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Knowledge and adoption level of organic vegetable farmers in Haryana

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Abstract

The organic farming system employs a number of strategies for maintaining as well as improving land productivity. It is an integrated production system based on active agro ecosystem management rather than external input which includes both certified and uncertified food systems and the most important characteristics of organic farming is that it involves maximal but sustainable use of local resources, minimal use of purchased input, ensuring the basic biological functions of soil water nutrients humus continuum, maintaining a diversity of plant and animal species as a basis for ecological balance and economic stability, creating an attractive overall landscape which gives satisfaction to the local people and increasing crop and animal diversity in the form of polyculture, agroforestry systems, integrated crop/livestock systems, etc. to minimize risk. Organic agriculture systems are based on the three strongly interrelated principles under autonomous ecosystem management: mixed farming, crop rotation, and organic cycle optimization. Hence, organic farming has emerged as an important priority area globally hence, organic farming is a form of agriculture which excludes the use of synthetic fertilizers, pesticides and plant growth regulators. The study was conducted in Karnal and Sirsa districts of Haryana to study the knowledge and adoption level of organic farming. The analysis of the data depicted that more than half of the respondents (58.33%) was belonged to 35-50 years age group. Regarding bio fertilizers are cheaper than chemical fertilizers 98.33 percent of the respondents again had full knowledge about it. Bio fertilizers are useful for all types of soils were reported by 95.00 percent of respondents who had full knowledge about it. Regarding the statement that bio fertilizers improve soil fertility 95.00 percent respondents had full knowledge about it followed by statement that bio fertilizers decrease the insect pest and disease was reported by 88.33 percent of respondents had full knowledge. Regarding the adoption of organic farming 61.66 percent respondents had full adoption about organic /solid waste management followed by 60.00 percent respondents who had full adoption about the statement that bio fertilizers are purchased from authorized source.

Keywords: Organic, knowledge, adoption, socio-economic impact

Introduction

The global organic vegetable farming market is expected grow from \$7.41 billion in 2020 to \$7.77 billion in 2021 at a compound annual growth rate (CAGR) of 4.9% and its growth is mainly due to the companies resuming their operations and adapting to the new normal while recovering from the COVID-19 impact, which had earlier led to restrictive containment measures involving social distancing, remote working, and the closure of commercial activities that resulted in operational challenges. This time market is expected to reach \$10.01 billion in 2025 at a CAGR of 7%. Organic agriculture is a holistic production management system which promotes and enhances agro ecosystem health, including biodiversity, biological cycles, and soil biological activity and it also emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, cultural, biological and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system. Organic farming concentrates on building up the biological fertility of the soil so that the crops take the nutrients they need from the steady turnover within the soil nutrients produced in this way are released in harmony with the needs of the plants. Control of pests, diseases, and weeds is achieved largely by the development of an ecological balance within the system and by the use of bio-pesticides and various cultural techniques such as crop rotation, mixed cropping, and cultivation. Organic farmers recycle all wastes and manures within a farm but the export of the products from the farm results in a steady drain of nutrients. Therefore where conservation of energy and resources is considered to be important, community or country would make every effort to recycles to all urban and industrial wastes

back to agriculture and thus the system would be only be a small inputs of new resources to “top up” soil fertility. An organic production system is designed to enhance biological diversity within the whole system; increase soil biological activity; maintain long-term soil fertility; recycle wastes of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources; rely on renewable resources in locally organized agricultural systems; promote the healthy use of soil, water and air as well as minimize all forms of pollution thereto that may result from agricultural practices; handle agricultural products with emphasis on careful processing methods in order to maintain the organic integrity and vital qualities of the product at all stages; become established on any existing farm through a period of conversion, the appropriate length of which is determined by site-specific factors such as the history of the land, and type of crops and livestock to be produced.

In view of this the present study was designed with following specific objective:

- To study the knowledge and adoption level of organic vegetable farmers

Materials and Methods

The study was conducted in Karnal and Sirsa districts of Haryana. One block was selected randomly from each district for the purpose of the study. From Karnal block village namely Sangoha, Sangohi, Geer, Landora & Churni Jagir were selected and from Sirsa block villages namely Alipur Titu Khera, Alikan, Sikanderpur, Bhamboor, Madho Singhan were selected. Thirty respondents were surveyed from each block with the help of well-structured interview schedule as per objectives of the study. On the whole, a total of 60 respondents were selected randomly. Data was analyzed and tabulated to draw the inferences as per objectives of the study. The collected data were coded, tabulated, analyzed and interpreted according to the objective of the present study with the help of appropriate statistical techniques. The descriptive statistical tools such as frequency, and percentage and chi square test had been adopted to draw the inference from the study. In the end, the collected data from the field was analysed in term of identifying various specific objectives.

