

Organic agriculture and environment Sustainability in Haryana

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Haryana is the state known as the food basket of India, and a worldwide shining example of how the Green Revolution (GR) and industrial agriculture greatly increased the yield of the food crops. Apart from meeting its own requirement for food grains, Haryana ranks second in contribution to wheat to the Central Pool despite the very small acreage under farming. It accounted for 27.8% (i.e., 69.24 lakh tonnes) of procurement of wheat for the Central Pool in 2011-12. This has been possible due to the introduction of high yielding cultivars of wheat and rice, creation of irrigation infrastructure, hard work of innovative farmers, and excellent policy support for promoting improved technologies in the State. Agriculture plays a vital role in Haryana's economy, in spite of the decline in the share of agriculture sector in the Gross State Domestic Product (GSDP) from 32.0% in 1999-2000 to 15% in 2013-14; about 80% population of the state still depends upon agriculture for its livelihood. Haryana is located in the northwest part of the country and the climate is arid to semiarid with average rainfall of 455 mm. Around 70% rainfall receives during the 13 month from July to September and the remaining rainfall receives during Dec. to Feb. The total geographical area of the state is 4.42 million hectares (m ha), which is 1.4% of the geographical area of the country. The cultivable area is 3.8 m ha, which is 86% of the geographical area of the state out of which 3.62 m ha, i.e., 96.2% is under plough. Thus, there is hardly any scope to bring more area under cultivation. The agriculture production can only be increased through enhanced cropping intensity, change in cropping pattern, improvement in seeds of high yielding varieties, better cultivation practices and post-harvest technology, etc.

ORGANIC FARMING

Organic agriculture is best known as a method of agriculture where no synthetic fertilizers and pesticides are used. Organic farming system depends mainly on crop rotation, crop residues, animal manures, legumes, green manures, off-farm organic residues, mineral bearing rocks, natural pesticides and biological pest control to maintain soil productivity and supply important nutrients like nitrogen (N), phosphorus (P) and potassium (K). Moreover, organic farming is a pathway to an evergreen revolution.

Differences between Organic and Conventional Farming

In organic agriculture one does not use chemical fertilizers and pesticides because these can be harmful for nature, the environment and human health. These inputs, and also genetically modified (GM) seeds, make farmers dependent upon standard industrial solutions and obstruct local adaptation and development of the farming system, which is the basis of organic farming. Instead of chemical inputs, organic systems focus on avoiding nutrient losses through recycling them, using manure and compost, green manure and varied crop rotations or agro-forestry systems. The prevention of nutrient losses also avoids environmental damage (e.g. damage to local water supplies). In preference to using GM seeds, organic farmers prefer resilient indigenous varieties that are adapted to local circumstances and have a natural resistance against pests, diseases and drought. Pests and diseases can harm the crops, reduce their yield and badly damage their quality. A wide range of (often highly toxic) chemical pesticides has been developed to control pests and diseases. Organic farming differs from conventional agriculture in that it prohibits the use of chemical pesticides. Organic farmers employ other methods to prevent an unacceptable level of pests and diseases; choosing strong varieties and creating the best conditions for crop growth. Organic farmers improve the fertility and structure of the soil through the use of for example compost. They plant a wide variety of crops, often inter-cropping, and leave or plant species that can create habitat for beneficial wildlife and/or improve the micro-climate. 22 Weed control is another area where there is a big difference between conventional and organic agriculture. Instead of using chemical herbicides, organic farmers use a different toolkit to manage weeds. A wide crop rotation helps to prevent the establishment of a few really difficult weeds which particularly thrive in monocultures. Organic farmers use a mixture of good composting, fast growing crop varieties that suppress weeds, mechanical weed-control, mulching, cover crops and hand weeding as the main methods of weed control. Whereas modern conventional farming uses chemical fertilizers to stimulate crop production, organic farming relies on manure, on composting waste materials from the farm and on recycling nutrients. The ideal model is a mixed farm, with food and fodder crops and animals. In such a system the animals can eat the fodder, crop residues and products that are not suitable for human consumption. The aims of organic farming are to protect: (i) the environment, by using organic management practices that do not have the adverse effects of conventional practices, and (ii) the health of consumers, by the provision of organic products.

EMERGING ISSUES FOR HARYANA AGRICULTURE

As we have stated above, Haryana is among pioneer states that have successfully implemented green revolution. Crop areas under high-yield varieties in Haryana needed more water, more fertilizer, more pesticides and certain other chemicals. Because market purchased inputs needed for output, only resource-rich farmers were able to take advantage of high-yielding cultivars. Small or marginal farmers have found it difficult to benefit from HYVs, machinery and fertilizers in their fields due to which the wealth disparities have widened further than before. Fertilizer, the most important component and input of new technology has played a very important role in enhancing the agricultural production and ushering

in green revolution in the State. Because of the introduction of High Yielding Varieties in the State, the consumption of chemical fertilizers has increased steadily. The total consumption of NPK (nutrients) is expected to be 1430 thousand tonnes in 2009-10. The per hectare consumption of fertilizers in nutrient terms are increased from 162 kg in 2005-06 to 200 kg in 2008-09. In 2008-09, Haryana's per hectare consumption of fertilizers was 56% higher than that of country as whole. The use of pesticides has led to pest resurgence and difficulty in controlling weeds. Indiscriminate use of artificial fertilizer and pesticide has caused severe water and environmental pollution. The residue of chemical is of serious concern for the safety of food and sustainable production.

