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## ECONOMICS OF DRY FARMING IN HARYANA STATE

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Of late dry land agriculture has received great attention from planners and scientists on account of the recent advances in agricultural technology. The dry farming areas have been characterized as those areas which receive 40 cm. to 100 cm. of annual rainfall and have less than 25 per cent of sown area under irrigation. These constitute nearly 47 million acres or 36 per cent of the net area sown in the country and account for less than 20 per cent of the total foodgrain production. Since the inception of the High-Yielding Varieties Programme in 1966, it has become a must that immediate steps should be taken to improve the lot of the people of dry farming areas. For, it was felt that any delay would accentuate the wide gap between the income of the farmers of irrigated and unirrigated tracts and foment social unrest.

In all, 84 districts in the country are included in the category of dry land farming. Mohindergarh district of Haryana State is one of them as the average rainfall in this district is only 60 cm. and total irrigated area is only 11.4 per cent of the total net sown area.<sup>1</sup> Though the situation is similar in some parts of Gurgaon and Hissar districts of the State, Mohindergarh represents a typical dry farming region and because of this, it was selected for the present study. The data for this study relate to the year 1970-71.

### *Objectives*

The specific objectives of the study were (i) to determine the input-output details of individual crops grown on the dry farming areas of Mohindergarh district; (ii) to determine the most profitable crop or crop rotations to be practised in a year; and (iii) to examine the extent of adoption of high-yielding varieties programme in the dry farming area. In addition, this study also furnishes information on the employment opportunities of human labour in this area.

### *Methodology*

District Mohindergarh was selected purposively for this study and two villages in this district were selected at random. All the cultivators in these villages were classified into two size-groups, those operating more than 10 acres and those with less than 10 acres. From this a 10 per cent sample was selected from each category. Thus the total number of sample came to 18 from the smaller and 15 from the larger size-groups. The input-output data of all the crops grown on these farms along with prices were collected by

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1. Statistical Abstract of Haryana 1970-71.

survey method. The data for the unirrigated and irrigated crops grown on the selected farms were analysed separately.

### *Results and Discussion*

A detailed analysis of the cropping pattern showed that the intensity of cropping in this area was about 150 per cent. The major crops of this area were bajra which accounted for 28.52 per cent of the total cropped area, followed by gram, *guara*, wheat, *sarson*, barley and jowar and they accounted for 26.09 per cent, 15.21 per cent, 14.67 per cent, 7.61 per cent, 4.22 per cent and 3.88 per cent, respectively, of the total cropped area. Of these crops gram, bajra, *sarson*, jowar and *guara* were grown mostly under unirrigated conditions while wheat was grown entirely under irrigated conditions and most of the barley crop was also grown only under irrigated conditions.

### *Economics of Individual Crops*

The input-output details of individual crops were prepared separately for small and large size holdings as well as for irrigated and unirrigated farms. Inputs were grouped into three categories, namely, human labour, bullock labour and cash expenses which include expenses on seeds, manures and fertilizers and irrigation charges, land revenue, insecticides and pesticides, charges for depreciation and repairs, and interest on working and fixed capital.

It was observed that there was no marked difference in the standard of farming as between the two size-groups of holdings. Hence data for both the size-groups were aggregated and were classified as irrigated crops and unirrigated crops. Table I gives the input-output details of individual crops under irrigated and unirrigated conditions.

Table I shows that in the case of unirrigated crops human and bullock labour accounted for more than 70 per cent of the total inputs which varied from 90 per cent in the case of *guara* to 62 per cent in the case of barley. Human labour alone contributed nearly 40 per cent of the total inputs. This reflects that the extent of use of other strategic inputs like improved seeds, manures, fertilizers, insecticides and pesticides was extremely low. This is indicative of the fact that the standard of farming in these areas was very poor which ultimately governed the output. From the output point of view *sarson* crop was the most profitable *rabi* crop while *gram* was the least. Among the *kharif* crops *guara* was the most profitable crop followed by bajra and jowar. Wheat crop was not grown under the rain-fed conditions. The lower return per acre was the main reason for the general poverty of these areas.