Results and Discussion

The analysis of the data depicted (Table 18) that more than half of the respondents (58.33%) was belonged to 35-50 years age group. The same trend was also found in both the districts. More than half of the respondents (55.00%) were belonged to general caste followed by backward caste i.e. 45.00 percent. Maximum number of the respondents (45.00%) was found educated at senior secondary level & above. Less than fifty per cent of the respondents (41.66%) had nil subsidiary occupation of the family. Analysis revealed that less than forty percent of the respondents (38.33%) had 2-4 ha of land holding. Maximum numbers of the respondents (60.00%) belonged to joint family. On the other hand (53.33%) had 5-8 members sized family. It was found that maximum number of the respondents (38.33%) had 2 to 4 ha and (36.66%) had up to 2ha of organic land holding. Majority of the respondents (81.66%) had more than 2 animal possession. It was found that maximum number of the respondents (38.33%) had annual income from organic vegetable crops up to Rs. 50,000 and 36.66 per cent had Rs. 50,000- Rs. 1,00,000 respectively. Less than forty percent of the respondents (36.66%) had more than 3 lakh annual family income followed by (33.33%) who had less than 1 lakh annual family income. The trend was observed similar in both the regions. More than half of the respondents (53.33%) had nil social participation. Analysis clearly revealed that maximum number of the respondents (50.00%) had medium level of mass-media exposure. Less than half of the respondents (46.66%) had medium level of socio-economic status. Singh *et al.* (2019) [1] also reported the same trend in their study that majority of the farmers belonged to the age group of 31 to 50 years, other backward caste with primary to middle level education and lived in joint family of 6-10 members in their family. They also revealed that majority of the farmers had below 3.5 ha land, 11-20 years of experience of farming and were involved in agriculture including livestock. The study shows that 37 farmers (46.25%) had high knowledge about organic farming practices and 31 farmers (38.75%) had medium level of knowledge. Only 12 farmers (15.00%) were having low level of overall knowledge of organic farming practices.

Table 1: Contextual matrix of the respondents

Sr. No.	Variables	Sirsa (n = 30)	Karnal (n = 30)	Total (n = 60)
1.	Age			
	Up to 35 years age group	4 (13.33)	1 (3.33)	5 (8.33)
	35-50 years age group	18 (60.00)	17 (56.66)	35 (58.33)
	Above 50 years age group	8 (26.66)	12 (40.00)	20 (33.33)
2.	Caste			
	Backward caste	6 (20.00)	21 (70.00)	27 (45.00)
3.	General caste	24 (80.00)	9 (30.00)	33 (55.00)
	Education			
	Illiterate	2 (6.66)	0 (0.00)	2 (3.33)
	Up to middle school level	3 (10.00)	3 (10.00)	6 (10.00)
	Secondary School level	11 (36.66)	14 (46.66)	25 (41.66)
	Senior secondary level & above	14 (46.66)	13 (43.33)	27 (45.00)
4.	Subsidiary occupation of the family			
	Nil	13 (43.33)	12 (40.00)	25 (41.66)
	Dairy	6 (20.00)	3 (10.00)	9 (15.00)
	Small scale enterprise	7 (23.33)	13 (43.33)	20 (33.33)
	Service	2 (6.66)	4 (13.33)	6 (10.00)
5.	Size of land holding			
	Marginal (up to 1 ha)	2 (6.66)	0 (0.00)	2 (3.33)
	Small (1-2 ha)	6 (20.00)	14 (46.66)	20 (33.33)

