Understanding the Level of Farmers' Explore the Extent of Adoption & Impact Over the socio-economic and Production Scenario on Vermicompost: A Post Training Behavioural Exploration of the Small-holder Farmers in Bihar State of India

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ABSTRACT: Vermicompost is an innovative kind of organic fertilizer which is distinctly following all the principles of sustainability as an agricultural input. Vermicompost is an excellent nutrient-rich organic fertilizer and soil conditioner. This is an impressive technology particularly in the context of contemporary climate change as it maintains the principles of sustainability and helps to maintain the crop as well as the soil health. This research study tried to explore the knowledge and skill level of the farmers who had previously attended the vermicompost training programme organised by the KVKs. This study was conducted in 3 districts of Bihar state *viz.* Samastipur, Muzaffarpur and Madhubani and the sample size considered for this study is 150. 2 blocks from each of these 3 districts were selected purposively for conducting the survey. The respondents were assessed and categorised into the three distinct categories of low, medium and high on the basis of their knowledge and skill level. More than half of the farmers (50%) showed the medium level of knowledge in all the 3 districts under study. More than 50% of the farmers in Samstipur and Muzaffarpur district are with medium level of skills and 50% of the farmers in Madhubani district are having the medium level of skills related to vermicompost technology. Data were analysed by using statistical tools in MS Excel for calculating knowledge and skill index of the individual respondent farmer.

Keywords: Adoption, impact, training, vermicompost, technology, vermiwash.

INTRODUCTION

Vermicompost is the decomposed product of vegetable, food waste, bedding materials, vermicast or worm cast in a form a heterogeneous mixture. It is basically the breakdown of organic matter content with the activities of the earthworm. The level of contaminants becomes lower in the newly created vermicompost with the increasing concentration of nutrients (Chauhan *et al.*, 2010). Vermicompost is an excellent nutrient-rich organic fertilizer and soil conditioner. Vermicomposting is the process of producing the vermicompost. The biological degradation and stabilisation of organic waste with the help of earthworms and various microbes help to create vermicompost through the process of vermicomposting (Joshi and Chauhan 2006). Vermicompost is playing a crucial role in today's organic farming and very much harmless to the crops. It is a stable fine granular organic matter which eventually increases the passage in the soil for the entry of air. It also allows the organic carbon to get released slowly in the soil slowly and steadily which thereby enables the crops or plants to absorb those nutrients properly (Allen, 2016).

Vermicompost strikingly supports the three-pillar model of sustainability and it is a product which supports the philosophy of sustainability. This is such a technology which is 'economically viable', 'environmentally sustainable' and 'socially acceptable' at the same time (Mahmud *et al.*, 2016). This is an impressive technology particularly in the context of contemporary climate change as it maintains the principles of sustainability and helps to maintain the crop as well as the soil health.

Training is a critical input in improving farmers' knowledge and skills level as it provides an excellent opportunity to the farmers for learning by doing themselves. The KVK training provides an opportunity for the farmers to inculcate a transparent idea about the vermicompost technology, particularly the preparation of vermicompost along with its application in the crop field. This kind of training helps the peasants to find a way of self employment and it supports the way towards poverty eradication at a micro level. This certainly helps to open new avenues of employment generation for hundreds of rural poor and thereby acts as a modifier in their livelihood status (Gaikwad and Gunjal 2000). This era has introduced a vicious facet of climate change and farming sector is a direct arena which is suffering from the ill effects. Effect of synthetic fertilizers in the land is creating a bunch of intangible troubles not only in the crop production, but also in the soil quality as well as produce quality. Indian Council of Agriculture Research (ICAR) along with the state department of agriculture is acting in tandem towards that direction by providing thorough support to the stakeholders.