In the case of irrigated crops the contribution of human labour varied from 34.40 per cent in the case of wheat to 52.42 per cent in the case of *guara*. The percentage contribution by bullock labour was much less in the case of

TABLE I—INPUT-OUTPUT DETAILS PER ACRE FOR DIFFERENT CROPS IN MOHINDERGARH DISTRICT (1970-71) (IRRIGATED AND UNIRRIGATED)

Items	Bajra		Jowar		Guara		Wheat		Barley		Gram		Sarson*	
	Unirri- gated	Irri- gated	Unirri- gated	Irri- gated	Unirri- gated	Irri- gated	Unirri- gated	Irri- gated	Unirri- gated	Irri- gated	Unirri- gated	Irri- gated	Unirri- gated	Irri- gated
Human labour (Rs.) ..	43.00 (45.62)	79.65 (37.64)	44.06 (42.58)	59.14 (38.35)	40.81 (51.94)	83.20 (54.42)	—	129.61 (34.40)	75.76 (34.44)	98.00 (35.99)	29.05 (36.96)	—	69.37 (46.20)	60.71 (38.78)
Bullock labour (Rs.) ..	27.90 (29.60)	79.80 (37.71)	41.69 (40.29)	56.25 (36.47)	30.61 (38.96)	52.00 (34.02)	—	72.91 (19.35)	60.00 (27.28)	74.49 (27.36)	32.48 (41.33)	—	63.00 (42.00)	45.00 (34.49)
Cash expenses (Rs.) ..	23.35 (24.78)	52.15 (24.65)	17.73 (17.13)	38.83 (25.18)	7.15 (9.10)	17.67 (11.56)	—	174.29 (46.25)	84.22 (38.28)	99.79 (36.65)	17.06 (21.71)	—	17.64 (11.76)	41.85 (26.73)
Total input (Rs.) ..	94.25 (100.00)	211.60 (100.00)	103.48 (100.00)	154.22 (100.00)	78.57 (100.00)	152.87 (100.00)	—	376.81 (100.00)	219.98 (100.00)	272.28 (100.00)	78.58 (100.00)	—	150.01 (100.00)	156.56 (100.00)
Output of grain (quintals)	3.32	5.75	2.54	3.58	3.51	5.97	—	11.06	6.58	8.58	1.96	—	3.26	3.63
Total output (Rs.) ..	232.49	402.26	223.34	315.24	253.05	430.12	—	984.55	467.00	609.39	175.00	—	521.80	581.25
Net profit (Rs.) ..	138.24	190.66	119.86	161.02	174.48	277.25	—	607.74	247.02	337.11	96.48	—	371.79	424.69

\* To make the results comparable sarson crop grown below 10 acres only has been considered here.

Note : The figures in parentheses indicate the percentages.

wheat cultivation. But in the cultivation of remaining crops it contributed slightly more than one-third of the total inputs. The use of other inputs was slightly more on the irrigated farms as compared to the unirrigated. The total inputs per acre was highest for wheat with Rs. 376.81 and was lowest for jowar with Rs. 154.22. Gross profit was also highest in the case of wheat with Rs. 984.55 per acre followed by barley, *sarson*, *guara*, bajra and jowar with Rs. 609.39, Rs. 581.25, Rs. 430.12, Rs. 402.26 and Rs. 315.24, respectively. In terms of net profit again it was the wheat crop which topped the list followed by *sarson*, barley, *guara*, bajra and jowar, in that order. This reveals that a shift to wheat cultivation from other crops would be most profitable in terms of the gross as well as the net returns. This would, in addition, increase employment opportunities on the farms.

A comparison of the inputs and outputs of the crops grown under unirrigated and irrigated conditions showed that individual inputs as well as output were more under irrigated crops as against unirrigated crops. This shows that with the increase in the irrigation facilities, firstly, there would be a shift in cropping pattern in favour of the wheat crop as from other crops, specially from gram, secondly there would be a shift from labour intensive to capital intensive farming and ultimate increase in output.

