

**RESEARCH ARTICLE :**

# Marketing behaviour of hi-tech farmers in Kerala

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**SUMMARY :** The study was conducted to assess the marketing behaviour of hi-tech farmers in the state of Kerala. The investigation was carried out on two categories of hi-tech farmers *viz.*, polyhouse farmers and open precision farmers to analyse the discrimination in their marketing behaviour. A sample of 60 farmers was selected by multistage sampling. The analysis indicated that the marketing behaviour of polyhouse and open precision farmers was found to be significantly different, particularly with respect to marketed surplus *i.e.*, open precision farmers followed farming as a profitable business while polyhouse farmers had less marketed surplus and lower price satisfaction. It was also found that open precision farmers had better backward and forward linkages with input and marketing agencies, respectively which contributed greatly to their success. The study also throws light on the various marketing channels used by hi-tech farmers in the state.

**KEY WORDS :**

Marketing behaviour,  
Hi-tech farmers,  
Marketed surplus,  
Linkages, Marketing  
channels

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## BACKGROUND AND OBJECTIVES

Agricultural marketing is mainly the buying and selling of agricultural products. Numerous factors affect the marketing of the produce. The study of such factors that determine the marketing behaviour of farmers would contribute significantly to the policy making. The state of Kerala witnessed a revolution in farming with the advent of hi-tech farming like polyhouse cultivation and open precision farming. These methods offer high quality produce with appreciable input use efficiency, which prompted the conventional farmers to venture into hi-tech farming. Open precision farming in Kerala was found to be highly successful as it focused on commercial production in bulk, whereas the polyhouse

cultivation in the state, inspite of policy support with subsidies, faced a setback as farmers adopted it as a way of producing organic vegetables for household consumption only, without much commercial aspects. The profit from marketing largely depends on the quantity of marketed surplus which represents the theoretical surplus available for disposal with the produces left after genuine requirements of family consumption, payment of wages in kind feed, seed and wastage have been met (Diware, 2002). The demand and supply side connections are also of major relevance in the hi-tech farming sector (Guimaraes and Hefner, 1991). Strong linkages with input and marketing agencies can aid in making each step of farming viable and lucrative. It could be assumed that there is a

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difference in the marketing behaviour of open precision and polyhouse farmers. The study was an attempt to throw light into the factors which led to this difference.

## RESOURCES AND METHODS

The study was conducted in the Thrissur and Palakkad districts of Kerala during the time period 2017-2019. A sample size of 60 hi-tech farmers were surveyed with structured interview schedule, thirty from each of the two districts, comprising an equal share of polyhouse and open precision farmers.

Marketing behaviour was operationally defined as the mode of selling produce in the market. The components of marketing behaviour were identified and measured by the procedure followed by Kumar (2013) with reasonable alterations. The components of marketing behaviour selected in the study were.

### Marketed surplus:

Marketed surplus refers to the quantity of produce, which is marketed. The marketed surplus was measured in tonnes in three categories as:

Categories of marketed surplus	Score
Upto 5 tonnes	1
5-10 tonnes	2
>10 tonnes	3

### Access to market

The respondents were asked as to whether they have adequate access to market.

The two constituents of access to market were identified as:

### Distance to market:

The distance to market was operationalized as the Kilo metres from the farm to market. The respondents were categorized in to three groups based on the distance to market from the farm.

Distance from market	Score
1-3 km	1
4-6 km	2
> 6 km	3

### Mode of transportation:

Mode of transportation was characterized as the

vehicle utilized for transporting the produce from farm to market. In the light of survey of farmers, mainly four modes of transportation were considered namely, car, auto, tempo and tractor. The respondents were asked to specify their mode of transport for marketing the produce. The scores were given as 1, 2, 3 and 4, respectively.

### Marketing channels:

There spondents were asked to specify the marketing channel they used to market the produce. Four channels were identified based on feedback from extension officers and farmers, namely directaccess to market, VFPCs, middle men and Eco shops with scores of 1, 2, 3 and 4, respectively.