	Semi-medium (2-4 ha)	13 (43.33)	10 (33.33)	23 (38.33)
	Medium (4-10 ha)	9 (30.00)	6 (20.00)	15 (25.00)
6.	Type of family			
	Nuclear	13 (43.33)	11 (36.66)	24 (40.00)
	Joint	17 (56.66)	19 (63.66)	36 (60.00)
7.	Size of family			
	Up to 4 members	13 (43.33)	6 (20.00)	19 (31.66)
	5-8 members	3 (10.00)	16 (53.33)	19 (31.66)
	Above 8 members	14 (46.66)	8 (26.66)	22 (36.66)
8	Size of organic land holding			
	Up to.2 ha	8 (26.66)	14 (46.66)	22 (36.66)
	.2 to.4 ha	13 (43.33)	10 (33.33)	23 (38.33)
	Above.4 ha	9 (30.00)	6 (20.00)	15 (25.00)
9	Animal possession			
	Up to 2 animal	7 (23.33)	4 (13.33)	11 (18.33)
	More than 2 animal	23 (76.66)	26 (86.66)	49 (81.66)
10	Annual income from organic vegetable crops			
	Up toRs. 50,000	8 (26.66)	15 (50.00)	23 (38.33)
	Rs.50,000-Rs.1,00000	13 (43.33)	9 (30.00)	22 (36.66)
	Above Rs.1,00000	9 (30.00)	6 (20.00)	15 (25.00)
11	Annual family income			
	Less than 1 lakh	7 (23.33)	13 (43.33)	20 (33.33)
	2-3 lakh	9 (30.00)	9 (30.00)	18 (30.00)
	More than 3 lakh	14 (46.66)	8 (26.66)	22 (36.66)
12	Social participation			
	Nil	17 (56.66)	15 (50.00)	32 (53.33)
	Low (1-2)	10 (33.33)	13 (43.33)	23 (38.33)
	Medium (3-4)	3 (10.00)	2 (6.66)	5 (8.33)
13	Mass media exposure			
	Low (up to 9)	8 (26.66)	11 (36.66)	19 (31.66)
	Medium (10-17)	14 (46.66)	16 (53.33)	30 (50.00)
	High (above 17)	8 (26.66)	3 (10.00)	11 (18.33)
14	Farm machinery			
	Low (12-18)	7 (23.33)	13 (43.33)	20 (33.33)
	Medium (19-24)	11 (36.66)	12 (40.00)	23 (38.33)
	High (25-31)	12 (40.00)	5 (16.66)	17 (28.33)
14.	Socio-economic status			
	Low (12-18)	9 (30.00)	12 (40.00)	21 (35.00)
	Medium (19-24)	12 (40.00)	13 (43.33)	25 (46.66)
	High (25-31)	9 (30.00)	5 (16.66)	14 (23.33)

Knowledge level of the respondents regarding organic vegetable crops

The knowledge about accurate method/procedure was reported by 100 percent respondents who had full knowledge about it followed by 93.33 percent respondents who had full knowledge about the statement that bio fertilizers increase the crop yield. Regarding bio fertilizers are cheaper than chemical fertilizers 98.33 percent of the respondents again had full knowledge about it. Bio fertilizers are useful for all types of soils was reported by 95.00 percent of respondents who had full knowledge about it. Regarding the statement that bio fertilizers improve soil fertility 95.00 percent respondents had full knowledge about it followed by statement that bio fertilizers decrease the insect pest and disease was reported by 88.33 percent of respondents had full knowledge. Similarly statement that bio fertilizers are pollution free fertilizers were reported by 98.33 percent respondents had full knowledge about it. Naik *et al.* (2009) [2] also conducted the study which also revealed that the knowledge percentage about the use of biofertilizer was also quite high (72.91%). Three-fourth of the respondents (75.00%) was found to have high level of knowledge followed by medium level (15.00%). Regarding the statements that crop rotation and shallow ploughing helpful in reduction of weed population was reported by 85.00

percent respondents who had full knowledge about it. Likewise regarding the statement that manual weeding is one of the main solution of weed control 48.33 percent respondents reported of full knowledge and another 48.33 percent respondents of partial knowledge. Regarding the statement that crop rotation control pests full knowledge about it was reported by 88.83 percent respondents. Similarly for the statement that proper crop residue management check major pests and diseases both 55.00 percent respondents and 45.00 percent respondents reported for full and partial knowledge respectively.

Statement of knowledge about vermi-compost and its benefits 40.00 percent respondents had no knowledge followed by 35 percent who had partial knowledge and rest 25 percent respondents who had full knowledge about it. Naik *et al.* (2009) [2] also revealed that the knowledge percentage of vermin compost was 60.41 per cent and accorded last rank order out of six organic farming practices. The study also revealed that 37farmers (46.25%) had high knowledge about organic farming practices and 31 farmers (38.75%) had medium level of knowledge and only 12 farmers (15.00%) were having low level of overall knowledge of organic farming practices.

