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Exploring the Socioeconomic Determinants for the Dominance of Traditional Milk Marketing System among Dairy Farmers and Consumers, an Evidence from Punjab Province of Pakistan

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Abstract: The present study was purposely carried out in three districts of southern region of Punjab province of Pakistan, to ascertain the socioeconomic determinants for the dominance of traditional milk marketing system. The three districts namely Lodhran, Vehari and Muzaffargrah having highest number of dairy farmers being engaged with traditional milk marketing constituted a rich population for conducting this study. A field survey study was conducted by incorporating prospective determinants required for this research. The data after collection was compiled, tabulated and analyzed by using the appropriate statistical tools and Logit model for traditional milk marketing system. The study revealed that eight determinants were found significant ($P<0.05$) in explaining the dominance of traditional milk marketing system among the dairy farmers in study area. Dairy farmers' education, large family size, large number of milking animals, no advisory services and non purchase of evening milking were negatively influencing the dairy farmers' adoption of milk selling towards the traditional milk marketing system. Female dairy farmers gender, old age, long distance from urban center, easy selling of milk at door step, provision of advance payment of milk by milkman, lack of quality control, provision of ancillary services by milkmen and social contact relationship between dairy farmers and traditional milkmen have positive influence. Policy implication is that elder age dairy farmers should be educated through advisory services to enhance their ability for better dairy and milk marketing management practices. There should be legal framework to regulate the traditional milk supply system. The practices and operations of traditional milk marketing should be monitored by licensing the trained traditional milkman to ensure the consumers food safety concerns. The comprehensive dairy milk marketing training sessions should be imparted to equip the traditional milkmen for delivering better services and to ensure the consumers' health safety. The traditional milk marketing agents should also provide advisory extension services to dairy farmers about market information, better dairy management practices as rich animal concentrates, veterinary clinical drugs, artificial insemination and potential cattle breed which dairy farmers should keep to respond the market demand to alleviate the poverty in remote areas.

Key words: Traditional milk marketing · Dairy farmers · Milkman · Determinants · Lodhran

INTRODUCTION

Livestock has been a major contributor in the agriculture sector of Pakistan and this sub sector of agriculture plays an important role for the alleviation of poverty in rural areas where more than 50% of country's populations resides. Keeping in view the national economic survey of Pakistan 2014-15, livestock share towards agricultural value addition is around 55.1% and to national gross development product (GDP) is 11.6%. It was also believed that 35-40 million country rural populations is dependent on this occupation and approximately 8.5 million small and landless rural families are engaged in raising of livestock. Pakistan livestock

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encompass rearing of buffalo, cow, goat, sheep, camels, horses, mules and asses. Main livestock products comprise of milk, meat, fat, eggs, wool, bones, blood, hide and skins, among which milk and meat are taken as the major products. Annual growth trends of last 15 years depicted that buffalo population was found as 3.0 % followed by goat (2.8 per cent), cattle (2.4 per cent) while sheep population experienced negative growth rate 0.8% [1]. Milk is primarily produced by two major dairy animals e.g. buffaloes and cows, while a little share is also contributed by goats, sheep and camels. Therefore, buffaloes and cows fetch major focus in livestock sector. These dairy animals when become uneconomical for milk production and complete their productive life span are making use as beef animals. In the dairy sector of Pakistan, the buffalo constitute 46%, cattle make up 52% and rest is based upon other animals. The buffalo population supplies approximately 61% of total milk production and cow's milk share is around 34.9% and remaining is collectively produced by goats, sheep and camels. Pakistan is the 5th largest milk producer in world and in 2014-15, total milk production was recorded to be 52.632 million tons [1].

Milk plays a vital function in building of healthy society and it can be used as vehicle for countryside progress, employment and to slow down the migration of rural population. Nearly one third of world's intake of animal protein is provided by milk and milk products [2]. The milk importance in Pakistan as cash commodity has always been overlooked in past while comparing milk value is found to be 60% higher with other cash crops of cotton and wheat together [3]. In Pakistan milk and milk products constitute 27% of the total household expense on food items. The availability of hygiene milk, altering production trends, high prices and improper supply channels and increasing demand of milk are major factors which direct towards the formulation of milk value chain policies. Around 80 thousand tons of dry milk worth 1213.5 million Pakistan rupees was imported to the country to fulfill domestic milk demand, however the quantity of milk imported remained changing along the period.

