Sustainable Agriculture Practices: A Case Study of Organic Farming in Punjab, India

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INTRODUCTION

The major breakthrough in the history of Indian agriculture was witnessed in the mid 1960s. A new Agricultural Strategy, named High- Yielding Varieties Programme (HYVP), popularly known as Green Revolution, was put into practice in the year 1966 to overcome the chronic shortage of food grains in India. The HYV programme was actually a package which apart from better quality seeds included regular and adequate irrigation facilities, use of fertilizers, pesticides and insecticides. The high-yielding variety seeds introduced by Norman Borlaug brought the Green Revolution, which transformed India from 'a begging bowl to a bread basket'. With the adoption of this programme, there was increase in agriculture yield and India attained self-reliance in food production.

Though, the green revolution technology helped in fulfilling the demand of food to a large extent, it led to enormous problems, like:

1. Because of heavy dependency on chemical fertilizers and pesticides, the soil lost its fertility. The disproportionate use of Nitrogen, Phosphate and Potash (NPK) fertilizers for increasing production created lack/unavailability of micro nutrients specially Zinc, Fe (iron), Mg (magnesium), Sulphur and Copper etc.
2. Due to overuse/exploitation of underground water for irrigation, the water table was declined gradually. This turned out to be a whistleblower in different areas of Punjab. Studies report that between 2002 and 2008, more than 26 cubic miles of groundwater has already disappeared from underground aquifers in large areas of Haryana, Punjab, Rajasthan and Delhi (GOI, 2013). Along with, the policies imparting free electricity

for agriculture has led to overuse and misuse of underground water resources in Punjab.

3. For enlargement of cultivated land, marginal land or forests were declined, crop rotation was deserted, and agriculture was limited to few crops. Further the implications led to loss of nutrients from soil and brought about many ecological changes.
4. With the emergence and usage of HYV seeds and innovative techniques, the farmers of Punjab started cultivating rice and wheat only. It leads them earn good profits initially, but its aftermath results were alarming. As mentioned in Punjab Development Report (2014), both the crops, especially rice, are water-intensive which led to large-scale depletion of groundwater in many areas. Further, it leads to degradation of soil due to intake of macro and micro nutrients by these crops from the soil to a large extent. The rice-wheat rotation severely affects physical characteristics of the soil. The rice-wheat rotation consumes heavy doses of fertilizers, pesticides (insecticides, fungicides and weedicides). It caused environmental pollution and builds up residual toxicity in soil, water and air. Additionally, the consumption of such affected grains causes serious health problems.
5. One of the important features of HYV programme was mechanized agriculture. Before the emergence of green revolution, farming was done manually. It was more labor intensive but the production was not self sufficient. For excessive production, machines such as tractors, threshers, harvesters and combines were introduced. Initially, farmers were satisfied with the same as unused and rugged land was also brought under cultivation. But the extreme use of mechanized system damaged the physiochemical and productive characteristics of soil resulting in corrosion of biological activities and thus making such soils less productive.

In the context of what is being discussed above, (Deshmukh & Babar, 2015) stated that "Organic farming is gaining gradual momentum across the world. Growing awareness of health and environmental issues in agriculture has demanded production of organic food which is emerging as an attractive source of rural income generation. Organic agriculture can become low cost, sustainable option of farming in the India, particularly by the small farmers in rain-fed areas and helps to improve their food and income security. It helps to produce and supply adequate

safe and nutritious food to the producers and consumers of the nation. Environmental benefits, health aspects and farmers empowerment are other important factors influencing farmers to shift to organic agriculture. Some of the important benefits of organic farming are Organic fertilizers are completely safe and does not produces harmful chemical compounds."

According to IFOAM (International Federation of Organic Agriculture Movement), "Organic agriculture is a production system that sustains the health of soils, ecosystems and people". It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. The major objectivity of organic farming resides on development of a self-sustainable farming system in harmony with nature which delivers ecologically and economically sustainable pure food with enrichment of surrounding biodiversity and its entire components. IFOAM proposed the four principles of organic agriculture:

1. It states that organic agriculture should maintain and enhance the health of soil, plant, animal, human and planet.
2. It should be based on living ecological systems and cycles, work with them, follow them and help sustain them.
3. Organic agriculture should build on fair relationships with regard to the common environment and life opportunities.
4. It should be managed in a safe and responsible manner to protect the health and well-being of current and future generations and the environment.

