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An analysis of costs and returns of organic and non-organic agriculture

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Abstract

In the recent development efforts, the economic benefits have been given more preference than the social and environmental benefits. These attempts have negatively affected the ecosystem and resulted in interruptions in the natural cycles. The organic agriculture is notified as one such attempt which has helped to increase the environmental sustainability. Socially, it increases the employment opportunities leading to labour welfare along with the consumer protection and food security. Economically, it provides higher price to the farmers to fulfill the higher cost of cultivation. Punjab, the trendsetter state of Green Revolution, has very high consumption of fertilizers and pesticides. In this regard, it is indispensable to have an insight of costs and returns of organic agriculture in Punjab. No doubt, the techniques developed during the period of green revolution are profit oriented, but these techniques and methods are opposed to the environment as well as to the health of individuals. Punjab has been the forerunner of Green Revolution in India and therefore, its worse effects have been visible here. In this regard, Organic agriculture is viewed as an alternative method for the sustainability of ecology in the state of Punjab. The main aim of the present study is to examine the costs as well returns in organic and non-organic wheat and paddy cultivation. An effort has also been made in the present study to suggest policy measures to promote organic agriculture in Punjab. In order to fulfill the objectives of the study, the first hand information/primary data has been collected by making use of well prepared questionnaire. The study has been conducted in Nabha area of Punjab state due to large area covered under organic agriculture here. A sample of 100 farmers doing organic as well as non-organic agriculture has been taken. The study brings out the efficient results to prove the relevance of organic agriculture. Its adoption is beneficial to the farmers as they are going through the disastrous period. Despite the low yield and high costs in organic agriculture, its gross as well as net returns are high. It will be more beneficial for the farmers, especially the marginal farmers of Punjab which are under debt. With the adoption of organic agriculture they can come out of the debt trap which would improve their economic condition also.

Keywords: Organic agriculture, Non-organic agriculture, Yield, Returns, Cost of Production.

Introduction

Many countries have made use of organic materials and conventional methods to increase the fertility of the soil. But due to the increasing demands for food by the expanding population, the farmers have shifted towards chemical farming which has created many problems such as unsustainability, ecological imbalance and other environmental problems. This has led to the environmental crisis which in turn has given a blow to the problems of malnutrition and farmer suicides. Its main reason is the increase in the costs of agricultural production. It has also increased the rural indebtedness. To reduce these problems and to promote ecological balance, many attempts have been made by social, cultural and environmental scientists in due course of time. The organic agriculture is notified as one such attempt which has helped to increase the environmental sustainability and to maintain the soil fertility.

Organic agriculture is also known as conventional or natural agriculture. In organic agriculture there is almost no use of chemical fertilizers, insecticides, pesticides, hormones and feed additives etc. Organic agriculture is that technique by way of which the soil gains its fertility, nature enhances its resource and the product is healthy and tasty. Organic agriculture is an important step towards achievement of sustainable development. It is based on four main principles- health, ecology, fairness and care. Socially, it has led to more employment opportunities leading to labour welfare along with the consumer protection and food security. The efficient organic inputs promote the level of productivity by reducing the incidence of pests and harmful effects of chemical fertilizers.

There are three categories of organic agriculture: the first category opposes the idea of organic agriculture as the production in the organic agriculture is low as compared to non-organic agriculture. The second category involves those farmers who are in favour of organic agriculture but attach less importance to it than non-organic agriculture. They opine that full organic agriculture may result in lots of expenditure along with reduced production in the initial periods. The third category of farmers is fully in the favour of the organic agriculture and suggests its adoption wholeheartedly. They are of the view that today's short term benefits must be given up to gain sustainable development of ecology. Thus, organic

agriculture is of the utmost importance. But, India is lagging behind in the adoption of organic agriculture. So, it is the need of the hour to start organic agriculture in the Indian economy as the best alternative method against chemical farming for long term protection and development of ecology.

