

Determinants of Preference for Marketing Channels : An Economic Analysis of Vegetable Growers in Chikkaballapur District

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ABSTRACT

This study has evaluated the factors that influence the farmer's preference of marketing channels for vegetables in Chikkaballapur district, Karnataka. The marketing channels include traditional and modern marketing channels. The primary data were collected from 50 vegetable growing farmers practicing traditional channels using random sampling and 50 vegetable growing farmers who prefer modern marketing channels using snow ball sampling technique. Three major vegetable were chosen for in-depth analysis based on the area dominance. Personal interview method was used to collect the data with the help of semi-structured schedule. Nine variables describing the socio economic characters of the respondents and market factors were considered for the analysis. It was observed during the survey that farmers were practicing many marketing channels. The probit regression was used to identify the factor influencing preference of a particular marketing channel. Empirical findings revealed that factors such as age, farm size, vegetable area, selling price were found to be significantly influencing the choice of channel for all the three selected vegetables. It was interesting to note that the relatively large farm size provided a win-win situation for farmers practicing modern retail marketing channel with planned cultivation and marketing of vegetables, as per the indent received from modern retail outlets. Further, these farmers devoted relatively sizeable area to realise benefits of large economies of scale from flower cultivation than other farmers practicing traditional marketing channel. Distance to the modern market negatively influenced in choosing modern markets by the farmers. There is a need to establish more and more collection centres so as to benefit more number of farmers in the region from these modern retail marketing channel.

Keywords : Modern marketing channel, Vegetable growers, Probit model

AGRICULTURE is considered as the backbone of Indian economy as it provides food to its million mouths and the raw materials to growing industrial base. The demand for vegetables and fruits is increasing due to awareness about the nutritional and protective nature of these commodities. Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield and economic viability, generation of on-farm and off-farm employment and nutritional richness.

Our country is blessed with diverse agro-climates with distinct seasons, making it possible to grow wide array of vegetables.

India ranks second in vegetables production in the world, after China with nearly 13 per cent in world's vegetable production. As per FAO statistics, India produced 196.26 million metric tonnes of vegetables from 10.73 million hectares during 2020-21. The production share of vegetables was 59.50 per cent in

total horticultural production during the year 2020-21. Vegetable production was more than doubled in the past decade from about 89 million MT. Amongst vegetables, India is the second largest producer of potato, onion, cauliflower, brinjal, cabbage, *etc.* The vast production base offers India tremendous opportunities for export too.

Marketing of vegetables is particularly important as up to 90-98 per cent of the produce is marketable surplus, except root and tuber crops of which a significant portion is saved for seeds (Singh and Sikka, 1992). The marketing operations of vegetables have a crucial role, due to seasonality of produce, which largely determines the profits of the farmer on one hand and level of availability to consumer on the other hand. The strengthening of Indian agriculture base can be achieved not only by increasing the farm production through new production technologies, but also even to a larger extent through addressing issues in post-harvest handling and distribution by linking farmers to markets. The decision to sell in any channel depends upon many factors than merely price and returns criteria. For instance, selection of the marketing channel depends on information related to product attributes, prices, cost and consumers' demand.

Most of the vegetables are perishable and are highly prone to production and market risks, which may act as deterrent to farmers participation in their cultivation. Local markets for high value commodities are thin, coupled with lower marketable surplus of individual small holder's to be traded remuneratively in distant urban markets due to high transaction costs, need to be addressed though research. The vegetable prices are volatile and fall drastically even with a small change production and market arrivals. Institutional innovations in marketing, enhance farmer's access to quality inputs, improved technology, information and other advisory services which eventually lead to improvement in productivity and reduction in marketing and transaction costs (Hanumanthaiah and Aparna, 2010).

