Recent Trend in crop land-use-Lohani in district Bhiwani, Haryana (India)

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Abstract: 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area an intensive sample study of agricultural land use of 44 sample villages has been taken up by obtaining data from unpublished revenue record i.e. Lal Kitabs.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. 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 harvestery changes than Bajra as 538 to 750 per acre. Total returns as increases as increasing farm size.
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Introduction:

After 1947, independence, India faced food deficit problem. So preference was to increase food grain production in the first five year. In very this sequence agricultural production team sponsored by food foundation in the year 1959. On various recommendations of the team, the Agricultural Food Production Board launched a new program was named as Green Revolution as a New Agricultural Strategy. It included regular and adequate irrigation facilities, use of fertilizers, H.Y.V. seeds, pesticides and insecticides, new instruments of agriculture, the main emphasize was on two food grains crops wheat and rice to solve the problem of food deficit. The result was quick and substantial. As far as, India is a unique country from agricultural point of view. Its enormous expanse of level plain, rich soils, high percentage of culturable land, wide climate variety with adequate aggregate rainfall combined with sufficient temperature, ample sunshine and long growing season provide solid base to agriculture. Agriculture has double relation with industry. It acts as a supplier of raw material to the industries and as consumer of industrial products. It goes without saying that the prosperity of industrial sector largely depends upon the agricultural prosperity. In fact prosperity of the entire nation depends upon the prosperity of agriculture.

India is a country, where primary occupation is agriculture and comprises more than 20 percent of the world's irrigated land. The country receives over 80 percent of its rainfall, during the period of the monsoon. the rainfall is too meager for successful agriculture. Therefore, storage is essential for an assured supply of water for irrigation. India is one of the foremost countries in the world in the exploitation of her water resources for irrigation, generation of hydroelectric power and supply of drinking water during the test about sixty years of planned development. Changes in cropping pattern is determined by factors like agro-climatic conditions, technological, infrastructural and institutional environment and profitability signals. The single most important element in crop production strategy in the post-green revolution period is improved agricultural technology. This technology is in the form of high yielding plant varieties, intensive cultivation, greater use of fertilizers. Since the early day's of 'Green Revolution' there are signs of imbalance in cropping pattern. Technological changes of mid-sixties caused significant shifts, in land utilisation, in favour of crops like wheat and rice at the cost of area under coarse cereals, pulses and oil seeds. This shift was the combined effect of differential rates of technological

change among crops, irrigation bias of new technology causing shift, of land away from dry crops in favour of irrigated crops and the associated policy of price support system as well as market intervention by the Government for certain crops. Distortions in cropping pattern were reflected in relatively abundant supply of the same crops (like wheat of which the Government had surplus stocks) and acute shortage of others (like pulses and edible oils which had to be imported at huge cost in terms of foreign exchange).

In the beginning, Intensive Agriculture Development Programme (IADP) popularly known as Package Program was launched in seven districts of seven different states. Out of these four were rice producing, two wheat producing and one was millets producing, these were shahabad (Bihar), Thanjaver (Tamil Nadu), Aligarh (U.P), West Godawari (Andhra Pradesh), Ludhiana (Punjab) Raipur (Chattisgarh) and Pali in Rajasthan. In 1964-65 Intensive Agriculture Area Programme (IAAP) was launched in 144 district of country and first time was introduced in Haryana. The food grain crops production, which was around 50 to56 million tones per year since 1950-51 started increasing at a fast rate. By the mid-1980s it had touched the level of 170 million tones and 209 million tomes in 2001-2002. This new strategy of agriculture has great importance to solve the food crises in India (Mathur, 2002).

In Haryana, the indices of Net State Domestic Product at factor cost by major sources at current prices have shown low growth rate of primary sector as compared to secondary and tertiary sectors. In the year 2003-04 the per capita net state domestic product of Haryana at current prices was 270.4 (State of The Environment Report, Haryana 2006). Agriculture forms the backbone of the economy of Haryana. Though the percent share of agriculture in the State Gross Domestic Product (SGDP) has declined about 65 percent of state's population still depends directly on agriculture. The workers are involved in agricultural activities either as cultivator or agricultural labourers.

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.

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

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

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

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 season.

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		

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.

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 combinatgion. Because Lohani has low irrigation intensity and these crops require low water supplyt, cotton and wheat are other important crops in this village.

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	

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 ploughing 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 harvestery 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	-	-	-	-	-
Plaughing		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	-	-	-	-	-
Plaughing	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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