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AGRICULTURAL PRODUCTIVITY IN HARYANA: A COMPARATIVE STUDY OF ORGANIC AND INORGANIC FARMING

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Abstract

The present study compares the yield of crops and productivity of organic and inorganic farming across agro-ecological regions of Haryana. It also attempts to understand the factors influencing the productivity of organic farmers. The study is based on primary data collected from 234 farmers (117 each from organic and inorganic farming) with the help of a structured questionnaire. The study brings out that the physical yield of almost all the crops cultivated under organic farming is less than that of inorganic farming. However, the monetary yield of almost all the organic crops is higher than that of inorganic farming in all the agro-ecological regions of the state. The benefit-cost analysis reveals that five organic crops rice, bajra, jowar, wheat, and sugarcane have been more profitable than their production under inorganic farming However, there is not a significant difference in this regard in cultivation of cotton, mustard and pulses.

Keywords: Organic farming, Agricultural productivity, Monetary yield, Agro-ecological region, Haryana.

Introduction

Agriculture production has increased at a fast pace since the introduction of high yielding variety of seeds all over the world. India also experienced green revolution during mid-sixties of 20th century and consequent spurt in agricultural production. However, with the passage of time, utilization of chemical fertilizers, pesticides, and weedicides increased at an exponential rate. Several studies all over the world have proved that over utilization of chemical fertilizers, pesticides, and weedicides has negative impact not only on human health but also on the environment as a whole. Introduction of modern organic farming during last few decades is seen as a solution to the soil, water, and human health problems caused by over use of chemical fertilizers and pesticides in inorganic farming. Organic farming at present is different from its traditional variant as it is based on modern scientific methods, tools, instruments and management practices. It is a holistic agricultural production system designed to optimize agricultural productivity, soil fertility, moisture retention capacity etc. by applying crop rotation and diversification methods.

Compared to the leading countries in organic farming like Australia, Argentina and Spain, there is a small proportion of area under chemical free farming in India (IFOAM, 2020). India has 8th position in terms of area under organic farming. However, only 2 per cent of cultivated area of the country is under

organic farming (APEDA, 2021). Among the states and union territories, Madhya Pradesh has the largest proportion of farm land under organic farming, while Haryana has 29th position. Haryana has only 4,903.06 ha of area under organic farming. Area under organic farming in Haryana has recorded a marginal growth of 0.28 per cent during the period of 2015-16 to 2020-21. With a production of 5,439 metric tones under organic farming, it ranked 18th among the provinces in India in 2020-21 (APEDA, 2021).

There has been a debate among the scholars on the viability of organic and inorganic farming in terms of ecological viability. Organic farming shows a consistently good ecological sustainability in the areas of soil, water, environment, biodiversity, and animal welfare (Leitgeb et al., 2023). But its economic viability has been questioned by many scholars based on their empirical works. Equally vocal have been the social scientists who have observed that organic farming is economically viable. However, there are some empirical studies supporting the argument that organic farming is economically more viable than inorganic farming (Kumar et al., 2017; Ferreira et al., 2022). In this background, the present study attempts to compare the agricultural productivity of organic and inorganic farming in Haryana.

Objectives of the Study

Major objectives of the study are:

- to compare crop yields and benefit-cost ratio under the organic and inorganic farming across agro-ecological regions of Haryana;
- to evaluate the determinants of agricultural productivity under organic farming and
- to examine the socio-economic correlates of organic farming.

Study Area

The state of Haryana is located in northern part of India spreading over 27º 39' to 30º 35'N latitudes and 74º 28' to 77º 36' E longitudes.(Fig. 1) It is largely a plain area, though its altitude varies from 200 m in south to 1200 m above mean sea level in Shivalik hills in north-eastern parts of the state (Singh, 1976). It is largely a fertile plain dotted with lower Shivalik hills in the north-eastern part and stretches of semi-arid sandy plain in the western part of the state. In southern part, the sandy plain topography is marked by the rocky outcrops of Aravalli hills. The climatic conditions of Haryana make it a semi-arid tract with annual rainfall varying from 30 to 100 cm from south-west to north-east.