In India the development of organized retail chains had deeply influenced fruit and vegetable marketing system. India is observing growth in organized retailing through the participation of large corporate

firms. Retail industry in India is expected to grow to US\$ 1.3 trillion by 2022, with a Compound Annual Growth Rate of 16.7 per cent over 2015-20, more importantly India is the fifth largest preferred retail destination globally. The country is among the highest in the world in terms of per capita retail store availability. India's retail sector is experiencing exponential growth, with retail development taking place not just in major cities and metros, but also in Tier-II and Tier-III cities. This trend can be closely related with growing urbanization, expanding consumerism and growing number of upper middleclass and high-income households. These retail chains bring in quality culture, instant demands and supply and more commercial nature of production and marketing at the farmer level (Singh and Singh, 2015).

Understanding the factors affecting the market choice (*i.e.* farmer's decision to sell in different marketing channels) is important and can be used to guide farmers, farm investment decision, and market channel development. Further, this also directs in formulating the strategic plans, policies for farmers inclusiveness to the marketing and development of market abilities. In this study, the factors that influence the farmers marketing choices for vegetables in different marketing channels have been evaluated. Co-existence of different marketing channels appears to support producers by providing convenient access to a range of price and quality service combinations. Marketing of vegetables is not a mere selling of the produce; it also includes the value added activities associated with post-harvest quality maintenance, according to the market channel requirement and unit prices for the produce. Market prices vary greatly with produce quality and market location. Markets are chosen not only with price consideration but also on the basis of services offered and their proximity (Roopa *et al.*, 2018). Choice of channel is greatly influenced by various factors such as farmer's socio-characteristics, location-specific attributes such as distance to markets, competition among the trader-buyers, consumer preference and their attributes.

Description of Vegetable Marketing Channels under Study Area

Traditional Marketing Channels

1. Farmer - APMC - Wholesaler - Retailer - Consumer
2. Farmer - APMC - Retailer - Consumer
3. Farmer - APMC - Consumer
4. Farmer - Trader - APMC - Retailer - Consumer

Modern Market Channel

These marketing channels which differ from the traditional channels indicated above and following are the modern retail marketing channels.

1. Farmer - Collection centre - Retail outlet - Consumer
2. Farmer - Trader - Collection centre - Retail outlet - Consumer

Sources of Data and Analytical Framework

Conceptual Framework

The conceptual model on marketing explains farmer's marketing behaviour. In marketing of agricultural commodities, selection of marketing channel has bearing on many other decisions, as different channels are characterized by diverse institutional attributes. It is assumed that selection of more than one channel by a farmer maximizes the returns and farmers would also practice it, depending upon the nature of the commodity, availability and accessibility to marketing agency, expected additional benefits and his knowledge. In this study, the farmers are classified into two categories as Farmers participating in Traditional Marketing Channels (FTMC) and Farmers participating in Modern Marketing Channels (FMMC). The FTMC are those who are selling more than 70 per cent of their produce in the traditional marketing channel. The FMMC farmers are those who are selling more than 70 per cent of their produce to the modern marketing channel, as it is needless to mention that we can't get the those category of farmers relying on a single marketing channel. The marketing decision on preference for a particular marketing

agency of a channel depends on many factors like his personal socio-economic characteristics of the farmers, availability of different market choices prices received, degrees of relationship among marketing firms with respect to competition, enforcement mechanisms of the trader including market infrastructure like transportation facility, market lead extension services, government regulations, of the marketing channel.

Study Area and Sample Design

The study was carried out in Chikkaballapur district, as it was the leading district in vegetable cultivation in Southern part of Karnataka and had greater opportunity to fulfill the large demand for vegetables from nearby huge consumer market and modern retailing prevalent in Bengaluru. To achieve the objective of the study, the required primary data from 50 farmers participating in Traditional Marketing Channels (FTMC), as defined earlier whose produce moves onwards in traditional retail format were selected using random sampling technique, while equal number of 50 farmers participating in Modern Marketing Channels (FMMC), using Snow ball sampling technique whose produce would reach the consumers through the modern retail outlet traced with the help of the organized retail firms. Thus a total sample size for the present study was 100 vegetable growers. The data were collected from the respondents through personal interview method using pre-tested, well-structured schedule. The cluster of villages were chosen randomly which were participant in the modern retail outlet and FTMC respondents were also