### Access to storage facilities:

Availing storage facilities was characterized as to whether the farmers were getting adequate access to any kind of storage units in or around the farm. The respondents were asked to denote the availability of storage facilities. A score of 1 was given for adequate access to storage and 0 for inadequate access.

### Post-harvest handling:

Post-harvest handling was operationalized as all the activities from storage to processing of the produce. The respondents were asked as to whether they follow any post-harvest handling practices. A score of one was given for positive response and zero for not following post-harvest practices.

### Price satisfaction:

The respondents were asked to specify if they got satisfactory price for the produce. A score of one was given for satisfaction and zero for non-satisfaction.

### Access to market in formation:

It is defined as the accessibility to the upto date information regarding market prices, sales etc. through different media. The respondents were asked if they had adequate access to market information. A score of 1 was given for positive response and 0 for negative response.

### Linkages in hi-tech farming sector:

The linkages were studied by following the method by Gotyal (2007) with due modifications.

**Backward linkages:**

It was operationally defined as the demand side connections of a firm.

The respondents were asked to specify the backward linkages they operated for procuring the inputs such as technological knowledge, infrastructure, planting materials, manures and fertilizers, finance forest ablishment and finance for cultivation. The main sources identified in the study were private agencies, government organizations, co-operatives and own resources. These were given scores as 1, 2 3 and 4, respectively.

**Forward linkages:**

It was characterized as the supply side connections of a firm.

There spondents were asked to denote the forward linkages they had operated for financial assistance for marketing, processing or value addition and market information. The main sources identified in the study were private agencies, government organizations, co-operatives and own resources. These were given scores as 1, 2, 3 and 4, respectively.

The statistical tools used in the study were:

**Frequency and percentages:**

Frequency distribution and percentages were used to know the distribution pattern of respondents according to variables. Percentages were used for standardization of sample by calculating the number of individuals that would be under the given category.

**Discriminant function analysis:**

This was used to test whether there is a significant discriminating power in the variables of marketing behaviour.

Discriminant function is used for classifying the observations. It produces functions that help to define the groups. The maximum number of functions that can be defined is 1 less than number of groups. The Eigen value shows what percentage of variance that is accounted for by the function. Wilkslambda tests the significance of the function.

**OBSERVATIONS AND ANALYSIS**

The findings of the present study as well as relevant discussion have been summerized under following heads:

**Marketing behaviour of hi-tech farmers:****Marketed surplus:**

In the light of the survey, it was observed that 12 out of the 30 polyhouse farmers had quit commercial production.

Among polyhouse farmers, a majority of 61.10 per cent had a marketed surplus ranging from 5-10 tonnes, while 38.90 per cent had marketed surplus upto five tonnes. It was concluded that the potential production could not be achieved in polyhouse farming due to various reasons like inadequate technical knowledge in production practices and lack of timely repair and maintenance of the polyhouse. It could be found that most of them were marginal farmers who wanted to produce organic vegetables for home consumption. In Kerala, there has been a recent movement for production of organic or safe to eat vegetables. Apart from that, the State government was providing subsidy for establishing small sized polyhouses. Hence, most of the marginal farmers utilized this opportunity to produce safe to eat vegetables in their homesteads. It should be noted that, the polyhouse cultivation in homesteads plays a pivotal role in achieving the goal of self-sufficiency in vegetable production in the state. However, its economics of production and marketing are not satisfactory.

On the contrary, among open precision farmers, a majority of 63.40 per cent of open precision farmers had high marketed surplus of above 10 tonnes, 33.30 per cent had upto 10 tonnes and 3.30 per cent had a marketed surplus upto 5 tonnes. Various factors contributed to this viz., the technology of open precision farming has been successfully adopted among commercial vegetable farmers of Kerala. Subsidy schemes are made available through different state government agencies, especially Vegetable and Fruit Promotion Council of Kerala (VFPCCK) which also provides both technical and marketing support to open precision farmers. Moreover, this technology was well adopted by farmers cultivating on leased land, who undertake vegetable cultivation on a large scale in the state.

