Agriculture Update
Volume 7 | Issue 3 & 4 | August & November, 2012 | 266-270

Research Article

Status and constraints of organic wheat cultivation in Punjab

■ **INDER PAL SINGH AND D.K. GROVER**

ARTICLE CHRONICLE :
Received:
03.04.2012;
Revised :
15.08.2012;
Accepted:
18.09.2012

SUMMARY : This paper highlights the status, cost - benefit and constraint analysis of organic wheat cultivation based on the primary data collected from 85 organic growers and 75 inorganic growers for the period 2008-09 in two districts of Punjab. The area under all the organic crops taken together accounted for 26.95 per cent of the total operational area of the sample holdings. The major percentage of the organic area was under wheat, sharing around 15 per cent of the total operational area of these selected holdings. More varietal biodiversity encompassing more local/unimproved wheat varieties has been used for organic cultivation of wheat crop as compared to inorganic wheat cultivation. Organic wheat cultivation fetched more profit to the farmers to the tune of about 26 per cent even with yield reduction of 35 per cent, mainly due to premium price of the organic produce in the market. Biotic constraints such as diseases, insect/pest and weeds as well as a biotic constraint such as inputs, marketing and environment etc were found to be the critical constraints, confronted by organic wheat growers. Marketing has been found as the main problem for its mass adoption, because there has been no price guarantee or support from any government or private agency for assured returns on the lines of inorganic produces.

How to cite this article : Singh, Inder Pal and Grover, D.K. (2012). Status and constraints of organic wheat cultivation in Punjab. *Agric. Update*, **7**(3&4): 266-270.

KEY WORDS:
Organic farming,
Constraint analysis,
Wheat cultivation

Author for correspondence :
INDER PAL SINGH
Department of Agricultural Economics, College of Dairy Science and Technology, Guru Angad Dev Veterinary and Animal Sciences University, LUDHIANA (PUNJAB) INDIA
Email: ips_saini1@yahoo.com
See end of the article for authors' affiliations

BACKGROUND AND OBJECTIVES

The effects of the Green Revolution on global food security are difficult to assess because of the complexities involved in food systems. The world population has grown by about four billion since the beginning of the Green Revolution and many believe that, without the revolution, there would have been greater famine and malnutrition (Shiva, 1991). India saw annual wheat production rise from 10 million tonnes in the 1960s to 80.58 million tonnes in 2008. The average person in the developing world consumes roughly 25 per cent more calories per day now than before the Green Revolution. Between 1950 and 1984, as the Green Revolution transformed agriculture around the globe, world grain production increased by over 250 per cent. The Green Revolution that emerged basically due to the introduction of high- yielding seed varieties of wheat and paddy. The term "high-yielding varieties" actually implies the new seeds possess high yielding capability of themselves. The prominent features of newly found seeds, however, were highly favorable to certain key inputs such as fertilizers and irrigation water. Hence, more appropriately,these should be termed as 'highly favourable responsive varieties' rather than 'high-yielding varieties irrigation'. The adverse effects of intensive uses of chemicals (fertilizers as well as pesticides) in the agriculture has been realized more than ever before in terms of escalating costs and deteriorating soil fertilty etc. People have been found supporting chemical free agricultural production using organic manure and other required inputs (Ramesh, 2005; Venkataswarlu, 2005; Sharma, 2005). Some of them even started adopting organic farming in the state, though on a smaller scale. The present paper is mainly concentrated on the status of organic wheat cultivation and various biotic as well as a biotic constraints, confronted by the growers in Punjab. The specific objectives of the study were to examine the status of organic farming in Punjab and to study various biotic/a biotic constraints confronted by wheat organic growers in the state.