#### *Economic Profitability of Crop Combinations*

It is equally important to work out the economic profitability of various crop combinations which can be grown in one year from the same field. Table II presents the input, output and net profit per acre of various crop rotations as practised on selected farms.

TABLE II—PROFITABILITY OF CROP COMBINATIONS

				<i>(Rs. per acre)</i>		
Crops	..	..	..	Input	Output	Net profits
Bajra and gram	..	..	..	227.66	403.16	175.50
Jowar and gram*	..	..	..	173.88	359.67	185.79
<i>Guara</i> and barley*	..	..	..	297.03	768.37	471.34
<i>Guara</i> and gram	..	..	..	173.12	478.76	305.64
Fallow and gram	..	..	..	123.99	238.23	114.24
Fallow and <i>sarson</i> †	..	..	..	154.39	718.12	563.73

\* Based on only few cases.

† *Sarson* crop grown below 10 acres as well as above 10 acres has been included in one.

It was observed that *sarson* crop alone was the most profitable crop during 1970-71 yielding a net profit of Rs. 563.73 per acre followed by *guara* and barley rotation with Rs. 471.34, *guara* and gram with Rs. 305.64, jowar and gram with Rs. 185.79, bajra and gram with Rs. 175.50 and fallow and gram with Rs. 114.24 as net profit. However, much reliance cannot be placed on the *guara* and barley rotation or jowar and gram rotation as they

are based on only a few observations. Similarly in the case of *sarson* crop in spite of its being highly profitable, it cannot be recommended for all, because of the great uncertainty in its yield. It was only *guara* and gram combination which showed moderate profits and stable yield. Hence this combination can be safely recommended for a stable income.

### *Dry Farming Areas and the Green Revolution*

It is the general belief that the people of dry farming areas are not fully aware of the green revolution and hence they are not utilizing the opportunity as provided by the green revolution. This needs empirical testing.

TABLE III—EXTENT OF USE OF IMPROVED VARIETIES AND FERTILIZATION IN DRY FARMING AREA : MOHINDERGARH DISTRICT

Particulars	Crops					
	Bajra		Jowar		Wheat	
	Unirrigated	Irrigated	Unirrigated	Irrigated	Unirrigated	Irrigated
Percentage of farmers using improved seeds .. ..	26.66	25.00	—	—	—	90.32
Percentage of area covered under improved seeds .. ..	20.69	15.79	—	—	—	69.14
Percentage of farmers using fertilizers .. ..	30.00	75.00	—	25.00	—	74.19
Percentage of area fertilized .. ..	41.20	73.68	—	25.00	—	79.43
Extent of fertilization (N <sub>2</sub> kilograms per acre) .. ..	7.40	10.21	—	6.50	—	27.05

The green revolution is based on the use of irrigation, improved seeds, manures and fertilizers, insecticides and pesticides and improved implements. Because of the non-availability of data on all these aspects only improved seeds and fertilizers for which data were available have been taken into consideration in the present analysis. Further, the green revolution has taken place mainly in five crops, *viz.*, paddy, bajra, jowar, maize and wheat. As paddy and maize were not grown in these areas, for the purpose of present analysis only three crops, namely, bajra, jowar and wheat have been taken into account.

Table III shows that there was not much difference between irrigated and unirrigated bajra crop with respect to the use of improved seeds but with respect to the use of fertilizers, the percentage of farmers using fertilizers as well as the area fertilized was almost twice in irrigated bajra as compared to unirrigated. Similarly the extent of fertilization of bajra crop under irrigated condition was 50 per cent more intensive than the unirrigated one. In the case of jowar crop the farmers have used neither improved seeds nor fertilizers under unirrigated conditions while under irrigated conditions 25 per cent of the farmers have used fertilizers and the area fertilized was 25 per cent with the extent of 6.50 kg. nitrogen per acre.