ORGANIC FARMING IN INDIA:

(Deshmukh & Babar, 2015) discussed that "Organic farming was practiced in India since ancient period. The great Indian civilization thrived on organic farming and was one of the most prosperous countries in the world. In traditional India, the entire agriculture was practiced using organic techniques, where the fertilizers, pesticides, etc., were obtained from plant and animal products. The traditional farming system was characterized mainly by small and marginal farmers producing food and basic animal products for their families and local village communities. After this qualification was drastically changed during the green revolution period but organic farming is seen today as the best option to attain sustainability in the crop production. Therefore organic farming appears to be one of the options for sustainability."

As per available statistics, India's rank in terms of World's Organic Agricultural land was 9th and in terms of number of producers was 1st as per 2018 data (Source: FIBL & IFOAM Year Book 2018). The Government of India has implemented the National Programme for Organic Production (NPOP). The National Programme involves the accreditation programme for Certification Bodies, standards for organic produce, promotion of organic farming etc. The NPOP standards for production and accreditation system have been recognized by European Commission and Switzerland for unprocessed plant products as equivalent to their country standards. Similarly, USDA has recognized NPOP conformity assessment procedures of accreditation as equivalent to that of US. With these recognitions, Indian organic products duly certified by the accredited bodies of India are accepted by the importing countries.

("Organic Products", 2019) also shows that,

AREA: As on 31st March 2018, total area under organic certification process (registered under National Programme for Organic Production) is 3.56 million hectare. This includes 1.78 million hectare cultivable area and another 1.78 million hectare for wild harvest collection. Among all the states, Madhya Pradesh has covered largest area under organic certification followed by Rajastan, Maharashtra and Uttar Pradesh. During 2016, Sikkim has achieved a remarkable distinction of converting its entire cultivable land (more than 76000 hectare) under organic certification.

PRODUCTION: India produced around 1.70 million MT of certified organic products which includes all varieties of food products namely Oil Seeds, Sugar Cane, Cereals & Millets, Cotton, Pulses, Medicinal Plants, Tea, Fruits, Spices, Dry Fruits, Vegetables, Coffee etc. The production is not limited to the edible sector but also produces organic cotton fiber, functional food products etc. Among different state Madhya Pradesh is the largest producer followed by Maharashtra, Karnataka, Uttar Pradesh and Rajasthan. In terms of commodities Oil Seeds are the single largest category followed by Sugar Crops, Cereals and Millets, Fiber crops, Pulses, Medicinal Plants, Herbal and Aromatic plants and Spices and Condiments.

EXPORTS: The total volume of export during 2017-18 was 4.58 lakh MT. The organic food export realization was around INR 3453.48 crore (515.44 million USD). Organic products are exported to USA, European Union, Canada, Switzerland, Australia, Israel, South Korea, Vietnam, New Zealand, Japan etc. in terms of export value realization Oil Seeds (47%) lead

among the products followed by Cereals and Millets (10%), Plantation Crop Products such as Tea and Coffee (8.96%), Dry Fruits (8.88%), Spices and Condiments (7.76%) and others."

SIGNIFICANCE OF THE STUDY:

As discussed earlier, although, many lives were saved with the advent of green revolution but it deteriorated the environment and created long term effects for present and future generation. The green revolutions resulted in many agricultural problems like unproductive soils, low water level, excessive use of fertilizers and pesticides etc. Thus, under such circumstances sustainable agriculture received importance to find solution and achieve economically and environmentally sound agriculture systems. In the Agenda 21 adopted at the Earth Summit in Rio, Brazil in June 1992, it was made mandatory for international agencies and governments of all nations to provide incentives to farmers to shift from environmentally destructive chemical farming practices to environmentally friendly natural and ecological farming. The International Movement for Ecological Agriculture meeting held in Penang, Malaysia in January, 1990 also gave emphasis to natural farming based on traditional experiences. Hence, it is very important to explore the alternative of organic farming in the state of Punjab. Thus, this study is indenting the major problems of organic farming and suggesting measures to ameliorate organic farming in Punjab.

OBJECTIVES OF THE STUDY:

1. To identify present situation of the Organic Farmers of Punjab.
2. To examine the problems faced by Organic Farmers in the State of Punjab.
3. To suggest measures to perk up organic farming practices in Punjab.

