

ATTRIBUTES PERCEIVED BY TRIBAL WOMEN REGARDING VERMICULTURE TECHNOLOGY DURING ADOPTION

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ABSTRACT

The attributes of an innovation such as cost, availability, relative advantage, compatibility, complexity, observability, trialability, profitability, appropriateness etc., of any technology perceived positively by the people affected the adoption of technology. The study was conducted in purposively selected *Panchayat Samiti Jhadol* of Udaipur district. There were 246 households in the village. From each household one tribal woman was selected as part of study sample. Thus, the total sample comprised of 246 tribal women (one woman from each household). A scale containing fifty statements with 150 scores was developed including nine attributes of vermiculture technology. The results of the study showed that the MWS of all the perceived attributes ranged between 2.19 to 2.69 (on three point continuum), which indicated the high extent of perception of vermiculture technology.

KEY WORDS: Adoption, relative advantage, vermiculture technology

INTRODUCTION

Dominance of chemical agriculture in last few decades has deteriorated the soil health and created the problem of agricultural waste disposal in rural areas. It is important to maintain environmental and agricultural sustainability without reducing productivity. Vermiculture technology has been considered as a sound and viable option to regenerate the soil health through recycling the agricultural waste. Vermiculture is the science of cultivating earthworms which feed on waste material and soil and release digested food material back into the soil, thereby producing compost rich in nutrients. Worms are natural ploughers of the soil throughout the day and night, maintaining the fertility and porosity of the soil. Vermiculture is considered a proven technology for increasing production and productivity of different crops (Singh *et al.*, 2008).

Adoption of improved agricultural practices in tribal area depends on the attributes perceived by the respondents. It was, therefore, thought necessary to develop a scale to measure the level of perceived attributes of tribal women regarding vermiculture technology. Attributes in the present context was conceptualized as the characteristics of vermiculture technology

perceived by the tribal women such as cost, availability, relative advantage, profitability, complexity, compatibility, observability, trialability and appropriateness etc. Thus, the present study was undertaken with the objective to study the attributes of vermiculture technology as perceived by the tribal women during adoption.

METHODOLOGY

The study was conducted in purposively selected *Panchayat Samiti Jhadol* of Udaipur district. Vermiculture technology was promoted in the *panchayat samiti* by a voluntary organization BAIF. The village "GORAN", with highest number of households adopted the vermiculture technology, was selected for the study. To cover the entire tribal social system of the village "Whole Village Approach" was used. All the families residing in the village were covered under the study. There were 246 households in the village. From each household one tribal woman was selected as part of study sample. Thus, the total sample comprised of 246 tribal women (one woman from each household).

Perceived Attributes

The attributes given by Rogers and Shoemaker (1971) i.e. relative advantage, complexity, compatibility, observability and trialability were included in the present study. In addition to this, four other important attributes i.e. cost, availability, profitability and appropriateness of the vermiculture technology was also included in the study. The attributes were measured on a four-point continuum recording the extent to high, medium, low and nil extent with 3, 2, 1 and 0. respectively.

The statements were framed related to each attribute of vermiculture technology. The developed attribute scale was given to three subject matter specialists (soil scientists) and ten extension experts for its content, coverage and construct clarity. On the basis their suggestions, few modifications were made in the scale.

The primary draft of the attribute scale was tested for its clarity and understanding with a group of 20 tribal women. Minor changes in the language parts were made on the basis of testing. The details of number of statements in each attribute with their possible score are presented in Table 1. In all, there were 50 statements with 150 scores. Since there was variation in the number of statements under each component and the responses were received in weighted score, the attributes were measured by mean weighted scores.

RESULTS AND DISCUSSION

The attributes of an innovation such as cost, availability, relative advantage, compatibility, complexity, observability, trialability, profitability, appropriateness etc., are especially important at this stage. Attributes of any technology perceived positively by the people affected the adoption of technology.