Milk Production in Pakistan: The milk production trend in Pakistan is consistently rising on yearly basis. The milk production rising trend is the need of country as the population is also increasing with rapid pace. So to conform the increasing demand for milk consumption, it is also crucial to improve milk production base. During 2014-15, approximately 52.632 million tons milk was produced in the country. The milk production increased by 4.5% during 2014-15 as compare to corresponding last period. The last ten years' (2006-2015) milk production development in Pakistan in thousands of ton is depicted in the Fig.1.

The milk production base in Pakistan is comprised of different domestic animals e.g. buffaloes, cows, goats, sheep, camels etc. The diversification of dairy farmers is also scattered geographically throughout Pakistan. According to FAO study in Pakistan, 80% of milk in the country is primarily produced by rural small dairy farmers and rural commercial dairy producers. The peri-urban dairy farmers' milk produce share is 15%, whereas urban producers contribute 5% to the total milk production [4].

The main milch animals are buffaloes and cows which have milk share as 61% and 35% respectively whereas sheep, goats and camels contribute 4% of the total milk produced in Pakistan. The well recognized cattle breeds are Red Sindhi, Tharparkar, Gir and Sahiwal whereas Murrah and Neeli Ravi are outstanding buffalo breeds in

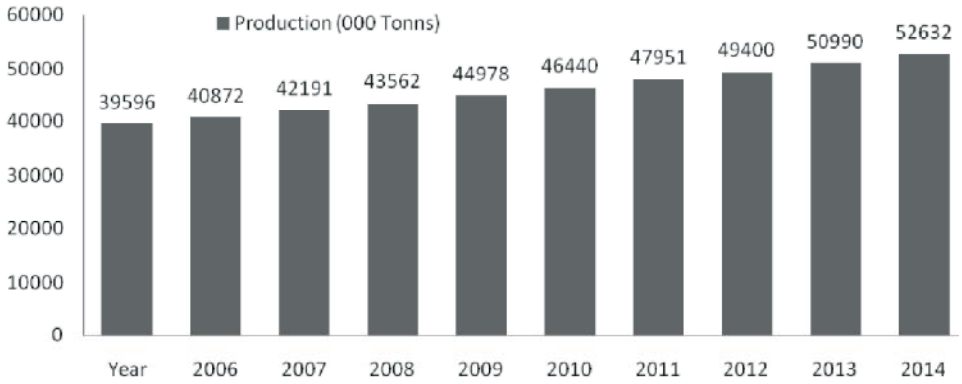


Fig. 1: Milk Production in Pakistan (2006-2015)
Source: Economic Survey of Pakistan (2006-07 to 2014-15)

Table 1: Milk produced by different dairy animals in Pakistan (000 tones)

Milch Species	2012-13	2013-14	2014-15
Buffalo	30,350	31,252	32,180
Cow	17,372	18,027	18,706
Goat	801	822	845
Sheep	37	38	38
Camel	840	851	862
Gross Milk production	49,400	50,999	52,632

(Economic survey of Pakistan, Ministry of Finance, Govt. of Pakistan.)

the region. A study by [5] described that Sahiwal, Red Sindhi and Tharparker breeds of cattle are important cattle milch breeds of Pakistan. The buffalo milk is richer in fat content as compare to cow milk. In Pakistan, milk yield per animal is low as compared to advanced dairy countries such as USA, China and Western Europe. This laggardness in milk yield is due to lack of scientific commercial animal husbandry, malnutrition practices and poor inherent genetic breeds.

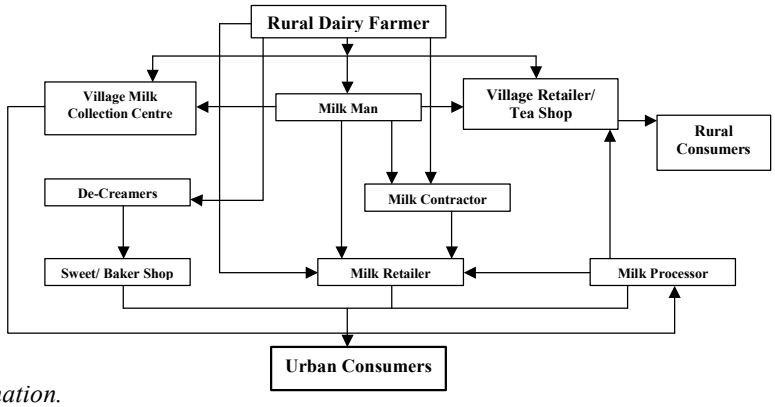
Milk Marketing System in Pakistan: The milk marketing / delivery structure is exclusively dominated by traditional system. The 94% of total milk is marketed in raw and loose form by the traditional milkmen (locally called dhodis) marketing channels and only 5-6 % is processed and marketed by using processed and modern milk marketing dairy channels. Out of the total milk available for human consumption, only 30-40% reaches urban markets, while the remaining 60-70% is consumed in the rural areas [6]. The milk delivery structure exhibit the involvement of various players and each player has a specific role at the relative joint of marketing chain. These marketing players are as dairy farmers, milk collectors, middlemen, milk processors, traders and final milk consumers. The milk supply system in Pakistan can be broadly segmented into three types;

