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Farmer's Awareness Level on Organic Agriculture in Varanasi District of Uttar Pradesh, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present study was conducted in four blocks of Varanasi district (Uttar Pradesh). A total 332 respondents from 63 villages were selected by the researcher. The objective of the study was to know the awareness level of respondents towards the organic fertilizers, organic farming, sources of information regarding awareness, and duration of practicing organic agriculture. It was found that around 43.97 percent of the respondents were aware of the organic farming in the study area. However only four types of organic fertilizers Organic Manure, Vermicompost, City compost, and PROM, known to the respondent out of 10 fertilizers recommended under FCO 1985, amended in July 2021. Most of the respondents practiced organic farming within the last 6 to 8 years, concurrent with the government policies emphasizing organic farming. The most important source of information regarding awareness towards organic farming was Krishi Vigyan Kendra and NGOs in the study area.

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1. INTRODUCTION

As per the definition of the United States Department of Agriculture (USDA), a study team on organic farming, "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives, etc.) [1] and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection" [2]. The goal of organic agriculture is to contribute to the enhancement of sustainability, which refers to the successful management of agricultural resources to satisfy human needs while at the same time maintaining or enhancing the quality of the environment and conserving natural resources for future generations [3]. The concept of organic agriculture is not alien to India. The first scientific approach to organic farming dates back to the Vedas of the later Vedic period, the essence of which is to live in harmony with, rather than exploit, Mother Nature [4]. There is a brief mention of several organic inputs in our ancient literature, literature like Rigveda, Ramayana, Mahabharata, Kautilya Arthasashthra, etc. Organic agriculture has its roots in traditional agricultural practices that evolved in countless villages and farming communities over the millennium. Significant milestones in the area of organic farming are presented in Table 1 [5].

Table 1. Historical perspective of organic farming in India

Ancient period	
Oldest practice	Ten thousand years old, dating back to the Neolithic age, practiced by ancient civilizations like Mesopotamia, Hwang-Ho basin, etc.
Ramayana	All dead things - rotting corpses or stinking garbage returned to earth are transformed into wholesome things that nourish life. Such is the alchemy of Mother Earth - as interpreted by C. Rajagopalachari
Mahabharata (5500 BC)	Mention of Kamadhenu, the celestial cow, and its role in human life and soil fertility
Kautilya Arthashastra	Mentioned several manures like oil cake, excreta of animals
Brihad-Sanhita (by Varahmihir)	Described how to choose manures for different crops and the methods of manuring.
Rig Veda (2500–1500 BC)	Mention of organic manure in Rig Veda 1, 161, 10, 2500–1500 BC, is Green Manure in Atharva Veda II 8.3 (1000 BC). In Sukra (IV, V, 94, 107–112) it is stated that to cause healthy growth, the plant should be nourished by dungs of goat, sheep, cow, water as well as meat. A reference to manure is also made in Vrksayurveda by Surpala (manuscript, oxford, No 324 B, Six, 107-164)
Holy Quran (590 AD)	At least one-third of what you take out from soils must be returned to it, implying recycling or post-harvest residue.

2. MATERIALS AND METHODOLOGY

Ist Stage - Selection of the District

Varanasi District was divided into three tehsils (Tehsil Sadar, Tehsil Pindra, and Tehsil Rajatalab) and eight blocks. The reason for selection districts were following

1. The researcher himself is familiar with the area.
2. The researcher is conversant with the local language, geography, agricultural situation, and other aspects of the area.
3. The knowledge of the tract was also helpful for collecting reliable information.

IInd Stage - Selection of the Block

Varanasi district comprises eight development blocks viz., Arajiline, Baragaon, Chiraigaon, Cholapur, Harhua, Kashi Vidhya Peeth, Pindara, and Sewapuri. Out of these eight blocks, 50 percent blocks, namely Kashi Vidhyapeeth, Baragaon, Harhua, and Pindara, were selected purposively for the present study [6].

IIIrd Stage – Selection of the Villages

There are 1360 villages in Varanasi towns. The individual selected block development offices received a complete list of towns. The villages were arranged in ascending order based on their size of land holding in the block. Then 10% of villages from each league were selected randomly, i.e., 63 villages.

Frequency: This measure was used to know the distribution pattern of respondents' variable wise and to categorize the problems perceived by respondents in order of importance.

