Crop land- Use Pattern in the district Bhiwani , Haryana (India)

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Abstract: The physical environment of man consists of landforms, climate, water, soil, natural vegetation and native animal life. These resource complex is necessary for human existence since it provides him with living space with food and with vast variety of raw materials used in the satisfaction of human wants land resources play a strategic role in the determination of man's economic, social and cultural progress which could be easily seen and clearly understood through reference to economic history of different countries. But unfortunately, the development and use of such an important resource was left in the past entirely to trial and error method which has naturally led to its improper use in many part of the world. Consequently, this basic resource has gradually deteriorated in a world short of food and other basic raw materials. Conservation of land resource is one of the basic necessities. In countries were efforts are being made to modernize agricultural through the adoption of scientific methods, there is an excellent opportunity for correcting part of errors in land use and to get rid of future errors through detailed mapping and classification of map.

Keywords: Agricultural, Productivity, Bhiwani, Haryana, India.

Introduction:

The study is based on secondary data taken from Statistical Abstract of Haryana, Economic and Statistical Organization, Chandigarh. An attempt has been made to tabulate process, analyze and interpret the data by applying suitable statistical and cartographic techniques. District-wise proportion of area under different land use categories has been calculated and shown on map with the help of pie diagrams for both time periods.

The landuse of an area is the cumulative product of the interaction between natural environment and socioeconomic condition in that area. Landuse is a primary indicator of the extent and degree to which man has modified the land resources. It is the application of human controls in a systematic manner, indicating an intimate relationship between prevailing ecological conditions and man (Vink, 1975). The regional differences in natural environmental and socio economic condition lead to significant regional variations in agricultural landuse pattern. The information on the land use provided by the Statistical Abstract of Haryana is based on nine fold classification of landuse by the Revenue Department, Government of India. But for convenience, current fallow and fallow land other than current fallow is combined under fallow land.

Cultivated crops are usually grown in combinational association (Weaver, 1954). Crop combinations or associations are now recognized as important typological characteristics of agriculture (Pande and Saxena >1972). Due to physical and cultural variety of land, the farmers of a region grow many crops rather than a single crop. Therefore the distributional pattern of crops gives lift up spatial prevalence of certain crops or combination of certain crops resultant in the coming out of crop regions. A study of crop combinations forms an essential part of agricultural geography, and such a study is greatly helpful in regional agricultural planning, especially to optimize crop farming. Crop concentration or diversification is the result of variety in agro-climatic, topographical and socio-economic conditions as well as intensity of irrigation technological level and institutional factors.

Scientists and policymakers are concerned about the world's growing population. For them, two key issues are food security—the ability of nations to feed their growing numbers of citizens—and the sustainability of agricultural systems in the face of intensified cultivation, the rising use of chemical inputs, and the increasing pressure on already scarce water resources. Because the relationships among population growth, land use, and sustainability of

resources are complex, exploration of these relationships must depend on detailed, region-specific studies and cross-regional comparisons.

Materials and Methods:

Out of 439 villages in the study area an intensive sample study of agricultural land use of 44 sample villages has been taken up by obtaining data from unpublished revenue record i.e. Lal Kitabs. These sample villages account for ten per cent of the total number of villages representing 5.26 percent of the total land of the study area. Stratified Random sampling method has been used for taking the sample. Three village are taken for in depth study with the help of primary data. The work has proceeded two stages firstly whole of the study area is stratified into three categories of irrigation intensity, normally, low irrigation intensity area, moderate irrigation intensity areas and high irrigation intensity areas. The village Lohani from the category of low irrigation intensity; village Nandha and change from the category of moderate and high irrigation intensity respectively. The operational holding are classified into marginal, small, medium, large and very large size groups. Four cultivatators of different size groups are randomly selected from the different size groups except in cases where they do not emerge.

The cropping intensity has been examined using the under mentioned formula.

$$\text{Cropping intensity} = \frac{\text{Total Cropped Aare}}{\text{Net Sown Area}} \times 100$$

Table 1. List of sample villages with their location code.

Sr. No.	Name of the Villages	Location Code
1.	Devsar	5
2.	Miran	40
3.	Budhsaili	14
4.	Gadhwa	38
5.	Matani	20
6.	Talwani	35
7.	Garwa	22
8.	Kashni Khurd	10
9.	Obra	7
10.	Cheher Khurd	33
11.	Kudal	23
12.	Jhanjra Sheoran	55
13.	Partia Bhiman	69
14.	Saral	25
15.	Rohnat	5
16.	Sagban	9
17.	Dhanimahu	32
18.	Ladianwali	41
19.	Barsi	1
20.	Kungar	11
21.	Rur	19
22.	Dhanana	16
23.	Baliyali	21

24.	Tigrana	6
25.	Chang	12
26.	Devsar	24
27.	Bamla	63
28.	Lohani	52
29.	Nimriwali	71
30.	Manheru	69
31.	Juikhurd	40
32.	Sanjerwas	62
33.	Charkhi	91
34.	Khatiwas	83
35.	Morwala	76
36.	Khosla	26
37.	Huee	33
38.	Mandi Haria	103
39.	Jhoju Kalam	150
40.	Mehrana	139
41.	Nandha	112
42.	Badrai	122
43.	Beejna	158
44.	Datoli	170

Choropleth technique has been applied to show the changes in cropping intensity. The changes in crop combination regions have been examined using the Doi technique in (1957) and choropleth technique has applied to show the changes in crop combination regions.

