Milk Production and Supply Chain in Peri Urban Areas of Jhang Pakistan

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Authors' contributions

This work was carried out in collaboration between all authors. Authors NAS and NK designed the study, wrote the protocol and wrote the first draft of the manuscript. Authors RA and BS reviewed the experimental design and all drafts of the manuscript. Authors MHR and BNS managed the analyses of the study. Authors FUK and SQM performed the statistical analysis. All authors read and approved the final manuscript.

ABSTRACT

The peri urban areas are facing the challenge of poverty, hunger, unemployment, pollution and ineffective utilization of natural resources. Present paper focuses on milk production and its supply chain in the peri urban areas of Jhang district, Punjab province, Pakistan. Quantitative and qualitative data obtained through structured interview schedule, focus group discussion and personal observation are analyzed through statistical package for social sciences (SPSS) and content analysis technique. Results of the milk supply chain revealed that an overwhelming

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majority of the respondents have no proper place for animals keeping. It was observed that in the peri urban areas most of the milk producers sell milk directly to their neighbors and also they sell to the *gawalas* Fellow farmers are the main source of information for about 32% of the respondents. Cows and buffaloes are major milk producing animals in the study area and milk is mostly sold through Gawalas as a middlemen. Therefore, interventions are required which focus on the control of diseases and marketing aspects of milk production in the peri urban areas of Jhang district, Pakistan.

1. INTRODUCTION

The word 'peri urban' refers to "the margins of big cities" [1]. Peri urban areas are situated within the municipal areas of a country but are often outside the formal urban boundaries where both agricultural and non-agricultural activities exist simultaneously, though the agricultural and rural characteristics are gradually replaced by urban lifestyles. Peri urban areas can also be defined as a region just around the built up territory of a city, its edge, the 'rural-urban fringe' where city and country land uses go beyond [2]. Peri urban boundary has a place that has a large impact on people. Due to the flow of goods, resources, people and capital to peri urban areas, the sustainability of cities and rural areas is affected. The peri urban areas are facing the challenge of poverty, hunger, unemployment, pollution and ineffective utilization of natural resources [3]. The combination of urban and rural activities with negligent regulations, industrial and urban waste, and intensive agriculture releases of toxic chemicals combined with poor waste and sanitation management often makes peri urban areas much polluted place [4]. Douglas [5] stated that the peri urban areas are facing significant challenges of access to land, problems related to soil and water quality gradually more polluted by peri urban waste, urban waste disposal and industrial activities.

Livestock sector is thought to be one of the most important sectors in the economy of peri urban areas. Earlier it was a traditional practice but now livestock are mostly reared for commercial purposes. It plays very important role in enhancing the health and food security status in developing country. Livestock holding is considered as an important strategy for poverty reduction in rural communities of Pakistan. The livestock accounts for approximately 55% of the agriculture value added and 11% to Gross Domestic Product (GDP) during 2012-13 (Govt. of Pakistan, 2013) [6]. Livestock commodities are very important for farmers because it provides independent of land and free ownership of assets. Livestock products and byproducts provide fast cash at the time of need and food. The dairy products like fresh milk, butter, *lassi* and *desi ghee* have important role in improving food security condition of the people [7].

Livestock products, especially dairy products provide protein, vitamin A, carbohydrates, and calcium which can make a significant contribution to human nutrition in developing countries [8]. Milk is very important commodity of rural and peri urban areas providing food requirements to the dwellers. Milk produced in peri urban areas is either used for food in the household or sold to earn some money. The earned money is used to buy other commodities including food items for the family. It significantly enables the milk producers to be prosperous [9]. Sharif et al. [10] noted that 80% milk is produced by rural areas, while 20 to 25% produced by peri urban areas and cities are the low producers of milk. The same author also further stated that about 90% of the sold milk comes from small farmers whereas the remaining is supplied by commercial farms. The traditional milk marketing channel involves the collection of milk from farmers in remote areas by the village *dodhi*. The unprocessed milk reaches the final consumer through a variety of peoples like through middleman, collection centers, milk shops, sweet shops, and *gawalas*. Transportation costs for moving milk from small towns or transaction points on main highways, to cities, ranges between Rs: 10-50 (Pakistani Rupees) depending on the size of the utensil, mode of transportation and distance involved.