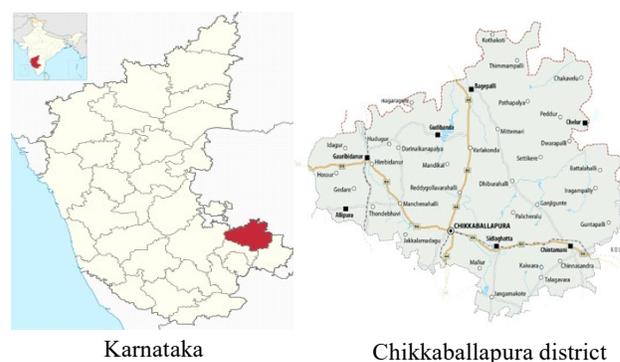


Fig. 1: Karnataka State and Chikkaballapur district showing study area

chosen from the same villages so as to ensure homogeneity in the sample except vegetable marketing practice. The required information about socio-economic character of the respondents like age, education level, land holdings, cropping pattern, details of marketing practices pertained to the agricultural year 2021-22.

Analytical Tools used

The data were analysed using the measure of central tendency and various functional forms as detailed below. The commonly used measures like averages, frequency and per cent were used to synthesize data for functional analysis.

a) *Probit Model* : The empirical specification of market choices can be modelled through probit regression analysis. The probit model is a statistical probability model with two categories in the dependent variable. Probit analysis is based on the cumulative normal probability distribution. The binary dependent variable, y , takes on the values of zero and one. The outcomes of y are mutually exclusive and exhaustive. The dependent variable, y , depends on k observable variables X_k where $k = 1, \dots, K$. While the values of zero and one were observed for the dependent variable in the probit model, there was a latent, unobserved continuous variable, y^* .

$$y^* = \sum_{k=1}^K \beta^k X^k + \varepsilon \quad (1)$$

ε is normally distributed with $(0, \sigma^2)$

The dummy variable, y , was observed and was determined through y^* as explained below :

$$y = \{ 1 \text{ if } y^* > 0, 0 \text{ otherwise} \} \quad (2)$$

The point of interest relates to the probability that y equals one. From the above equations,

$$\begin{aligned} \text{Prob}(y = 1) &= \text{Prob}\left(\sum_{k=1}^K \beta_x X_k + \varepsilon > 0\right) \\ &= \text{Prob}\left(\varepsilon > -\sum_{k=1}^K \beta_x X_k\right) \\ &= 1 - \Phi\left(-\sum_{k=1}^K \beta_x X_k\right) \end{aligned} \quad (3)$$

Where Φ is the cumulative distribution function of ε

The probit model assumes that the data were generated from a random sample of size n with a sample observation denoted by i , for $i = 1, \dots, N$. Thus the observations of y must be statistically independent of each other to rule out possible serial correlation. Additionally, it was assumed that the independent variables chosen were random variables.

The Maximum Likelihood Estimation (MLE) technique was used to estimate probit model parameters. MLE focused on choosing parameter estimates that gives the highest probability or likelihood of obtaining the observed sample y . The main principle of MLE was to choose as an estimate of β for set of K numbers that would maximize the likelihood of having observed this particular y (Aldrich and Nelson, 1984).

The probit model for the study was specified as below

$$Y_{ki}^* = \beta_{k0} + \beta_{k1} X_1 + \beta_{k2} X_2 + \beta_{k3} X_3 + \beta_{k4} X_4 + \beta_{k5} X_5 + \beta_{k6} X_6 + \beta_{k7} X_7 + \beta_{k8} X_8 + \beta_{k9} X_9 + \beta_{k10} X_{10} + \beta_{k11} X_{11} + \varepsilon$$

Where,

Y = Dependent variable (Channel Chosen), Binary variable with 1 for FMMC and 0 for TMMC

X_1 = Age of vegetable grower (years)

X_2 = Level of education (No. of formal years of education)

X_3 = household size (No.)

