

## **Participation in Farm Markets in Rural Northwest Pakistan: A Regression Analysis**

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### **Abstract**

Participation in farm markets is important for increasing income of farmers in the developing countries. A number of factors account for a household participation in agricultural marketing. This study attempts to explore such associated factors which play a significant role in farmers' participation in farm markets in rural northwest Pakistan. Drawing on empirical data from the field survey; gur, vegetables, and milk were the main products offered for marketing in the area. The degree of specialization of market relations was based on the nature of the farm product. In gur markets, the marketing relations were based on personalized terms whereas in vegetable markets, they were exclusively commercialized. The results of the binary logit model show that size of self-cultivated land and number of livestock, were important determinants of a household participation in agricultural marketing. The study concludes that participation in agricultural markets could be substantially increased through improved infrastructure, commercialized farming systems, and increased number of farm markets so that the dominance of few selected commission agents is minimized.

**Keywords:** Agricultural marketing, Farm products, Commission agent, Gur, Logit model.

### **1. Introduction**

Participation in farm markets is both a cause and a consequence of economic development. Markets offer households the opportunity to specialize according to comparative advantage and thereby enjoy welfare gains from the trade. Recognition of the potential of markets as engines of economic development and structural transformation gave rise to a market-led paradigm of agricultural development during the 1980s (Reardon and Timmer, 2005). With participation in farm markets, households' disposable income increases, and so does demand for multiple goods and services. It, therefore, induces increased participation in demand-side markets, which further increases the demand for cash and thus participation in supply-side markets. The standard process of rural transformation thus involves households' transition from a subsistence mode to a commercialized mode with products increasingly sold off the farm (Staatz, 1994).

In most of the developing countries, enormous financial, political, as well as scientific efforts have especially concentrated on raising agricultural production. Nevertheless, the results from improving the overall living conditions in rural areas are, on the whole, quite

poor. One of the reasons that is mentioned again and again even in recent literature, is the neglect of agricultural marketing as a partial aspect in the integrated development process in the rural sector (Jan, 2007). In this study, the market is designated as an important agricultural support institution having a significant impact on the overall socioeconomic improvement of the farmers. In similar studies (Manig, 1992; Muessen, 1988) on agricultural marketing system in rural areas of Peshawar in the past, the market structures and market relationships have been critically analysed.

### *1.1 Markets for Farm Products in Peshawar*

The most important farm products in Peshawar, as identified by the field work and other studies (Manig, 1991, 1992) are gur (brown, non-crystalline sugar) vegetables, cereals, and milk. For gur, vegetables, and fruits, there are five large wholesale markets (two each for fruits and vegetables, and one for gur) in Peshawar. The fruits which are channeled through these markets, are however, not locally produced but are brought either from Afghanistan or other parts of the province and country. All these markets are private enterprises. The role of the government-marketing department is limited to collecting data on prices, its statistical evaluation and broadcast on media (radio). All other products such as milk, milk products, fodder etc. are sold directly to the consumers at village (on-farm) or in Peshawar main city (off-farm). There exists no formal market for marketing of cereals, which are channelled to the consumer directly either in the village or are directly sold to the dealers in Peshawar.

In both markets for gur and vegetable, there is a hold of several commission agents who play their important role in executing marketing contracts for these products (Jan, 2007). However, the nature of marketing relations between the commission agents and producers differs at both these markets. The marketing relations at gur markets are dominated by the social ties whereas those in vegetable markets are based on economic ties. The gur commission agents place more emphasis on personal and social relations whereas the commission agent's relation with producers at vegetable markets is mostly based on financial terms (ibid).

