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A Study on Acceptance for Hi-Tech Horticulture Supporting Measures Among Vegetable Farm Cultivators in Kerala

Dr.Sarin Thomas

Mar Ivanios College (Autonomous) Kerala University

I. Abstract

Horticulture is nowadays recognised as a crucial sector in agriculture with vast opportunities for diversification and value addition. Realising the importance of the sector in improving livelihood security and enhancing economic development, the authorities are keen to promote horticulture industry in the country. The ability of the sector to contribute towards food and nutritional security and employment generation also added to is growing significance The land of Kerala which is blessed with rich and diverse natural resources is considered as a state with much potential for value addition in the horticulture segment Various supporting schemes are introduced to promote hi-tech-horticulture in Kerala both by the central government and state government. To what extent various supporting measures introduced for the enhancement of farm return and productivity among vegetable cultivators in Kerala gained acceptance in terms of perceived usefulness, ease of use and adoption intention constitute the basis of the study.

Key words: Horticulture business, Hi-tech farm practices, Supporting measures

II. Introduction

Twenty-first century is witnessing dynamic and revolutionary technological developments in all walks of life. In the field of agriculture, technology offers potential solutions to many of the problems prevalent in the sector. Radical changes in farming practices are visible in the horticulture segment also with the emergence of innovative technologies. Hi-tech horticulture is a broad term encompassing application of technology in various stages of farm management such as plant propagation management, soil health management, crop health management, water resource management and weather management.

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Hi-tech farming today does not remain a jargon but is commonly practiced even by the low-profile farmers in their pursuit to increase the farming output, changing the status of horticulture to horti business. In Kerala state also, technological innovations are utilised in various phases of farm operation management for enhancing productivity and profitability of horti business. Resistance to change is an important challenge to be handled whenever a new technology is attempted to be introduced. Perceptions of the users with regard to the usefulness and ease of use of technology and the altitudinal inclinations developed out of these perceptions may have significant influence in determining its usage pattern.

III. Review of Literature

Ananya Mitra and Shradhanjali Panda(2020), in their study with regard to horticulture and economic growth in India examined short run and long run relationship between horticultural production and economic growth in India. Although agriculture continue to be the backbone of Indian economy in terms of source of livelihood, the absence of a short term relationship between horticultural production with the GDP of the country is a matter of concern

Girish K Jha, A Suresh, Bhoopesh Punera and P Supriya (2019) in their study examined the prospects, trends and growth rate of horticulture segment in India. According to their opinion the major concerns of the sector are improving the productivity through research and development, enhancing the share of value-added products, geographical diversification of exports and enhancing the infrastructure including cold storage and rural roads.

Bijulal B.L (2015) remarked about the reasons for stagnation in the agriculture sector in Kerala and critically appraises the hi-tech practices in Kerala which is presented as a potential solution to the problems prevailing in the sector today. The various hi-tech practices which can be adopted in Kerala are examined. Suggestions for making hi-tech practices a success is also highlighted taking into account the peculiarities of the existing agricultural scenario in Kerala.

Sreejith Kulathunkara (2015) examined the impact of Kerala model development on environment and identified significant decline in yield and productivity of food crops and the resultant overdependence of the state on others for food crops as the major adverse impact on the agricultural sector in the state. Despite significant

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achievement in the material conditions of people in the state as reflected by various socio-economic indicators, the pressure on natural resources is alarmingly increasing which even challenges quality life of the future generations. It is pointed out that there is great potential for sustainable development in Kerala because of its diversified natural resource base.

IV. Statement of the Problem

Realizing the relevance of horti-business, government today provides various schemes of financial assistance for the same. In the state of Kerala also, financial and technical support is provided by the government through various agencies in order to promote hi-tech horticulture in the state. In this study an attempt is made to examine the acceptance for the various supporting measures especially among the vegetable cultivators in Kerala. To what extent the supporting measures provided by the government are acceptable to the vegetable cultivators in Kerala in terms of perceived usefulness, ease of access and adoption intention seems relevant and these issues constitute the basis for the study.

V. Objectives

The basic objective of the study is to examine the acceptance for the supporting measures introduced to promote hi-tech horticulture among the vegetable cultivators in Kerala

1. To study the level of acceptance among vegetable farm cultivators in Kerala with regard to perceived usefulness for the supporting measures.
2. To examine their level of acceptance in terms of ease of access perception for the supporting measures
3. To assess the level of acceptance in terms of attitude towards hi-tech horticulture supporting measures.
4. To examine the level of acceptance in terms of adoption intention among the vegetable cultivators with regard to these supporting measures in future.