Database and Methodology

The study is based on the primary data collected through field survey during 2021-22. Two stage sampling designs have been used in this study. Stratified sampling has been used to find out the locations of organic farmers in different agro-ecological regions. And snowball sampling technique has been employed to reach out to farmers in the field in different agro-ecological regions for survey. A total of 234 farmers (117 each from organic and inorganic farming) have been chosen for collection of farm-level data. The size of the sample from each region has been selected aproximately in proportion to their geographical area. Accordingly, 120 farmers have been selected from wheat-rice region (60+60), 54 from wheat-cotton region (27+27), and 60 from mixed-crop region (30+30). From a sampling location, same number of organic and

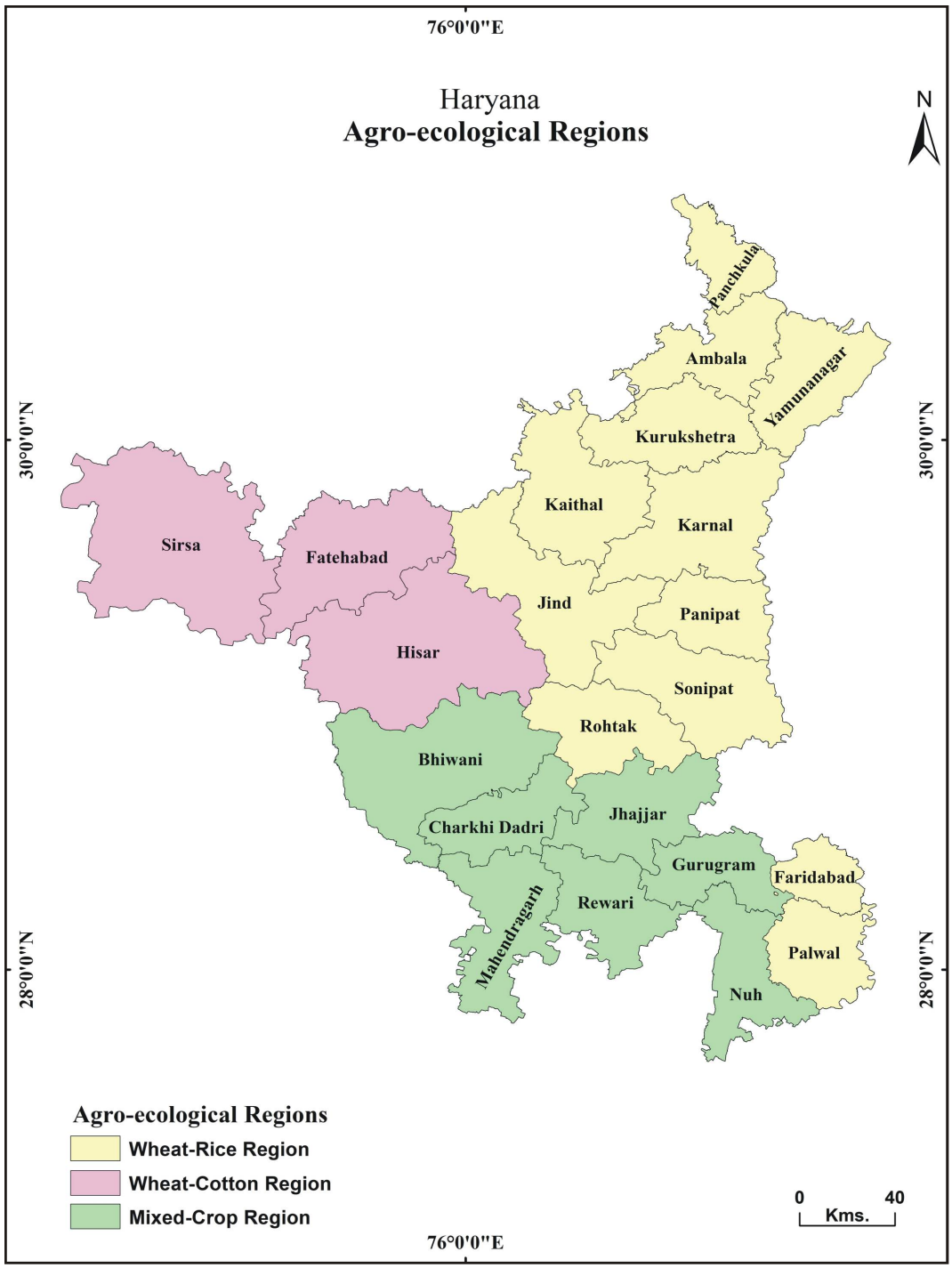
76°0'0"E
Haryana
Agro-ecological Regions
N
30°0'0"N
28°0'0"N
Panchkula
Ambala
Yamunanagar
Kurukshetra
Kaithal
Karnal
Sirsa
Fatehabad
Jind
Panipat
Hisar
Sonipat
Rohtak
Bhiwani
Jhajjar
Charkhi Dadri
Gurugram
Faridabad
Rewari
Mahendragarh
Palwal
Nuh
Agro-ecological Regions
Wheat-Rice Region
Wheat-Cotton Region
Mixed-Crop Region
0
40
Kms.
76°0'0"E