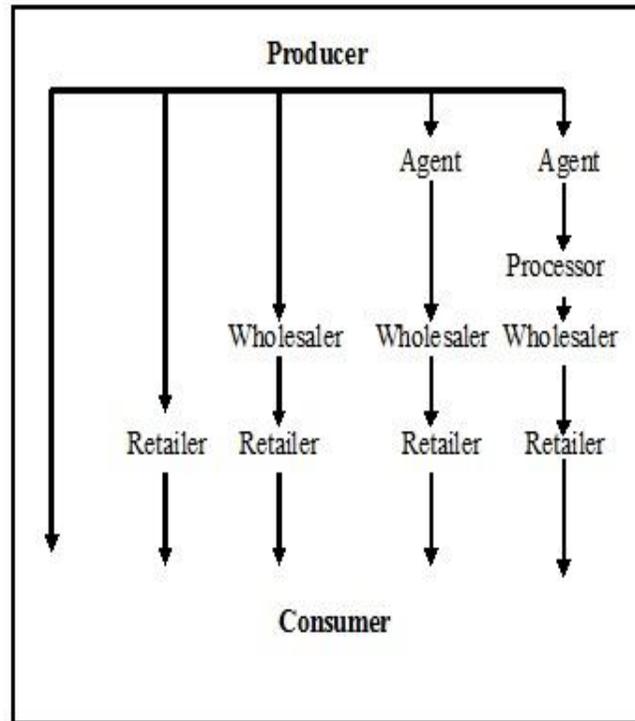
There are two fruits markets in Peshawar called the 'old *fruitmandi*' and 'new *fruitmandi*'. These two *mandis* (markets) are under the control of few commission agents who mediate large volume of fruits from and to other parts of the province. However, no local producers can be found in these markets. The conditions at both of these markets, especially the old one, are too unhygienic and the space for a large number of small retailers at the auctions time is too small. Therefore, the over-crowding sometimes makes the business difficult for the retailers. The above mentioned farm products are marketed through different channels. Various types of marketing channels available for agricultural products are mentioned in detailed here-onwards.

### *1.2 Marketing Channels*

Marketing channels are defined as a set of interdependent businesses and/or organisations, which make a product or service available to intermediary and end users. Farm products are distributed to the consumers via marketing channels, which may be more or less direct and are formed by the trading activities of first-hand intermediaries, processors, wholesalers, and retailers, who buy and process raw materials and distribute finished products to consumers. Marketing channels begins with farmers (producers) and ends with the end user (consumer). The marketing channels in the study area are

illustrated with the help of figure 1. The most important marketing channel for majority of the products is the 'commission agent' to whom the goods are sold. The second important channel is direct sale to the consumers, for most part in the same village. A small number of the sellers sell their products to the small traders in their village stores.

**Figure 1: Marketing Channels in the Six Selected Villages in District Peshawar, Pakistan.**



Source: Adopted from (Jan, 2007; Haines, 1999)

The transforming trend in global agricultural system from subsistence to commercialized farming is also observable in Pakistan. Farmers are now producing for their own consumption as well as for marketing so that to increase their disposable income. Participation in farm markets is however, retarded by a number of entry barriers (Barrett, et al., 2005). This study attempts to identify the factors that lead a household to participate in farm marketing in rural northwest Pakistan.

### *1.3 Objectives of the Study*

This study is conducted with the aim to analyze the type and nature of marketing relations among different stakeholders involved in the marketing processes. In this context the specific objective of the study is to identify various factors responsible for participation in farm marketing in the area.

## 2. Methodology

### 2.1 Description of the Research Location and Data

The paper is a component of the study conducted by the author as part of his PhD research in 2005-06 in six selected villages in Peshawar. The villages included in the study are Gulbela, Kochian, Dalazak, Kukar, Mushtarzai, and YousafKhel. During the first phase, basic information about all household in these villages was collected through a semi-structured questionnaire. All the households were then separated as farm and non-farm household. Out of the farm household 20 household were randomly selected from each village. Thus the total sample size across six villages was 120. For data to be unbiased and highly representative, farm household were categorized based on their land tenure system and other socioeconomic conditions. Then selection of all household was made proportionately from each household category. Thus proportionate stratified randomized sampling technique was used to collect data. For random selection of the households, SPSS was used.