VI. Methodology

The present study is both descriptive and analytic and survey method using structured questionnaire is employed for data collection. Vegetable farm cultivators in the state registered under the various schemes of agricultural department as beneficiaries constitute the population for the study. Multi stage sampling is used to

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collect data from 378 farm cultivators in Kerala. For selecting samples, the state of Kerala is divided into three zones namely North, Central and South zones. Two district each from a zone is selected based on highest number of beneficiaries and as such cultivators are selected from Wayanad, Malappauram (North Zone), Idukki, Ernakulam (Central Zone) , Thiruvananthapuram and Kottayam (south Zone). For selecting the sample units, proportionate stratified random sampling method was applied. The data collected from the respondents were analysed using percentage analysis and one sample t test

VII. Hitech Horticulture Supporting Measures: Conceptual Framework

Kerala, being blessed with favourable agro climatic situations, enjoys competitive advantage for many agricultural crops, especially crops belonging to horticulture sectors. Hence promotion of horticulture is considered as a high priority area in the state and it is quite evident from the past few budgetary allocations for hi-tech horticulture in the state. The state government started its own initiatives in Hi-tech agriculture by announcing a 45 Crore package in 2012-13 financial budget to promote hi-tech farming.

In Kerala, the promotion of horticulture is mainly entrusted with the Ministry of Agriculture which executes the various supportive measures mainly through the village level agriculture offices popularly known as Krishi Bhavans'. Funds from various national agencies for the promotion of horticulture industry such as National Horticulture Mission are distributed through these Krishi bhavans. Apart from offering financial assistance, these offices act as a nodal agency for the agripreneurs and farm cultivators in the state by providing various supporting measures for enhancing farm profitability and return.

A. Plant propagation management supporting measures

The practices and resources used in plant propagation is vital in determining the farm output, both in terms of quality and quantity. The agricultural department in the state has an elaborate institutional mechanism to make standard planting materials available to the farmers without much difficulty. With regard to the hi-tech practices in plant propagation supporting measures are provided for the distribution of high yield variety seeds and seedlings through agricultural universities, seed farms and

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research centres. Subsidised assistance is provided for pre sowing seed treatment also through various Krishi Bhavans in the state.

B. Soil Health management supporting measures

Realising the importance of soil quality and soil health in farm productivity, innovative measures for enhancing soil quality were suggested by the agricultural scientists and experts in the field. Establishment and popularisation of soil analysis lab and distribution of soil health cards are some of the supporting measures initiated. In order to cater to the soil information requirements, there are web portals and mobile applications developed and operated under the agricultural department. For encouraging the cultivators to focus on acid base balancing, financial support is being provided to the cultivators to procure soil balancing materials like dolomite.

C. Crop Health management supporting measures

Various measures have been launched and implemented both by the central and state governments with regard to crop health management in horticulture industry. Crop health clinics which facilitate early detection of pest and disease attack are now been established in different parts of the state. Short term training to equip the cultivators with the innovative and effective crop management techniques are undertaken by the agricultural department at various levels. Financial support is also provided for the purchase of nutrients and pest management resources though subsidy schemes for the same.

D. Water resource management supporting measures

The agricultural administrative machinery, both at the centre and state are now promoting hi-tech water resource management strategies as a priority segment, realizing the need for conserving the scarce water resources for the future. Various micro irrigational facilities available in practice such as drip irrigation, sprinkler irrigation, mist irrigation etc which ensures effective utilization of water resources in farm operation are encouraged by the agricultural department through the provision of financial support for the same. Rain water harvesting is also promoted as an effective long run water conservation strategy focusing on the sustainable development of the society.

E. Weather management supporting measures

In order to cop up with the problem of low farm yield and productivity because of weather and climatic irregularities in the horticulture industry, the state government is

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now keen on introducing hi-tech weather management practices like poly house farming and rain shelter farming. Open precision farming is also promoted by the agricultural department, especially among fruit crops and vegetable crops. IT oriented weather information systems developed for the use of farm cultivators are also being used by the farm cultivators in the state. Hi-tech weather management practices are promoted by the agriculture department by way of financial assistance and awareness campaigns.

VIII. Data Analysis

For examining the level of acceptance for supporting practices, the perception of the farmer respondents with regard to usefulness of these measures, ease of access, their attitude towards these supporting measures and future adoption attention are measured using 5-point rating scale.