X_4 = Social participation (0-No participation, 1-Panchayat, 2-Co-operative, 3-SHG, 4-Others)

X_5 = Average farm size (acres)

X_6 = Area under the selected vegetable (acres)

X_7 = Credit facility by the members of channel (1 = Yes, otherwise 0)

X_8 = Access to extension service (1 = Yes, otherwise 0)

X_9 = Quality checking (1 = Yes, otherwise 0)

X_{10} = Price realized in each channel (In Rs. / qtl)

X_{11} = Distance to market (Kms)

In equation (4) Y_{ki}^* is a variable reflecting choice of a marketing channel by the i^{th} farmer with k denoting the market choice ($k = 0, 1$), if k is 0 then farmer is

selling more than 70 per cent of the produce through the traditional market channel otherwise to modern marketing channel.

The probit model was used to estimate the impact of the independent variables on consumer behaviour regarding the sale of vegetables and to predict probabilities of change in producer's channel choice under several simulated variable levels.

b. Output-elasticities

Marginal effects of the explanatory variables at the mean could be obtained by:

$$\text{Marginal effect of } X_i = \frac{dy}{dx_i} * \frac{\bar{X}_i}{\bar{Y}} \text{ (or) } b_i * \frac{\bar{X}_i}{\bar{Y}} \quad (5)$$

Where,

B = Parameter estimate (partial elasticity associated with each independent variable)

x = Mean of independent variable

y = Mean of dependent variable

RESULTS AND DISCUSSION

The descriptive statistics and the description of variables are reported in Table 1 and 2. The two choices available for the marketing include traditional marketing channel (FTMC) and modern marketing channel (FMMC) and were expressed in dummy variable. As mentioned earlier, value 1 was used if farmer sold through modern marketing channel otherwise zero. From the conceptual model, it is hypothesized that the decision of choosing a marketing channel choice depends on characteristics of respondents like socio-economic and market attributes like age (AGE), education (EDU), Household size (HHSIZE), Social participation (SOCP), farm size (FAMSIZE), area under vegetables (VEGAREA), Credit facility provided by the channel member (CREDFAC) Extension services provided by the personnel in the channel (EXTSERV), Quality checking at market place (QULICHECK),

TABLE 1
Summary statistics of variables used in probit model- Modern market channel

Variable	Mean	Standard deviation	Maximum value	Minimum value	Expected sign
AGE - Age of the respondents(Years)	44.94	13.46	53.00	29.00	-
EDU -Education level (years of formal education)	11.00	1.33	18.00	7.00	+
HHSIZE - Size of the household (No.)	5.00	2.89	8.00	3.00	-
SOCP - Social participation (No.)					
No participation (8.00)					
Panchayat member (3.00)		1.23	4.00	0.00	+
Co-operative member (25.00)					
SHG member (10.00)					
Others (15.00)					
FARMSIZE -Size of farm (Acres)	4.40	3.08	18.00	1.00	+
VEGAREA -Area under the vegetable (Acres)	1.44	0.83	3.50	0.50	-
CREDFAC-Credit facility provided by the channel member (1=Yes, 0=otherwise)	0.26	0.44	1.00	0.00	-
EXTSERV- Extension service by the personnel in the channelb (1=Yes, 0=otherwise)	0.82	0.39	1.00	0.00	+
QULICHECK -Practice of quality checking (1=Yes, 0=otherwise)	1.00	1.23	1.00	0.00	+
PRICE -Price realized in each channel (Rs/Qtl)	2291.76	1586.57	4850.00	2140.53	+
DISTMRKT -Distance to market (Kms)	4.24	4.55	25.00	2.00	-

TABLE 2
Summary of statistics of variables used in probit model- Traditional market channel

Variable description	Mean	Standard deviation	Maximum value	Minimum value	Expected sign
AGE - Age of the respondents (Years)	48.64	14.34	85.00	27.00	-
EDU -Education level (years of formal education)	8.07	0.98	13.00	3.00	+
HHSIZE - Size of the household (No.)	6.00	55.00	12.00	4.00	+
SOCP - Social participation (No.)					
No participation (30.00)					
Panchayat member (0.00)					
Co-operative member (10.00)		1.15	4.00	0.00	-
SHG member (5.00)					
Others (10.00)					
FARMSIZE - Size of farm (Acres)	2.73	3.30	16.70	1.50	-
VEGAREA -Area under the vegetable (Acres)	2.04	1.32	6.50	3.00	+
CREDFAC-Credit facility provided by the channel member (1=Yes, 0=otherwise)	0.62	0.49	1.00	0.00	+
EXTSERV- Extension service by the personnel in the channel (1=Yes, 0=otherwise)	0.40	0.69	1.00	0.00	-
QULICHECK -Practice of quality checking (1=Yes, 0=otherwise)	0.00	0.89	1.00	0.00	-
PRICE -Price realized in each channel (Rs/Qtl)	1613.907	12.04	3250.00	1520.00	-
DISTMRKT -Distance to market (Kms)	8.37	6.98	22.00	4.00	+