Traditional Milk Marketing System: Traditional channels market unprocessed milk in loose form. The traditional milk supply system consists of a large number of small subsistence, smallholders and commercial dairy farmers, milkmen (Dhodis), localized small scale milk processors, milk /dairy shops and tea seller working at various node of milk delivery to ultimate household consumers. In the traditional milk supply system, the milkman/dhodi is the major interlink between rural dairy farmers and consumers in urban centers. The milk is delivered to the end users in a non sophisticated way. The milkmen collect fresh milk from small size rural dairy farmers and market it to various stakeholders e.g. milk shops, bakers shops, khoya makers (traditional dairy product), sweet shops and city household consumers etc. The milk marketing chains under traditional system can be further subdivided into following chains;

Rural Milk Marketing Chains: The 80% of total milk in the country is produced by rural dairy farmers. Milk in rural marketing channel is supplied by a large number of landless, small subsistence and few commercial dairy farmers. The small size dairy farmers contribute almost 90% of rural milk supply. In rural areas, a significant proportion of milk around 55-60 % is consumed at source within the sphere of village. The village dairy farmer households either consume the milk or directly sell to neighbor households. The remaining 30-40% is sold out through a multi-layered marketing channel consisting of various milk oriented intermarries.

Urban Milk Marketing Chains: The urban centers have been overwhelmed with increasing population over time. To fulfill milk demand in these over increasing urban areas, the peri-urban and urban area's dairy farmers also engaged in milk production. The peri-urban dairy farms are found on the periphery areas of major cities. As the milk produced by these dairy farms is not sufficient to fulfill the total milk demand. Therefore, to conform the deficient milk quantity, the rural dairy producers come forth to fill this gap. The milk marketing in rural areas is ensured by milkmen and other stakeholders.

Modern or Formal Milk Marketing System: Modern milk marketing channels were operated by commercial milk processing companies which are specialized in marketing of processed milk through innovative procurement and distribution activities. The formal milk marketing system has established an organized milk collection set-up by introducing milk chillers and refrigerated carriers/vehicle for transporting milk. The milk collected at Village Milk Collection Centers (VMCC) is then moved to milk processing sub-centers and major milk processing plants through refrigerated carriers/vehicles. The large commercial dairy companies procure milk from VMCC, process it and produce a wide range of milk products that are marketed to ultimate consumers. The following diagram depicts the distribution of milk as it moves from various intermediaries in the rural milk marketing network.



Source: Market Information.

The modern milk marketing system has induced a competition to traditional milk marketing channels and thus rural dairy farmers are able to fetch better price of milk and also have an ensured opportunity of milk selling. However, even then the traditional milk marketing system has major share in country' milk marketing and the formal milk marketing carried out by major dairy processing commercial companies is still lagging behind. To investigate which determinants motivate the dairy farmers to produce more milk and choose traditional milk marketing system than formal dairy marketing channels, district Lodhran, Vehari and Muzzafergrah provide a potential area for this study. The results of study became essential to provide valid information for effective research, planning and policy formulation. Therefore, the study provides an empirical basis to indentify the determinants for the dominance of traditional milk marketing and attempts to fill up the research gap. The specific objectives of this research were;

- Systematic identifications of major socioeconomic determinants responsible for the dominance of traditional milk marketing among the dairy farmers in the study area.
- Assessing the consumer preference conceptions for the traditional milk marketing over formal milk marketing system.
- Suggest policy options to further strengthening the milk marketing in accordance with benefits of social and economic context.