SCOPE OF THE STUDY:

The present study is limited to the State of Punjab (India). Punjab is one of the most fertile regions on Earth. The region is ideal for growing wheat, rice, sugarcane, fruits and vegetables. Punjab is called the 'Granary of India' or India's bread-basket. Punjab is also one of the smallest states of India with 5.03 million hectare of land which accounts for only 1.5% of the total area of the country. Of this 4.2 million hectare is the net cultivated area, leaving less than 17% of the area under habitation, roads, rivers, canals, waste lands etc. However, with intensity of cropping at 90%, the cropped area amounts to around 8 million hectare which accounts for 4.5% of the cropped area in the country (Johl, Sidhu & Vatta, 2015). On production side, total production of food grains increased from 3.2 million hectare in 1961 to 29.2 million hectare in

2011-12, an increase of over 9 times. Rice production during this period increased from 0.24 million hectares to 10.54 million hectare and wheat increased from 1.77 million hectare to 17.98 million hectare (Punjab Statistical Abstract, 2018). Farmers of Punjab are now shifting towards natural or organic farming due to awareness towards environment and health. The area under organic farming in Punjab is as below:

Districts	Area in hectares
Ferozepur, Mukatsar, Bathinda, Faridkot, Sangrur, Mansa	1214.5
Ropar Nawanshehar, Mohali	283.4
Ludhiana, Moga, Patiala	485.8
Amritsar, Tarn Taran, Hoshiarpur, Jalandhar, Kapurthala	404.8
Fatehgarh Sahib	101.2
Birla Farm, Ropar	141.7
Total Area	**2631.5**

Source: Organic Farming Council of Punjab, 2007 as cited in SOE, Punjab-2007 (no current data on organic farming is available)

RESEARCH METHODOLOGY:

For the completion of the study both primary as well as secondary sources were taped. There are 22 districts in the state of Punjab which are divided into three regions i.e. Malwa, Majha and Doaba. The researcher has adopted sampling method for the primary data collection. For this, convenient sampling method has been used. A convenient sample of 100 organic farmers from 15 districts; eleven from Malwa, being a big region,(Patiala, Mansa, Sri Muktsar Sahib, Fazilka, Faridkot, Firozpur, Barnala, Sangrur, Moga, Bathinda, Ludhiana), two from Majha (Tarn Taran and Amritsar) and two from Doaba (Kapurthala and S. Bhaghat Singh Nagar) of Punjab has undertaken. The initial data has been collected through questionnaire method along with semi-structured interviews of various officials of Department of Agriculture of Punjab and from different agriculture based NGO's like Kheti Virasat Mission. These districts have chosen because most of the peasants are cultivating organic crops in these areas of Punjab.

RESPONSES OF ORGANIC FARMING FARMERS:

Table – 1.1
Educational qualification of Organic Farming Farmers
(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Up-to Metric	44	44%
Senior Secondary	19	19%
Post Graduate	26	26%
Ph. D./ Engineer/MBBS/MBA/LLB	11	11%
Total	100	100%

The farmers were asked about their educational qualification. The result shows that 44% farmers started up-to metric only. 19% farmers were senior secondary passed. 26% were Post Graduate and 11% were highly qualified like Ph.D./Engineer/MBBS/LLB etc.

Table – 1.2
Area of Agricultural Land under Organic Farming
(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
1 acre	40	40%
2 acre	30	30%
5 acre	17	17%
More than 5 acre/ total agricultural land	13	13%
Total	100	100%

The farmers were asked about the area of their total land under organic farming. The result shows that only 13% farmers are cultivating organic farming on their total agricultural land. 40% are cultivating it on only one acre. 30% are cultivating organic farming on 2 acres of their agricultural land and 17% are on 5 acres.

Table – 1.3

Why have you started Organic Farming?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Due to contract with an organisation	19	19%
Being aware of Environment and Health	55	55%
Due to the victim of a serious illness of a family member	24	24%
To increase the income	2	2%
Total	100	100%

The farmers were asked why they adopted organic farming. The result shows that majority of the farmers (55%) started organic farming because they are aware of environment and health. 24% farmers started it due to the victim of a serious illness of a family member, 19% farmers started organic farming due to contract with some organizations, and only 2% farmers started it to increase income.

Table – 1.4

During the time that you began to improve the health of the land, did you get financial help from the government or any other organization?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes	12	12%
No	88	88%
Total	100	100%

When the farmers were asked about did they get financial help from government or any other organization during the time when they began to improve the health of the land for organic farming. The result shows that only 12% get it and 88% did not get any help from anyone.

