is undulating with sand dunes.

In this cropping region Bajra, cotton and guar was main kharif crops and wheat, oilseeds was main Rabi crops. Fig No 04 was increased 17% during 1985 to 2010. Wheat crop growing 4.2 % in 1985 and 11.7 per cent in 2000 or 21.2 % in 2010. It increase due to sprinkling and lift irrigation had been developed in these areas. The area under oilseeds crop was 4.8% in 1985 and 35 % in 2000 or 20.8% in 2010. It increased near about 30% in 1985 to 2000. The area of gram was decreased near 20% during 1985 to 2010 and Bajra was also decreased 6% area. The area of cotton and guar was increased during 1985 to 2010. Development of irrigation inferior crops was being replaced by superior crops.

**Cropping Region No 5, Table No 05**

Year	Wheat	Gram	Oilseeds	Bajra	Cotton	Gowar	Others
1985	5.1	27	4.9	40.3	2	8.5	12.2
2000	10.4	4.9	24.3	37.7	2.5	16.2	4





2010	18	3.3	16.4	38.2	2.6	17.5	4
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THE REGION OF BAJRA-WHEAT  
OILSEEDS AND GOWAR CROPPING  
TRENDS 1985 TO2010

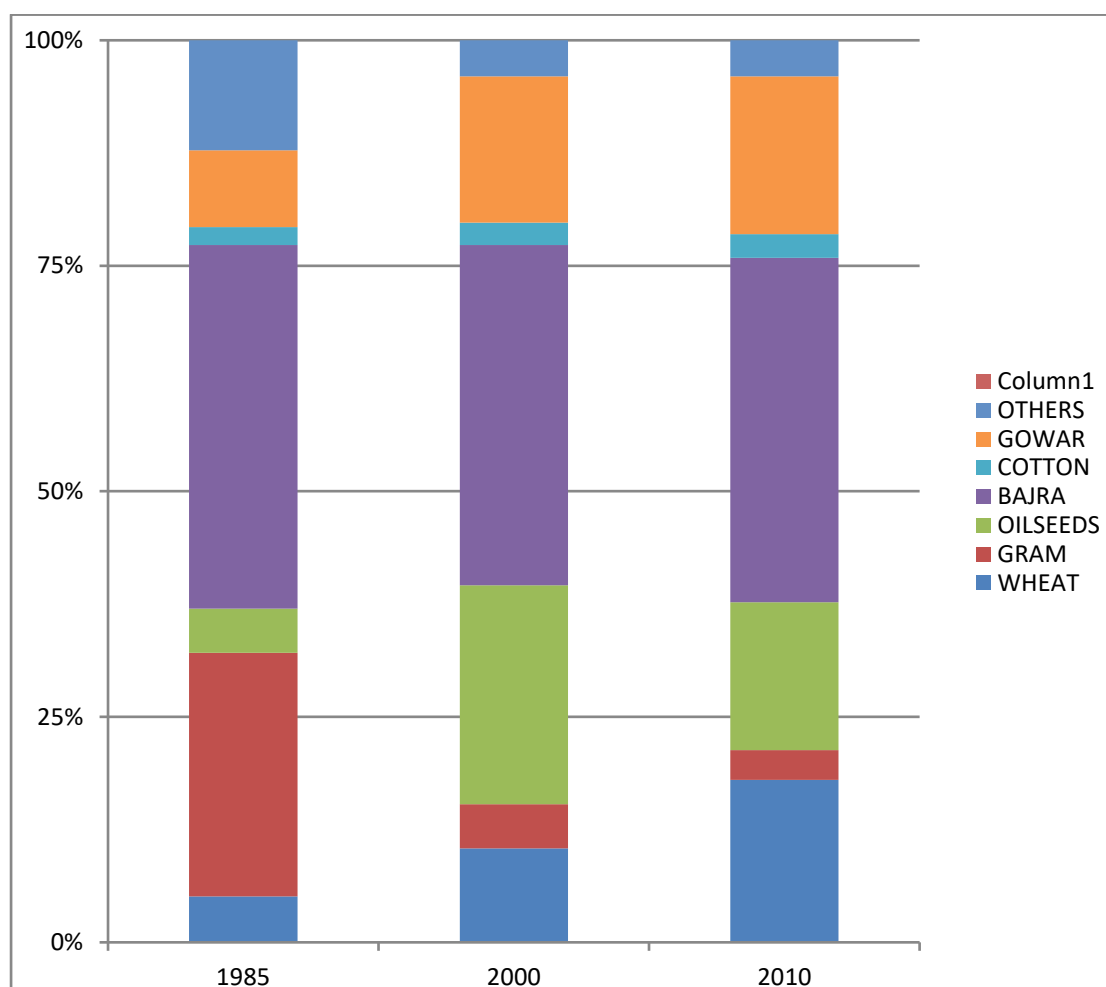


Fig No 05

**(6) Region of Rain fad cropping Bajra-Gowar- Gram:-**

In this cropping region covered 16 per cent of the total area of the district. The irrigation intensity ranged below 30 per cent that was very low and the main source of irrigation has been canals, tube-wells, and sprinkler-seats. The soils of this cropping region are sandy and the surface is undulating with sand dunes.