Organic agriculture enhances environmental sustainability and soil quality along with its health benefits for humans as well as animals. Though its yield is less yet its net returns are higher as compared to non-organic agriculture which is good symbol for the economic sustainability of farmers. Moreover, all the costs of organic agriculture inputs are less except the human labour. With the adoption of organic agriculture, farmers can come out of the debt trap. Studies by Bromm and Wilson[1], Cisilino and Madau[2], Kopke[3], Ikemura and Shukla[4], Hathaway-Jenkins[5] and Sharma[6] provides ample evidence of the same fact.

Objectives: The main objectives of the study are as under: i. To examine the cost of cultivation of organic and non-organic agriculture. ii. To analyse the returns of organic and non-organic agriculture. iii. To suggest policy measures to adopt organic agriculture.

Methodology

In order to fulfill the objectives of the research study, primary data has been obtained from Nabha Organic Farms group by making use of well prepared questionnaire. A total sample of 100 farmers (both doing organic and non-organic cultivation) was taken covering the villages - Sahauli, Dittupura, Malout, Gunike, Ranjitgarh, Kishangarh, Khanaura etc. from tehsil Nabha of district Patiala. To reach at the conclusions, we first calculated gross returns (Total value of main product + total value of by product) and after that, net returns (gross returns-variable cost- fixed costs) were obtained. In order to test the level of significance t-test has been applied.

Working hypothesis: The following hypothesis would be tested during the course of the study: i. Organic agriculture involves lower cost of cultivation than non-organic agriculture. ii. Organic agriculture produces higher yield than non-organic agriculture. iii. Organic agriculture provides greater returns than non-organic agriculture.

Results and discussion

Costs in organic and non-organic agriculture: There is a difference in the costs in case of organic and non-organic agriculture. This difference is shown in the Table-1.

As revealed by Table-1, nursery raising and sowing took 4 hours and 3.5 hours in organic and non-organic wheat and paddy cultivation, respectively. Land preparation utilized 7 hours and 6 hours in organic and non-organic wheat and paddy cultivation. Fertilization utilized 7 hours inorganic agriculture and 1hour in non-organic agriculture. Organic wheat and paddy cultivation took 4 hours of man in irrigation operation when the non-organic took 7 hours for the same. The plant protection operation took 5.5 hours in case of organic agriculture and 2 hours in case of non-organic agriculture. Same labour i.e. 8.5 hours was used in harvesting operation in case of both organic and non-organic agriculture. A labour use i.e.3 hour in threshing operation was also the same in both organic and non-organic agriculture. Total labour utilization was 39 hours in organic agriculture whereas in case of non-organic agriculture, it was 31 hours.

Table-1: Human labour use for different operations in organic and non-organic wheat and paddy cultivation.

Operations	Organic (hours/per acre)	Non-organic(hours/ per acre)
Nursery raising/ sowing	4	3.5
Land preparation	7	6
Fertilization	7	1
Irrigation	4	7
Plant protection	5.5	2
Harvesting	8.5	8.5
Threshing	3	3
Total	39	31

t =1.56, Note: Implies significant at 0.05 level.

It is clear from the Table-1 that labour utilization is more in organic agriculture than non-organic agriculture in case of wheat and paddy cultivation. The fertilization time is more in organic agriculture; the labour use is also more for applying the manures in the fields. Generally, locally available material i.e neem, khatti lassi, basin, cow dung, cow urine etc. is used in organic cultivation of wheat and paddy in Punjab. Application of all these input needs more labour. So the significant difference has been observed in human labour use in case of organic and non-organic cultivation which is proved by t-test. But, organic agriculture needs less irrigation as compared to non-organic agriculture.