Fig. 1

inorganic farmers has been taken for survey. To analyze the regional variations in the agricultural productivity the state has been divided into three agro-ecological regions: wheat-rice region (eastern and northeastern parts), wheat-cotton region (northwestern parts), and mixed-crop region (diversified cropping pattern in south and southwestern parts). The agro-ecological regions have been delineated by taking district as a unit. The data of crop area and total cropped area pertaining to the triennium 2017-20 have been used for delineation of agro-ecological regions (Fig. 1).

The physical yield has been obtained as the quantity of commodity per unit area (kg/ha). The monetary yield of a crop has been obtained by multiplying physical yield by its selling price (₹/ha). The agricultural productivity of farmers includes output of both main and by-products (straw, fodder etc.) of all the cultivated crops, has been computed by using the method devised by Bhalla and Tyagi (1989). The prices of crops used for computing monetary yields and agricultural productivity have been obtained from farmers during the field survey.

The benefit-cost analysis has been carried out to measure the benefits accrued by the farmers per unit agricultural inputs. Benefit: Cost (B:C) ratio has been calculated by dividing the total return by total cost. It represents the return per unit cost.

Agricultural productivity is mathematically expressed as under:

$$Y = \sum_{i=1}^{n} (C_1S_1 + C_2S_2 + C_3S_3 + ...C_nS_n)/NSA$$

where Y = agricultural productivity, C = crop production (main and by-products), S = selling price of crops (main and by-products), and NSA = net sown area.

The correlation coefficients and stepwise regression have been used to find out the degree of association between dependent and independent variables of agricultural productivity. The list of dependent and independent variables is as under:

Dependent Variable

Y = agricultural productivity (₹/ha)

Independent Variables

X_1 = expenditure on seed input and seed treatment (₹/ha), X_2 = fertilizers cost (₹/ha) (cost of bio-based fertilizers), X_3 = pesticides and weedicides cost (₹/ha) (cost of bio-pesticides), X_4 = irrigation cost (₹/ha), X_5 = mechanization cost (₹/ha) (includes the hiring cost of inter-culture equipment), and X_6 = human labour cost (₹/ha).

The effect of socio-economic factors on agricultural productivity has also been measured with the help of correlation and linear regression analysis. The variables used in analysis have been categorized as dependent and independent variables as under:

Dependent variable

Y = agricultural productivity (₹/ha)

Independent variables

Z_0 = no. of crops cultivated by farmer, Z_1 = age of farmer (years), Z_2 = period of schooling (years), Z_3 = landholding size (ha), Z_4 = no. of family members involved in farming, and Z_5 = organic farming experience (years).

Results and Discussion

Physical Yield of Crops

Physical yield is the measurement of quantity of crop produce per unit area of land. It has been found that all the crops cultivated under organic farming have less physical yield than that of cultivated under inorganic farming (Table 1). The gap between the physical yield of rice and wheat in this regard is more than 30 per cent. However, the difference in physical

Table 1
Haryana: Physical Yield of Crops (tones/ha)

Major Crops	Organic Farming				Inorganic Farming			
	Wheat-Rice Region	Wheat-Cotton Region	Mixed-Crop Region	All Regions	Wheat-Rice Region	Wheat-Cotton Region	Mixed-Crop Region	All Regions
Rice	3.70	2.90	2.22	2.95	5.18	4.86	3.93	4.66
Bajra	2.01	1.35	2.05	1.80	3.07	1.53	2.37	2.32
Cotton	1.07	1.50	1.37	1.31	1.48	1.89	1.61	1.66
Jowar*	54.80	49.00	47.75	50.52	52.93	51.62	47.58	50.71
Moong	0.53	0.94	0.81	0.76	1.04	1.14	0.99	1.05
Wheat	2.90	2.78	2.75	2.81	4.90	4.74	4.24	4.62
Mustard	1.87	1.91	1.91	1.90	2.23	2.13	2.11	2.16
Gram	1.44	1.20	0.92	1.19	1.88	2.18	1.55	1.87
Sugarcane	55.24	24.70	38.66	39.53	74.42	57.96	55.57	62.65