**Marketing channels:**

It is apparent from the results in that more than half (61.10%) of the polyhouse farmers had a direct access to market via super markets or local markets, 11.10 per cent through eco-shops, where they could sell the organic produce at a higher price, 11.10 per cent marketed

through middlemen and 27.80 per cent marketed through VFPCCK, which is a public sector initiative aimed at bringing about overall development of fruits and vegetables sector in Kerala. It provides market information and facilitates the marketing of fruits and vegetables in bulk to wholesalers at fair prices.

It was found that, farmers got more price for the produce when sold under the tag of locally grown vegetables. Eco-shops are another initiative under the state government where farmers could sell their organic produce at fair price. Both of these facilitated marketing, making it easier for them to dispose the produce in time at a fair price. Most of the farmers believed that they did not get profit when sold through middlemen. The results are on par with the findings of Maratha and Badodiya (2017).

In case of open precision farmers, 66.70 per cent marketed through VFPCCK and 33.30 per cent had direct access to market. VFPCCK promotes new technologies of production and extend government subsidy to the farmers. Thus, most of the commercial open precision farmers availed the services of VFPCCK which also helps them in avoiding middlemen in marketing. It must be concluded that that open precision farmers got more profits through VFPCCK marketing, as they could market produce easily. More or less similar results have been reported by Desai and Solanki (2013).

#### **Access to market:**

##### *Distance from market:*

The results showed that 44.4 per cent of the polyhouse farmers were 7-10 km away from the market while, 38.90 per cent were 4-6 km away and 16.70 per cent were 1-3 km away from the market. The polyhouse farmers had limited access to rural markets, while they travelled to nearby city to sell their produce in super markets and eco-shops, which ensured fair price.

As far as open precision farmers are concerned, a clear majority of 76.70 per cent were only 1-3km away from market, while 20 per cent were 7-10 km away and 3.30 per cent were 4-6 km away from market. The result could be because, most of the open precision farmers marketed their produce through VFPCCK to wholesalers who used to pick the produce from the farm gate.

#### **Mode of transport:**

The results showed that 38.90 per cent of the polyhouse farmers used auto as a mode of transport to

reach markets, while 27.80 per cent used tempo, 16.70 per cent used car and another 16.70 per cent used tractor.

Polyhouse farmers found it economical and affordable to transport produce in tempo and auto. While some of the farmers had very small quantity of produce, for which they used their own cars. Most of the farmers did not own a tractor.

In case of open precision farmers, 60 per cent used tempo as the mode of transport, 16.70 per cent used auto, 13.30 per cent used tractor and 10 per cent used cars.

The likely reason for such a result could be that, majority of the farmers marketed in nearby VFPCCK which could be reached in a tempo and most of them did not own tractors or any other private vehicles. Similar results have been reported by Kumar (2013).

#### **Access to market information:**

It could be found that 61.10 per cent of polyhouse farmers had adequate access to market information, while 38.90 per cent had inadequate access. The likely reason for such a result could be the medium level of education among polyhouse farmers added to their moderate mass media and extension contact. The results are in conformity with Dhara *et al.* (2015).

In case of open precision farmers, a clear majority of 83.30 per cent had adequate access, while only 16.70 per cent had inadequate access to market information. The reason for such a result could be attributed to the consistent contact of open precision farmers with VFPCCK and extension officials. The results are on par with the findings of Gangadhar (2009).

#### **Price satisfaction:**

The results in showed that 55.60 per cent of the polyhouse farmers were unsatisfied with the price of the produce, while 44.40 per cent were satisfied with the price. The reason for non-satisfaction could be as the polyhouse farmers were unable to cope up with the changing market demands and they did not have access to any kind of guidance from the officials to avail market information. A clear majority of 60 per cent of the open precision farmers found the prices satisfactory, while 40 per cent found it unsatisfactory. The probable reason for majority being satisfied could be that they sold their produce through VFPCCK at a fair price and also had moderate contact with the officers to collect market information on time and followed a cropping pattern in

accordance with the market demand.