Table 2: Knowledge level of the respondents regarding organic vegetable crops

Sr. No.	Statement	Full knowledge (2)	Partial knowledge (1)	No knowledge (0)
1	Accurate method/procedure of FYM preparation.	60 (100.00)	0 (0.00)	0 (0.00)
2	Way of crop residue incorporation in soil.	31 (51.66)	20 (33.33)	09 (15.00)
3	Organic/solid waste management meaning.	33 (55.00)	21 (35.00)	06 (10.00)
4	Stage at which green crop should be incorporated in field.	22 (36.66)	20 (33.33)	18 (30.00)
5	Bio fertilizers increase the crop yield.	56 (93.33)	04 (6.66)	00 (0.00)
6	Bio fertilizers are cheaper than chemical fertilizers.	59 (98.33)	01 (1.66)	0 (0.00)
7	Bio fertilizers are useful for all types of soils.	57 (95.00)	03 (5.00)	0 (0.00)
8	Bio fertilizers are pollution free fertilizers.	59 (98.33)	01 (1.66)	0 (0.00)
9	Bio fertilizer decrease the insect pest and disease.	53 (88.33)	07 (11.66)	0 (0.00)
10	Bio fertilizers improve soil fertility.	57 (95.00)	03 (5.00)	0 (0.00)
11	Knowledge about vermin-compost and its benefits.	15 (25.00)	21 (35.00)	24 (40.00)
12	Crop rotation and shallow ploughing helpful in reduction of weed population.	51 (85.00)	09 (15.00)	0 (0.00)
13	Manual weeding is one of the main solution.	29 (48.33)	29 (48.33)	02 (3.33)
14	Seed rate/proper spacing/adjusting transplanting time has any effect on pest/disease population.	43 (71.66)	17 (28.33)	0 (0.00)
15	Proper crop residue management check major pest and disease.	33 (55.00)	27 (45.00)	0 (0.00)
16	Resistant varieties control pest.	47 (78.33)	13 (21.66)	0 (0.00)
17	Crop rotation controls pests.	53 (88.33)	7 (11.66)	0 (0.00)

Figure in parentheses denote percentage

Year wise adoption of organic vegetable farming by the farmers

Regarding the adoption schedule 40.00 per cent of the respondents had adopted organic farming since two to three years followed by 31.66 per cent respondents who adopted it since one to two years again followed by 26.66 per cent respondents who adopted it since more than three years. The rest 1.66 per cent adopted it since less than one year.

Table 3: Year wise adoption of organic vegetable crops

		Sirsa (n = 30)	Karnal (n = 30)	Total (n = 60)
1.	Less than one year	1 (3.33)	0 (0.00)	1 (1.66)
2.	One to two years	9 (30.00)	10 (33.33)	19 (31.66)
3.	Two to three years	12 (40.00)	12 (40.00)	24 (40.00)
4.	More than three years	8 (26.66)	08 (26.66)	16 (26.66)

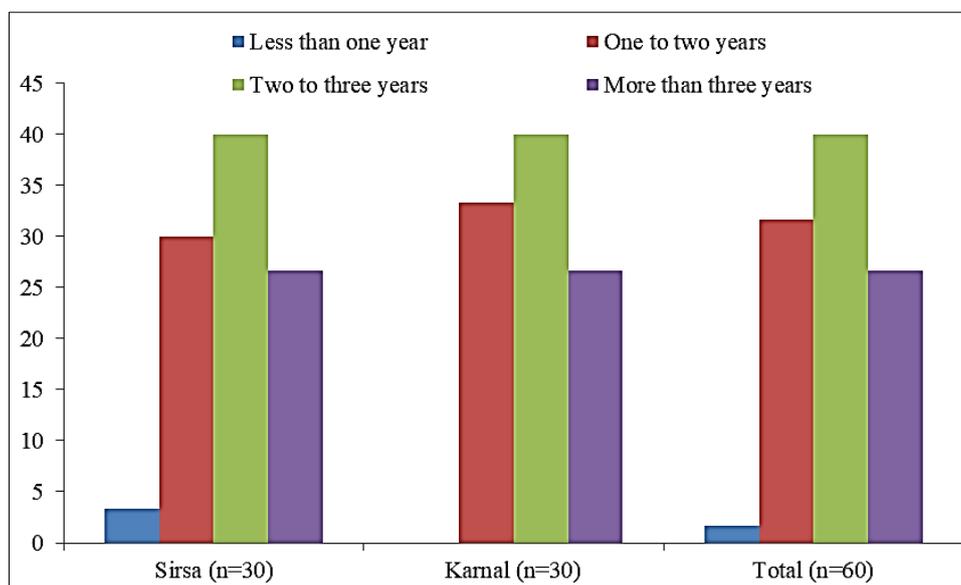


Fig 1: Year wise adoption of organic vegetable crops

Adoption level of the respondents regarding organic vegetable crops

Regarding the adoption of organic farming 61.66 percent respondents had full adoption about organic/solid waste management followed by 60.00 percent respondents who had full adoption about the statement that bio fertilizers are purchased from authorized source. Regarding crop rotation and shallow ploughing for weed control 90.00 percent respondents had full adoption about it followed by 85 percent respondents who also had full adoption about summer ploughing. Regarding vermi-compost application majority of the 51.66