The crop diversification have evaluated used Gibbs-Martin index as under the formula:

$$\text{Index of Diversification} = 1 - \frac{\Sigma X^2}{(\Sigma X)^2}$$

Where X is the percentage of total cropped area occupied by each crop or hectoreage under one individual crop.

Results and Discussion:

On examining the data presented in table 5.6 show that the cropping pattern of marginal and small farmers are dominated by Bajra and Guar as 50 per cent area is occupied by these two crops in Kharif season and; Rapeseed and Mustard, Wheat and Gram are the dominating crops in rabi season 40 to 46 percent area of the total cropped area is covered by these crops. Medium farmers having more than 40 per cent area under wheat, Rapeseed and mustard and cotton. Guar and Bajra are dominating crops during the Kharif season. Wheat, Rapeseed mustard and Cotton are the main dominating crops during the Rabi session.

Crop combination Analysis:-

Four to five crops are in combination. Bajra-rapeseed and mustard-Guar-Wheat combination found among the marginal farmers, Guar-wheat-Bajra-Rapeseed and mustard; Wheat-cotton-Guar-Bajra-Rapeseed and mustard; Guar-Rapeseed and mustard-Wheat-Bajra; Bajra-Guar-Wheat-Rapeseed and mustard crop combination found among the small, medium large and very large farmers respectively.

Table 1: Consumption of chemical fertilizers size of land holdings (Lohani) (Consumption Kg./ Acre).

Size of Holdings	0.(0.00)	UP to 50	51-150	151-250
Marginal farmers	25%	25%0	50%	-
Small farmers	0	0	75%	25%
Medium farmers	0	0	25%	75
Large farmers	0	0	100	-
Very large farmers	0	0	25	75%

Table 2: Consumption of Bio-Chemical Input and Size of Land Holdings Consumption (Rs. / Acre).

Size of Holding	0(0.00)	Up to 800	800-1600	1600-2000	Above 2000
Marginal	25		75		
Small	25		75		
Medium				50	50
Large		25	75		
Very Large		25	75		

season.

Table 3: Cropping Pattern in Different Size Holdings in Percentage to Gross Cropped Area: Size of Operational holding in Acres

Crops	Less than 5	5-10	10-20	20-40	More than 40
Paddy	-	-	-	-	-
Guar	14.82	33.33	15.78	28.94	21.02
Bajra	37.05	20.37	11.95	18.72	24.64
Jowar	1.18	-	6.52	-	0.36
Sugarcane	-	-	-	-	-
Cotton	2.47	-	19.03	-	14.86
Vegetable	-	-	-	4.68	-
Wheat	11.18	27.78	32.60	22.98	19.20
Gram	9.88	-	3.26	-	-
Barley	2.47	-	-	-	-
R/M	20.95	18.52	10.8	24.68	18.84
Green Fodder	-	-	-	-	-

Table 4: Crop combination in Lohani.

Size of operational holdings (Acres)

0-5	Bajra 37.05	R/M 20.95	Gwar 14.82	Wheat 11.18	Gram 9.88	Barley 2.47	Cotton 2.47	Jowar 1.18
5-10	Guar 33.33	Wheat 27.78	Bajra 20.37	R/M 18.52				
10-20	Wheat 32.60	Cotton 19.03	Guar 15.78	Bajra 11.95	R/M 10.86	Jowar 6.52	Gram 3.26	
20-40	Guar 28.94	R/M 24.68	Wheat 22.98	Bajra 18.72	Vegetable 4.68			
40	Bajra 24.64	Guar 21.02	Wheat 19.20	R/M 18.84	Cotton 14.86	Jowar 0.36	Barley 1.09	

Most of the categories of operational holdings having Bajra, Guar, Rapeseed and mustard are dominating crops emerging as first and second ranking crops in crop combination. Because Lohani has low irrigation intensity and these crops require low water supply, cotton and wheat are other important crops in this village.

Size of Farm, Yield and Cost Relationship of Bajra

Bajra is the most important Kharif season coarse cereal crop particularly in the village Lohani. With the low expansion of irrigation facilities it is important crops. Total expenditure on various inputs per acre of Bajra is Rs. 1572.3 on marginal size farms, Rs. 25.25.43 on small size farms, Rs. 2355.8 on medium size farms Rs. 2216 on large size farms and rs. 2171.6 on very large size farms. The yield and cost of production increase as the size of farms increase. Along the marginal farms failure of crops due to lack of water facility 4.60 percent. All size farms used HYV seeds and chemical fertilizers. They do not use any type of insecticides. They paid sloughing and harvesting charges as 733 to 1000 and 927 to 1066.66 Rs. Per acre.