Milk is very important part of the daily food of Pakistan but pure milk is not easily available. Mostly milk is supplied to big cities from peri urban areas through different ways and means. Milk producers in peri urban areas are facing many constraints regarding rearing livestock and milk marketing. The main concern of the research work is to identify the problems of

producers and supply chain. Therefore, this study was conducted with the following objectives: to identify the problems regarding livestock rearing, assess the animal's diseases awareness level and to observe the milk production and supply chain.

2. MATERIALS AND METHODS

The study was conducted in peri urban areas of Jhang city. It is situated in Central Punjab, Pakistan. It is the oldest city of the Central Punjab. The sample of population was limited to 120 peri urban dwellers selected through simple random sampling technique. Three peri urban areas namely Hasnana, Kotsai Singh and Pukay Wala are under peri urban distribution. From each peri urban areas 40 peri urban dwellers were selected as respondents making sample size of 120. In order to collect the required information, a validated and reliable interview schedule was used for quantitative data. In order to collect qualitative data, focus group discussion and personal observation were used. The quantitative data were statistically analyzed by using computer software Statistical Package for Social Sciences (SPSS) [11] and qualitative data through content analysis technique.

3. RESULTS AND DISCUSSION

3.1 Age of the Respondents

Table 1 shows that about 32.5% of the respondents were up to 40 years of age, 20.8% of the respondents were up to 41-50 years of age. However, 32.5% of the respondents were above the age 50-60 years and 14.2% above 60.

Table 1. Distribution of the respondents according to their age

Age group	Frequency	Percentage
<= 40	39	32.5
41 – 50	25	20.8
51 – 60	39	32.5
61+	17	14.2
Total	120	100.0

It is generally believed that with the increase in age, the individual become mentally mature and takes rational decisions and therefore, age can be one of the important factors affecting the behavior of the respondents [12].

3.2 Education Level of the Respondents

The 23% respondents in the peri urban areas were illiterate because they have no facilities for education. Qualitative data as shown in Table 2, revealed that most of the people in these areas belong to poor families so they have no access to education.

Table 2. Distribution of the respondents according to their education

Education level	Frequency	Percentage
Illiterate	28	23.3
Primary	26	21.7
Middle	41	34.2
Above	25	20.8
Total	120	100.0

Education can be defined as the process of developing knowledge, wisdom and other desirable qualities of mind, character and general competency, especially by a source of formal instructions.

3.3 Animals Rearing

Livestock enterprises are particularly important for the landless and small farmers because livestock provides an alternative form of asset ownership, independent of land. Finally, for subsistence farmers, livestock products like fresh milk and butter or *desi* ghee provide food security for the family and help to meet nutritional requirements in terms of calories and protein. Some livestock like donkey, bulls and camels are also used for the transportation purposes in these areas. Distributions of the respondents according to the number of animals are given in Table 3.

With regard to the production and use of livestock products; cows and buffaloes were mostly reared for milk production. In the study area, a single cow produces about 6-8 liter milk/day while 10-12 liter/day milk was produced

Table 3. Distribution of the respondents according to the number of animals

No. of animals	Yes (%)	No (%)
Cows	20	80
Buffaloes	25	75
Sheep	12	88
Goat	16	84
Hen	43	57

by buffaloes. About one third of the total milk produced was used for domestic purpose and remaining amount was sold out to nearby milk shop, *gawalas*, hotels etc. They also produce milk by-products like "dasi ghee and butter" and sell out for earning. Some peoples also have a small flock of sheep and goat. Mostly these are reared for meat purpose but some people use goat milk for domestic use. peri urban dwellers mostly sell out goat and sheep on *"Eid-ul Azha"* because at this occasion they get much better profit than other days. However, some people also sell out in *"Maveeshi Mandi"* (livestock market) when they are in drastic condition.

3.4 Proper Barn for Animal Keeping

The data from Table 4 reveals that more than 50% of respondents have no proper barn for animal while they are also rearing animals get money and products from their animals.

Table 4. Distribution of respondents according to the proper place of animal

Proper barn for keeping animal	Frequency	Percentage
Yes	48	40
No	72	60
Total	120	100

3.5 Animal Diseases Awareness

Animal's diseases are the major problem in peri urban and also in rural areas. Due to these diseases, they are facing challenges for production. As indicated in Table 5 more than 50.8% respondent has awareness regarding animal diseases whereas the remaining 49.2% has no information regarding diseases of animal.