RESOURCES AND METHODS

Though, it was intended to cover whole of Punjab, yet the study pertains basically to Patiala and Faridkot districts of Punjab where more number of organic growers were found during field investigations. To accomplish the various objectives of the study, the primary level data/information was required. Since, organic wheat farming was not practiced on a large scale, its status was not well documented; State Departments of Agriculture /Horticulture and concerned scientists/experts and extension functionaries from State Agricultural University were consulted to gather basic information on the present status of organic wheat in the state. Based on the concentration of organic wheat growers/acreage, one block from each district namely, Nabha from Patiala and Kotkapura from Faridkot district were selected for the field survey. A complete list of organic wheat growers in these sampled blocks of Patiala and Faridkot districts was prepared in consultation with extension specialists/key informants in the area. The organic wheat growers were found scattered over a number of villages in these blocks. A random sample of 85 organic wheat growers, spreading over about 30 villages was taken. Besides, 75 inorganic wheat growers were also randomly chosen from the area that formed controlled group for comparison purpose in the study. The study has, therefore, been based on the total sample of 160 farmers (85 organic wheat growers and 75 inorganic wheat growers) in Patiala and Faridkot districts in all. Though organic wheat farming is much beyond the use of chemicals, the farmers who were not using chemical fertilizers and chemical pesticides/weedicides at least for the last three years were considered as the organic wheat growers in the present study. Farmers were found growing crops like wheat, paddy, sugarcane, vegetables and fodders in the study area, keeping in view the most commonly produced crops, study has been restricted to wheat only. The reference period of the study was 2008-09. To accomplish the various objectives of the study, required information was collected through personal interview method with the help of an especially structured schedule. Z-statistics was applied to study the significance of variations in organic and inorganic wheat crop cultivation. To quantify the severity of biotic as well a biotic constraints, five scale methods representing as very severe problem, severe problem, moderate problem, slight problem and occurrence but no loss was used.

OBSERVATIONS AND ANALYSIS

Results have been discussed under the following heads:

- Status of organic farming
- Constraint analysis
- Summing up

Status of organic farming:

The area under organic farming was about 26.95 per cent of the total operational area in *Rabi* season for the sample organic growers (Table 1).The major percentage of the organic area was under wheat, which accounted for 15.02 per cent of the total operational area for sample organic growers. During *Rabi* season 2008-09, the average area under wheat was about 1.37 acre, followed by vegetables (0.54 acre), sugarcane (0.5

Table 1 : Area under organic and in-organic crops on sample organic growers, Punjab, 2008-09 (Acre)

	Rabi season		
	Organic crops	Inorganic crops	Total
Wheat	1.37 (15.03)	7.75 (84.97)	9.12 (100)
Sugarcane	0.5 (100)	-	0.5 (100)
Fodder	0.45 (100)	-	0.45 (100)
Vegetable	0.54 (100)	-	0.54 (100)
	2.86 (26.95)	7.75 (73.05)	10.61 (100)
Total	2.86 (26.95)	7.75 (73.05)	10.61 (100)

Figures in the parentheses indicate percentage to total

Table 2 : Commonly used varieties for organic and inorganic crops by the sample organic growers, Punjab, 2008-09

Crops	Organic crops		Inorganic crops	
Wheat	Varieties	% Organic area	Varieties	% Inorganic area
	PBW 343	40	PBW 343	75
	C-306	20	-	-
	Bansi	30	-	-
	Other	10	Other	25
Average yield/acre		12.7		19.7
Gross return /acre		29790		24625
Costs/acre		7895		7925
Net returns/acre		21895		16700

acre) and fodder (0.45 acre). The area under other organic crops was about in between 3-5 per cent to the total operational area for each of the following crops *i.e.* fodder, sugarcane, and vegetables during *Rabi* season for sample organic growers. The crop varietal distribution for both organic as well inorganic wheat crops have studied and indicated in Table 2.The per cent area under different varieties for organic wheat was maximum under PBW 343 (35 %) for sample organic growers followed by Bansi (30 %), C-306 (20 %) and others (10 %). Similarly, the per cent area under different varieties of inorganic wheat was maximum under PBW 343 (75 %) for the sample organic growers, followed by others (25 %). More varietal biodiversity has been observed for organic cultivation of wheat crops as compared to inorganic cultivation. Organic wheat cultivation fetched more profit to the farmers to the tune of about 26 per cent even with yield reduction of 35 per cent, mainly due to premium price of the organic produce in the market.