As is evident from Table-2, machine labour used for nursery raising and sowing took 5.5 hours in organic wheat and paddy cultivation whereas non-organic wheat and paddy cultivation utilized 6 hours. For Land preparation machine use was of 6 hours in case of organic agriculture and of 5 hours in non-organic agriculture, for irrigation purpose machine use was of 4 hours in organic agriculture and 7 hours in non-organic agriculture. Threshing activity took the same machine hours i.e.5.5 in case of both organic and non-organic agriculture. The total machine use was of 22.5 hours in case of organic agriculture and of 25 hours in case of non-organic agriculture.

Table-2: Machine labour use for different operations in organic and non-organic wheat and paddy cultivation.

Operations	Organic (hours/per acre)	Non-organic (hours/ per acre)
Nursery raising/ sowing	5.5	6
Land preparation	6	5
Irrigation	4	7
Harvesting	5.5	5.5
Threshing	1.5	1.5
Total	22.5	25

t =1.28, Note: Implies significant at 0.05 level.

As is evident from the Table-2 that there is a little difference in machine use in operations like land preparation, sowing, harvesting, threshing in case of both organic and non-organic agriculture, but in case of irrigation, difference has been observed in machine use. Overall, machine use observed to be lower in case of organic agriculture as compared to non-organic agriculture. Less machine use means less irrigation requirement for organic agriculture which is the need of the hour to improve the water table in the Punjab state.

Table-3 highlights the total costs in organic and non-organic wheat and paddy cultivation.

Table-3: Input use in different operations in organic and non-organic wheat and paddy cultivation.

Operations	Organic (cost in Rs. per acre)	Non-organic (cost in Rs. per acre)
Seed	1380	925
Nursery/transplantation	2800	2800
Farm yard manure	4200	-
Total fertilizers	-	3250
Machine used	4200	4200
Irrigation	720	720
Plant protection	1080	1800
Human labour	18000	6250
Family imputed value	18000	6250
Land rent	20,000	20,000
Depreciation	4000	4000
Interest on working capital	10500	10500
Additional cost	600	-
Total	85480	60695

t =1.37, Note: Implies significant at 0.05 level.

As revealed by the Table-3, the seed use cost in organic wheat and paddy cultivation was Rs. 1380, when the seed use cost in case on non-organic wheat and paddy cultivation was Rs 925. Nursery /transplantation cost was Rs2800 both in organic and non-organic cultivation. Chemical fertilizers costs Rs 3250 in non-organic cultivation and farm manure cost was of Rs 4200 in organic cultivation. Machine use cost was found to be the same both in case of organic and non-organic agriculture. The cost of irrigation was also same i.e. Rs. 720 in organic as well as non-organic agriculture.

Plant protection cost was observed to be Rs1080 in case of organic agriculture and of Rs 1800 in non-organic agriculture. Labour use cost was Rs 36000 (human labour and family imputed labour) under organic agriculture and Rs 12500 (Human labour and family imputed labour) under non-organic agriculture. The land rent (per acre) for both organic and non-organic agriculture was Rs 20,000. The depreciation cost (per annum) for both organic and non-organic agriculture was Rs 4000. The interest on working capital (per annum) was Rs 10500 both for organic and non-organic agriculture. The additional cost paid for organic agriculture was Rs 600, but no such additional cost was involved in case of non-organic agriculture.

As is evident from the Table-3 that no difference has been observed in the cost of fertilizer, machine use, irrigation, land rent, depreciation and interest on the working capital but in case of seed, plant protection, human labour, family labour and additional cost significant difference has been observed in case of organic and non-organic cultivation. Human labour cost was found to be higher in case of organic agriculture than the non-organic agriculture and the difference is significant which is justified by t-test.

On the basis of above findings, it has been concluded that the total cost of organic wheat and paddy cultivation is more as compared to non-organic wheat and paddy cultivation. This is an interesting result because it is contrary to our hypothesis that organic agriculture costs less. The major cause of the high cost of organic agriculture is found to be the labour cost especially for hoeing.

Returns from organic and non-organic wheat and paddy cultivation: Table-4, highlights the returns from organic and non-organic wheat and paddy cultivation.