Source: Compiled by Authors, *Yield as a fodder crop

yield between these two modes of farming is marginal in case of mustard. Across the agro-ecological regions, wheat-rice region has recorded the highest yield of rice, wheat, and sugarcane under both farming systems. But this is not true in the case of cotton, moong and gram. The physical yield of cotton and mustard under organic farming is highest in the wheat-cotton region. But bajra cultivation under organic farming provides highest yield in the mixed-crop region. The favourable agro-climatic conditions seem to be the important factor in determining the quantity of physical yields of organic crops in different agro-ecological regions.

Monetary Yield of Crops

Monetary yield refers to per ha output of individual crops in money terms (₹/ha). The price of a commodity produced is very important factor for the cultivation of crops. The higher price fetched by organic produce is one of the important factors that draws farmers intention towards organic farming. The average prices of all the samples of organic rice and wheat are almost double to that of under inorganic farming (Table 2). This may be attributed to increasing demand of organic produce among people who can afford it. Overall, the prices of most of the organic crops are higher in the wheat-cotton region. The organic moong crop has the highest price in the mixed-crop region.

It has been found that the crops like rice, bajra, wheat, mustard, and sugarcane have higher monetary yields under organic than inorganic farming (Table 3). On the other hand, crops like cotton, jowar, moong, gram, and vegetables have lower monetary yields under organic than inorganic farming. The difference in monetary yields between organic and inorganic farming is highest in case of sugarcane, rice, and wheat crops. These are the main crops under organic farming in the wheat-rice and wheat-cotton regions. Among the agro-ecological regions, wheat-rice region has recorded the highest monetary yields of organic rice, wheat, and sugarcane. However,

Table 2
Haryana: Selling Price (000'₹/tones)

Major Crops	Organic Farming				Inorganic Farming			
	Wheat-Rice Region	Wheat-Cotton Region	Mixed-Crop Region	All Regions	Wheat-Rice Region	Wheat-Cotton Region	Mixed-Crop Region	All Regions
Rice	41.18	58.24	53.75	51.06	26.76	26.04	23.70	25.50
Bajra	26.60	28.08	24.79	26.49	17.62	18.10	20.16	18.63
Cotton	57.80	66.93	52.83	59.19	60.00	62.24	51.45	57.90
Jowar*	1.18	1.38	1.83	1.47	1.17	1.36	1.83	1.45
Moong	86.67	87.78	94.00	89.48	68.33	72.00	80.00	73.44
Wheat	42.42	40.92	42.18	41.84	20.27	19.75	20.38	20.13
Mustard	63.54	66.18	64.40	64.71	55.00	56.15	54.56	55.24
Gram	78.30	81.20	77.56	79.02	66.80	65.00	65.00	65.60
Sugarcane	7.44	10.00	7.06	8.17	4.74	4.38	3.62	3.99

Source: Compiled by Authors, *Sold as a fodder crop

the monetary yields of organic vegetables in wheat-rice region are lower than the inorganic farming. This may be attributed to sizeable difference in production and negligible difference between the selling price of organic and inorganic vegetables. In wheat-cotton region only rice and bajra crops have recorded higher monetary yields under organic than

Table 3
Haryana: Monetary Yield of Crops (000'₹/ha)