MATERIALS AND METHODS

Description of Study Area: The milk production was carried out in all the geographical parts of Pakistan. This study was conducted in the southern region of Punjab province, because the Punjab province share in country's milk production is more than 60%. The three districts namely; Vehari, Lodhran and Muzaffergrah were purposively chosen as study area as these districts are rich in livestock population and milk production. The Pakistan livestock census 2006 showed that about 65% of buffaloes were found in the Punjab, followed by 27% in Sindh and the shares of Khayber Pakhtunkhwa (KPK) and Balochistan provinces was very small. Similarly, half the cows were found in Punjab, 23% were in Sindh, 20% in KPK and about 8% in Balochistan province. The fertile soil of these selected districts provides great potential for cultivation of various agricultural crops like wheat, cotton, maize, sugarcane, barley, sorghum, berseem and the livestock rising is also very productive in this region. These districts have immense livestock population such as buffaloes, cows, goats, sheep and poultry etc. The population in these three districts offers large market opportunities for most of the dairy products. The dairy farming composition includes small, medium and commercial farmers. The small dairy farmers have 1-4 milk animals (mostly buffalo and cow) and produce milk mostly for domestic consumption. The medium dairy farmers are a little market oriented and have 5-10 milk animals. The large dairy farmers comprising more than 10 to 100 animals are involved in dairy farming for commercial purpose. The urban dairy farmers have 6-8 milking animals. Keeping in view the diversity of all these factors, these three districts were selected for this study, as they are potential milk production, processing, marketing and consumption areas of the Punjab province.

Sampling Techniques and Sample Size: A multistage random sampling procedure was used to select the representative dairy farmers from the study area. According to the administrative system of Pakistan, each

district is divided into some sub-divisions locally called as tehsil. The Lodhran district has three sub-division or tehsils namely; Lodhran, Kehror pacca and the Dunyapur and the Vehari district also has three tehsils namely Vehari, Burewala and Mailsi while the district Muzaffargarh has four tehsils namely Muzaffargarh, Jatoi, Kot Adu and Alipur. These sub-divisions were selected purposively on the basis of milk production, marketing and consumption. The 80 dairy farmers from each district were selected and in this way a total sample size of 240 dairy farmers from far flung rural, peri-urban and urban areas of these three districts were selected using simple random sampling methods. The 20 milk consumers from each district were also randomly selected to assess their preferences for choosing traditional milk marketing system. However, 15 dairy farmers with inappropriately filled questionnaire and missing data were dropped and data set of 225 dairy farmers was analyzed.

Data Collection Methods: The quantitative and qualitative data were used in the study under investigation and both primary and secondary data sources were utilized. Secondary sources included reports of dairy and livestock department on milk productions and utilizations. Primary data source included field survey to collect first hand information from dairy farmers. The data collection tools included discussions, formal survey, visual ads, self observation and market appraisal. Before the actually implantation of the field survey, pre-testing of semi-structured questionnaire was conducted by interviewing 18 dairy farmers in rural areas of district Lodhran as well as 10 milk consumers in urban area. Based on the responses of interviewed dairy farmers, the survey questionnaires were modified. Using the final questionnaire, interviews were conducted to collect data on dairy farmer's socioeconomic and demographic characteristics. The focus was on to collect maximum information about those influencing determinants which inclined dairy farmers to sell their milk through traditional milk marketing system. Researchers themselves along with the trained enumerators conducted the field survey to collect data from respondents.

Methods of Data Analysis: The following two types of data analysis techniques were used:

Mean Descriptive Statistics: The descriptive method of data analysis was used to analyze the data collected from respondents and it included mean, percentages and standard deviation in processing of comparing socioeconomic and demographic characteristics of dairy farmers' adoption of traditional milk marketing system.

Econometric Model: Logit model was applied in this study to assess the socioeconomic determinants of dairy farmer's preferential choices for adoption of traditional milk marketing system. The dependent variable (adoption of traditional milk marketing system) bound between 1 and 0 is conveniently tested with the help of Logit model. Probit model is best suited to experimental data whereas Logit model is well suited for observational data [7]. Logit model provides empirical estimates of how variation in the independent variables influences the probability of adoption of traditional milk marketing system. The general probability of traditional milk marketing system is specified as function of economic and social explanatory variables as follow:

$$C_A = f(X_1, X_2, \ldots\ldots\ldots\ldots\ldots\ldots\ldots, X_{13}) + \varepsilon_i$$