1. Cost

Data presented in Table 2 depicts that majority of the respondents (63.31% and 94.67%) perceived nil cost of earthworms and raw material as the earthworms were supplied free of cost by the NGO-BAIF and raw material was available in plenty of amount without cost at and around their homes. Nearly half of the respondents (49.78%) stated that preparation of shade over the vermin bed is cheaper too, while 44.10 per cent respondents considered as low cost technology. Regarding cost of bricks, majority of the respondents (45.85%) mentioned that purchasing of bricks were low costly affair, whereas 24.44 per cent respondents perceived this cost to high and medium level, however 27.07 per cent respondents does not consider it costly.

The cost of vermiculture technology was perceived towards nil extent, the reason may be due to all the required materials i.e. earthworms, tiles, plastic sheet, bricks, etc. were provided by BAIF on free of cost at initial stage, whereas bamboo sticks or for the construction of thatched mud shade were contributed by the tribal families at their own, so cost of purchase of bamboo and labour for mud construction over the bed found costly to low extent by them. Regarding bricks, BAIF also distributed without taking any charge but afterwards the tribal families had to maintain it and broken bricks had to be replaced by their own pockets, so the cost of bricks was reported costly to some extent by majority of respondents.

2. Availability

It was observed that 39.74 - 64.62 per cent respondents reported easy availability of earthworms, water, raw material, bricks and plastic sheet, whereas 16.59 and 19.21 per cent respondents stated water and earthworms, respectively are difficult to get and the availability of plastic sheet to a low extent (31.00%). The reason behind might be that after first supply of material at free of cost, one had to purchase earthworms and plastic sheet by their own, in case earthworms die and plastic sheet turned due to lack of care or for further maintenance & expansion.

Table 2 further showed that easy availability of credit facility and labour for the technology was perceived to a high extent (42.79 to 44.54 %), followed to nil extent (19.65 and 39.74 %). This might be due to the reason that there was no need to borrow credit for the technology. It can be started with minimum resources and labour, available with the family itself and not required much of labour.

3. Relative advantage

Relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes. The nature of the innovations determines the specific type of relative advantage important to adopters (Rogers, 1995).

A. Soil

Data presented in Table 2 indicated that majority of the respondents (37.55 to 76.41 %) perceived all the benefits related to soil to a high extent i.e. soil fertility, textures and structure improved, soils water absorption and water holding capacity increased, reduced number of irrigation reduced required amount of DAP and Urea, and check termite problem in field. A very few respondents (0.87 to 3.45%) experienced these advantages of soil to a low extent. However regarding reduction in number of irrigation and termite problem 21.83 and 24.01 per cent respondents, respectively reported for low to nil extent. This might be due to the respondents having small land holdings and not able to judge the difference on small patches of land.

B. Crop

Table 2 illustrated that more than half to three fourth of the respondents (58.51 to 80.34 %) reported the faster plant growth, improves greenness and vigour in plants, increased size and cutting of fruits per plant, tenderness of fruits and vegetables improved and increased yield. Regarding check on insect/pest and diseases attack, majority (36.24 to 39.30 %) reported these problems to a medium extent followed by 31.00 to 34.49 per cent to a high extent. These results might be due to the observations of the respondents in the crops. Regarding insect/pest and diseases attack they were unaware or they were not able to notice any insect/pest or disease attack before and after the use of vermicompost.

C. Environment

The Table 2 further indicated that majority of the respondents (60.69%) stated that vermiculture technology recycles the agrowaste to a high extent, whereas, it maintains healthy surroundings to a high extent was reported by 40.77 per cent respondents followed by 40.16 per cent to medium extent. This might be due to the reason that recycling of agrowaste was experienced by the respondents, as the big straws turned into a powdery form compost and due to this surrounding were neat and clean.

D. Vermibed can be used as a nursery bed

Table 2 further indicated that vermibed can be used as a nursery bed, was perceived (as dual profitable) to a high extent by majority of the respondents (59.38%). This might be due to the respondent's innovative idea.