A. Perceived Usefulness with regard to Hi-tech horticulture supporting measures

In order to understand the perception of farmer respondents towards the usefulness of the supporting measures of the government to promote hi-tech horticultural practices, statements regarding their role in enhancing farm operation efficiency, farm income, minimising risk, improving productivity and usefulness in terms of extension facilities are considered. The distribution of farmer respondents with regard to their level of agreement on these components is presented in Table No:1

The mean score with regard to the agreement on supporting measures contribute to farm operation efficiency and enhances farm income are 3.38 and 3.28 respectively which are significantly higher than the mean of response scale and the respondents show agreement regarding these statements as one sample t test shows significance level less than 0.05. With regard to the statement that supporting measures are useless because of ineffective mechanism, the agreement of respondents is just above average level as the mean score is 3.08. But for the statements regarding the role in minimising risk and enhancing productivity, the respondents disagree as the mean score for both these statements (2.77 and 2.72) are less than the mean of the response scale.

The supporting measures are significant in enhancing farm operation efficiency and income, but the risk associated with agricultural operations are multifaceted for which

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the existing supporting measures from the part of the government fails to yield an adequate solution.

B. Perceived Ease of Access with regard to Hi-tech horticulture supporting measures

The response of the farmer respondents with regard to their perception related to ease of access to supporting measures are studied in terms of their agreement for timeliness of information, promptness in getting the related benefits, support from the officials, mental efforts and administrative formalities involved. **Error! Reference source not found.** shows the distribution of the respondents with regard to the perceived ease of access for supporting measures.

The mean score with for the statement regarding timely information is 3.15 which is higher than the response scale mean and farmer respondents have above average agreement for the same as one sample t test with test value 3 shows significance level less than 0.05. For the statements regarding difficulties because of administrative formalities involved, the mean score (3.09) is just higher than response scale mean. With regard to support of officials, the farmer respondents are neutral in their response as the mean score is just 3.02 and significance level is more than 0.05. But in the case of opinion regarding minimum delay and mental efforts in getting benefits, they show slight disagreement as the mean scores (2.91 and 2.88) are just below the mean of the response scale.

C. Attitude of cultivators with regard to Hi-tech horticulture supporting measures

The attitude of the farmer respondents with regard to the supporting measures and schemes for promoting hi-tech horticultural practices is measured with the help of their perception towards these practices as an idea to enhance productivity, to improve farm profitability and to minimize risk and as a solution for agrarian crisis. The attitude of the respondents in relation to support from officials is also considered. Table 3 describes the distribution of respondents with reference to their attitude for the supporting measures

The mean score with regard to the statement regarding supporting measures as a good idea to enhance productivity is 3.34 which is significantly higher than the response scale mean as the significance level of one sample t test is less than 0.05. The result indicates that the farmer respondents show significantly above average level of agreement in this regard. But it is observed that regarding these the statement that supporting measures is not a fruitful solution to the agrarian crisis the

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level of agreement is above average level as the mean score is 3.11. The respondents are neutral in their opinion with regard to the support of officials as the mean is score is 2.99 which is almost equal to the mean of the response scale and test significance is above 0.05. As an essential measure to enhance productivity and minimise risk, the respondents show slight disagreement as the mean scores are 2.95 and 2.87 respectively which are just below the response scale mean.

The supporting measures provided by the government for supporting hi-tech practices in horticulture needs to be restructured in such a way as to give more assurance to the farmers in terms of risk reduction and protection from environmental and market uncertainties.

D. Adoption intention with regard to Hi-tech horticulture supporting measures

The adoption intentions of farmer respondents for the hi-tech supporting practices is studied with the help of responses regarding regular use in the future, diversified use in future and possibility of recommending these measures to other farmers. Table 4 represents the distribution of respondents on the basis of their level of agreement towards adoption intention

The mean score regarding the response about regular use of supporting measures is 3.08 which is slightly higher than the response scale mean, indicates that farmer respondents have above average level of agreement regarding future intention to use these practices regularly. Also one sample t test shows a level of significance less than 0.005. But with regard to the statements regarding frequent usage of different option and possibility of recommending to other farmers, the respondents show slight disagreement as the mean score for the same (2.95 and 2.83 respectively) which are lower than the mean of the response scale.

IX. Findings

- The vegetable farm cultivators in the state have average acceptance in terms of perceived usefulness for supporting measures for hi-tech horticulture. The supporting measures are significant in enhancing farm operation efficiency and income, but the risk associated with agricultural operations are multifaceted for which the existing supporting measures from the part of the government fails to yield an adequate solution.

