

# Livestock Integrated Farming in Rural Area of Pakistan

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## ABSTRACT

Agriculture in Pakistan has been realized as indispensable for food security, employment, and poverty alleviation at the rural level. About 70% of the population here in Pakistan depends upon agriculture for their livelihoods. Plants contribute 84% calories and 66% protein consumption of total human food demands. Presently agriculture sector is contributing 19.2% to national GDP in addition to the provision of employment to 38% of the labor force. Livestock has emerged as the largest subsector in agriculture by contributing 60.1 % to agriculture value addition and 11.5 % to the GDP during FY 2021. It provides an opportunity for livestock production and entrepreneurship for the people in the livestock industry, particularly in developing countries. It is organized in the long market chain and supports the livelihoods of smallholders in the developing world. Livestock sector is highly dynamic in response to increasing demand for livestock products. More than 8.0 million families are engaged in livestock production and supplementing more than 40% of their income from this sector. Gross value addition of livestock (1505 billion) increased with 3.06 % growth rate in FY 2021. In developed countries, demand is stagnating, efficient production systems, and environmental sustainability. The demand for livestock products is characterized by a dichotomy between developing and developed countries. Presently livestock products are contributing 17% to energy and 33 % to protein consumption in developing countries. The trend for animal production and consumption of livestock products has been tripled for the last three decades in developing countries of South East Asia. Per capita availability of meat and milk in Pakistan is far below compared to developed nations. While forecasting per capita demand of animal products, it has been indicated even a wider gap in protein deficiency from animal origin in all Asian countries. Livestock production has to take into account consumers' demands such as food safety and quality, zoonotic disease transmissions, animal welfare, reduction of the use of treatments, and an acceptable environmental impact of livestock production. The production systems keep changing according to the economic and social factors and government policies. In an integrated livestock agriculture system, up to five (1-5) dairy animals along with their followers are reared for family needs. Majority (>75%) of the dairy animals are managed in a herd size (1-10) of smallholder level and contribute > 70% of national milk production, which is consumed house at the household level. Surplus milk is also processed into butter and ghee or other dairy products. They keep raising these animals, as there are adequate fodder and crop residues in mixed farming in villages. The system is important for poverty alleviation for rural poor through income generation by selling of the surplus dairy products in the nearby markets. The sale value of surplus products met a need for cash to buy other food items, school fees for their children and medical expenses. Hence, integrated livestock farming makes its holder healthy and wealthy due to balanced nutrition, food, and income generation. In this system, dairy animals are also used to produce draught animals integrated agri-farming by poor smallholders. As expensive capital machinery is beyond the reach of small farmers, so the demand for draught animals is meant as well.

**Keywords:** *Integrated farming, Pakistan, milk production*

## 1. INTRODUCTION

Livestock has emerged as the largest subsector in agriculture by contributing 60.1% to agriculture value

addition and 11.5% to the GDP during FY 2021. It provides an opportunity for livestock production and entrepreneurship for the people in the livestock industry, particularly in developing countries. It is organized in

the long market chain and supports the livelihoods of smallholders in the developing world. Livestock sector is highly dynamic in response to increasing demand for livestock products. More than 8.0 million families are engaged in livestock production and supplementing more than 40% of their income from this sector. According to an estimate 80% of the total national milk production is from the prevailing integrated animal-agriculture system of livestock farming [1]. The rest of 20% of milk production is from commercial dairying in the Peri-urban / Urban region [2]. Rural subsistence or market-oriented integration into agriculture farming is the most common dairy farming system in the country. The prevailing integrated dairy production systems in Pakistan may be further classified as: 1) rural subsistence level; and 2) rural market-oriented (semi intensive/commercial). The subsistence dairy farming system, on average, is comprised of three (1-3) lactating animals in common herd size of 1-10 animals (78%), having an average milk yield of 5 liters animal<sup>-1</sup> day<sup>-1</sup> [3]. About 18% of the total dairy animal are found in herd size of 11-30 animals and termed as a rural market-oriented system. About 4% of the total buffalo and cattle are found in herd size of >30 animals and are considered commercial dairy farmers (GOP, 2006). The composition of the dairy herds in the traditional dairy production system is 90% buffaloes & 10% cows, respectively. It is observed that 3-4 % of the total milk comes into the market through formal channels, but 95-97% of milk comes into the market through informal means having a multi-tiered layer of agents [4] [5].

Nowadays, an increasing trend has been observed for commercial dairy farming due to the higher demand for milk in urban masses. The trend for animal production and consumption of livestock products has been tripled for the last three decades in developing countries of South East Asia, just to cope with the demand. The factors influencing the cost of milk production are feeding, heifer cost, labor cost, electricity & diesel, treatment & A.I. cost, equipment & machinery cost in addition to land/rent cost. Out of all mentioned, feeding cost is the predominant factor [6]. The milk production cost in Peri-urban dairying is relatively high due to the fully stall feeding system [7]. Per capita availability of meat and milk in Pakistan is far below compared to developed nations. While forecasting per capita demand of animal products, it has been indicated even a wider gap in protein deficiency from animal origin in all Asian countries. The demand for livestock products is characterized by a dichotomy between developing and developed countries. Presently livestock products are contributing 17% to energy and 33 % to protein consumption in developing countries. Livestock production has to take into account consumers' demands such as food safety & quality, zoonotic disease transmissions, animal welfare, reduction of the use of

treatments, and an acceptable environmental impact of livestock production.