E. Empowers tribal women economically

By adoption of vermiculture technology and it's sale, tribal women can be empowered economically was stated by majority respondents (44.54%) to high extent, whereas, 14.82 and 3.49 per cent reported to low extent to nil extent, respectively, as it is useless and it can not empowered the tribal women economically. The reason behind this might be that the NGO tried to involve all the families to adopt it as small venture led to the shrinking of market in local area

or nil demand in local area and fluctuating demand from the outside village, created marketing problem, hence perceived the empowerment as low to nil extent.

4. Profitability

Regarding profitability of vermiculture technology, majority of the respondents (41.48 to 53.27%) stated that it was profitable to a high extent in terms of providing extra income, easily sold in local market and provided more economic benefits as compared to investment (Table 2). It was also observed that about 1.75 to 19.65 per cent of respondents mentioned that it as very less or not at all profitable. The reason behind such findings might be low demand in local area.

5. Complexity

The Table 2 further revealed that vermiculture technology was not at all perceived complex by two third of respondents (62.88 to 77.72%) except marketing problem (36.68%). They reported that it as very easy to understand the complete procedure of the technology (69.86%), preparation of vermibed (77.72%), filling of bed (77.29%), preparation of shade (76.41%), evacuation of bed (70.30%), sorting of earthworms (68.55%), storage (62.88%).

6. Compatibility

Compatibility was studied as the need of present farming, consistent with exiting values, and with past experience of tribal women. Regarding compatibility of vermiculture technology 67.24 per cent respondents perceived its preparation as need of present farming to a high extent. Table 2 further depicted that majority respondents (62.44% and 38.86%) also mentioned that the use of vermicompost is consistent with existing values and it is also consistent with their past experience, respectively followed by medium extent of compatibility in all aspects. 38.42 per cent respondents also reported that the vermiculture technology was consistent to low extent with their past experiences.

7. Observability

In vermin-composting, the materials gets fully decompose and looks like non sticky odourless matter was visible to majority of the respondents (75.00 to 76.41%) to high extent (Table 2).

8. Trialability

Table 2 showed that regarding trialability, majority of the respondents (61.57%) perceived production possibility of vermiculture technology to a high extent, whereas regarding marketing possibility, half of the respondents (51.52%) perceived to a medium extent. The reason behind this might be the respondents did not find market for the sale of their vermicompost in near by area. But they hope there is possibility of production if people

are made aware of its advantages and marketing possibility if few families adopt the technology.

9. Appropriateness

Regarding appropriateness, majority of the respondents (58.51 to 71.61 %) stated that the vermiculture technology is very much suitable to the region (71.61%), to the local situation/farming (62.88%) and to the individual (58.51%).

An effort was made to analyze the overall component wise perception of attributes of vermiculture technology by the respondents. The review of Table 3 clearly revealed that, on three point continuum all the perceived attributes MWS ranged between 2.19 to 2.69, which indicated the very positive perception of technology. To summarize, it can be concluded that the vermiculture technology was cheap, easily available, advantageous, simple, compatible, suitable to the farming community, and appropriate as majority of the respondents perceived the various attributes of vermiculture technology to high to medium extent.

CONCLUSION

The attributes of an innovation such as cost, availability, relative advantage, compatibility, complexity, observability, trialability, profitability, appropriateness etc., of any technology perceived positively by the people affected the adoption of technology. The results of the study showed that the MWS of all the perceived attributes ranged between 2.19 to 2.69 (on three point continuum), which indicated high extent of perception of vermiculture technology. Majority of the respondents perceived this technology as it was very useful to them.