#### Availability of storage facilities:

Hundred per cent of the polyhouse farmers had inadequate storage facilities, while 96.70 per cent of open precision farmers had inadequate and 3.30 per cent had adequate storage facilities. The government is not providing any infrastructure for storage and farmers did not have the knowhow on the importance of storage and post-harvest handling. The results are on par with the findings of Karpagam (2000).

This finding is worth to call the attention of policy makers. The government needs to popularize the advanced post-harvest handling techniques among the hi-tech farmers who often produce bulk quantity which requires more storage facilities. This would help the farmers to negotiate for better price instead of disposing their produce at whatever price offered in the market. This will be a great step towards making hi-tech farming more profitable and attractive.

#### Post-harvest handling or processing or value addition:

The results showed that none of the farmers, both in polyhouse and open precision had adopted any processing or value addition activities. The hi-tech farmers were not aware of the relevance of value addition in avoiding the post-harvest losses. They did not have the will to invest in such activities due to the fear of further losses.

#### Discrimination in the marketing behaviour of polyhouse and open precision farmers:

To test whether there is a significant discrimination

in the marketing behaviour of polyhouse and open precision farmers, discriminant function analysis was performed.

The eigen value was found to be 2.11 and the function explained 100 per cent of the variance. The canonical correlation is 0.824 which is comparatively high. The higher the value of correlation better the function that discriminates the two groups. The Wilks lambda is 0.322 and chi-square statistic shows that it is significant at 1 per cent level of significance. Then the function is statistically significant in showing a discriminatory power.

Marketed surplus had the greatest effect for predicting membership to group as there is a huge difference between the marketed surplus of polyhouse and open precision farmers, followed by distance to market, though it has inverse relationship to group membership, showing that as distance increases farmers show weaker marketing behaviour. Marketing channel had the lowest effect for predicting group membership as both groups had some marketing channels in common. Thus, it was found that there was a significant discriminatory power for the variable marketed surplus between the groups.

The finding again helped to conclude that the open precision farmers were more successful in marketing as compared to polyhouse farmers.

#### Linkages in hi-tech farming sector:

##### Backward linkages:

Linkage for technological needs:

It is apparent from the results that 66.70 per cent of the polyhouse farmers utilized training programmes for receiving information on technology. While 27.80 per cent used consultancy services and 5.60 per cent used

**Table 1: Summary of discriminant function analysis**

Sr. No.	Eigen value	Percentage of variance	Canonical correlation	Wilks lambda
1.	2.11	100%	0.824	0.322**

**Table 2 : Standardized canonical discriminant function co-efficients**

Sr. No.	Prediction variable	Standardized canonical discriminant function co-efficients	Rank of variable
1.	Marketed surplus	0.906	1
2.	Distance to market	-0.850	2
3.	Access to market information	0.719	3
4.	Price satisfaction	0.308	4
5.	Mode of transport	0.264	5
6.	Access to storage	0.249	6
7.	Marketing channels	0.054	7

exposure visits.

In case of open precision farmers, 86.70 per cent utilized training services as source of information on technology, while 10 per cent utilized consultancy services and 3.30 per cent utilized exposure visits.

It could be concluded that farmers greatly depended on periodical training on hi-tech farming offered by State Agricultural Universities or Department of Agricultural Development and Farmers Welfare, while farmers found consultancy services inefficient and inaccessible. Farmers did not have the information on how to avail such services.

#### **Linkages for infrastructure:**

Hundred per cent of the polyhouse farmers established the infrastructure with the support of private agencies. In case of open precision farmers also, 100 per cent purchased inputs from private agencies.

The probable reason could be that government organizations did not have much sales output for selling infrastructural inputs. Farmers found it easier and cheaper to purchase from private agencies at a cheaper rate or through installments.

#### **Linkage for planting materials:**

Seventy two per cent of the polyhouse farmers procured planting materials such as seeds and seedlings from private nurseries and shops, while 27.80 per cent from government organizations.

In case of open precision farmers, 40 per cent bought planting materials from private nurseries, while 23.30 per cent from government organizations and 16.70 per cent used their own seedlings.