Constraint analysis:

Biotic constraints:

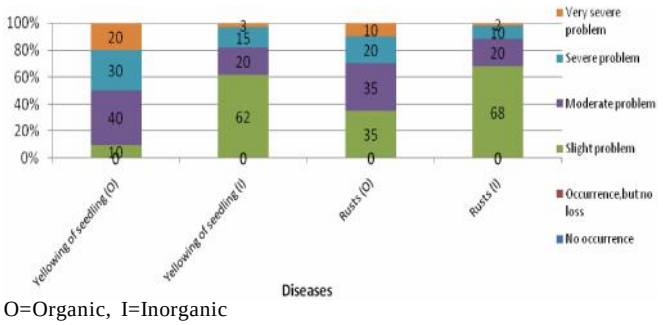
As per the perception of the farmers, the yield losses due to yellowing seedling diseases wheat rust (*Puccinia striiformis)*s of organic wheat crops were 4 and 3 per cent, respectively. The yellowing of leaf (*Viral disease, various mosaics)* were the most serious diseases. About 80 per cent farmers faced problem of yellowing of leaf (*Viral disease, various mosaics)* and wheat rust (*Puccinia striiformis)* while very severe attack was faced by 20 percent. The intensity of disease varied from slight problem to very severe. Diseases were the most serious problem (Table 3). As per the perception of the farmers, the yield losses due to yellowing seedling diseases wheat rust (*Puccinia striiformis)* of in-organic wheat crops were 2 and 1 per cent, respectively. The yellowing of leaf (*Viral disease, various mosaics)* were the most serious diseases. About 20 per cent farmers faced problem while very severe attack was faced by 3 per cent. The intensity of disease varied from slight problem very severe problem. In Fig. 1 a the disease intensity of organic/inorganic wheat production on five scale method is indicated as mentioned in the methodology.

Table 3 : Biotic constraints intensity of wheat production on the sample farms in Punjab, 2008-09 (Per cent yield losses)

Disease	Organic	Inorganic
Yellowing of leaf (*Viral disease, various mosaics)*	4*	2
Wheat rust (*Puccinia striiformis)*	3*	1
Insect /Pest		
Aphid (*Microsiphum miscanthi*)	3	1.5
Jassid (*Amrasca biguttula biguttula*)	3	1.5
Weeds		
Gulidanda (*Phalaris minor*)	3	1.5
Bathu (*Chenopodium album*)	2	1
Wild oat (*Avena ludoviciana*)	2	1

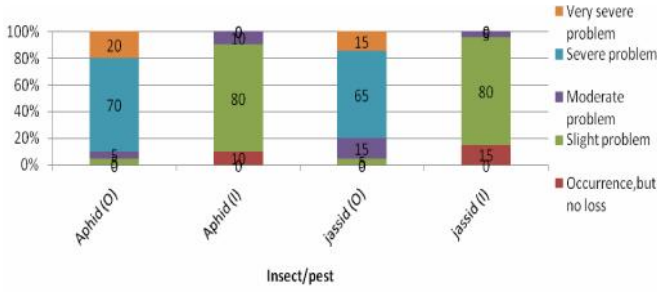
**Z-statistics significantly different at 5 per cent probability level (two-tailed)

Insect/pest attack was another problem of wheat. The main insect /pest of wheat were aphid (*Microsiphum miscanthi*), jassid (*Amrasca biguttula biguttula*) and army worms. Table 3 shows that wheat aphid (*Microsiphum miscanthi*) and jassid (*Amrasca biguttula biguttula*) were the major enemies of organic wheat crop in order of their intensity. The respective losses due to these insects were 3 per cent and 3 per cent, respectively. The intensity of these insects varied from slight to very severe with 20 per cent of farmers reporting very severe problem while 70 per cent reporting severe attack of these insect/pests. The respective loses due to these insect/pests in case of inorganic paddy were 1.5 per cent and 1.5 per cent, respectively. The intensity of these insect/pests varied from slight to moderate and about 10 per cent of farmers reporting moderate problem. In Fig. 1 b the insect/pest intensity of organic/inorganic wheat production on five scale method is indicated as mentioned in the methodology. The Table 3 shows weed intensity of organic wheat production. It shows that different weeds of organic wheat crop were bathu (*Chenopodium album*), wild oat (*Avena ludoviciana*) and gullidanda. The major weeds caused yield of loss of organic wheat was gulidanda (*Phalaris minor*), bathu (*Chenopodium album*) and wild oat (*Avena ludoviciana*). The yield loss due to these weeds as perceived by sample farmers