Table – 1.5

Whether you are supported by an organization or department for Organic Farming?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes	38	38%
No	62	62%
Total	100	100%

When the farmers were asked whether they were supported by any organization or department for organic farming, the result shows that majority of farmers (62%) did not get any support from anywhere and only 38% said got it.

If yes, then from which Organization?

Table – 1.5.1

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Punjab Agriculture University, Ludhiana/ KrishiVighyanKander	5	13.2%
Punjab Agriculture Department	0	0%
Private Agency/NGOs/Others	33	86.8%
Total	38	100%

When these 38% farmers were asked that from where they get support for organic farming, the result shows that only 13.2% farmers get it from PAU/ Krishi Vighyan Kander and 86.8% get it from private agencies or NGOs.

Table – 1.6

Is there any subsidy given to you by any Organization, Governmental Department for Organic Farming?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes	03	03%
No	97	97%
Total	100	100

When the farmers were asked about subsidy given to them from any organization, the result shows that only 3% said yes and majority (97%) said they did not get any subsidy from anywhere.

If yes, then from which Organization?

Table – 1.6.1

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Private Agency	0	0
Bank (Private or Government)	03	100%
Punjab Agriculture Department	0	0
Any other	0	0
Total	03	100%

When these 3% farmers were asked about the organization from where they get subsidy, the result shows that all farmers get it from banks, which includes government and private banks.

Table – 1.7

Do you have any training for Organic Farming?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes	61	61%
No	39	39%
Total	100	100%

When the farmers were asked about training regarding organic farming, the result shows that 61% said yes they get training and 39% said they did not get any training.

If yes, then from which Organization?

Table – 1.7.1

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Punjab Agriculture University, Ludhiana/ KrishiVighyanKander	11	18%
Punjab Agriculture Department	0	0%
Private Agency/NGOs (KhetiVirasat Mission/Patanjli/Shramikbharti/KudratManavKandritLoklahar)	50	82%
Total	61	100%

When these 61% farmers asked about from where they get training of organic farming, the result shows that only 18% get it from PAU and 82% get it from private agencies or NGOs.

Table – 1.8

Do you think Organic Farming is more expensive than Chemical Farming?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes, to a large extent	14	14%
To some extent	16	16%
Equal	07	07%
Cheap	63	63%
Total	100	100%

When the farmers were asked that is the organic farming more expensive as compare to chemical farming. The result shows that 14% agreed that yes the organic farming is more expensive than chemical farming, 16% said that to some extent organic farming is more expensive than chemical farming. 7% said that both are equal and 63% farmers said that organic farming is cheaper than chemical farming.

Table – 1.9

Has the production of Organic Farming decreased as compared to the Conventional Chemical Farming?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes, to a large extant	02	02%
To some extant	05	05%
Equal	20	20%
Increased	73	73%
Total	100	100%

When the farmers were asked about the level production after switching to organic farming, the result shows that only 2% farmers said that their production decreased, 5% said their production decreased to some extent. 20% farmers said that their production remains same and 73% farmers said that their production has increased.

Table – 1.10

Is there any easy and proper arrangement for the marketing of Organic Production?

(Organic Farming Farmers)

(Frequency Distribution)

Responses	No. of Farmers	Percentage
Yes	32	32%
No	68	68%
Total	100	100%

When the farmers were asked about the marketing arrangement of their organic production, the result shows that only 32% said yes there is a proper arrangement for marketing and 68% said that there is no arrangement for marketing of their products.

Major Findings of the study:

1. Majority of the farmers (58%) were studied up to higher secondary, metric or even less than that. It is also revealed that some of the farmers were even highly qualified as doctors, lawyers, engineers and professors but the numbers were minimal (11%). Self nurturing and knowhow of the profession has made these farmers to involve into the arena of organic farming. (Table 1.1)
2. The results indicate that majority of the land is occupied for conventional chemical farming instead of organic farming. A bit of an acre or two are dwell in for the purpose of organic farming. Only 13% farmers are cultivating organic farming on their total agriculture land. Most of the farmers are cultivating organic farming on one or two acres of land only. (Table 1.2)
3. The study also revealed an interesting fact that 24% farmers started organic farming because of the serious health issues of their near and dear ones. 55% engaged into this profession as they were concerned about the environment and their surroundings. (Table 1.3)
4. Recently, (one or two years ago) majority of the farmers initiated this very process of cultivating organic farming. A satisfactory number of farmers were engaged into this occupation one or two decades ago.
5. During the time of transformation from conventional chemical to organic, very less number of farmers (12%) got financial aid from the government or any other organization

for maintenance of the land. This was a challenging task for the farmers of the country. (Table 1.4)