## 2. MATERIALS AND METHODS

The study was held in the city of Faisalabad-Pakistan for the various prevailing dairy production system in the prevailing integrated animal agriculture system. Faisalabad is the 2<sup>nd</sup> largest city in the province of Punjab and the 3<sup>rd</sup> biggest in Pakistan. The district of Faisalabad is located between 31<sup>o</sup>20' - 31<sup>o</sup>33' N and 73<sup>o</sup>13' - 72<sup>o</sup>55' E at an altitude of 184 m a.s.l. [8]. The highest temp hit 50<sup>o</sup>C, and the lowest in winter may fall below the freezing point. A total of 105 respondents were randomly selected, comprising 35 farmers each in three the category of as per herd size; i) Rural subsistence farmer with small herd size (1-10); ii). Rural market-oriented, having herd size 11-30 and commercial dairying with a herd size of >31. The farmers were interviewed using a pretested questionnaire to assess the welfare and production performance of dairy animals in specific production systems. Production parameters were used as herd size, milk production, farm income, feeding management, labor, health care & breeding, length of dry period, marketing trends, or other husbandry practices related to the research parameters

## 3. RESULTS AND DISCUSSION

A study was planned to study the various dairy farming system in Faisalabad, Pakistan. The dairy production systems were divided into three groups i.), rural subsistence (1-10 animals); ii.), rural market-oriented (11-30animals), and iii.), commercial dairying (>30 animals). The farmers were asked about the herd profile of animals, education, education level of farmers, objectives of animal keeping, welfare parameters viz. 1. Good health, 2. Good housing, 3. Good feeding and 4. Appropriate behavior, feeding practices, fodder and concentrate source, milk and animal marketing, production and reproduction records, constrain in dairying, adoption of new techniques. The educational profile revealed that the highest % age of farmers (31.4%) had primary level education in rural market-oriented production system. The higher % age (57.1%) in integrated farming and commercial farming had calving interval (CI) of 15-16 months or even more (16-17 months) in subsistence-level farming. The herd composition indicated a higher % of buffalo as compared to cattle. The CI in cattle (60%) was found 15-16 months in subsistence-level farmers, and it was 14-15 months in rural market-oriented production system (51.4%), and similar in commercial farmers. The age of 1<sup>st</sup> calving in buffalo maintained under the commercial system (63.6%) was found 3-3.5 years, and it was found 4-4.5 years in subsistence farmers (60.0%). The dry period (DP) in commercial farming was 2-2.5 months, while in the subsistence production system, it

was 3-3.5 months. The lactation length in the case of buffalo (65.7%) both in rural market-oriented and commercial level production systems were found in 8-9 months, but it was 7-8 months in subsistence farming (62.9%).

The main purpose of keeping animals in rural market-oriented farmers (60%) was the sale of milk in addition to home consumption. The majority of the farmers in rural subsistence farming kept animals for household-level milk consumption. The majority of farmers in commercial level farming were maintaining the herd for the sale of milk and sale of animals. The avg milk production at the subsistence level was 8-10 L animal<sup>-1</sup> day<sup>-1</sup>, but it was 12-14L in rural market-oriented production systems (62.9%). It was revealed that 40% of the farmers at subsistence level were selling the milk at Rs. 70-75 L<sup>-1</sup>, rest of 60% farmers were using all milk for home consumption. In rural market-oriented system, 71% of farmers were selling milk at Rs 70-75, and only 2.9% were selling milk at Rs 90-95. The results also showed that selling of animals was highest (42.9%) in commercial farmers, while these % ages were 5.7% and 25.7% in rural subsistence and rural market-oriented farmers, respectively. It was also noted that 28.6% of farmers in the commercial farmers group were selling lactating buffalo, whilst 11.4% were each in rural subsistence and rural market-oriented farmers, respectively. The highest % (5.7%) in rural subsistence farmers was selling their animals due to overage, and 2.9% in commercial farmers (20%) was selling their animals due to disease, and the second reason was disease plus old age (17.1%).

The data revealed that farmers in rural integrated production were using traditional milk production methods. Modern equipment and milk machines were not common in integrated systems.

Quality feed and fodder were realized a major constraint, in dairying after genetics. All of the farmers showed concern about fodder availability. The subsistence farmers were not interested in sexed semen or new technologies adoption. It was noted that only 2.9 % of the farmers were using silage technology. Majority of the commercial farmers (68.6%) were not satisfied with veterinary services. In the case of udder health care, only 20% of the farmers, both in rural market-oriented and commercial farmers were using mastitis test. None in the subsistence group were using BST, but 5.7% and 11.4% of farmers in market-oriented and commercial were using BST, respectively. Commercial farmers (31.4%) were using a balanced ratio. Vaccination (100%) was well adopted in all production systems. The synchronization techniques were common (60%) in commercial farmers. The total input cost for milk production was shown an increasing trend as per size of the herd or farm. It was found that 40% of the commercial farmers were spending maximum compared

to subsistence or market-oriented farmers. The role of extension workers was found very weak; extension messages were circulated through friends and social media/ newspapers.

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