The attributes in above equation include the explanatory variables as; dairy farmers' age, gender, education, family size, distance from urban area, number of milking animals, easy selling of milk, provision of advance milk payment, lack of quality control, provision of auxiliary services, social relationship, advisory service and non purchase of evening milking. The logit model assumes that (I*i*) is factor which predicts the adoption of traditional milk marketing:

$$P = \frac{e^{I_i}}{1+e^{I_i}}$$

Generally, the behavioral model to assess the explanatory variables influencing the traditional milk marketing can be shown as:

$$Y_i = g(I_i)$$

$$I_i = \ln \frac{P_i}{1-P_i}$$

$$I_i = b_o + \mathrm{E} b_j X_{ji}$$

Where, Y*i* is the observed response for the ith observation (i.e. the binary dependent variable, Y*i*=1 for traditional milk marketing system, Y*i*=0 for formal milk system). I =1,2,3,……*m* are observations for the investigation determinants for the adoption of traditional milk marketing system; m is the sample size; X*ji* is the jth independent variables for the ith observation.

The marginal effects are of all explanatory variables for (X*ji*) on the adoption of traditional milk marketing system is measured with respect to X*ji,* calculated by following equation =

$$\frac{\partial P_{ji}}{\partial X_{ji}} = P_{ji}(B_j - EP_{ki}B_k)$$

Whereas β and *P* represent the parameters and likelihood respectively of traditional milk marketing system. Marginal likelihood gives better trends and represents changes in the traditional milk marketing system for a given change in the independent variables. The results of Logit model estimates revealed the marginal effects of a change in the explanatory variable i.e. the change in the probability of adoption due to one unit change in the explanatory variables. In case of dummy variables (1 or 0) such as dairy farmers' gender, the marginal effect is the difference in probability due to belonging to one group rather than the other e.g. dairy farmer male versus female. For discrete variables such as education of dairy farmers, the marginal effect is the change in probability due to an increase in one year schooling. The influence of other categorical and continuous factors can also be interpreted analogously. The magnitude, statistical significance and the signs i.e. positive or negative showed the influence of the probability of choice of selling milk to traditional system.

RESULT AND DISCUSSION

Determinants Influencing the Dairy Farmers Towards the Adoption of Traditional Milk Marketing: Data derived information to make household level indices of social, economic and demographic indicators were identified based on economic theories and empirical studies. Dairy farmer's socioeconomic determinants influencing the adoption for traditional milk marketing are depicted in Table 2.

The number of dairy farmers engaged in milk marketing across the three sub-divisions (tehsil) was different (Table 2). The econometric model was tested against 13 independent variables. The following explanatory variables were found significant ($P<0.05$) in explaining dairy farmers' choice for selling milk in traditional milk marketing system. The dairy farmers' gender, age, distance from urban area, easy selling of milk at door step, provision of advance payment for milk, lack of quality control in traditional milk marketing system, provision of ancillary services by milkman, influence of social relationship between dairy farmers and milkmen are found to be significant determinants which have positive and motivational influence towards adoption of traditional milk marketing system. Whereas dairy farmers' education level, family size, number of milking animals, no advisory services and non purchase of evening milking are determinants which negatively influence dairy farmers' adoption towards traditional milk marketing system (Table 3).

Gender of Dairy Farmers: The gender is dummy variable that takes the value 1 if dairy farmer is male and 0 otherwise. There was found a mixed dairy farming system in the study area especially in the categories of small dairy farmers so both male and female participate in dairy management. Females contribute more labor in forage cutting, cleaning of farm, milking the cows, milk selling, butter and ghee making activities. Male dairy farmers are expected to be more market oriented and posses more market information. The female headed dairy farming

Table 2: Mean descriptive statistics for determinants in the econometric models for traditional milk marketing system.

Major Determinants	Lodhran	Vehari	Muzaffargrah	Overall
Dairy farmer's gender, 1=male,0=female	0.607	0.586	0.618	0.603
Dairy farmer's age, years	46.2	47.4	45.9	46.5
Dairy farmer's Education Level, 1=Above Primary,0=Primary	0.572	0.665	0.616	0.617
Family Size	5.8	6.3	6.6	6.2
Distance from urban area, Km	16.3	22.5	24.8	21.20
Number of milking animals	2.86	3.8	4.2	3.6
Easy selling milk at door step, 1=yes,0=No	0.727	0.763	0.743	0.744
Provision of advance payment of milk, 1=yes,0=No	0.612	0.687	0.742	0.680
Lack of quality control, 1=yes,0=No	0.616	0.595	0.603	0.604
Provision auxiliary service by milkman,1=yes,0=No	0.449	0.463	0.428	0.446
Influence of social relationship with milkman,1=yes,0=No	0.651	0.674	0.663	0.662
Advisory services, 1=yes,0=No	0.376	0.406	0.395	0.392
Purchase of evening milking,1=yes,0=No	0.326	0.365	0.356	0.349