Price realised in each channel (PRICE), Distance to the market (DISTMRKT).

It could be observed from summary characteristics of the variables used in the probit model for modern and traditional farmer (Table 1 and Table 2) that the age was an important factor in choice of market channel. Younger farmer are more likely to choose modern marketing channel to dispose their output as average age of respondents in the modern marketing channel was 45 years for respondents in FMMC category which is less than age of the farmers in traditional marketing channel *i.e.*, 49 years.

Thus age was found to be inversely related to the choice of modern marketing channel. Education (Edu) level could be an important determinant as it would help to gather and take benefit of information flow through different means and aids in rational decisions. Literacy is also an indicator of managerial decisions

and marketing practices. The education level of the farmer measured in terms of total number of years of formal schooling. Descriptive statistics revealed that on an average, farmers in the category of FMMC have completed the higher secondary school whereas traditional retail farmers on an average have possessed primary education.

Thus possession of higher education ensured the farmers to take advantage of information, better managerial decisions and ultimately facilitated better marketing practices. Social participation by the farmers is also an important factor, which was observed with most of sample farmers in modern marketing channel like membership in co-operatives whereas the level of participation in such organisation with respect to traditional retail farmers was poor. Participation as member or office bearers in various social organisations will strengthen their social network and enabled them to timely access to information and better managerial decisions.

Farm size also turned out to be prominent factor in the literature of the marketing choice decisions. Farm size is used as a proxy for wealth of farmers. The literature revealed that in Indian context, wealth has an effect on the farmer's choice of place as wealthier farmers can take advantage of low transportation cost due to economies of large scale benefits both in input sourcing and output marketing, in addition they can have or wider social network helping in better market access and market facilities. Average land holding of traditional farmers (2.73 acres) was less compared to the modern farmers (4.40 acres). This indicates that the modern farmers are better-off than traditional farmers in reaping benefits of economies of scale. Further, vegetable farm size is also equally important, as it is an important determinant of vegetable production, investment and marketing decisions. Results presented in table also revealed average area under vegetable cultivation of 1.44 acres in the case of FMCC farmers and 2.04 acres for FTMC farmers. The reason behind this is that the FMCC practicing farmers with large holdings allocated higher area for cultivation of flowers like rose, chrysanthemum, marigold *etc.* which provide better year round income and savings. It was observed during the survey that respondents reported floriculture was more beneficial enterprise than vegetable cultivation. As vegetables generally associated with lump-sum mostly one time returns, which is not useful in managing recurring expenses. Another reason could be that due to very close and intimate contact of farmers practicing in FMCC retail format with personnel in retail outlet and collection centre, succeeded in getting more frequent, regular indents for the vegetables they produce. Credit facility (CREDFAC) is also important factor in choice of channel, as the agents in traditional market channels like commission agent, wholesaler and retailer provided credit facility in advance of crop season to meet expenses of farmers starting from sowing to various peak crop season, which might have compelled to some extent to sell through that agency. If the farmer is availing credit facility in the particular channel then value of dummy variable is one otherwise zero.