### 2.2. Analytical Techniques

The data obtained was analysed by using SPSS. It was hypothesized that various household and individual level variables may influence a household's participation in farm marketing services. The nature and influence of these variables, however, may differ within regions. The level of a household participation in agricultural marketing was determined by using regression analysis. The dependent variable -participation in farm marketing -is in dummy (Binary) form; in this case binary logistic model is a most appropriate econometric tool for regression analysis (Gujrati, 2004).

The general regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p + \mu \quad (1)$$

Where

$Y$  = Dependent Variable

$X_1, X_2, \dots, X_p$  = Explanatory Variables

$\beta$ 's = Regression Coefficients

$\mu$  = Error Term

If the dependent variable is in dummy form, the use of binary response model is recommended, which is as follow.

$$Y = 1 \quad \text{if } \beta_0 + \beta' X > \mu$$

and

$$Y = 0 \quad \text{if } \beta_0 + \beta' X \leq \mu$$

where

$$\beta^t = \beta_1, \beta_2, \dots, \beta_p$$

$\mu$  = Error term

Assuming  $\mu \sim$  logit standard, then

$$P(Y = 1 | X) = E[Y | X] = G_{Logit}(\beta_0 + \beta^t X) = \frac{1}{1 + e^{-\beta_0 - \beta^t X}}$$

where

$G_{Logit}$  = Cumulated Distribution Function of the random Error term  $\mu$

That means conditional expectation is equal to probability for  $Y = 1$

This gives the prediction

$$\hat{E}[Y | X] = \frac{e^{\hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \dots + \hat{\beta}_p X_p}}{1 + e^{\hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \dots + \hat{\beta}_p X_p}}$$

or, in different terms (i.e. for the latent variable),

$$Logit(\hat{Y}) = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \dots + \hat{\beta}_p X_p \quad (2)$$

### 3. Discussion of Main Findings

#### 3.1. The Model Specification

Participation in farm marketing services is modeled as a dichotomous variable where participation takes the value '1' if a house participates in these services and '0' if otherwise. The probability of a household to participate is formulated as a function of individual, household and village level characteristics, the descriptive statistics of which are given in table 1.

Education can be used as proxy for more knowledge (awareness) about the requirement for different channels of marketing and their regulations. Household members visit to the main city was hypothesized to have positive effects on a household participation in the marketing, as people frequently travelling to the main city of Peshawar were supposed to be more aware of different markets and the channels adopted for marketing of a particular product. Since one of the major marketing products in the area is milk and milk products, therefore, number of livestock in a house was also included as a potential variable to affect the overall fitness of the model. An important variable in the model was total land-self cultivated. It was hypothesized that a farmers having more cultivable land will have more produce and hence more likelihood of participation in agricultural marketing.

**Table 1: Summary Statistics of the Variables used in Binary Logit Model**

Variable	Description	Mean	Std. Deviation.
HACTM	Involved in Farm Marketing (=1, if Yes	0.69	0.46
EDUILL	No Education ( = 1, if illiterate)	0.58	0.49
EDUPRI	Primary Education (1 = 5 years education)	0.09	0.29
EDUMAT	Matric Education (1 = 10 years education)	0.24	0.43
EDUHIG	Higher Education (1 = >10 years education)	0.09	0.29
BNCPP	Household members visit to Peshawar ( = 1 if visits daily )	0.53	0.50
TNOB	Number of livestock (Buffalos)	1.75	7.34
LogTLSC	Self-cultivated land	0.41	0.49
HHW	No. of HH members working	2.19	1.49
LOVWRP	Location of village from Peshawar ( 1 = Nearer, 6 = Too far )	3.50	1.72
N	120		

Source: Author's Own Data Depiction

### 3.2. Results of the Binary Logit Model

The model for participation in marketing services is as follow:

$$\text{Logit}(\hat{Y}) = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \dots + \hat{\beta}_8 X_8 \quad (3)$$

Where

$Y = 1$  if involved in marketing of the farm products

Table 2 shows the results of the binary logit model for participation in marketing services. Education of the household head and number of household members working showed no significant effect on the participation of a household in agricultural marketing. The results are in contrast with those of Heltberg and Tarp (2002) whose study depicted the significantly positive impact of education on participation in farm marketing in Mozambique. The number of livestock (buffaloes) in a household shows significant effect on the participation in marketing. A household having more buffaloes have the higher probability for participation in marketing (more milk production) than others.