*The dummy explanatory variable takes the value of 1 if the dairy farmer adopted the traditional milk marketing system and 0, otherwise

Table 3: Logit model for determinants affecting dairy farmers' adoption towards traditional milk marketing in southern Punjab

Major Determinants	Parameter estimates ± Standard error
Intercept	3.24±2.33
Dairy farmer's gender, 1=male,0=female	0.029±0.093
Dairy farmer's age, years	0.00431±0.0136
Dairy farmer's Education Level, 1=Above Primary,0=Primary	-0.183±0.167*
Family Size	-0.0248±0.263
Distance from urban area, Km	0.163±0.734
Number of milking animals	-0.0242±0.197**
Easy selling milk at door step	0.412±0.406
Provision of advance payment of milk	0.356±0.305**
Lack of quality control	0.323±0.048
Provision auxiliary service by milkman	0.152±0.242
Influence of social relationship with milkman	0.087±0.316*
Advisory services	-0.0117±0.373
Purchase of evening milking	-0.0916±0.203*

*The dummy explanatory variables take the value of 1 if the dairy farmer adopted the traditional milk marketing system and 0, otherwise.

** Parameter estimate significant at 0.05 level

Source: Field survey, 2015.

households tend to prioritize milk for family consumption rather than selling in market especially when family is having children underage of six and then there is competition for children' requirement and volume of milk sold out in the market. However, in this study female dairy farmers influenced positively for traditional milk marketing channel because females feel more comfortable to sell milk in traditional system. This is due to cultural restrictions for females in the study area as females cannot move and perform marketing activities freely so in this situation the females consider it a bit comfortable to communicate with local well known milkmen for selling milk rather than to adopt other alternative milk marketing channels.

Dairy Farmer's Age: The probability of dairy farmers' adoption for traditional milk marketing system increased if household is of old age (Table 3). This is because the young age dairy farmers tend to sell milk through alternative channels as they have more access to information and ponder dairy as a business activity. Whereas the old age farmers are more reluctant and consistent with their old traditions and hesitate to adopt new innovation.

Education Level: It is a continuous explanatory variable measured in formal years of schooling acquired by dairy farmers. There was found a negative relationship between dairy farmers' education and adoption of traditional milk marketing system (Table 3). Education plays an important role in the adoption of new skills and tends to convince household to accept new motivational ideas. Higher education directs the dairy farmers to obtain updated information about milk demand, supply and price which will result in more precise decision for selection of milk marketing system. According to Getaneh [8] and Tariq *et al.* [9], the formal education positively influences the household market participation and marketable volume. Therefore, education of dairy farmers significantly and negatively influences towards traditional milk marketing channel.

Family Size: Increase in household size also increases the domestic milk consumption requirements. The family size of dairy farmers influenced the supply of milk negatively (Table 3). The large household size offers less milk to sell in market as in the local cultural circumstances the family milk consumption requirements are more important than to earn revenue by selling it. When less milk is available to supply there is more probability that the households would prefer to sell the surplus milk to traditional milk marketing channel.

Distance from Urban Areas: This variable has been measured in kilometers. The probability of dairy farmers for adopting traditional milk marketing channel is positively influenced with the increase in distance between dairy farm and the urban areas (Table 3). The dairy farmers residing in peri-urban areas have more access to latest market information, bear less transportation expenses, less spoilage chances of milk and also have more market options of selling milk in cities.

A study was carried out by Ayyaz *et al.* [10] on expanding market participation among dairy producers in Pakistan and the results revealed that distance to nearest urban center was found negatively related to milk supply so less the distance between dairy farms and city centers, the lesser is the milk supply to traditional milk marketing channel.