Major Crops	Organic Farming				Inorganic Farming			
	Wheat-Rice Region	Wheat-Cotton Region	Mixed-Crop Region	All Regions	Wheat-Rice Region	Wheat-Cotton Region	Mixed-Crop Region	All Regions
Rice	167.04	162.95	107.44	163.47	130.89	138.52	104.36	137.66
Bajra	53.80	41.53	56.28	53.29	62.29	32.61	48.34	50.24
Cotton	32.97	108.83	72.45	90.03	82.00	110.34	80.18	102.39
Jowar	61.61	71.10	88.50	70.08	68.03	71.99	95.15	75.92
Moong	51.82	83.19	63.04	53.30	62.07	81.81	79.04	65.61
Wheat	134.94	107.72	118.02	128.87	108.09	104.33	95.69	105.57
Mustard	126.00	126.02	131.70	128.06	126.27	132.66	113.93	122.63
Gram	114.50	75.08	79.63	87.81	125.40	124.63	112.38	117.10
Sugarcane	346.89	246.90	347.24	344.72	286.74	216.87	201.18	285.89
Vegetables	119.76	149.31	147.01	132.39	190.33	194.82	146.63	183.44
Other Crops	82.29	101.92	30.71	81.40	30.19	64,580	23.71	51.39
All Crops	**278.10**	**218.61**	**172.80**	**225.53**	**235.14**	**220.14**	**163.03**	**219.71**

Source: Compiled by Authors

Table 4
Haryana: Benefit-Cost Ratio of Crops (All Regions)

Major Crops	Organic Farming				Inorganic Farming			
	Total Input Cost (000'₹/ha)	Total Return (000'₹/ha)	Net Return (000'₹/ ha)	B:C Ratio	Total Input Cost (000'₹/ha)	Total Return (000'₹/ha)	Net Return (000'₹/ ha)	B:C Ratio
Rice	79.30	150.62	71.32	1.90	83.65	118.80	35.15	1.42
Bajra	32.77	47.82	15.05	1.46	32.61	43.27	10.66	1.33
Cotton	57.46	77.65	20.19	1.35	70.95	96.28	25.33	1.36
Jowar*	39.60	74.04	34.44	1.87	41.95	73.61	31.66	1.75
Moong	30.16	68.09	37.94	2.26	34.09	77.41	43.32	2.27
Wheat	60.15	117.57	57.41	1.95	52.71	93.11	40.40	1.77
Mustard	53.09	122.62	69.53	2.31	50.31	119.20	68.89	2.37
Gram	49.45	93.72	44.26	1.90	50.82	122.87	72.04	2.42
Sugarcane	195.34	322.77	127.43	1.65	198.75	250.26	51.51	1.26

Source: Compiled by Authors, *Sold as a fodder crop

inorganic farming. The least irrigated mixed-crop region also has recorded higher monetary yields of wheat, bajra, and mustard under organic than inorganic farming.

Benefit-Cost Analysis of Crop Production

Comparison of total input cost of organic and inorganic crops reveals that only three crops, wheat, bajra and mustard, have higher cost under organic farming (Table 4). The highest difference in this regard has been in the case of wheat cultivation. The study reveals that per ha input cost under organic farming is higher in case of rice, cotton, jowar, moong, gram, and sugarcane crops. However, the crops namely, rice, bajra, jowar, wheat, mustard and sugarcane give higher net return per ha under organic than inorganic farming. The benefit-cost ratio of five crops namely rice, bajra, jowar, wheat, and sugarcane, is higher in organic than inorganic farming. The difference in the benefit-cost ratio under organic and inorganic farming is highest for rice cultivation followed by sugarcane cultivation. The benefit-cost ratio of mustard crop is higher under inorganic farming than under organic farming. However, the findings reveal that there is not a significant difference in the benefit-cost ratio for cotton crop under both types of farming.

Agricultural Productivity under Organic and Inorganic Farming

Agricultural productivity is the ratio of output to input in relation to land, labour, capital, and overall resources employed in agriculture (Singh, 1976; Hussain 1996). It is also a measure to know about the level of agricultural development. Agricultural productivity changes with time and space, however, such change depends on several factors. Agricultural productivity in Haryana has increased by more than two and half times since the infusion of modern green revolution technology in mid-sixties of 20th century. The development of irrigation, use of high yielding

variety seeds (HYV), pesticides, chemical fertilizers, weedicides, and mechanization have been the dominating factors in enhancing productivity of inorganic agriculture in Haryana (Jaglan and Sindhu 2007).

The agricultural productivity under organic is higher than inorganic farming in Haryana, though the difference between the two types of farming is not much higher. Among the agro-ecological regions, agricultural productivity of organic farming is highest in wheat-rice region. The difference between the productivity of two types of farming is also highest in this region. The agricultural productivity under organic farming in this region (₹278.10 thousand/ha) is quite higher than inorganic farming (₹235.14 thousand/ha) having a difference of ₹42.96 thousand per ha (Table 5).