With advent of more number of modern retail outlet in metropolitan cities, farmers are getting relatively better marketing option for their produce in general and vegetables in particular. Strict quality checking and frequent lot rejection due to the poor quality in the modern marketing channel hinders the farmers to choose this channel. This variable (QUALICHECK) is taken as dummy variable with value one for prevalence of quality checking and zero otherwise. These channels also provide extension service in term of advisory role by the personnel in the channel. If any farmers availing advisory services from particular channel then the value is one otherwise zero. The average value of this is near to one in modern channel, it is due to the reason every modern outlet will be having a person placed may be horticulture specialist or agricultural graduates, who is assisting farmers in observing good agricultural practices (GAP) right from selection of variety, planting time, spraying schedule, harvesting schedule, *etc.* Price is also another major factor in choice of marketing channels and obviously, the channel with better price realisation would be preferred. Average price realised by the farmer in modern channel (Rs.2291.76/ qtl) was found to be comparatively higher (42%) compared to the traditional channel (Rs.1613.91/ qtl). Distance to the market also a factor which helps the farmers to choose between channels. Shorter the distance to collection centre higher the probability of farmers to for with and prefer modern channel and visa-versa. The average distance between farm and the collection centre in the case of modern format of retail market channel is 4.24 km and is 8.37 km in the case of FTMC, so the distance had positive relation with probability to choose modern market channel.

The estimates of the probit model about factors influencing the preference for marketing channel are presented in Table 3. The coefficients of these parameters indicate direction of association with dependent variable. Majority of the parameters listed in the model have shown positive influence of choice of channel. The pseduo r^2 indicated that the model chosen for estimating choice of channel and its determinants was found to be good fit to the data as it worked to be very high per cent of explanation of

TABLE 3
Estimates of probit model on factor affecting choice of channel between traditional and modern marketing channel for major vegetables

Variables	Parameters	Tomato		Potato		Cabbage	
		Co - efficient	P - Value	Co - efficient	P - Value	Co - efficient	P - Value
INTERCEPT	β_0	10.619 (22.585)	1.523	26.33 (12.22)	2.589	2.234 (2.619)	5.265
AGE	β_1	-3.138 * (1.440)	0.012	-2.633 ** (1.026)	0.022	-1.094 ** (0.015)	0.005
EDU	β_2	0.208 * (1.002)	0.045	1.88 (1.023)	1.253	4.706 * (1.206)	0.025
HHSIZE	β_3	-1.998 (0.671)	1.352	1.835 (5.41)	2.142	-4.024 * (-1.689)	0.012
SOCP	β_4	3.406 * (0.098)	0.042	-3.063 (1.079)	1.025	2.472 * (0.008)	0.032
FARMSIZE	β_5	1.294 ** (0.572)	0.001	3.198 ** (0.496)	0.007	1.194 (1.975)	0.125
VEGAREA	β_6	-2.812 ** (0.811)	0.007	-2.228 ** (2.035)	0.031	-4.115 * (-1.541)	0.032
CREFAC	β_7	-1.083 (2.969)	0.552	-1.070 * (0.034)	0.025	-2.806 * (-1.057)	0.039
EXTSERV	β_8	6.789 (10.828)	1.985	2.412 (3.523)	1.253	1.795 * (0.245)	0.009
QULITY	β_9	3.136 ** (1.181)	0.045	1.112 (2.740)	2.021	1.342 (1.957)	0.108
PRICE	β_{10}	2.016 ** (1.006)	0.003	3.094 ** (1.033)	0.015	3.098 ** (1.058)	0.024
DISTMARKT	β_{11}	-2.980 (4.403)	7.252	-1.062 (0.002)	2.562	-2.109 (0.059)	0.014
Pseudo r ²			0.80		0.69		0.73

Figures in parenthesis indicate standard error; ** and * indicates level of significance at one and five per cent level of probability

80 per cent, 69 per cent and 73 per cent in the case of tomato, potato and cabbage, respectively. The estimated coefficient for age and area under vegetables revealed negative and significant influences on the choice of channel for all selected vegetables. The farm size and price realised in each channels have positive and significant influence on choice of channel for all the three vegetables. Social participation by the farmer and prevalence of practice of quality checking found to have positive and significant influence in choosing marketing channel for tomato. Credit facility by the

agencies in traditional channel has also showed negative and significant impact on choosing the modern market channel for potato. House hold size has negative and significant influence on choice of channel for cabbage farmers. Whereas the extension services and social participation have positive and significant impact in the case of marketing practice of choosing MMC for cabbage. Although distance to the market exhibit negative relation with choice of channel but fail to emerge as significantly influencing factor.