percent respondents had no adoption about it and likewise 66.66 percent respondents had no adoption about vermi-compost preparation method. The statements that crop residue managed properly to check major pest and disease 48.33 percent respondents had full adoption about it followed by 43.33 percent respondents who had partial adoption about it. In the same trend the statement that sown resistant varieties for pest/ disease control 55.00 percent respondents had full adoption about it followed by 45.00 percent respondents who had partial adoption about it. Regarding adoption of indigenous/traditional method for proper storage 83.33 percent respondents had full adoption about it and for the

statement that seed treated with bio fertilizers for vigour growth/ disease control 43.33 percent respondents had full adoption and each partial adoption respectively. Singh *et al.* (2019) ^[1] revealed in his study that majority

(55%) of farmers had medium level of adoption followed by high (25%) and low level of adoption (20%). Similar findings were reported by Singh and Chauhan (2006) ^[3], Singh and Chauhan (2010) ^[4], and Singh (2015) ^[1].

Table 4: Adoption level of the respondents regarding organic vegetable crops

Sr. No.	Statements	Full adoption (2)	Partial adoption (1)	No adoption (0)
1	Organic/solid waste management	37 (61.66)	16 (26.66)	07 (11.66)
2	Adoption of green manure crop selected and sowing time	25 (41.66)	18 (30.00)	17 (28.33)
3	Seed treated with bio fertilizer for vigour growth/disease control	29 (43.33)	26 (43.33)	5 (8.33)
4	Biofertilizers purchased from authorized source	36 (60.00)	20 (33.33)	4 (6.66)
5	Vermicompost application	16 (26.66)	13 (21.66)	31 (51.66)
6	Vermicompost preparation method	17 (28.33)	3 (5.00)	40 (66.66)
7	Practiced crop rotation and shallow ploughing for weed control.	54 (90.00)	6 (10.00)	0 (0.00)
8	Practiced summer ploughing	51 (85.00)	9 (15.00)	0 (0.00)
9	Crop residue managed properly to check major pest and disease	29 (48.33)	26 (43.33)	5 (8.33)
10	Sown resistant varieties for pest/disease control	33 (55.00)	27 (45.00)	0 (0.00)
11	Adopted indigenus/traditional method for proper storage	50 (83.33)	10 (16.66)	0 (0.00)

Figure in parentheses denote percentage.

Conclusion

It was concluded that knowledge about accurate method/procedure was reported by 100 percent respondents who had full knowledge. Regarding the adoption schedule 40.00 per cent of the respondents had adopted organic farming since two to three years. Regarding crop rotation and shallow ploughing for weed control 90.00 per cent respondents fully adopted it followed by 85 per cent respondents who also had full adoption about summer ploughing. Assis (2011) ^[8] in his study concluded that there is a need for greater awareness especially among producers or farmers through extension programs and also training and promotional activities to become conscious of sustainable organic farming with use of those agricultural methods which do not create hazards for the environment or jeopardize the health of soil, plants, animals, humans and ecosystems. There is need for government to play important role to spur growth of the organic industry especially for vegetable industry through strategic policy development and programs to support it. Research and development (R & D) and marketing are also very important issues or aspects to be look into in order to increase the production of organic products through organic farming practices. Maityetal () also stressed that the research for organic farming should be focused on developing technologies which may attract the vegetable growers to adopt them, keeping in view of the requirements of small holdings of resource poor small and marginal farmers. Singh *et al.* (2019) ^[1] also concluded in his study that majority of the farmers had adopted the organic farming technology to medium extent. Out of sixteen variables, ten variables education, caste, occupation, social participation, herd size, source of information, mass media exposure, knowledge, attitude and training received were found to be positively and significantly correlated with adoption of organic farming technology. Margit olle *et al.* (2012) ^[6] revealed in their study that the growth of vegetables was affected positively in 43% and negatively in 57% of all studied cases from the literature on organic cultivation. Organic cultivation affected the yield of vegetables 59% positively, 29% negatively and 12% did not have any significant influence. Organically grown vegetables have, in most cases (65%), better nutritional value than conventional ones. She also reported that weed control is the most difficult part of vegetable production in organic cultivation and the good methods against weeds include

tillage, mulching, flaming and hot water treatment. If the proper technology is used the organic cultivation of vegetables is not so time and money-consuming and the trend is that, with organic cultivation, vegetables with better quality and better nutritional value with no pesticides residues can be produced.

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