Large Number of Milking Animals: It is the continuous explanatory variable measured in number of milking cows and buffaloes owned by dairy farmers. The probability of adoption of traditional milk marketing system is negatively influenced as number of milking animals rise and otherwise (Table 3). The logic behind is that as there are more number of milking animals, the milk production volume will increase and resultantly there will be marketable surplus milk available. As small dairy farmers prefer to sell their surplus milk through traditional channel but large dairy farmers have more exposure to opportunities for milk selling, better infrastructure and latest market information. Therefore they tend to sell huge volume of milk to formal milk marketing channel rather than selling to traditional milkmen to fulfill their daily cash needs from milk. So that is why traditional milk marketing system is discouraged by more milking animals' holders.

Easy Selling Milk at Dairy Farmer's Door Step: This explanatory variable has strong positive relationship for traditional milk marketing channel (Table 3). In the Punjab province of Pakistan, mostly the dairy farming activities are carried out as aside business along with agriculture farming so the farmers have not sufficient time to sell milk by themselves at urban areas or to make arrangements to visit milk collection centers to supply milk to them. Therefore, they prefer the traditional milk marketing as the milkmen themselves visit the dairy farmers' home and purchase milk at their door step. The dairy farmers don't need to bother for travelling, time allocation and to bargain at markets for price etc.

Provision of Advance Payments by Milkmen: The probability for adoption of traditional milk marketing system was found positively influenced by this determinant (Table 3). To ensure the consistent milk supply, the traditional milkmen / Dhodis offer the dairy farmers the advance payment of their milk produce. So small dairy farmers who usually are in dire need of cash money to fulfill their daily households requirements are more likely to accept the advance payments from traditional milkmen/Dhodis. Unlike the banks, financial institutions and other cooperatives, the milkmen don't require any security or collateral except that the dairy farmers will be bound to sell their milk produce at the pre agreed price to only to them. Therefore provision of advance payment by milk men is found strong motivational determinant for the dominance of traditional milk marketing system in the study area.

Lack of Quality Control: This determinant influenced positively towards traditional milk marketing (Table 3). The traditional milkmen/dhodis purchase milk from dairy farmers without adopting any food safety measures and the testing of milk attributes i.e. fat contents, protein and other solids. They purchase milk by just measuring its volume and distribute it at urban milk markets. The dairy farmers also dislike engaging in such type of food safety and chemical testing standards of milk so there is found lack of quality control checks for milk attributes in the traditional marketing at our study area.

Provision of Auxiliary Services: The probability for the adoption of traditional milk marketing is increased when milkmen/dhodis offer auxiliary service (Table 3). These auxiliary services offered by milkmen may be in the form of paying utility bills of rural farmers, recharge prepaid mobile phones with credit money, buying fodder seeds, animal concentrates and other veterinary drugs etc. In our study area, all these services were found available in urban areas because the milkmen visit cities on daily basis to deliver the collected milk from far flung rural areas so the dairy farmers often assign their personal tasks to them to avoid their personal visits because personal visits incur the additional cost for the dairy farmers.

Social Relationship with Milkman: The milkman is well known to nearby dairy farmers as he himself is also resident of the same locality. There exists personal trust building relationship between milkman and the dairy farmers. Due to this fact, there is increased probability for traditional milk marketing dominance in research area (Table-3). As the milkman is easily approachable for dairy farmers and they can easily adjust and settle matters concerning business activities, milk collection time, volumes and regarding payment so they prefer to sell milk to the nearest milkmen.

Advisory Services: It is generally perceived that dairy farming advisory extension services broaden the dairy farmers' knowledge. According to Rehima [11], the agricultural extension services boost the household skills and knowledge with modern technology and markets.

Table 4: Distribution of Consumers Preferences for Traditional Milk Marketing

Sr. No.	Description of Determinants	No. of Consumers	Percentage response (N=60)
1	Low price attraction	47	78.3
2	Supply of milk at door step.	42	70
3	Available in desired volume	40	66.6
4	Fresh and high fat content	49	81.6
5	Milk payment on monthly basis	36	60

Source: Survey data (2015)

The past studies revealed that extension visits had positive impact on market selling decision and marketable output. The milkmen don't focus on advising dairy farmers about better dairy management practices because it might discourage milkmen's milk marketing share. Thus access to more advisory service influenced traditional milk marketing negativity (Table 3).

Purchase of Evening Milk: This determinant is also discouraging for traditional milk marketing system as milkmen mostly purchase milk at morning time from rural areas and then visit nearby cities to re-distribute it. Unlike the dairy processing formal marketing system which has milk storage facilities and milk chillers at their collection centers, the milkmen have no such arrangements. So they mostly don't buy evening milking from dairy farmers as at the evening timings they cannot visit city areas to re-distribute the milk. Thus non purchase of evening milking negatively influenced the dominance of traditional milk marketing system (Table 3).