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Table 1: Distribution of question and their scores

Sr. No.	Components	Statements	Score
i)	Cost	4	12
ii)	Availability	8	24
iii)	Relative Advantage	17	51
iv)	Profitability	3	09
v)	Complexity	8	24
vi)	Compatibility	3	09
vii)	Observability	2	06
viii)	Triatability	2	06
ix)	Appropriateness	3	09
	Total	50	150

Table 2: Distribution of the respondents on the basis of perceived attributes regarding vermiculture technology (N = 246)

Sr. No	Attributes	No. of Female Respondents	Extent			
			High	Medium	Low	Nil
1.	Cost (Cost of)					
a)	Earthworms	3 (1.13)	0 (0.00)	12 (5.24)	69 (30.13)	145 (63.31)
b)	Raw material	3 (1.13)	0 (0.00)	4 (1.74)	51 (22.27)	171 (94.67)
c)	Preparation of shade	3 (1.13)	3 (1.13)	8 (3.49)	101 (44.10)	114 (49.78)
d)	Bricks	6 (2.62)	28 (12.22)	28 (12.22)	105 (45.85)	62 (27.07)
2.	Availability (Easy availability of)					
a)	Earthworms	4 (1.74)	125 (54.58)	27 (11.79)	29 (12.66)	44 (19.21)
b)	Water	4 (1.74)	111 (48.47)	56 (24.45)	20 (8.73)	38 (16.59)
c)	Raw material	4 (1.74)	148 (64.62)	45 (19.65)	12 (5.24)	20 (8.73)
d)	Material for shade	0 (0.00)	129 (56.33)	89 (38.86)	11 (4.80)	0 (0.00)
e)	Bricks	0 (0.00)	91 (39.74)	76 (33.18)	53 (23.14)	9 (3.93)
f)	Plastic sheet	0 (0.00)	107 (46.72)	40 (17.46)	71 (31.00)	11 (4.80)
g)	Credit facility	0 (0.00)	102 (44.54)	28 (12.22)	8 (3.49)	91 (39.74)
h)	Labour	4 (1.74)	98 (42.79)	41 (17.90)	41 (17.90)	45 (19.65)
3.	Relative Advantage					
A)	Soil					
i)	Soil fertility improves	0 (0.00)	173 (74.54)	46 (20.08)	10 (4.36)	0 (0.00)
ii)	Soil texture and structure improves (Granuler form & sponginess)	1 (0.43)	146 (63.75)	75 (32.75)	7 (3.05)	0 (0.00)
iii)	Soils water absorption or water holding capacity increases	10 (4.36)	124 (54.15)	76 (33.18)	19 (8.29)	0 (0.00)
iv)	Reduces number of irrigation	4 (1.74)	116 (50.65)	57 (24.89)	50 (21.83)	2 (0.87)
v)	Reduce required amount of chemical fertilizer (DAP & Urea)	6 (2.62)	175 (76.41)	42 (18.34)	6 (2.62)	0 (0.00)
Vi)	Check termite problem in soil	8 (3.45)	86 (37.55)	72 (31.44)	55 (24.01)	8 (3.45)
B)	Crop					
i)	Faster plant growth	3 (1.13)	184 (80.34)	42 (18.34)	0 (0.00)	0 (0.00)
ii)	Improves greenness and vigour of plants	3 (1.13)	145 (63.31)	77 (33.62)	4 (1.74)	0 (0.00)
iii)	Increases size & cutting of fruit per plant	8 (3.45)	134 (58.37)	81 (35.37)	6 (2.62)	0 (0.00)
iv)	Tenderness of fruit & vegetables improves	8 (3.45)	132 (57.64)	78 (34.06)	11 (4.80)	0 (0.00)
v)	Check insect/pest attack	9 (3.93)	79 (34.49)	83 (36.24)	54 (23.58)	4 (1.74)
vi)	Check disease attack	10 (4.36)	71 (31.00)	90 (39.30)	46 (20.08)	12 (5.24)
v)	Yield increase	3 (1.13)	140 (61.13)	68 (26.69)	15 (6.55)	3 (1.13)

Table 2 Contd...

