Constraints Perceived by the Vegetable Growers towards Excessive Use of Chemicals in Bankura District of West Bengal

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ABSTRACT

The study was conducted during 2018 to know the constraints perceived by the vegetable growers towards excessive use of chemicals in the Bankura district of West Bengal. This study was followed ex-post and expletory research design with considering 27 constraints, which data was suitably analyses with the help of principal component analysis. The results of these 27 constraints were divided into six components on basis Eigen rules. The six components had greater than one Eigen value 6.265, 2.59, 2.292, 1.421, 1.216 and 1.086 respectively. The first component having Eigenvalue of 6.265 was labeled as Protection Knowledge. Similarly other sequentially components were labeled as Lack of Knowledge, Bio - control, Scarcity, Unavailability and Training respectively. The particular emphasis in this study was therefore on identifying the problems faced by vegetable growers in the application of pesticides to vegetable crops during the use of a chemical in the study area.

INTRODUCTION

Through the various five year plans beginning in 1951, India has made remarkable progress. As a result, the country's social and economic scenario has significantly changed. Production from agriculture has increased (Bharati et al., 2014). The Indian pesticide market is the world's twelfth largest and ranks first in Asia. India produces 90,000 metric tons of pesticides in a year with more than 400 million acres under cultivation and over 60 per cent of the country's population depends on agriculture, while the country's economy depends primarily on agriculture (Jana and Basu, 2014). Pesticides are organic compounds or mixtures of substances of different chemical and biological character (Gondkar et al., 2016). Pesticides are certainly poisonous and their arbitrary use and abuse can lead to ecological dissimilarity.

Despite this, vegetable production is low because the vegetable growers did not follow the enhanced package of plant protection measures practices (Suman, 2014). India's potential crop yield of 30 percent is affected by insect pests, diseases, weeds, and rodents

attack. Pesticides play a critical role in protecting crops from pre- and post- damage which helps to increase crop yields (Kundu and Wale, 2013). Pest toxicity was shown to be dangerous and toxic to pesticides well in our food supply chains (Verma et al., 2013). More food needs to be produced to feed the burgeoning population and this has to be achieved without reducing the resource base (Singh et al., 2017). Human beings have an inseparable link with plants that play a crucial role in preserving the eco-system and environmental balance, as well as in controlling contamination of the atmosphere and purifying the air (Patel and Chouhan, 2017). Yet vulnerability to various pests and diseases has become essential constraints for the productive growth of these crops, resulting in complete harm to the crops in many cases. The rodents, insects, fungi, and nematodes have caused tremendous crop losses of 20-30 per cent in the nation (Gupta et al., 2010). Plant protection is central to all measures to increase productivity (Bhandari, 2019). Sustainable farming must maintain the basic natural environment at least resources such as healthy soil, clean water, clean air, and viable rural communities (Sunder, 2006). For more than ten years, about

80 percent of vegetable farmers have been using pesticides to argue that pesticides are used to improve agricultural productivity and protect public health (Sushma, 2015). The present study was undertaken to find out the constraints of vegetable growers in the adoption of eco-friendly technology in vegetable cultivation.

METHODOLOGY

The study was concerned with identifying constraints perceived by the vegetable growers towards excessive use of chemicals with confined to ex-post-facto and exploratory researcher design. West Bengal state was selected and purposive sampling method was used during 2018. A purposive sampling procedure was also followed for the selection of districts, block, and villages. Four villages namely- *Maklara, Dakai, Bansi* and *Menjua* were selected from two blocks namely Khatra and Indpur. The vegetable growers from the selected villages were drawn randomly with the Sample size of 120. The data were collected through the Semi - structured schedule were coded, tabulated, analyses, and presented in tables to make the findings meaningful and understandable. The Twenty tree constraints statements were included in this study based on response of vegetable growers with three responses classified as "Very Serious," "Serious," and "Less Serious" The assigned scores were 3, 2, and 1 respectively. The data were analyzed with the help of descriptive statistics as these are short descriptive coefficients that can sum up a series of data, either to represent the entire population or to represent a subset of the population. Divided into central pattern and measurement of variability (spread). Central trend metrics include mean number, while variance statistics include standard deviation. Later on, Principal Component Analysis was applied with the help of Statistical Package for the Social Sciences (SPSS), version 16.0 software. PCA is a multivariate technique that analyses data in which observations were described by several inter-correlated quantitative constraints of vegetable farmers in the study area.

RESULTS AND DISCUSSION

Table 1 delineates the result (BTS at 1.1860 and the level of significance at P = 0.000) and indicated that the data were appropriate for principal component analysis. The result of the KMO measure of sampling adequacy was 0.751 which indicates that there were sufficient items for each factor. The two tests support the appropriateness of the principal component analysis technique.