Consumer Preferences Perceptions about Traditional Milk Marketing System: In this study it was found that consumers also preferred to consume the milk of traditional milk marketing channel. Therefore consumers were also questioned to collect information about which determinants they are encouraged to choose milk coming through traditional milk marketing channel. The respondents were randomly selected from three districts namely Lodhran, Vehari and Muzaffargrah of the Punjab province of Pakistan. After gathering the responded information against pre-set parameters, their open ended responses were also recorded and analyzed. The following inferences were drawn and shown in Table 4.

Low Price Attraction: The Survey data showed that almost 78% consumers prefer to use loose milk supplied by milkmen/dhodis due to low price attractions (Table 4). The raw milk is 20-50% cheaper than the formal packed and pasteurized milk therefore the households of medium income group usually prefer loose milk to consume.

Received Milk Supply at Door Step: As shown in Table 4, more than 70% consumers adopt traditional milk marketing system as the milkmen/dhodis ensure the supply of milk at consumers door step. Consumers don't need to make any effort to purchase milk from market. They have consistent and uninterrupted supply of milk at their homes. This was found a dominating factor for traditional milk marketing system in the research area.

Available in Desired Volume: The probability of loose milk consumption by traditional system is increased as loose milk can be purchased in any desired quantity by the consumers. The loose milk is sold in desired quantities and it offers the access to low income consumers as they can buy as little as they can financially afford. More than 66.6% consumers like to choose traditional milk supply system due to this determinant.

Fresh Milk and High Fat Contents: The milk supplied on daily basis through traditional milk marketing is fresh and full with fat contents. Majority of Pakistani consumers have strong appeal for high butterfat constituents in milk and the buffaloes are consumer's choice all over the country. The fresh taste and more butter contents become reasons for 81.6% customer's preference towards traditional milk marketing (Table 4).

Milk Payment on Monthly Basis: In the research area, the milkmen supply fresh milk to urban consumers on daily basis and receive the full payment of milk after an elapsed of month. Around 60% consumers do not pay milkman on daily basis and it provides an ease for them in household milk consumption (Table 4). However, the consumers are also a little bit health conscious about traditional milk marketing channel as there is lack of adoption for food safety measures. As there exists adulteration of water and poor hygienic conditions in handling of milk but still despite of these consumers' reservations, the traditional milk marketing is still a dominating milk market structure in the research area as well across the Punjab province, Pakistan.

Conclusion and Policy Implications: The findings of the study demonstrate that different explanatory variables have dominating influences for traditional milk marketing system over the formal milk marketing

system in the research area. The Logit model estimation results revealed that older age dairy farmers play a significant role in the dominance of traditional milk marketing system. The easy selling of milk by dairy farmers at their door step is positively and significantly influencing the dominance of traditional milk marketing system. The dairy farmers' education, family size and more milking animals, no advisory service by milkmen and non purchase of evening milk negatively influenced the traditional milk marketing system. There is dire need that farmers should be encouraged to undertake additional income generating activities which stabilize the household incomes to enable them adopt modern dairy technologies. Policy implication is that elder age dairy farmers should be educated through advisory services to make them familiar with better dairy and milk marketing management practices and there should be arrangements frequent visits of dairy experts to train them. Therefore, improving milk marketing performance not only provides more benefits to rural communities but also improves the productivity of dairy sector. The consumers' perceptions parameters analysis and the distributions results revealed that majority of consumers also prefer traditional milk marketing. The substantial price difference between loose milk and the processed packed milk is the attraction for consumers to use it. The ability to purchase in desired volume as one household can afford has also positive appeal for traditional milk marketing. The loose milk with fresh taste and rich fat contents has multiple pattern of use at home e.g. simple drinking, preparing milkshake, yoghurt, butter, cheese and sweet dishes preparation. Policy option for consumers' food safety concern is that there should be legal framework to regulate the milk supply system. The proper dairy milk marketing trainings should be imparted to equip the traditional milkmen with better services and to ensure the consumers health safety. The practices and operations of traditional milk marketing should be monitored for the food safety concerns. The traditional milk marketing agents should also provide advisory extension services about market information, better dairy management practices as animal concentrates, veterinary clinical drugs, artificial insemination and which high potential cattle breed should dairy farmers keep to respond the market demand.

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