The estimated coefficient for age and area under vegetables revealed negative and significant influences on the choice of channel for all selected vegetables. The farm size and price realised in each channels have positive and significant influence on choice of channel for all the three vegetables. Social participation by the farmer and prevalence of practice of quality checking found to have positive and significant influence in choosing marketing channel for tomato. Credit facility by the agencies in traditional channel has also showed negative and significant impact on choosing the modern market channel for potato. House hold size has negative and significant influence on choice of channel for cabbage farmers. Whereas the extension services and social participation have positive and significant impact in the case of marketing practice of choosing MMC for cabbage (Pavithra and Gaddi, 2022). Although distance to the market exhibit negative relation with choice of channel but fail to emerge as significantly influencing factor.

The chosen independent variables were regressed against the choice of the channel as dependent variable. Table 4 indicate the marginal efficiency of the factor influencing choice of channel. It could be inferred based on coefficient for age of respondents

TABLE 4
Marginal efficiency of factors affecting choice of the channel

Variable	Marginal efficiency		
	Tomato	Potato	Cabbage
AGE	-2.199	-2.821	-5.819
EDU	1.386	1.706	1.015
HHSIZE	-1.647	-0.857	-3.438
SOC	2.227	0.203	3.537
FARMSIZE	1.394	0.306	1.193
VEGAREA	-2.006	-1.054	-1.119
CREDFAC	-4.211	-2.745	-2.542
EXTSERV	4.527	0.187	1.417
QULITY	1.054	1.110	2.012
PRICE	1.049	1.094	2.104
DISTMARKT	-1.984	-0.940	-5.819

that younger farmer tend to choose the modern channel even though, there exist a risk of rejection of produce was high based on quality specifications set. As one per cent increase in the age of the respondents will reduce 2.199 per cent of farmers to choose modern marketing channel in case of tomato, 2.821 per cent in case of potato and 5.819 per cent in case of cabbage. These results are consistent with the findings reported by Bongiwe and Micah (2013) while studying Factors affecting the choice of marketing channel by vegetable farmers in Swaziland and reported negative relation with age and choice of NAM Board market channel. As expected literacy level of respondents has positive and significant influence on choice of market channel in case of tomato and cabbage. These results are in line with Gilbert and Adam (2017). House hold size of cabbage farmers has negative and significant influence of choice of MMC. As one per cent increase in the household size reduces 3.438 per cent of farmers to choose modern channel. Social participation has positive and significant impact on choice of channel in case of tomato and cabbage farmers. As one per cent increase in the social participation increases 2.227 and 3.537 per cent of farmers to switch to modern marketing channel due to expanded social network and timely information enable farmers to take better marketing decisions. Farm size has positive and significant impact on choice of channel for all selected vegetables.

Farm size is taken as proxy for wealth of the individual. Wealthier farmers due to their vast social network, market access and market facility, probability to choose modern market channel was high. One per cent increase in farm size, access to modern markets would rise marginally by 1.394, 0.306 and 1.193 per cent for tomato, potato and cabbage respectively. Whereas area under selected vegetable has significant and negative impact on dependent variable. Large area under the vegetable means large produce which cannot be absorbed by the modern market channel, so farmers choose traditional channel and also there is problem of quality maintenance when cultivated vegetables on larger area. To take the advantage of better price realisation in modern retail marketing channel, the

large farmers are much planned and allocate manageable area for vegetable cultivation and flower cultivation was even better preference enterprise in the study area. The flower cultivation provides them regular and continuous returns to farmers and help meet day to day operational expenses in farming. As one per cent increase in vegetable area decreases the farmer's probability to choose modern channel by 2.006 per cent in case of tomato growers and about one per cent in the case of both potato, cabbage cultivation. Thus findings of the present study are in line with that of Rajanna *et al.* (2017) who reported that, small farmers with lesser vegetable area reaped more benefit from modern marketing channel.