This present study was designed with 2 specific objectives to accomplish and those are as follows:

— To explore the extent of adoption level of the farmers after attending the vermicompost training programme organised by the *Krishi Vigyan Kendra* (KVKs)

— To assess the impact of the farmers concerned with the vermicompost technology in the post KVK training period on vermicompost technology

METHODOLOGY

Research design and Sources of data: The data were collected from a specific group of farmers who took part in various training programs organised by different *Krishi Vigyan Kendra (KVKs)*/Farm Science Centres of the state Bihar. This study was designed to assess the level of adoption along with their impact after attending those training programs. The study was conducted in 3 districts of Bihar state *viz.* Samastipur, Muzaffarpur and Madhubani. 2 blocks from each of these districts were

selected randomly for conducting this study. Pusa and Tajpur bocks were selected from Samastipur, Saraiya and Marwan blocks were selected from Muzaffarpur and Madhwapur with Bisfi blocks were selected from Madhubani district. The particular villages under this very study were Morsand, Karmila, Thahra and Kothia in Samastipur district; Birpur, Anandpur, Dwarikapur Khaie, Bhagwatpur and Jhakhra Shekh in Muzaffarpur district; Basuki Bihari, Mahua, Pihwara, Sahar, Jagwan and Lohra in Madhubani district. 25 farmers from each of the selected blocks were interviewed in a face-to-face situation using a pre-tested interview schedule and the data were collected from 150 farmers in total who have attended at least a single vermicompost training conducted by the local KVKs.

Extent of Adoption level- Total 20 questions were asked to test the adoption of the farmers and each of those are scored as 0, 1, 2, 3 and 4 for 'very low' adoption, low ,moderate high, 'high' adoption and very high adoption respectively completely based on the responses of the respondents. The adoption of each respondent was then calculated by estimating the adoption index for each of them. The respondents were categorised into 5 distinct categories *i.e.* very low' adoption group, low, medium adoption group high adoption group and very high adoption group based on the statistical estimation of arithmetic mean and standard deviation.

Impact Assessment- Total 20 questions were asked to test the skills of the farmers and each of those are scored as 0, 1 and 2 for Low impact, moderate and high impact respectively completely based on the responses of the respondents in the 3-point continuum. The respondents were categorised into 3 distinct categories *i.e.* low impact group, medium impact group and highly impact group based on the statistical estimation of arithmetic mean and standard deviation. Statistical treatments such as percentage, arithmetic mean, standard deviation, average were used which are the part of descriptive statistics. The data were duly analysed as well as categorised by using these tools in MS Excel.

Table 1: Distribution of frequency & percentage on the basis of their extent of adoption of vermi-compost technology among trainees.

Categories	Districts					
	Samastipur		Muzaffarpur		Madhubani	
	f	%	f	%	f	%
Very Low (0-20)	04	08	06	12	03	06
Low (21-40)	06	12	03	06	27	14
Moderate (41-60)	31	62	27	54	28	56
High (61-80)	07	14	05	10	04	18
Very high (81-100)	02	04	09	18	08	16
Mean SD	70.77 26.23		72.45 35.55		72.88 34.12	

RESULTS AND DISCUSSION

A. *Extent of adoption of vermi-compost technology among trainees*

It was found that the maximum number of farmers (62%) in Samastipur is holding medium level of adoption concerned with vermicompost technology, followed by 14% farmers holding high level of adoption and 12% farmers holding low level of adoption. This quantitative distribution was based on the arithmetic mean = 70.77 and the standard deviation = 26.23 of Samastipur district. However more than half of the farmers (54%) in Muzaffarpur district are holding moderate level of adoption, followed by 18% farmers holding very high level of adoption and 12% farmers holding very low level of adoption. This quantitative distribution was based on the arithmetic mean=72.45 and the standard deviation=35.55. In Madhubani district, the data follow the similar kind of trend. 56% of the farmers were holding medium level of adoption, followed by 18% of the farmers holding high level of adoption and 16% of the farmers holding very high level of adoption. This quantitative distribution was based on the arithmetic mean = 72.88 and the standard deviation=34.12 respectively. The findings were in line with Swetha *et al.* (2020) and confirmity with Joshi (2004) and Modi *et al.* (2008) were in similar pattern with Around 56.67 per cent of respondents who had attended training at *Krishi Vigyan Kendra* had formed the vermicompost as an enterprise, and 41.18 percent of those who had adopted belonged to a high adoption level.