O=Organic, I=Inorganic

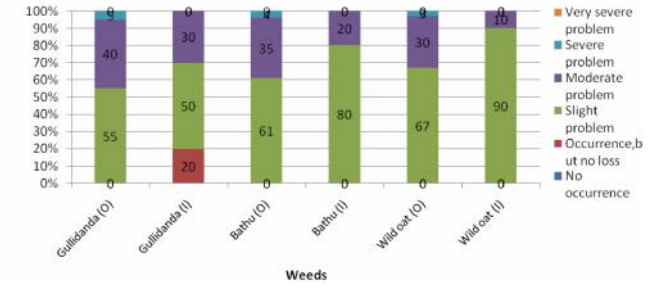
Fig. 1 a: Disease intensity of wheat production



O=Organic, I=Inorganic

Fig. 1 b: Insect/pest intensity of wheat production

was 3, 2, and 2 per cent, respectively. The major weeds caused yield loss of inorganic wheat was gulidanda (*Phalaris minor*), bathu (*Chenopodium album*) and wild oat (*Avena ludoviciana*). The yield loss due to these weeds as perceived by sample farmers was 1.5, 1, and 1 per cent, respectively. However the weed problem was not severing. In Fig. 1 c weeds intensity of organic/inorganic wheat production on five scale method is indicated as mentioned in the methodology.

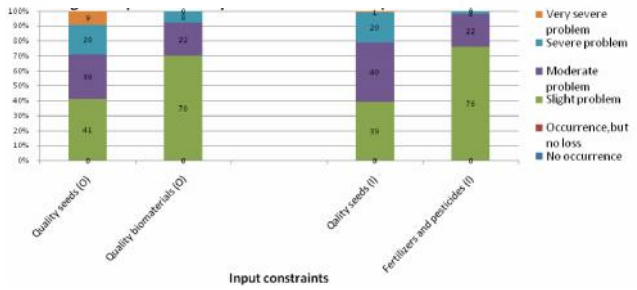


O=Organic, I=Inorganic

Fig. 1 c: Weed intensity of wheat production

A biotic constraints:

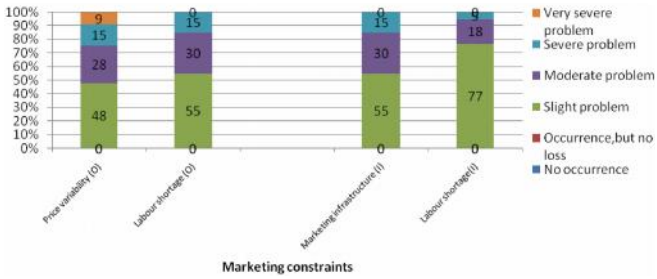
A Biotic constraints faced on the sample farms were related to input availability, marketing and environment. The input constraints faced by farmers are shown in Fig. 2 a.The problem of improved seeds and quality seeds, organic fertilizers and pesticides were the major problem faced by organic wheat growers. Regarding improved and quality seeds, 30, 20 and 9 per cent farmers faced moderate, severe and very severe problem on the sample farms. Similarly regarding availability of quality seeds, 22 and 8 per cent farmers faced moderate and severe problem of shortage of labour. The availability of irrigation, machinery and credit was not a serious problem on the sample farms. The input constraints faced by farmers are shown in Fig. 2 a. The problem of improved seeds and quality seeds, cheap fertilizers and pesticides were the major problem faced by in-organic wheat growers. Regarding improved and quality seeds 40, 20 and 1 per cent farmers faced moderate severe and very severe problem on the sample farms. Similarly regarding availability of quality seeds 22 and 2 per cent farmers faced moderate and severe problem of shortage of labour. The availability of irrigation, machinery and credit was not a serious problem on the sample farms.