Credit facility extended by the commission agents in APMC restrict farmers to go for modern channel. As one per cent increase in the credit facility, increase the farmers to choose the traditional channel by 2.745 per cent and 2.542 per cent in the case of potato and cabbage respectively. Price is positively and significantly influencing factor in choice of a particular retail format of marketing channel. As price increases, the farmer's choice to go for modern market channel also increases. One per cent increase in price would results in increase in the preference for modern retail format by 1.049 per cent, 1.094 per cent and 2.104 per cent in the case of tomato, potato and cabbage farmers, respectively.

Marketing decision is more important in farming since, whatever farmers gained through modern production technologies are being lost in the process of marketing. In the democratic counties like India, even with multiple number of policies, programs and interventions to improve the conditions for agriculture marketing, the glitches and hitches found continuing. However, the reasons are obvious, as are inherent in the characters of farming, farm produce and Indian farmers. However, leaving greatly to the free play of market forces, do some time help in finding better and acceptable prices for both the producer-seller and consumer-buyer. In this direction, with the emergence of modern format of retail marketing, largely located in consumption centres are playing some encouraging role of providing better prices to

producer and fresh and relatively cheaper and variety of consumer requirements at one place. Hence in the present study which was attempt to quantify the extent of association between producer's characters and choice of marketing channel brought out very interesting facts using probit regression analysis. It was in line with the approri that age and vegetable area were negatively influencing the choice of FMMC, while literacy and farm size were positively and significantly influencing preference for FMMC channel. Large farmers with more average land holding allocate less area to the vegetable cultivation took advantage of better price from FMMC and revealed win-win situation with planned and regulated production of vegetables compared to FTMC participants. Small farmers generally having financial commitment with commission agents and problem in maintaining quality of the produce, who faced frequent rejection from modern retail outlets preferred to go with APMC and other traditional mode of marketing than with collection centres of FMMC. Therefore, popularising and with expanded absorption capacity of higher quantity coupled with more number of collection centres from FMMC retail formats would help more number of farmers to get better income and improve their living standard.

REFERENCES

- ALDRICH, J. H. AND NELSON, F. D., 1984, Linear probability, logit and probit models. Sage Publications, Newbury Park.
- APARNA, B. AND HANUMANTHAIAH, C. V., 2012. Are supermarket supply channels more efficient than traditional market channels?. *Agricultural Economics Research Review*, **25** (2) : 309 - 316.
- BONGIWE, G. X. AND MICAHA, B. M., 2013, Factors affecting the choice of marketing channel by vegetable farmers in Swaziland. *Sustainable Agriculture Research*, **2** (1) : 112 - 123.
- GILBERT, J. N. AND ADAM, M. A., 2017, Factors influencing choice decision for marketing channels by coffee farmers in Karagwe district, Tanzania. *Global journal of biology, agriculture and health*, **6** (2) : 1 - 10.

- PAVITHRA, K. N. AND GADDI, G. M., 2022, Drivers of crop diversification: An empirical evidence from eternally drought prone area of Karnataka. *Mysore J. Agric. Sci.*, **56** (1) : 244 - 251.
- RAJANNA, R., WOLFGANG, B. AND ERIC, O., 2017, Small holder vegetable farmers and marketing choices: Implications for inclusiveness of farmers to markets. *Asian Journal of Agricultural Extension, Economics & Sociology*, **16** (1) : 1 - 10.
- ROOPA, N., LAKSHMINARAYAN, M. T., NATARAJU, M. S., NAGARAJU, G. N. AND GANAPATHY, M. S., 2018, Awareness, utilization and satisfaction of vegetable growers regarding marketing facilities available at chikkaballapura agriculture produce market committee. *Mysore J. Agric. Sci.*, **53** (1) : 93 - 98.
- SINGH, M. AND SINGH, R., 2015, Organized retail challenges and opportunities. *Int. J. Sci. Adv. Res. in Tech.*, **1** (7) : 105 - 110.
- SINGH, R. AND SIKKA, B. K., 1992, Production and marketing system of apple in tribal area of Himachal Pradesh. *Agricultural Situation in India*, **47** (8) : 595 - 597.