Percentage Analysis Method: The simple percentage analysis method refers to a special kind of ratio. With the help of absolute figures, it wasn't easy to interpret any meaning from the collected data, but when percentages are found out. Then it becomes easy to find the relative difference between two or more attributes.

Formula: -

$$P = \frac{X}{N} * 100$$

Where;

P= Percentage
X= Frequencies
N= Total number of respondent

Chi-square Test - A chi-square (χ^2) statistic is a test that measures how a model compares to actual observed data. The data used in calculating a chi-square statistic must be random, raw, mutually exclusive, drawn from independent variables, and drawn from a large enough sample.

The Formula for Chi-square test-

$$x^2 = \sum \frac{(O_i - Ei)^2}{E_i}$$

Where,

x^2 = Chi Squared
O_i = Observed Value
E_i = Expected Value

Table 2. Distribution of farmers in the study area

Blocks	Villages selected	Marginal farmers	Small farmers	Semi-medium farmers	Medium farmers	Large farmers	Total
KashiVidhyapeeth	13	4	10	32	26	4	76
Baragaon	14	10	16	28	22	6	82
Harhua	17	8	10	24	24	4	70
Pindara	19	12	16	38	28	10	104
Total	63	34	52	122	100	24	332

Table 3. Awareness of chemical and organic fertilizer

Sample size: 332			
		Chemical fertilizer	**Organic fertilizer**
Types of land holding	Marginal	34 (10.24)	20 (6.02)
	Small	42 (15.66)	24 (7.22)
	Semi medium	122 (36.74)	46 (13.85)
	Medium	100 (30.12)	40 (12.04)
	Large	24 (7.22)	16 (4.81)
Total		**332 (100.00)**	**146 (43.97)**

Source: Based on data collected by the researcher in the Study Area

3. RESULTS AND DISCUSSION

Table 3 revealed that all the respondents in the study area were aware about chemical fertilizers 10.24 percent of the Marginal farmer were knowledgeable about chemical fertilizers however only 6.02 percent of marginal farmers were aware of Organic fertilizer [7], in small land holding farmers which were 15.66 percent of total respondent only 7.22 percent were knowledgeable about the organic fertilizer. The Semi medium group, which accounts for 36.74 percent of respondents, has the highest awareness level of 13.85 percent. The medium landholder, which account for 30.12 percent of the total respondents had second highest awareness regarding organic fertilizer which stood at 12.04 percent. The large landholder, which has the least number had an understanding of 4.81 percent. The overall awareness regarding the organic fertilizer stood at 43.97 percent. Fig 1 reveals that out of total aware respondent towards organic fertilizer i.e. 146 (43.97), the maximum share of around 32 percent belong to semi medium respondents followed by 27 percent medium respondent, so both groups combine make more than 50 percent share in awareness regarding the organic fertilizer the other group small (16 percent) and marginal (14 percent) contribute in understanding however 11 percent of respondent were from large land holding [8].

Table 4 revealed that only 1.36 percent of the small land holding group uses the city compost, the semi-medium group has the highest percentage, i.e. 4.10 percent in uses of city compost and the marginal landholder stood at 2.73 percent in using city compost it was found that no marginal and large group uses the city compost as a fertilizer. The overall contribution of city compost stood at 8.21 percent. The Vermicompost was maximum used by semi medium group which stood at 7.58 percent followed by the medium group, which stood at 8.21 percent. There was tie in large and small farmers in uses of vermicompost, which stood at 4.10 the marginal farmers stood at 5.47 percent in using the vermicompost. The vermicompost was the second highest preference of the respondent in organic fertilizer. Phosphate rich organic Manure (PROM), which is an advanced fertilizer has the least uses in the study area only 2.73 percent of respondent using it, and only one respondent in each marginal group and semi medium group uses the PROM [9]. The Organic Manure was found to be the highest preference in organic fertilizer, which stood at 57.53 percent. There is a tie between the semi-medium and medium groups in using organic manure as fertilizer, which stood at 16.43 percent. The small group uses 10.95 percent, followed by the marginal and large group, which stood at 6.84 percent. However, no respondent uses Bio enriched organic manure, Raw bone meal, streamed meal, Potash derived from Rhodophytes, fermented organic manure, and liquid fermented organic manure [10]. The overall percentage of organic fertilizer use was highest among the medium group, i.e. 31.50, followed by the medium group at 27.39 percent, 16.43 percent in the small group, and 13.69 percent of respondent of marginal categories uses organic fertilizer, and the large farmers stood at 10.95 percent. Fig 1 showed that out of a total of 10 types of organic fertilizer, only four were used by the respondent in which organic manure has a highest preference of the respondent, followed by vermicompost and city compost in the study area.