As revealed by Table-4, that per acre yield of wheat and paddy in organic cultivation was 28.99 quintals and in non-organic cultivation was 61.31 quintals. The total cost in organic wheat and paddy cultivation was Rs85480 and in non-organic cultivation was Rs 60695. The gross returns in organic cultivation were Rs 72582 in case of organic cultivation where as in case of non-organic these were of Rs 41548.5. So far as net returns are concerned these were of Rs 26382 in case of organic cultivation and of Rs 7098.5 in case of non-organic cultivation.

Table-4: Returns from organic and non-organic wheat and paddy cultivation.

Operations	Organic (per acre)	Non-organic (per acre)
Yield (in qt)	28.99	61.31
Total cost (In Rs)	85480	60695
Gross returns (in Rs)	72582	41548.5
Net returns (in Rs)	26382	7098.5

It is evident from study findings that yield of non-organic agriculture is greater than organic agriculture, and the gap is quite large and significant. The cost of non-organic agriculture is also less as compared to organic agriculture. But an important finding of the research study is that gross returns as well as net returns are much more in organic cultivation as compared to non-organic cultivation. The main factor responsible for high gross as well as net returns from organic cultivation has been observed to be the price which is found to be higher in case of organic produce as compared to non-organic produce. The willingness of people to purchase organic produce even at higher price is the reason that leads to higher gross returns for organic farmers. On the basis of the above finding our research study rejects the first and second hypothesis but select the third hypothesis.

Conclusion

In the nutshell, it can be concluded that despite the low yield and high costs in organic agriculture, its gross as well as net returns are high. It is more beneficial for the farmers' especially marginal farmers of Punjab which are under debt. With the adoption of organic agriculture, they can come out of the debt trap which would improve their economic condition also. So, it becomes very important that subsidies should be given to the farmers for practicing organic agriculture, which can build up confidence of the organic farmers to promote it. Some policy measures should be made to fix the price of organic products in the market to promote it. Hence, to increase the organic cultivation area, facilities such as technological package should be provided to farmers. Government Organisations like Punjab Agriculture University, Ludhiana and agricultural university, Palampur are the good institutions to innovate and provide new technology related to organic agriculture to the farmers in Punjab.

References

1. Bromm J.A. and Wilson B. (2004). An economic comparison of organic and non-organic agriculture in Saskatchewan. 2nd OACC Organic Research Workshop, Presented in association with the Organic Connections: Prairie Wide Organic Conference and Trade Show, November 14-16th, 2004.Organic Agriculture Centre of Canada.

2. Cisilino F. and Madau F.A. (2007). A comparative analysis of organic and non-organic agriculture through the Italian FADN. Published in: Proceeding of the Mediterranean conference of Agro-food Social Scientists.103rd EAAE Seminar 'Adding Value to the Agro-Food Supply Chain in the Future Euro mediterranean Space'. Barcelona, Spain, 1-22.

3. Kopke U. (2001). Influence of Organic and Non-organic agriculture on Nutritional Quality of Food. In *Impact of Agriculture on Human Health and Nutrition, Vol. 2*, edited by Ismail Cakmak and Ross M. Welch, EOISS Publishers Co. Ltd. United Kingdom, 210-221. ISBN: 978-1-84826-094-8.

4. Ikemura Y. and Shukla M.K. (2009). Soil quality in organic and conventional farms of New Mexico, USA. *Journal of Organic System*, 4(1), 34-47.

5. Hathaway-Jenkins L.J., Godwin R.J., Pearce B., Sakrabani R. and Whitmore A. (2010). A comparison between conventional and organic farming practices. 19th World Congress of Soil Science, Soil Solutions for a Changing World 1-6 August 2010, Brisbane, Australia.

6. Sharma Subhash and Pandove A. (2010). Organic Farming in Punjab: An Economic Analysis. Doctorate thesis. Submitted to the Faculty of Social Sciences, Punjabi University, Patiala, 1-172.