Similarly, total land self-cultivated has also significant role on the participation in farm marketing. The likelihood of a household for participation in farm marketing increases with increase in size of land self-cultivated. The results are significant at 1% of probability. Similar results were found by Heltberg and Tarp (2002) who identified factors such as farm size per household worker, animal traction, and infrastructure as significant factors of smallholder market participation.

**Table 2: Determinants of Household’s Participation in Farm Marketing in Northwest Pakistan**

Variables	Variable Label	Coefficients	Standard Errors
EDUPRI (1)	Primary education	-.134	1.041
EDUMAT (1)	10 years of education	-.135	.876
EDUHIG (1)	> 10 years education	17.070	110.10
BNCPP(1)	HH members visit to Peshawar (frequency)	.704	.863
TNOB	Number of buffaloes	.468 *	.243
LogTLSC	Self-cultivated land	4.938 ***	1.454
HHW	HH-members working	-.211	.250
LOVWRP(1)	Location of village 1	-4.904 ***	1.518
LOVWRP(2)	Location of village 2	-3.654 **	1.563
LOVWRP(3)	Location of village 3	14.999	848.90
LOVWRP(4)	Location of village 4	-3.559 **	1.462
LOVWRP(5)	Location of village 5	-5.697 ***	1.668
Constant		2.696	141.98
N		120	
Log-Likelihood		-59.19	
LR Chi <sup>2</sup> (12)		29.95***	

\*(\*\*)[\*\*\*] Significant at p=0.10 (0.05) [0.01]

The location of the village, which was hypothesized to have a significant effects turned out to be significant in the model. The negative signs of the coefficients, however, show that the villages which are nearer to Peshawar, compared to the reference village, are less likely to participate in marketing services. Thus it is concluded that distance from the main city is not the only influencing factor for a household participation in farm products

marketing. Other factors like number of producers in a particular village, the existing cropping pattern in the village, and road and transport availability etc. are important in influencing a household participation in the marketing farm products, as the factors identified by Heltberg and Tarp (2002). The overall model, however, is highly significant having probability of 1%.

#### **4. Conclusion**

The study shows that the most important marketing products in the research area are gur, vegetable, milk, cereals, and green fodder. These products were marketed through different channels. Gur and vegetables, for example, were marketed through commission agents. However, there were two distinct differences in the marketing of these products through commission agents. The first was the cropping pattern and specialization of household land tenure system. The household falling in the 'tenant category' of farmers were mostly marketing gur whereas household with additional employment (non-farm employment) were involved in marketing of vegetables. The second difference is that of the specialization of marketing relation existing between the producer and the commission agents. The prevailing marketing relations between commission agents and gur producers were driven by social interaction (such as visits to farm, gur-factory, and credit etc.). On contrarily, the relations between commission agents and vegetable growers were absolutely commercialized involving cash transactions on the spot. Hence, gur producers were normally tied to specific commission agents and the vegetable producers were having no such obligation. They were marketing through the agent offering relatively better prices. Milk was marketed through retailers in the city. The products like fruits and milk products have almost disappeared from the region. Similarly, cereals, despite the large volume of cropping, are of less importance from marketing perspectives. They were either marketed at a small level through the local shopkeepers or through large dealers collecting it in bulk for processing at flour mills. The producers of gur and vegetables particularly face two problems in participating in agricultural marketing; the poor infrastructure, due to which perishable vegetables are often lost, and the hold of few commission agents in the markets who often control the prices. It is recommended that if farm to market infrastructure is improved, farmers adopt more commercialized farming system, and further markets are established in the surroundings of the main city, large number of farmers will be able to timely channel their produces to markets and will be able to get more profits of their efforts.

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