B. *Impact assessment of training on vermi-compost technology among trainees*

The majority of farmers *i.e*. 72% were found to be having a moderate level of impact on vermicompost technology, followed by 18 % of farmers who had a low impact level and 10% of farmers who had a high level of impact in Samastipur District. This quantitative distribution was based on the Samastipur district's arithmetic mean of 71.56 and standard deviation of 24.67. However, in the Muzaffarpur district, more than half of the farmers (64%) had a moderate level of impact, followed by 22% of farmers with a low level of impact and 14% of farmers with a high level of impact. The arithmetic mean and standard deviation of this quantitative distribution were 72.76 and 23.24, respectively. The findings exhibit a similar pattern in the Madhubani district. Farmers held a medium level of impact in 68 percent of the cases, a high level of impact in 18 percent of the cases, and a low level of impact in 14 percent of the cases. Based on an arithmetic mean of 78.24 and a standard deviation of 23.76, this quantitative distribution was created. While Tiwari *et al.* (2020) found in their research that the impact assessment of the trainees was necessary to evaluate these training programmes, the current study was conducted to learn the impact assessment of the participants and suggestions from the trainees to improve the upcoming training courses. The majority of participants enrolled in the training programme to pursue an occupation in vermin composting, whereas 10.5% enrolled purely for receiving a certificate of completion. Three ideas made by the participants for making improvements to future programmes were placing more emphasis on practical sessions, providing printed materials, and extensive publicising.

Table 2: Impact of training on vermicompost technology among the trainees.

Impact of training	Districts					
Categories	Samastipur		Muzaffarpur		Madhubani	
	f	%	f	%	f	%
Low Impact (Score of 1)	09	18	11	22	07	14
Moderate Impact(Score of 2)	36	72	32	64	34	68
High Impact(Score of 3)	05	10	07	14	09	1
Mean SD	71.56 24.67		72.76 23.24		78.24 23.76	

CONCLUSION

The majority of the farmers under study have exhibited medium level of adoption regarding vermicompost technology which had been gained by them during the KVK training programs. Alongside, most of the farmers' respondents divulged the medium level of impact related to vermicompost technology as they possessed. But it is strongly recommended to the KVK scientists as well as the public extension workers to conduct more training programs and ensure the farmers participation to a higher degree by functioning in tandem with the agricultural universities and the regional agricultural research centres. The adoption as well as impact will be enhanced to a satisfactory level with the sincere attempts of the institutes and the subsequent post programme exploration of the behavioural metrics of the farmer participants and the rural habitants of the northern part of Bihar state.

FUTURE SCOPE OF THE STUDY

Based on the results obtained from the study and the experience gained on completion of the investigation it is suggested that

1. The independent variables selected for the research are socio-personal, socio-economical, communicational

and extent of adoption, the attributes that are considered in the study may be limited to determine the adoption of the respondents. Hence some additional factors may be added to make the study more comprehensive in the adoption of recommended vermi compost production technology.

2. The study was limited to only 3 districts in Bihar state. Hence, a detailed study covering more districts may be conducted to generalize the recommendations for the entire state of Bihar.

3. There is a wide scope for the study of the psychological characteristics of the respondents. Few kinds of research are available on these aspects.

4. The agriculture universities and State Department of Agriculture should probe into the reasons for the non-adoption of recommended vermi production technology.

5. From the study, it was found that most of the respondents had no contact with SMS and Agricultural Scientists, thus a detailed study focusing on the problems faced by SMS and agricultural Scientist to have contact with lac growers and vice versa may be done to pinpoint the causes and suggestions for corrective steps to be taken.

6. The role of sources of information regarding extent of adoption of recommended vermi production technology may be investigated in detail to make reliable suggestions for the entire state.

Conflict of Interest. None.

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