Table 5. Distribution of respondents regarding animal diseases awareness

Animal diseases awareness	Frequency	Percentage
Yes	61	50.8
No	59	49.2
Total	120	100

3.6 Information Sources

The peri urban dwellers get their latest information regarding livestock and agriculture from different sources. Most of the respondents

(32.5%) get their information from their neighbor farmers Table 6. About 20.0% of the respondents have extension department as main source of information regarding the livestock and agriculture, while 11.7, 6.7 and 17.5 respondents have T.V, radio and other sources of information, respectively. 15% are not able to get any information from any source. Newspaper has no role to disseminate agricultural information in the peri urban areas.

Table 6. Distribution of respondents according to source of information

Source of information	Frequency (out of 120 respondents)	Percentage
Neighbor farmers	39	**32.5**
Extension department	24	**20**
Other sources (Internet)	21	**17.5**
Not get information	18	**15**
TV	14	**11.7**
Radio	0	**6.7**
Newspaper	**0**	**0**

3.7 Milk Supply Chain in Peri Urban Areas of Jhang District

Milk is produced from dairy farmers in variable quantity depending on number of milch (milking) animals and better management practices. Milk produced in the peri urban areas is either directly bought by the neighbors or the milk producer sell their produced milk to the *gawalas* (called as middle man) after full filling their own requirements. The neighbors directly getting milk from the producers are satisfied with the purity of milk although it cost is higher than market price. Further *gawalas* sell fresh milk to the end users and also to the milk shops, hotels and sweet shops, these milk shops process milk by boiling, chilling, making cream, yogurt butter and *khoae*. When the milk is transported through *gawalas* milk is not pure because *gawalas* might add water to increase the milk quantity and also use other chemicals to have thick milk which are very harmful for health. Mostly in the hotels milk is used for tea and *lassi* (yogurt shake). In the sweet shops milk is either used for making sweets or packed for daily usage. From these shops milk and milk by products are directly supplied to the end users or consumers. Detail of milk supply chain is given in Fig. 1.
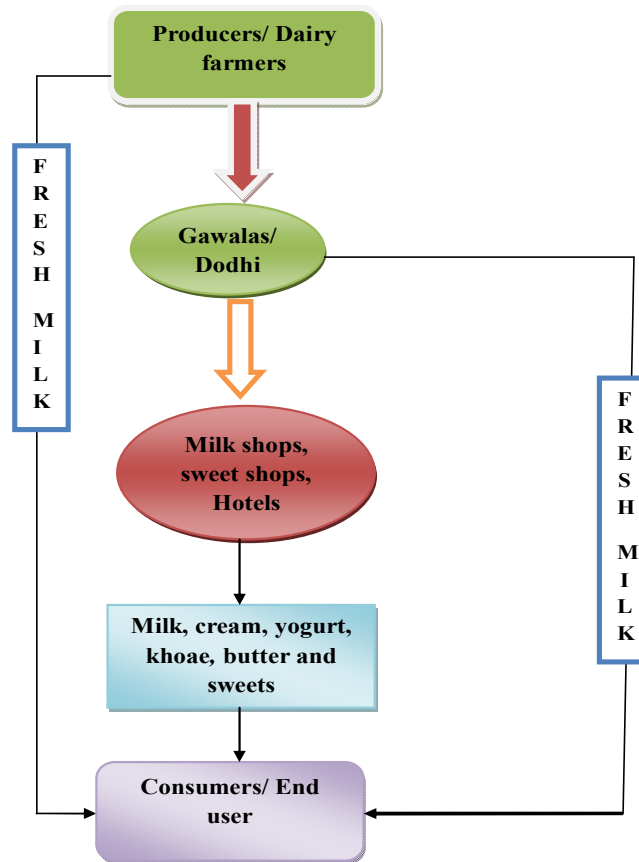
Fig. 1. Milk supply chain in the peri urban areas of Jhang district

4. CONCLUSION AND RECOMMENDATIONS

It is concluded that livestock have massive share in every country like Pakistan's economy and it is also a good source of food and cash income. However, farmers do not have animal sheds and have little knowledge about credible information source(s) regarding diseases of animals and marketing of the milk. The role of middlemen (gawala) was dominant in milk marketing chain. Therefore government should focus on diseases and marketing aspects of milk production in peri urban areas of Jhang district, Punjab, Pakistan.

ACKNOWLEDGEMENTS

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=740&id=2&aid=7156