6. The study indicates that majority of farmers do not get any financial aid either from government or any other financial institution. But yes there are people (38%) who are getting support from Punjab Agriculture University and various other Non-Governmental Organizations. (Table 1.5, 1.5.1, 1.6 & 1.6.1)
7. The study reflects that majority of the farmers (61%) are skilled and efficient as they get training from various government and private agencies. The study further indicates that majority relies on private sources of training irrespective of governmental sources as result shows that only 18% get it from Punjab Agriculture University, Ludhiana and 82% get it from private agencies or NGOs like Kheti Virasat Mission, Patanjli, Shramik Bharti, Kudrat Manav Kandrit Lok lahar etc. (1.7 & 1.7.1)
8. Study shows that in Punjab although State Agriculture Department is very large department to transfer technical skill to the farmers but its role in organic farming is almost negligible. (Table 1.4 to 1.7)
9. Majority of the farmers states that organic farming is far cheaper than conventional chemical farming method as they are now able to cultivate more crops and thereby result in high yield of crops. (Table 1.8 & 1.9)
10. The study examines the problem of systematic and organized market infrastructure and sources as only 32% farmers said that there is a proper arrangement for the marketing of their organic products and 68% farmers said that there is no arrangement of marketing. (Table 1.10)

SUGGESTIONS:

The present study shows that in the state of Punjab farmers doing organic farming without any financial assistance from state government side. Thus, from the empirical analysis along with the interaction with farmers and respective officials, the researcher can state following suggestions that should be considered in the wake of promoting sustainable agricultural practices:

1. Firstly, the Government should be responsible and should take initiative to spread awareness among people about the benefits and merits of organic farming/products which is in stark contrast with the conventional chemical farming.

2. The government should make the procedure and norms flexible so that the farmers could find it easy to get them licensed for organic farming as they found it very difficult and challenging.
3. As organic farming is labour intensive, the farmers should get the support of MGNREGA labour. It will encourage them to initiate and expend organic farming.
4. Government should organize training camps for farmers through State Agriculture Department/ State Agriculture University/ NGOs to make them aware about the techniques/methods of organic farming. They should also be taught several ways to prepare compost fertilizers in these camps.
5. Government should also provide subsidies to the organic farmers so that they can be encouraged.
6. The findings of the study show that most of the farmers face difficulties in marketing of their organic products. Thus, government should provide them a platform to sell their products easily.
7. The government should also make some special provisions and policies in the budget for research, subsidy, marketing, machinery and training etc. for organic farming. On the one hand, it will be able to provide diversified and healthy food products to the people along with a good hike in the income of the farmers.

CONCLUSION:

Green revolution in the today's scenario is confronted with some major environmental issues, i.e. environmental degradation as portrayed by the qualitative and the quantitative degeneration of all environmental resources such as air, water, land, forests, bio-diversity etc. There emerges the need of a sudden and abrupt change in the agricultural methods and farming practices in the country. The solution to these severe issues lies in adopting sustainable agricultural practices which constitutes organic farming as the only feasible and productive way out. Organic farming benefits society at large by reducing pollution and other related problems. Ecologically and economically sustainable organic farming is mandatory for enabling wider adoptability, secured livelihoods and ensuring affordability at the consumer's end. India has a rich history of organic farming but a continuous increase in health problems and environmental degradation evokes the necessary drive to the organic movement. Diversified educational and awareness programmes at both the consumer and farmers' level are needed for bringing about

large scale organic transformation. An efficient and result oriented national and state organic policy is the foremost need of the current situation. The study also recognizes less or no participation of the state government in adoption of sustainable agricultural practices. Therefore, government needs to do a meticulous and in- depth evaluation of the general picture of the organic sector policies, programmes and plans to understand how they affect the current organic sector. An executive plan for the organic sector should be developed and prepared based on the analysis of the current situation of the sector along with the analysis and recommendations of various researches already done in the respective framework.

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