

## Current Status of Dairy Industry in Five districts of Punjab, Pakistan

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### Abstract

The current study reports about the status of dairy industry in selected districts of Punjab, Pakistan. The data was recorded by visiting farms individually and processed to calculate percentages for suitable representation. The results showed that farmers with high level of education and training have more productivity. Sixty two percent of farmers had higher secondary and above while most of the farmers had more than five years of experience in the field. Forty seven percent of the farm animals were belonging to buffalo breed Nili Ravi followed by a cow breed Sahiwal (29 %) and crossbreed cows (20 %), while Australian cow breed was only 3 % of the total animals on the farms under study. Overall the study mainly describes about the farm production and management on the selected farm. The output of the study will help for further planning to improvement in the dairy sector.

### INTRODUCTION

Pakistan stands fourth in the list of milk producing countries in the world, United States of America, China and , India stand first, second and third respectively [1]. Currently livestock makes around 56.3 percent of value added agriculture and contributes 11.3 percent to national economy (GDP) (Pakistan Economic Survey, 2013-14). The estimated population based on inter census growth rate from 1996 to 2006, livestock population in 2013-14 was 154.3 million [2]. More than 35 billion rupees foreign exchange is earned by livestock sector annually (US\$ 707 million). Annual milk production of Pakistan is almost 36.2 million tons [3]. Per capita milk production of Pakistan is around 230 kg annually, that makes two times of India and almost 70 percent of United States of America [4]. Currently, Rs. 1.1 billion (US\$ 22 million) is spent by Pakistan to import dry milk products, that is a big burden on the national economy (Government of Pakistan, 2013-14). Annual increase in milk demand is 15% but the annual growth rate is just 5% which is great matter of concern quoted by the statistics division of Pakistan [5]. Recently per capita milk production in Pakistan has increased but this increase is not due to increase in milk production per animal but this increase is due to increased number of dairy animals (FAO, 2010) [6, 7]. Only in Karachi city four million liters of milk shortage is reported. It is estimated that the demand and supply difference would be 3.6 billion liters by the end of 2015 [8]. Unfortunately Pakistan is facing shortfall in dairy sector even on having more numbers of milked animals [9]. Because misty of the livestock farmers have less profit due to poor breed and transport system, due to low income they are unable to provide proper fodder and management. As a result one animal produce less amount of milk, which affect the overall economy of the country [8]. The main problem with livestock in Pakistan is the low milk production of Pakistani milked animals. This is because of improper systematic national breed awareness program, unavailability of nutrients in fodder due to less profit [9]. Pakistan needs a good support and inter sectarian coordination to fill the loopholes and to enhance the yield to make dairy a profitable business [9].

The livestock sector of Pakistan showed a growth rate of 4.1 percent in year 2014-15 which is higher than the previous year's growth rate of 2.8 percent (Table 1). The key products of livestock are milk and meat, but milk is the most important. Milk production is given below in Table 2 whereas livestock growth rate percentages are shown in Table 3.

The above mentioned figures and data are secondary and are based on estimation or prediction. Therefore the current study was conducted to discuss the exact status of dairy farms in selected districts of Punjab, Pakistan. The study was conducted using a field questionnaire filled by farmers and face to face interviews.

**Table 2.21: Livestock Population (Million Nos.)**

Species	2012-13 <sup>1</sup>	2013-14 <sup>1</sup>	2014-15 <sup>1</sup>
Cattle	38.3	39.7	41.2
Buffalo	33.7	34.6	35.6
Sheep	28.8	29.1	29.4
Goat	64.9	66.6	68.4
Camels	1.0	1.0	1.0
Horses	0.4	0.4	0.4
Asses	4.9	4.9	5.0
Mules	0.2	0.2	0.2

Source: Ministry of National Food Security & Research

<sup>1</sup>Estimated Figure based on inter census growth rate of Livestock Census 1996 & 2006

**Table: 2.22 Milk Production (000 Tonnes)**

Species	2012-13 <sup>1</sup>	2013-14 <sup>1</sup>	2014-15 <sup>1</sup>
<b>Milk (Gross Production)</b>	<b>49,400</b>	<b>50,990</b>	<b>52,632</b>
Cow	17,372	18,027	18,706
Buffalo	30,350	31,252	32,180
Sheep <sup>2</sup>	37	38	38
Goat	801	822	845
Camel <sup>2</sup>	840	851	862
<b>Milk (Human Consumption)<sup>3</sup></b>	<b>39,855</b>	<b>41,133</b>	<b>42,454</b>
Cow	13,897	14,421	14,965
Buffalo	24,280	25,001	25,744
Sheep	37	38	38
Goat	801	822	845
Camel	840	851	862

**Table 3. Livestock Growth Percentages (Base=2005-06)**

Sector	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
<b>Livestock</b>	2.2	3.8	3.4	4	3.5	2.8	4.1

## METHODOLOGY

### Data collection

The data was collected from hundred randomly selected farms, located in five selected districts of Punjab province viz. i) Rawalpindi district ii) Faisalabad district iii) Lahore district iv) Sahiwal district. v) Jhang district. The data regarding education level of farmers, farm management experience, number of trainings attended by the farmers, farm size, farm productivity, types of breeds kept at farms, feeding system used at farms, milk price, percentage of milk selling to various buyer types, types of contracts, level of trust on different types of buyers, association of farmers with groups, benefits from group membership, financing and types of financial records were documented for further analysis.