Table 4. Distribution of respondents based on the type of Organic Fertilizer used

Type of Organic Fertilizers	Type of Land Holding				
	Marginal	Small	Semi medium	Medium	Large
City Compost	0(0.00)	2(1.36)	6(4.10)	4(2.73)	0(0.00)
Vermicompost	8(5.47)	6(4.10)	14(9.58)	12(8.21)	6(4.10)
Phosphate-rich organic manure	2(1.36)	0(0.00)	2(1.36)	0(0.00)	0(0.00)
Organic manure	10(6.84)	16(10.95)	24(16.43)	24(16.43)	10(6.84)
Bio-enriched organic manure	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
Raw bone meal	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
Steamed bone meal	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
Potash derive from Rhodophytes	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
Fermented organic manure	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
Liquid-fermented organic manure	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)

TOTAL	20(13.69)	24(16.43)	46(31.50)	40(27.39)	16(10.95)

Table 5. Distribution of farmer based on years of practice in organic farming

Year of Practicing	Type of Land Holding					Total
	Marginal	Small	Semi medium	Medium	Large	
Less than two year	4 (2.73)	8 (5.47)	12 (8.21)	14 (9.58)	2 (1.36)	40 (27.39)
2-4 years	12 (8.21)	8 (5.47)	16 (10.95)	10 (6.84)	6 (4.10)	52 (35.61)
4-6 years	2 (1.36)	4 (2.73)	12 (8.21)	8 (5.47)	4 (2.73)	30 (20.54)
6-8 years	2 (1.36)	4 (2.73)	4 (2.73)	4 (2.73)	0 (0.00)	14 (9.58)
More than eight year	0 (0.00)	0 (0.00)	2 (1.36)	4 (2.73)	4 (2.73)	10 (6.84)
Total	20 (13.69)	24 (16.43)	46 (31.50)	40 (27.39)	16 (10.95)	146 (100)

Source: Based on data collected by the researcher in Study Area

Table 5. revealed that 27.39 percent of respondents practicing organic farming for less than two years. The maximum percentage of respondent belong to the Medium group which stood at 9.58, followed by the semi medium group which stood at 8.21, the minor group respondent has a value of 8 respondents who have practiced organic farming for less than two years [11]. The marginal stood at 2.73, and the prominent farmer stood at 1.36 percent in less than two year of practicing organic farming. The highest percentage of respondents i.e. 35.61 practicing organic farming between the past 2-4 years in which highest share was 10.95 percent of semi-medium farmers followed by marginal farmers stood at 8.21 percent, 6.84 percent who practice organic farming between 2 to 4 years. 4.10 percent of prominent farmer practicing in this mentioned period, around 20.54 percent of respondents practicing organic farming between 4 to 6 years the highest share obtained by semi-medium farmers i.e., 8.21 percent followed by small and large farmers with a share of 2.73 percent however marginal farmer has most minor percentage in the year 4-6 year with 1.36 percent. For the year 6 to 8 the maximum share holder belonged to small semi, medium and medium categories farmers, with foraving equaleight share of 2.73 percent; however there was no prominent farmer found in this classes, during survey. Two respondents practicing organic farming for more than eight years were highest in medium and large farmers, with 2.73 percent in both categories and two respondents in semi medium categories. However, no marginal and small farmer practicing organic farming for more than eight years. Marginal farmers' maximum respondent performing organic farming Between 2 to 4 years However the average was found to be five years. In small farmers' categories, maxim farmers lie between less than two year and 2 to 4 years; maximum respondent practicing organic farming from 2 to 4 years; in medium farmers' categories, maximum respondent belong to less than two year categories; and in large farmers' top respondent belong to 2 to 4 year of practicing organic farming [12].