The probable reason for the result could be that the farmers purchased seedlings and seeds at a lower cost from private agencies and hybrids were easily available in private seed shops. Polyhouse farmers were largely dependent on hybrid seeds, suitable for the polyhouse climate, which were rarely available in government agencies. In order to make farming economical, some of the open precision farmers, who had surplus production depended on own seeds and seedlings.

#### **Linkage for fertilizers and manures:**

The results revealed that 50 per cent of the polyhouse farmers and 40 per cent of open precision farmers purchased manures from private shops while 11 per cent of polyhouse and 40 per cent of open precision

farmers obtained from government organizations on subsidy and 38.90 per cent of polyhouse and 23.30 per cent of open precision farmers had been preparing their own manures.

This shows that majority of the hi-tech farmers incurred much costs for purchase of fertilizers and other inputs from private agencies.

#### **Linkage for financial assistance:**

##### *Finance for establishment:*

Seventy two per cent of polyhouse and 30 per cent of open precision farmers met financial needs by assistance of nationalized banks, while a majority of 40 per cent of open precision farmers approached co-operative banks for finance and 27.80 per cent of polyhouse and 30 per cent of open precision farmers had their own funds for establishment.

The probable reason for polyhouse farmers to choose nationalized banks for finance might be that the most of them took loans as part of the State Horticulture Mission subsidy scheme at low interest rates.

The open precision farmers had high annual income from farming, which enabled them to use their own funds, apart from that they had strong contact with co-operative banks in nearby towns which disposed farm loans at affordable interests without delay.

##### **Finance for cultivation:**

It was evident that 16.70 per cent of polyhouse and 6.70 per cent of open precision farmers met financial needs for cultivation by assistance of nationalized banks, while 83.30 per cent of polyhouse and 70 per cent of open precision farmers had their own funds for cultivation which was either saved from last season's profit or from other non-farm activities. A mere 23.30 per cent of open precision farmers relied on co-operative banks.

Most of the polyhouse farmers had subsidiary occupation, so that they could use those funds in farming. The open precision farmers had high annual income from farming, which enabled them to use their own funds, a part from that they had strong contact with co-operative banks in nearby towns which disposed farm loans at affordable interests without delay.

##### **Forward linkages:**

##### *Linkage for market information:*

Seventy two per cent of polyhouse farmers depended on State Department of Agricultural

Development and Farmers Welfare for market information while 27.80 per cent of polyhouse farmers got market information through VFPCCK.

In case of open precision farmers, 66.70 per cent approached VFPCCK and only 33.03 per cent approached Krishi Bhavans as most of them were VFPCCK farmers who received market information from Market Information Centre at Trivandrum.

### Finance for marketing:

The results showed that 83.30 per cent of polyhouse farmers and 70 per cent of open precision farmers used their own funds for marketing. While 16.70 per cent of polyhouse and 6.70 per cent of open precision farmers relied on nationalized banks and 23.30 per cent of open precision farmers relied on co-operative banks. The probable reason for the result could be that, most of the farmers marketed their produce in VFPCCKs, Eco-shops or super markets which was located at easily accessible distance, thus, minimizing transportation costs. They could meet marketing costs with their own funds and only a small fraction of open precision farmers approached co-operative banks in case of emergencies.

### Linkage with processing or value addition industries :

It was found that none of the farmers had any kind of linkage for value addition or processing. This shows that farmers are to be made aware of the economic benefits of value addition of their produce and government must take necessary steps to develop linkage of hi-tech farmers with processing industries.

### Conclusion:

The two categories of hi-tech farmers viz., polyhouse and open precision farmers showed significant difference in marketing behaviour with respect to marketed surplus.

The open precision farmers were more market oriented and considered farming as a commercial enterprise whereas the polyhouse farmers followed homestead farming. The open precision farmers were found to have better linkages with input and marketing agencies, particularly VFPCCK which made farming profitable, while the polyhouse farmers had weaker

forward linkages with markets and processing industries. The polyhouse farmers need to focus more on commercial production of vegetables so that farming turns viable and sustainable.

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