On the other hand, mixed-crop region has the lowest agricultural productivity in both types of farming. But agricultural productivity under organic (₹172.80 thousand/ha) is higher than inorganic farming (₹163.03 thousand/ha) (Table 5). Overall low agricultural productivity both under organic and inorganic farming may be attributed to insufficient irrigation facilities. The other probable factors behind low agricultural productivity include low rainfall and unfavourable agro-climatic conditions. The soils of this area are sandy and their water retention capacity is low. This magnifies the perpetual soil moisture deficit primarily caused by low rainfall and lack of irrigation facilities.

Wheat-cotton region in north-west Haryana, however, depicts a different picture of agricultural productivity as compared to other two regions. In this region, productivity under organic farming is less than inorganic farming. However, the difference between agriculture productivity of organic and inorganic farming is marginal, which is attributed to the fact that cotton which is one of the main crops is not cultivated under organic farming.

It has been observed that agricultural productivity is highest for the farmers having longer experience of organic farming. The farmers having experience of organic farming more than 10 years have the agricultural productivity of ₹240.83 thousand/ha (Table 6). On the other hand, agricultural productivity is lowest (₹214.10 thousand/ha) among farmers who have pursued the organic farming for the period of 3 to 5 years. The productivity of organic farming increases with increase in the experience of farming in all the three agro-ecological regions. It may be due to the factors such as increase in the knowledge base of organic cultivation (methods of sowing, use of intercropping, use of organic fertilizers and pesticides along with number of doses with respect to time and crop), better understanding of organic market, selection of crops according

Table 5
Haryana: Agricultural Productivity (000'₹/ha)

Region	Organic Farming	Inorganic Farming
Wheat-Rice Region	278.10	235.14
Wheat-Cotton Region	218.61	220.14
Mixed-Crop Region	172.80	163.03
All Regions	**225.53**	**219.71**

Source: Compiled by Authors

Table 6

Haryana: Agricultural Productivity of Organic Farmers by Experience of Organic Farming (000'₹/ha)

Region/Farming Experience	Agricultural Productivity		
	3-5 Years	6-10 Years	>10 Years
Wheat-Rice Region	253.97	282.63	283.92
Wheat-Cotton Region	213.81	214.88	233.94
Mixed-Crop Region	169.19	178.36	190.07
All Regions	**214.10**	**225.69**	**240.83**

Source: Compiled by Authors

to their demand in market etc. However, the agricultural productivity varies from region to region which indicates that ago-climatic conditions have strong impact on the agricultural productivity under organic farming too.

Determinants of Organic Farming Productivity

Correlation and stepwise regression analysis has been carried out for assessing the determinants of agricultural productivity of organic farming (Table 7). All the independent variables have positive and significant correlation with agricultural productivity under organic farming. The mechanization cost has highest correlation coefficient (0.721) followed by fertilizer cost (0.574), human labour cost (0.571), and irrigation cost (0.484). The bio-pesticide cost (0.315) has emerged to be the least significant factor in agricultural productivity of organic farming in Haryana.

The study reveals that mechanization cost is the most important explanatory variable of agricultural productivity of organic farming. It enters at step one and explains 51.90 per cent variation in the agricultural productivity (Table 8). Human labour cost joins this independent variable at step two and together these two variables explain 60.00 per cent variation in agricultural productivity. Fertilizer cost, and irrigation cost entered at the third and fourth step of regression equation respectively, and together with earlier mentioned variables explain 62.00 per cent variation in agricultural

Table 7

Haryana: Correlation Matrix, Organic Farmers-All Crops (All Regions)

Variables	Y	X_1	X_2	X_3	X_4	X_5	X_6
Y	1	0.336**	0.574**	0.315**	0.484**	0.721**	0.571**
X_1		1	0.324**	0.402**	0.206**	0.299**	0.587**
X_2			1	0.434**	0.400*	0.563**	0.519**
X_3				1	0.152**	0.263**	0.457**
X_4					1	0.462**	0.397**
X_5						1	0.438
X_6							1

Source: Compiled by Authors, *Correlation is significant at the 0.01 level (2-tailed)
**Correlation is significant at the 0.05 level (2-tailed)

Table 8

Haryana: Step-Wise Regression Analysis for Organic Farmers-All Crops (All Regions)