Sr. No	Attributes	No. of Female Respondents	Extent			
			High	Medium	Low	Nil
C)	Environment					
i)	Maintain healthy surroundings	6 (2.62)	92 (40.77)	93 (40.61)	34 (14.84)	3 (1.13)
ii)	Recycles the agro-waste	5 (2.18)	139 (60.69)	71 (31.00)	13 (5.67)	1 (0.43)
D)	Vermi-Bed can be used as nursery bed	10 (4.36)	136 (59.38)	49 (21.39)	28 (12.22)	6 (2.62)
E)	Empowers tribal women economically	9 (3.93)	102 (44.54)	76 (33.18)	34 (14.84)	8 (3.49)
4.	Profitability					
A)	Easy selling in local market	5 (2.18)	100 (43.66)	69 (30.13)	45 (19.65)	10 (4.36)
B)	Provides Extra income	9 (3.93))	95 (41.48)	81 (35.37)	40 (17.46)	4 (1.75)
C)	More economic benefits as compared to investment	8 (3.49)	122 (53.27)	77 (33.62)	14 (6.11)	8 (3.49)
5.	Complexity					
A)	Difficult to understand complete procedure of technology	7 (3.05)	3 (1.13)	10 (4.36)	49 (21.39)	160 (69.86)
B)	Preparation of vermi-bed is difficult	7 (3.05)	6 (2.62)	6 (2.62)	32 (13.97)	178 (77.72)
C)	Problems in arranging raw material layers/ filling of vermi-bed	7 (3.05)	7 (3.05)	5 (2.18)	33 (14.41)	177 (77.29)
D)	Preparation of shade is difficult	6 (2.62)	9 (3.93)	7 (3.05)	32 (13.96)	175 (76.41)
E)	Evacuation of bed is very tedious job	7 (3.05)	9 (3.93)	7 (3.05)	45 (19.65)	161 (70.30)
F)	Sorting of earth worms is difficult task	10 (4.36)	9 (3.93)	3 (1.13)	50 (21.83)	157 (68.55)
G)	Marketing is big problem	3 (1.13)	32 (13.97)	25 (10.91)	85 (37.11)	84 (36.68)
H)	Storage of vermicompost is Difficult	11 (4.80)	7 (3.05)	15 (6.55)	52 (22.70)	144 (62.88)
6.	Compatibility					
A)	Need of present farming	6 (2.62)	154 (67.24)	63 (27.51)	6 (2.62)	0 (0.00)
B)	Consistent with existing values	6 (2.62)	143 (62.44)	67 (29.25)	13 (5.67)	0 (0.00)
C)	Consistent with past experience	6 (2.62)	89 (38.86)	56 (24.45)	88 (38.42)	0 (0.00)
7.	Observability					
A)	Material gets fully decomposed	6 (2.62)	172 (75.10)	39 (17.03)	12 (5.24)	0 (0.00)
B)	Non-sticky- odourless matter	7 (3.05)	175 (76.41)	28 (12.22)	19 (8.29)	0 (0.00)
8.	Trialability					
A)	Production Possibility	2 (0.87)	141 (61.57)	82 (35.80)	4 (1.74)	0 (0.00)
B)	Marketing Possibility	1 (0.43)	55 (24.01)	118 (51.52)	35 (15.28)	20 (8.73)
9.	Appropriateness					
A)	Suitable to the region	1 (0.43)	164 (71.61)	33 (14.41)	29 (12.66)	2 (0.87)
B)	Suitable to the local situation/ farming	1 (0.43))	144 (62.88)	65 (28.38)	17 (7.42)	2 (0.87)
C)	Suitable to the individual	1 (0.43)	134 (58.51)	59 (25.76)	32 (13.97)	3 (1.13)

Note: Figure in parenthesis is per cent of female respondents

Table 3: Component wise distribution of the respondents by the perceived attributes of vermiculture technology alongwith MWS (N = 246)

Sr. No.	Attributes	MWS
1.	Cost	2.28
2.	Availability	2.19
3.	Relative Advantage	2.38
(i)	Soil	2.42
(ii)	Crop	2.37
(iii)	Environment	2.37
(iv)	Nursery Bed	2.33
(v)	Empower tribal women economically	2.29
4.	Profitability	2.19
5.	Complexity	2.46
6.	Compatibility	2.33
7.	Observability	2.69
8.	Trialability	2.33
9.	Appropriateness	2.50

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