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- The cultivators have average acceptance regarding the ease of access for supporting measures in hi-tech horticulture.
- The cultivators agree with the statement that supporting measures enhances farm productivity, but they have low agreement to the statements that these measures are essential to enhance farm profitability and minimise risk. They have average acceptance for supporting measures in terms of their attitude towards the same.
- With regard to the acceptance for supporting measures among the vegetable farm cultivators in the state in terms of adoption intention they have shown only average acceptance.
- The cultivators have shown average acceptance to the supporting measures initiated by the government agencies to promote hi-tech horticulture in the state.

X. Conclusion

The examination of the acceptance for hi-tech horticulture supporting measures with specific reference to vegetable farm cultivation reveals the strengths and weaknesses these measures. With regard to the supporting measures initiated in the state for promotion of hi-tech horticulture, a radical shift is essential in the policy orientations of the administrative authorities. In general, though the supporting measures for hi-tech horticulture resulted in improving productivity and profitability in terms of land and labour, it failed to bring desirable positive result in ultimately enhancing the farm income. As exposed in the study, the priority areas for the supporting measures in the state have to be redefined and necessary policy shift in this regard will definitely contribute for the progress of horticulture business in the state.

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Table 1:Distribution of farmers by their level of agreement about usefulness of supporting measures with mean score and level of significance

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD	t	Sig.
Contribute to farm operation efficiency	n	25	79	50	174	50	3.38	1.15	6.493	0.000
	%	6.61	20.90	13.23	46.03	13.23				
Beneficial in enhancing farm income	n	37	73	56	171	41	3.28	1.18	4.614	0.000
	%	9.79	19.31	14.81	45.24	10.85				
Minimise risk associated with farm operations	n	48	127	84	104	15	2.77	1.11	-4.135	0.000
	%	12.70	33.60	22.22	27.51	3.97				
Substantially improve farm productivity	n	43	129	112	77	16	2.72	1.05	-5.214	0.000
	%	11.41	34.22	29.71	20.42	4.24				
Useless because of ineffective extension mechanism	n	14	107	135	80	42	3.08	1.04	1.432	0.153
	%	3.70	28.31	35.71	21.16	11.11				

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Table 2:Distribution of farmers by their level of agreement about ease of access of supporting measures with mean score and level of significance

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD	t	Sig.
Timely information available about supporting services	n	52	97	29	143	57	3.15	1.33	2.164	0.031
	%	13.76	25.66	7.67	37.83	15.08				
Minimum delay in getting the benefits of the measures	n	64	104	47	126	36	2.91	1.29	-1.356	0.176
	%	16.98	27.59	12.47	33.42	9.55				
Prompt support from officials in availing the schemes	n	66	75	70	121	46	3.02	1.31	0.236	0.813
	%	17.46	19.84	18.52	32.01	12.17				
Minimum mental efforts in availing the schemes	n	62	96	69	129	22	2.88	1.21	-1.992	0.047
	%	16.40	25.40	18.25	34.13	5.82				
Difficult to avail because of administrative formalities	n	13	140	86	78	61	3.09	1.16	1.502	0.134
	%	3.44	37.04	22.75	20.63	16.14				

Table 3:Distribution of farmers by their level of agreement about attitude towards supporting measures with mean score and level of significance

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD	t	Sig.
Accessing the supporting practices is a good idea to enhance farm productivity and income	n	24	87	47	175	45	3.34	1.14	5.845	0.000
	%	6.35	23.02	12.43	46.30	11.90				
Essential to improve farm profitability	n	30	104	120	102	22	2.95	1.05	-0.884	0.377
	%	7.94	27.51	31.75	26.98	5.82				
Essential to minimise farm risks	n	32	106	138	85	17	2.87	1.00	-2.612	0.009
	%	8.47	28.04	36.51	22.49	4.50				
Active Support from officials make me confident in using the supporting schemes	n	59	90	70	115	44	2.99	1.28	-0.201	0.841
	%	15.61	23.81	18.52	30.42	11.64				
Not a fruitful solution to the agrarian crisis.	n	21	114	95	97	51	3.11	1.14	1.932	0.054
	%	5.56	30.16	25.13	25.66	13.49				

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Table 4:Distribution of farmers by their level of agreement about adoption intention for supporting measures with mean represents the score and level of significance

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD	t	Sig.
Will avail supporting measures on a regular basis	n	24	124	66	126	38	3.08	1.15	1.346	0.179
	%	6.35	32.80	17.46	33.33	10.05				
Will frequently make use of different options available as supporting measures	n	34	129	68	115	32	2.95	1.16	-0.798	0.425
	%	8.99	34.13	17.99	30.42	8.47				
Will strongly recommend others to make use of these practices	n	50	115	84	106	23	2.83	1.15	-2.807	0.005
	%	13.23	30.42	22.22	28.04	6.08				

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