The farms on the Agricultural productivity is to identify the determinants of Agricultural development at the micro level study in the sample villages. The relevant data has been computed are engaged in the operation of agriculture per acre agricultural productivity has been calculated with the help of formula:

$$\text{Land Productivity} = \frac{\text{Quantity of Agricultural products}}{\text{Net Sown Areas}} \times \text{Respective Prices (Main and By Products)}$$

Table 4: Per acre cost of production of bajra in Lohani

Inputs	0-5	5-10	10-20	20-40	40 <
Seeds i) Desi ii) HYV	110	130	147.5	110	110
Manure Organic Chemical	149	551	225	245.5	165.60
Insecticides	-	-	-	-	-
Plaughing	733.3	916.66	1000	916.66	1000
Harvesting	-	927.77	983.3	1066.66	1000
Total	1572.3	2525.43	2355.8	2216	217.25

Table 5: Relation of farm size to cost production, yield and output

Size of Holdings (Acres)	Bajra yield, per acre (Quintal)	Cost of Production Per acre (Rupees)	Output (Rs.)	Total Returns (Rs.)
0-5	2.1	1572.3	1670	97.7
5-10	6.0	2525.43	4359.6	1834.17
10-20	6.5	2355.8	4365.5	2009.7
20-40	7.33	2216	5446.6	3230.6
40<	7.75	2171.25	5870	3698.75

Size of Farm Yield and Cost Relationship of Guar

Guar is the most dominant crop in this village it is considered as a fodder crop. Mostly it emerges as first and second ranking crop in crop combination. In total expenditure on various inputs per acre of Guar is Rs. 1818.2 on small farm, 1507.66 on medium, Rs. 1486 on large farms and 1469 on very large forms. Due to lack of water the marginal

forms do not sow the Guar and they left the field as fallow land. The yield increases as the farm size increase but it not some with the cost of production. All size of farm do not use any type of insecticide and manure because Guar is also a green manure its leaves gave manure to the field so it do not require any fertilizers. but all size farms use H.Y.V seeds. They are paying low harvester changes than Bajra as 538 to 750 per acre. Total returns as increases as increasing farm size.

Table 6. Per acre cost of production of guar in Lohani guar.

Inputs	0-5	5-10	10-20	20-40	40<
Seeds iii) Desi iv) HYV		168.66	109.3	150	125
Manure Organic Chemical	-	-	-	-	-
Insecticides	-	-	-	-	-
Laughing		916.66	860	750	750
Harvesting		733	538.66	586	594.3
Total		1818.29	1507.66	1486	1469

Table 7: Relation of farm size to cost production, yield and output.

Size of Holdings (Acres)	Guar yield, per acre (Quintal)	Cost of Production Per acre (Rupees)	Output (Rs.)	Total Returns (Rs.)
0-5				
5-10	2	1929.3	3.214	1284.7
10-20	2.15	1507.66	3473.25	1965.59
20-40	2.49	1486	4733.8	3247.8
40<	3.7	1469	6933	5464

Wheat is a Rabi Crop. It is the first ranking crop is small, medium, large and very large farmer and second ranking crop with the marginal farmers in the Rabi season. It requires a combination of physical and non physical factors including cool climate with moderate rainfall, flat and well drained plain area, pertile-friable loamy soil and heavy inputs in the farms of irrigation, high yielding variety of seeds, fertilizers and mechanization. Assured regular supply of water makes its cultivation intensive. Irrigated wheat is commonly raised as a rotational. Crop under tube wells irrigation on fertile blanger and. The

various input costs and their relation to yield under different size of holdings is given in Table

The per acre input cost of wheat is Rs. 4489.4, Rs. 4171, Rs. 4240.6, Rs. 4332 and Rs. 4158.62 on marginal, small, medium, large and very large size farms respectively. It is observed that there is no correlation between size of farm, cost of production and yield per acre. Cost of H.Y.V seeds of wheat is Rs. 586.66 to 800, small size farms invest maximum on seeds of Rs. 800 among other categories. Fertilizers charges are more Rs. 1019.4 in marginal size holding.

Table 8: Per acre cost of production of wheat in Lohani

Inputs	0-5	5-10	10-20	20-40	40<
Seeds (i) Desi (ii) HYV	7.30	800	683	798	586.66
Manure (i) Organic (ii) Chemical	1019.4	958	952.6	957	955.33
Insecticides	-	-	-	-	-
Laughing	1100	1000	1083	1000	1083.33
Harvesting	1640	1413	1522	1577.6	1533.33
Total	4489.4	4171	4240.6	4382	4158.62

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