ORGANIC FARMING AND HARYANA

Organic farming has been received considerable attention in Haryana in the recent years. In their search for a more sustainable agriculture, producers, consumers and policymakers attempt to rediscover organic farming. Haryana government believes that producer concerns to organic products and therefore market development should be stimulated. Currently, the greater part of the agricultural budget for stimulating organic farming is allocated to research, education and information dissemination. According to the information available on the official website of the Haryana State Co-operative Supply and Marketing Federation Limited (HAFED), an area of around 1,000 acres has been earmarked for organic farming of basmati rice in three districts of Kaithal, Kurukshetra and Karnal. The desi wheat would be cultivated in an area of around 805 acres in Mewat and Jhajjar region. Apart from these two crops, Sirsa district has been shortlisted for the cultivation of gram crop.

OBJECTIVES OF THE PAPER

The paper is examining the economic viability of organic wheat farming in Haryana

- (i) Organic farming wheat is economically viable in Haryana.

Research Design

The study uses an exploratory research design. The research type is qualitative. The data are collected mainly through focus group discussions. The economic viability of organic farming system is assessed by estimating costs, returns and profits. To gauge whether Haryana's farmers will transit to organic farming same calculation has been done for a conventional farming system and then the results are compared. No census or other comprehensive listing of organic farms exists in Haryana state.

Sources of Data

The present paper is primarily based on primary data. The data used in the study are mainly cross-sectional. The focus group discussion method has been used to obtain the requisite information. The data on growth trends in organic farming in the world leading producers are obtained from International Federation of Organic Agriculture Movements (FIBL-IFOAM) survey.

Review of Literature:

As per our observation, hardly any state specific study examines the economic viability of organic farming in Haryana. However, few prominent studies that empirically analyse the economic implications of organic farming for the rest of India and for other countries are in order.

Bjørkhaug and Blekesaune (2012) used spatial regression models to explore the diffusion of organic farming in Norway. They find: (1) a connection between the level of organic production, the population level in the municipalities, and access to consumers, (2) a connection between the farm processing of organic products and the level of organic farming, and (3) the neighbourhoods effect in the development of organic farming that are especially strong in particular regions of Norway.

Charyulu and Biswas (2010) compared the production cost of organic and non-organic farming for cotton, wheat, rice and sugarcane for Gujarat, Maharashtra, Punjab and Uttar Pradesh. They found that the unit cost of production is lower in organic farming in case of cotton and sugarcane crops whereas the same is lower in conventional farming for paddy and wheat crops.

Kshirsagar (2008) compared the yield and profit of organic and inorganic sugarcane in two districts of Maharashtra. It is found: (a) the yield from organic sugarcane is 6.79% lower than the conventional crop, it is more than compensated by the price premium received and yield stability observed on organic sugarcane farms, and (b) organic sugarcane farming gives 15.63% higher profits and profits are also more stable on organic sugarcane farms than the inorganic sugarcane farms.

RESULTS

The input-use pattern of organic and inorganic wheat cultivation in Haryana was studied. The results are presented in Table 1 The organic pesticides used in organic wheat were prepared by the mixture of many products like awk, sambola, onion, chilli, neem, etc. Its average cost was about Rs 150/acre. The jeev amrit was prepared by mixing the urine (10 litres) of cows, especially of indigenous varieties, with dung (10 kg) and was applied with irrigation to the crops after a week. Cost on bio-dynamics preparation was not included because very few farmers used this bio-fertilizer and it was provided by an NGO at nominal charges.

In the case of inorganic wheat, a considerable amount was spent on urea, DAP, herbicides and their applications to the crops. The average cost on marketing of organic wheat was Rs 250/ acre as against Rs 150/acre in case of inorganic wheat, it was because of less number of organic wheat buyers which led to an increase in marketing hours and consequently marketing cost.

Table: 1

**Input-use Pattern of Organic and Inorganic Wheat Crops by Selected Sample
Farmers of Haryana: 2012-13 (per acre)**

Particular	Organic growers (Quantity)	Inorganic growers (Quantity)
Seed (kg)	41	40
FYM + jeev amrit (q)	82	40
Vermi compost (q)	4.5	-
Organic pesticides		-
Plant protection spray (No.)	-	1.20
Urea (kg)	-	120
DAP (kg)	-	70
Herbicides (No.)	-	1
Irrigation (No.)	4	4
Human labour (hours)	189	124
Tractor (hours)	5.6	5.6
Harvesting/threshing (hours)	3	4
Marketing (hours)	6	5

Source: Author's Field Survey.

CONCLUSION

To sum up, we have examined the economic viability of organic wheat cultivation in Haryana. These are the chief crops grown in the state. We find that organic farming provides low yield, low profit and low returns over variable cost. The situation was worst in production of organic wheat. In addition, the premium prices for organic wheat were not available in Haryana. Based on our findings we conclude that presently organic wheat cultivation is economically not viable in Haryana.

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