Wheat crop was not grown under unirrigated conditions. In the case of irrigated conditions it was observed that 90 per cent of the farmers were using improved seed which covered 70 per cent of the sown area. Nearly 75 per cent of the farmers were using fertilizers covering 80 per cent of total area under wheat. The extent of fertilization was also high which came to about 27 kg. nitrogen per acre.

The above facts revealed that the farmers of dry farming areas were fully acquainted with the technological advances made in the production of crops and if there was any lag in their adoption, it was mainly because of lack of assured irrigation. In cases where there was assured irrigation, the farmers used improved seeds and fertilizers on a wider scale as compared to cases where there was no irrigation.

### *Employment Opportunities*

One of the important problems of dry farming areas is under-employment of people engaged in agriculture. It is important to examine the extent of employment and also the availability of farm labour on such holdings. The details are given in Table IV.

TABLE IV—EMPLOYMENT OF HUMAN LABOUR IN DRY FARMING AREA :  
MOHINDERGARH DISTRICT

Details of employment	Size of holding	
	Below 10 acres	Above 10 acres
Average size of holding (acres) .. .. .	6.83	21.83
Number of men totally engaged in agriculture per holding ..	2.61 (0.38)	2.33 (0.10)
Number of women totally engaged in agriculture per holding ..	0.55 (0.08)	0.47 (0.02)
Farm employment per man (days) .. .. .	78.39 (11.48)	111.11 (5.09)
Farm employment per woman (days) .. .. .	69.0 (10.1)	60.38 (2.77)
Man-days hired in for farm operation per holding .. .. .	12.57 (1.84)	62.05 (2.84)
Woman-days hired in for farm operation per holding .. .. .	7.59 (1.11)	57.06 (2.61)
Per cent of hired labour to total labour used .. .. .	8.00	29.00

*Note:* Figures in brackets indicate per acre.

It is seen from Table IV that on an average 2.61 men and 0.55 woman were engaged in agricultural operation on small size farms and 2.33 men and 0.47 woman on large farms. Men and women got employment in crop production for 78.39 days and 69 days on small farms and 111.11 days and 60.38 days, respectively, on large farms. Generally livestock maintenance



accounted for 20 per cent of the total labour employment in agriculture. Thus altogether a man was hardly employed for 100 days on small farms and 140 days on large farms. This shows that most of the labour is under-employed throughout the year. Hence there is need for increasing employment opportunities in this area by opening small scale industries or such other alternative avenues of employment. It was further noted that in spite of the availability of surplus labour on farms, casual labour was also employed during peak periods. This varied from 8 per cent of the total labour use on small holdings to 29 per cent on large holdings. The per acre family labour use was three times more (21.49 days) on small holdings as compared to that on large holdings (7.86 days). In the case of hired labour, employment on small size farms averaged about 2.95 days per acre, as compared to 5.45 days per acre on large farms. Employment on small size farms was almost twice as large as on the large size holdings, the average employment being 24.44 days per acre on the former and 13.31 days for the latter category of farms.

### *Conclusion*

The present study shows that the average input-output returns of crops were very low in the dry farming areas with the result that the economic condition of the farmers remained very precarious. The analysis further revealed that *sarson* crop alone was more profitable than any other combination of crops. The problem, however, is one of yield and income variability which was very high for this crop. Under such situation the cultivation of *guara* followed by gram can be recommended safely for a moderate but stable income. The empirical results further showed that the farmers of this area were aware of the technological advance made in the field of agriculture and they were adopting it on a wider scale in wheat and to some extent in bajra. Their adoption of improved practices is only inhibited due to locational limitations. In the case of employment opportunities, it was observed that on an average a farm worker got hardly 100 days work on farms below 10 acres and 140 days on farms above 10 acres in a year. The study suggests that urgent steps should be taken to increase the irrigation facilities in these areas and also to establish small scale industries to utilize the labour potential which are presently under-utilized. It further shows that there is enough potential to increase agricultural production in these areas if resources were channelized properly.