Steps	Variable	R	R^2x100	Increased R^2x100	F	Regression Coefficient	S.E in Regression Coefficient	T	Intercept
Steps I	X_5	0.721	51.90	0.00	457.09	9.26	0.43	21.38	23318.50
Steps II	X_5	0.775	60.00	8.10	316.62	7.48	0.44	17.01	13467.56
	X_6					1.93	0.20	9.22	
Steps III	X_5	0.782	61.20	1.20	220.97	6.73	0.48	13.96	12063.21
	X_6					1.64	0.22	7.41	
	X_2					1.98	0.56	3.53	
Steps IV	X_5	0.788	62.00	0.80	171.44	6.31	0.49	12.70	10765.93
	X_6					1.51	0.22	6.76	
	X_2					1.78	0.56	3.19	
	X_4					3.61	1.17	3.08	
Regression Equation									
Organic Farmers	$Y= 10765.93 + 6.31X_5 + 1.51X_6 + 1.78X_2 + 3.61X_4$								

Source: Compiled by Authors, All Values are Significant at 0.000

productivity (Table 8). The value of R (0.788) shows that all the four explanatory variables have high positive relationship with agricultural productivity. The multiple regression models show that the regression coefficients of the independent variables are positive and significant. The mechanization cost which includes the mechanical operations has the most significant impact on the agricultural productivity followed by other variables. Since organic farming requires much more human labour than inorganic farming for carrying out manual operations, therefore human labour comes out to be the second most important explanatory variable in stepwise regression analysis.

Effect of Socio-economic Factors on Productivity of Organic Farming

The Pearson correlation coefficients does not show a significant association of agricultural productivity with socio-economic characteristics of organic farmers. It is interesting to note that the agricultural productivity has significant positive association with the number of crops grown (0.520) by

Table 9

Haryana: Correlation Matrix, Organic Farmers - All Crops

Region	Variables	Z_0	Z_1	Z_2	Z_3	Z_4	Z_5
Wheat-Rice Region	Y	0.144	-0.06	0.164	0.191	0.121	-0.035
Wheat-Cotton Region	Y	-0.265	0.057	-0.145	-0.232	-0.174	-0.197
Mixed-Crop Region	Y	0.520**	-0.127	0.084	0.176	-0.073	-0.079
All Regions	**Y**	**0.117**	**-0.048**	**0.033**	**-0.018**	**0.029**	**-0.091**

Source: Compiled by Authors, *Correlation is significant at 0.01 level (2-tailed),**Correlation is significant at 0.05 level (2-tailed)

organic farmers (Table 9). The crop diversity has significant positive association with the agricultural productivity of organic farmers in this region. However, the crop diversity is minimum in wheat-rice and wheat-cotton regions.

Conclusions

The study brings out that the physical yields of almost all the crops cultivated under organic is less than inorganic farming. The gap between physical yield of rice and wheat is quite high but it is marginal in case of mustard. However, the monetary yields of almost all the organic crops are quite higher than that of inorganic farming in all the agro-ecological regions. This is attributed to higher market prices of organic than inorganic crops. The benefit-cost ratio of crops like rice, bajra, jowar, wheat, and sugarcane under organic is remarkably higher than inorganic farming. However, it is not true in the case of cotton, mustard and pulses (gram and moong). Overall agricultural productivity of organic remains higher than inorganic farming.

Among the agro-ecological regions, agricultural productivity of organic farming is highest in wheat-rice region. The difference between the productivity of two types of farming is also highest. On the other hand, mixed-crop region has lowest agricultural productivity under both the types of farming. It is attributed to poor irrigation facilities, low rainfall and unfavourable agro-climatic conditions in terms of perpetual soil moisture deficit. However, the difference between agricultural productivity of organic and inorganic farming is marginal in wheat-cotton region. It may be due to the fact that the main kharif crop in the region, cotton, which is not cultivated as organic crop. Duration of experience of practising organic farming has a positive impact on the agricultural productivity.

The step-wise multiple regression model reveals that mechanization cost has the most significant impact on the agricultural productivity followed by human labour which is used for carrying out various manual operations in organic farming. For the state as a whole, agricultural productivity of organic farmers does not show significant association with the socio-economic factors. However, in mixed-crop region productivity has significant positive association with number of crops sown by organic farmers implying that crop diversity is a significant positive factor of agricultural productivity.

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