O=Organic, I=Inorganic

Fig. 2 a: Input availability constraints of wheat production

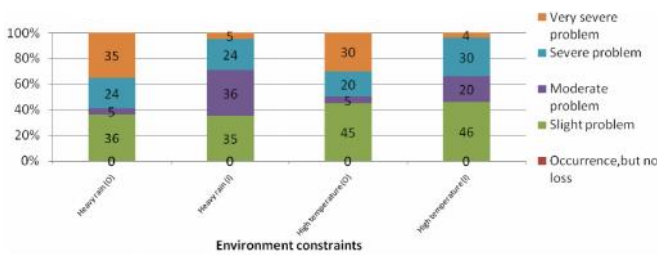
Price variability, and high labour needs as shown were the major marketing constraints highlighted by the organic wheat growers. Price variability was reported by 28 per cent farmers as moderate, 15 per cent as severe and 9 per cent very severe. High labour need was highlighted as moderate to severe problem by 30 and 15 per cent farmers. Labour shortage during harvest season, and proper marketing infrastructure needs were the major marketing constraints highlighted by the inorganic growers. Labour shortage was reported by 77 per cent farmers as slight, 18 per cent as moderate and 5 per cent severe. Proper marketing infrastructure need was highlighted as moderate to severe problem by 30 and 25 per cent farmers. This is demonstrated in Fig. 2 b.



O=Organic, I=Inorganic

Fig. 2 b: Marketing constraints of wheat production

Environmental constraints intensity of organic wheat on sample farms is depicted in Fig. 2 c .It shows that heavy rain and high temperature were the major environmental constraints which resulted in 3 per cent and 5 per cent reduction in yield on sample farms. The intensity of heavy rain and high temperature varied from moderate to severe. Fig. 2 c highlights that severity of heavy rain was reported by 36 per cent farmers as moderate, 24 per cent as severe and 5 per cent very severe. Nearly 20 per cent and 30 farmers reported high temperature from severe to very severe. Environmental constraints intensity of in -organic wheat on sample farms is depicted in .It shows that heavy rain and high temperature were the major



O=Organic, I=Inorganic

Fig. 2 c: Environment constraints of wheat production

environmental constraints which resulted in 3 per cent and 4 per cent reduction in yield on sample farms. The intensity of heavy rain and high temperature varied from moderate to severe. Fig. 2 c highlights that severity of heavy rain was reported by 36 per cent farmers as moderate, 24 per cent as severe and 5 per cent very severe. Nearly 30 per cent and 4 per cent farmers reported high temperature from moderate to very severe.

Summing up:

The area under organic farming was about 26.95 per cent of the total operational area in *Rabi* season for the sample organic growers .The major percentage of the organic area was under wheat crop, which accounted for 15.02 per cent of the total operational area for sample organic growers. More varietal biodiversity has been observed for organic cultivation of wheat crops as compared to inorganic cultivation. The net return over variable cost of organic wheat and inorganic wheat was Rs 21895 and Rs 16700 for organic growers..The net return of organic wheat was about Rs 5000 more in comparison to inorganic wheat. The total cost of organic wheat of organic growers was little lower in comparison to inorganic wheat of inorganic growers but it is little higher to their own inorganic wheat, because organic growers used less chemical fertilizer and pesticides for their inorganic wheat cultivation. Diseases, insect pest, input availability, marketing, environmental stress was found as the most important problem in order of intensity of organic wheat crop in comparison to inorganic wheat cultivation. Timely sowing and weeding, use of more organic fertilizers and use of organic pesticides were the most desired practices to increase yield at farmer's level as reported by about 80, 60 and 50 per cent growers, respectively. The major desired areas of research from scientists to increase the yield of organic wheat as perceived by sample farmers were to develop new organic fertilizers and organic pesticides as well as suitable improved varieties.

Authors' affiliations :

D.K. GROVER, Department of Economics and Sociology, Punjab Agricultural University, LUDHIANA (PUNJAB) INDIA

REFERENCES

Ramesh (2005). Organic farming: Its relevance to the Indian context. *Curr. Sci.*, **88** : 561-568.

Sharma, A.K. (2005). *Handbook of organic farming*. pp. 100-02.Agribiod (India).

Shiva, V. (1991). The green revolution in the Punjab. *Ecologist*, **21** : 25.

Venkateswarlu, B. (2005). Organic farming in rainfed agriculture : Opportunities and constraints. Paper presented at the National seminar on National Policy on Organic Farming, NCOF, Ghaziabad, 10-11 March, 2005.Central Research Institute for Dryland Agriculture. Hyderabad-500 059.