In this region there was no significant change in cropping. There had been slight increased in wheat, oilseeds, and cotton, guar and Bajra crops from 1985 to 2010. Only gram was decreased 18% from 1985 to 2010 due to development of irrigation facilities. Cropping in this region was dominated by the soil- building crops like gram and guar. sprinkling and

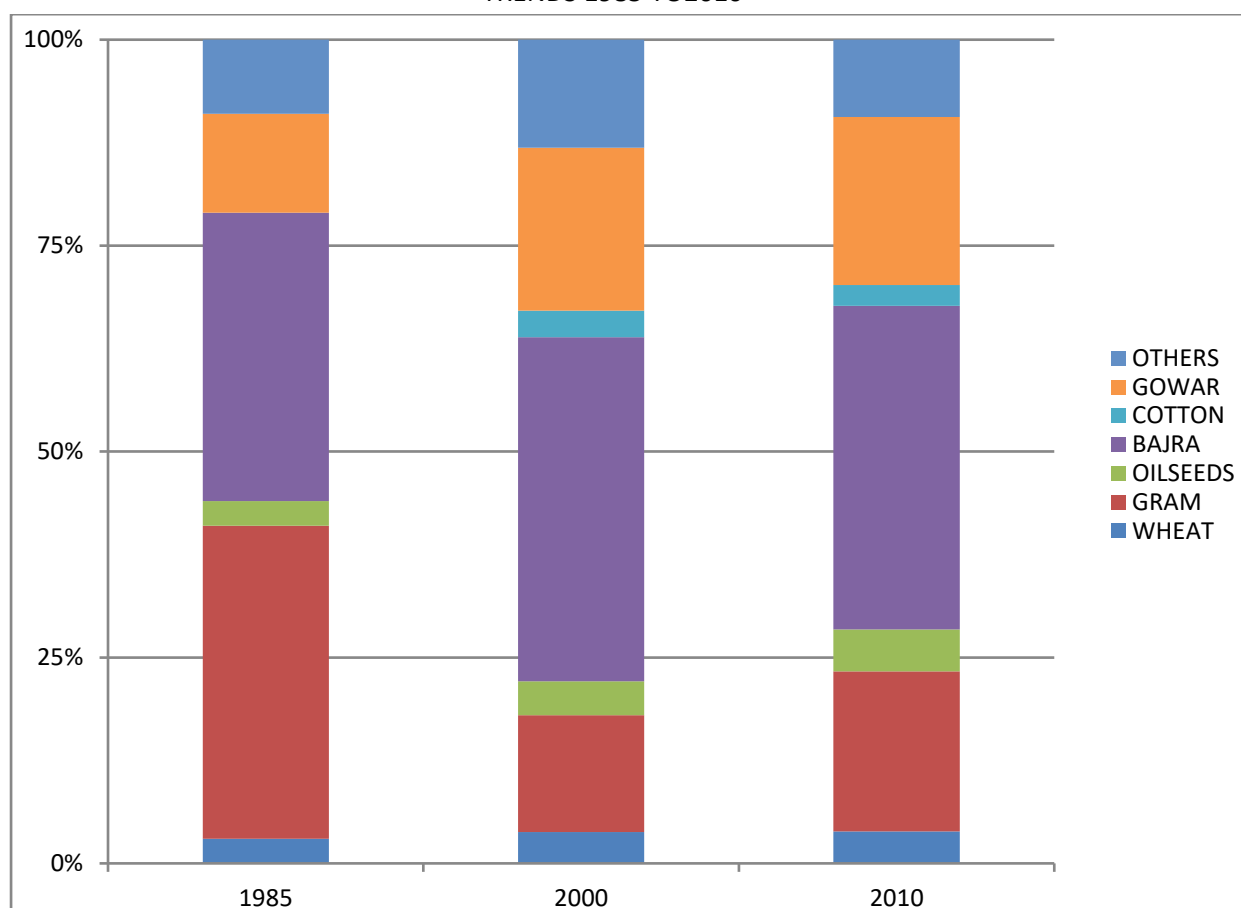


lift irrigation had been developed in these areas. On such irrigated fields inferior crops was being replaced by superior crops.

**Cropping Region No 6, Table No 06**

Year	Wheat	Gram	Oilseeds	Bajra	Cotton	Gowar	Others
1985	3	38	3	35	-	12	9
2000	3.8	14.2	4.8	41.8	3.2	19.8	13.1
2010	3.9	19.4	5.1	39.3	2.5	20.4	9.4

THE REGION OF RAIN FED BAJRA-GOWAR AND GRAM CROPPING TRENDS 1985 TO2010



**Fig No 06**

**6.2 CONCLUSION:-**

After having gone through the contents of the subject. It is concluded that with the increase in irrigation and fertilizer or pesticide the cropping patterns have become diversified. Inferior crops like jawar, Bajra, guar, barley have lost area to superior crops of wheat, oilseeds and cotton in areas where irrigation facilities have increased significantly.



The farmers cannot invest huge amount of money on tube-wells as the water table is low to very low. Again, in most of the area the under-ground water is not suitable for agriculture. Hence the farmers mainly depend on the canal irrigation and rainfall. Both are not able to fulfill the water requirements of the various crops. Sprinkler irrigation and lift canal system can help the farmers to make better use of the existing small amount of water for irrigation purposes.

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