Table 2 indicates that the six components had greater than one eigenvalues. Only factors that had eigenvalues greater than one were retained under the rules of the principal component analysis. The first component had an Eigenvalue of 6.265, with a percentage of the variance of 27.239, and a percentage of cumulative of 27.239. The component was made up of the six items. The items in this component were plant protection equipment's are costly (0.776)

Table 1. KMO and Bartlett's test for constraints perceived by the vegetable growers towards excessive use of chemicals

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO)		0.751
Bartlett's Test ofSphericity	Approx. Chi-Square	1.1860
	df	253
	Sig.	0.000

with the highest factor loading, other item include lack of availability of equipment's (0.748), lack of literacy (0.733), labels on pesticide containers are hard to understand (0.716), lack of awareness about side effects of pesticides (0.617) and personal protective clothing are uncomfortable (0.550). The component one was labeled Protection Knowledge. The protection knowledge component was largely an important for vegetable growers because its sustaining from different kind of losses. The second component had an Eigenvalue of 2.59, a percentage of the variance of 11.261, and a percentage of cumulative of 38.5. There were seven items in the component. Items covered by this component included lack of knowledge about INM (0.805), lack of knowledge about the advance effect of chemical and pesticides (0.745), lack of awareness about environment pollution (0.696), lack of knowledge about the advance effect of chemical and pesticides. (0.664), lack of knowledge about IWM (0.651), lack of technical knowledge about usage of bio-control agents (0.589), and lack of skill to adopt eco-friendly technology (0.502). The component was labeled Lack of Knowledge. Due to a lack of knowledge in the use of chemicals scientifically the vegetable growers are very reluctant to use chemicals and producing of vegetables because of its creating adverse effect. Therefore, they need to get scientific knowledge of chemical use practices.

The third component has an eigenvalue of 2.292, a percentage of the variance of 9.967, and a percentage of cumulative of 48.46. The component is made up of items from the three. The items in this component were sporadic uses of bio-control agents (0.735), non-availability of IPM tools (0.734), and quality aspect of biocontrol is not assured (0.698). The component was labeled *Biocontrol*. Vegetable growers have to face a lot of difficulties to use of biocontrol measurement in the study area. The fourth component has an Eigenvalue of 1.421, a percentage of the variance of 6.179, and a percentage of cumulative of 54.64. The component is made up of items from the four. The items in this component were Lack of government support (0.432), shortage of labour (0.782), high labour cost for alternative protection measures (0.726), and Scarcity of FYM and compost (0.648). The component was labeled Scarcity. Vegetable growers are not getting much profit from vegetable farming and faced a problem because of lack of government support, Shortage of labour, and unavailability of FYM and compost.

The fifth component has an eigenvalue of 1.216, a percentage of the variance of 5.288, and a percentage of cumulative of 59.93. The component was made up of two items. The items in this component were the unavailability of raw material (0.693) and the non-availability of credit facility in time. The component was labeled Unavailability. Vegetable growers have to face a lot of difficulty because of the Unavailability of raw material and credits facilities in the study area. The sixth components have an eigenvalue of 1.086, a percentage of the variance of 4.723 and a percentage of cumulative of 64.65. The component was made up of one item only i.e. lack of technical training/education for the right application of equipment's (0.832). The component was labeled as Training. Vegetable growers also facing difficult problems related to the right application of equipment because they do not have proper knowledge and awareness about Training of the use of chemicals in the study area.

Table 2. Principal component factor analysis (varimax rotation), for constraints perceived by the vegetable growers towards excessive use of chemicals

	Rotated Component Matrix a						
Constraints	Component						Commu-
	1	2	3	4	5	6	nalities
Plant protection equipment are costly (C5)	0.776						0.687
Lack of availability of equipment's (C1)	0.748						0.599
Lack of literacy (C2)	0.733						0.706
Labels on pesticide containers are hard to understand (C8)	0.716						0.724
Lack of awareness about the side effects of pesticides (C4)	0.617						0.696
Personal protective clothing is uncomfortable (C3)	0.550						0.482
Lack of knowledge about INMC (10)		0.805					0.679
Lack of knowledge about the advanced effect of chemicals and pesticides (C12)		0.745					0.660
Lack of awareness about environment pollution (C13)		0.696					0.623
Lack of knowledge about the advance effect of chemical and pesticides (C11)		0.664					0.563
Lack of knowledge about IWM (C14)		0.651					0.703
Lack of technical knowledge about usage of bio-control agents (C23)		0.589					0.599
Lack of skill to adopt eco-friendly technology (C22)		0.502					0.711
Sporadic uses of bio-control agents (C20)			0.735				0.584
Non-availability of IPM tools (C18)			0.734				0.682
The quality aspect of biocontrol is not assured (C16)			0.698				0.533
Lack of government support (C17)				0.432			0.483
Shortage of labour (C21)				0.782			0.737
High labour cost for alternative protection measures (C6)				0.726			0.606
Scarcity of FYM and compost (C15)				0.648			0.625
Unavailability of raw material (C9)					0.693		0.639
Non-availability of credit facility in time (C19)					0.591		0.774
Lack of technical training/ education for right application of equipment's (C7)						0.832	0.777
Eigenvalues	6.265	2.59	2.292	1.421	1.216	1.086	
Percentage of variance	27.239	11.261	9.967	6.179	5.288	4.723	
Percentage of Cumulative	27.239	38.5	48.46	54.64	59.93	64.65	

CONCLUSION

The study concluded that twenty three constraints was divided into the six components on the based of greater than one Eigenvalue, which was renamed as Protection Knowledge, Lack of Knowledge, Bio - control, Scarcity, Unavailability and Training respectively as per the characteristics and similarity of constraints. Its shows the six components are more capable to cause the problem in vegetable cultivation in area of study. These six components expressing the essential need to be focus to solving the problems of vegetable growers and its essential to give attention on providing the appropriate technology, skill training and knowledge that can reduce the cause of excessive use of chemicals, and increase the sustained livelihood of vegetable growers. This research will be extremely useful to policymakers and suitable policies can be established to encourage vegetable growers, from subsistence level to intensive level so that income from Vegetable farming in the study area will increase.

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