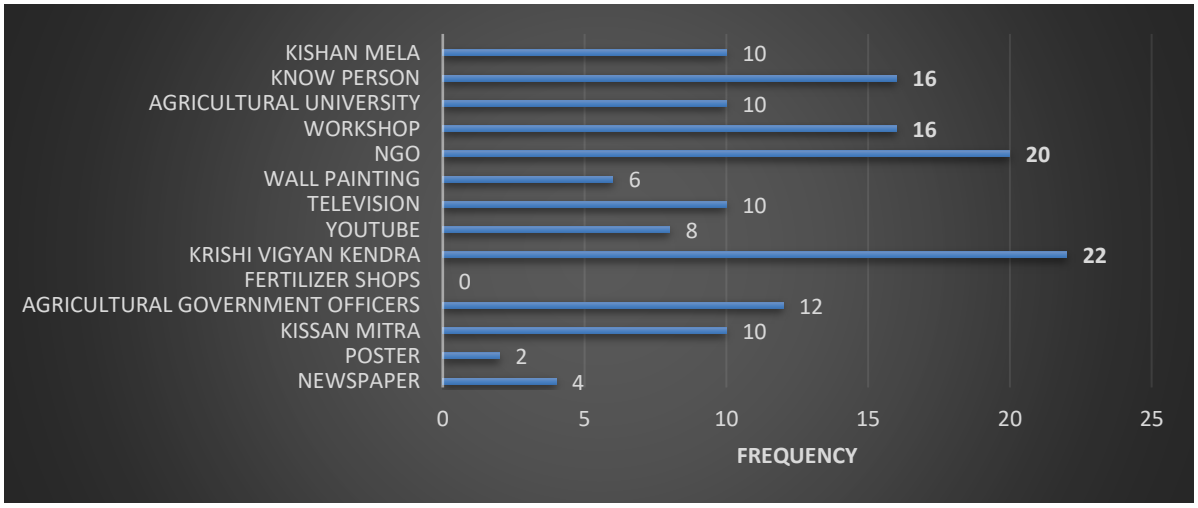

Fig. 1. Source of information regarding organic farming

Fig revealed that the approx. 15.06 percent of the respondents affect from promotional activity performed by Krishi Vigyan Kendra for awareness regarding organic farming. The second highest promotional activity was performed by the NGO in the study areas, which contribute 13.69 percent share in promoting awareness regarding [13].

Organic farming the third highest contribution was given by the workshop arranged by Department of agriculture in the study area, also, 10.95 percent of respondents stated that they know about organic farming from their relative person or "know person". Approx. 8.21 percent of respondents stated that they receive information regarding organic farming from the Agricultural officers in the study areas; newspaper also contribute to promotional activity with the contribution of 2.73 percent in awareness regarding organic farming. The poster for advertisement is also a promotional activity which contributed 1.36 percent of awareness of the respondents for organic farming; the Kisan Mitra in each village contributed 6.84 percent share in awareness regarding organic farming in the study areas, around 5.47 percent of respondents stated that they obtain information regarding organic farming from YouTube which act as a promotional tool for advertisement. Approx. 6.84 percent of respondents mentioned that they get information regarding organic farming from television channels like DD Kisan, etc., around 4.10 percent of respondents stated that they get information about organic farming from the wall painting in their village which contain motivational quotes and pictures, the Banaras Hindu University also plays a contribution in awareness regarding organic farming which is 6.84 percent. The kisan mela, which was organized from time to time acts as a promotional activity for organic farming itcontributes 6.84 percent in awareness share. In marginal categories of farmers, i.e. 13.69 percent, a maximum of 2.73 percent were influenced by Krishi Vigyan Kendra and Kisan Mela in the study area.

Major Finding of the Study

- Out of 332 respondents 43.97 percent were aware about the organic agriculture.
- Out of all Organic fertilizers approved Fertilizer (Inorganic, Organic and Mixed) Order, 1985, amended in July 2021, 57.53 Percent of respondent using Organic Manure in study area followed by Vermicompost.
- Around 60.0 percent of respondent started practicing organic farming from 2019 due to Government emphasis.

The prominent source of information for awareness of organic farming was KVK and NGO's in the study area.

4. CONCLUSION

It was concluded that around 42 percent of the respondents in the study area were aware of the organic farming. It was evident that mostly farmers have engaged in this activity for the past 6 years, which shows that goverment initiative like Namami Gange, PGS India, and NPOP system in the study area However, it was revealed that fertilizers shop has no contribution in the study area regarding awareness towards organic farming however around 22 respondents were influence by Krishi Vigyan Kendra in the study areas followed by 20 respondents by the NGO working in the study area. The most minor promotional activity was Poster, Newspaper, and wall painting in the study ,areas. The study revealed that maximum influence was done when respondents were in direct contact with the activity of awareness regarding organic farming.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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