### Data Processing and Analysis

The raw collected data was processed to calculate three categories of education level, farm running experience was also categorized in four further categories, number of trainings attended by farmers was divided into two heads yes or no, farm size was divided in big, medium and small farms based on number of animals at each farm, farm productivity was categorized in three types high, medium and low productive based on productive animals at each farm, breeds mainly kept in studied farms were of five different types, four different kinds of feeding system was found at studied farms, three main types of customers were introduced and percentage of milk sold to each type was calculated, types of contracts used by farms was also analyzed, farmers level of trust on different types of buyers was categorized in four levels and investigated, association of farmers with three different kinds of groups were measured, benefits enjoyed from group membership was investigated through six measuring techniques, financing types used by different farms was also recorded and in the end, financial records used by farmers for recording their farms input and output was divided into four types and analyzed to give a details understanding of the dairy farms included in the study. Percentage were calculated for all the processed data and represented in the form of graphs/tables.

## RESULTS AND DISCUSSION

### Educational levels

The current study revealed that 5% of the farmers were less than or equal to primary level education, 33% were having secondary while the rest of the 62% farmers were having higher secondary and above education level (Figure 1). More than 60% farmer's educational level was higher secondary and above which is higher than previous reports and gives a good sign for coming years about the industry and for educated people as well who are wishing to join the profession. The studies conducted in India also reported that level of education of dairy farmers has increased in recent years. It has already been established that education level of a farmer influence the productivity of a farm because educated people quickly adopt new techniques and management practices. A study in United States of America also depicted the same results by telling that farm income is influenced by education level [10, 11].

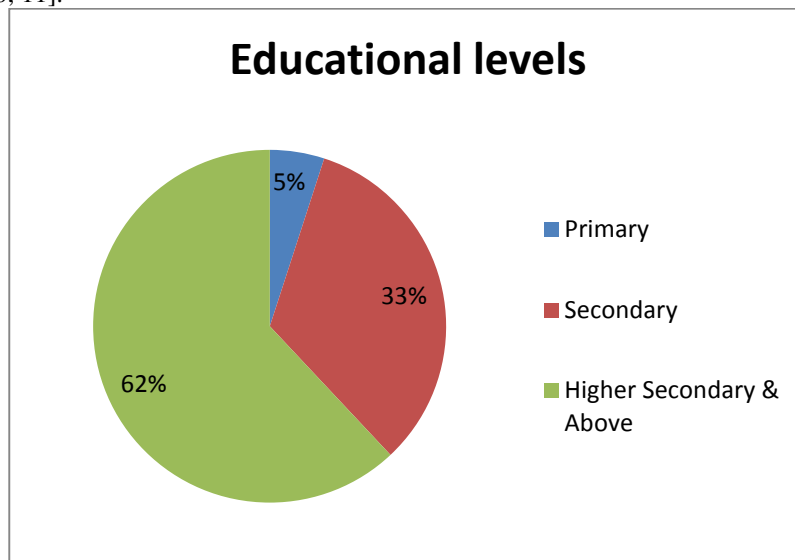


Figure 1: Education levels of dairy farmers

### Farm Management Experience

According to study the farm management experience was divided into four groups, the group one was of farmers having experience of 1-5years, the second was 6-10 years, 11-15years and 16years and above respectively. Twenty percent of the farm managers were having less than or equal to five years of experience. Thirty four percent of the farmers were having 6-10 years experience, while 30% of the farmers were having 11-15 years of experience. The percentage of farmers having experience of 16 years or above was 16% (Figure 2). It is obvious from previous reports that farm management experience has a positive impact on the farm as an experienced dairy farmer can tackle the problems faced by them in better way. The current study is also in concurrence with the studies conducted in Ireland, Germany and France where the similar trend of management experience was followed among the dairy farmers [12, 13].



Figure 2: Farm Management Experience of dairy farmers

### Trainings

Trainings play a vital role in the betterment of farm management. The arrangement of vocational or non vocational trainings is done by the government and non government organizations so that the farmers can improve their farms according to the latest trends and practices. The study reflects that the ratio of farmers attended vocational trainings in the year 2014-15 was just 26% and the remaining 74% have not attended any vocational training in the year 2014-15 (Figure 3). The results depict that dairy sector is yet a less focused field by government and non-government organizations. The situation could be improved by organizing monthly, quarterly or at least semiannually trainings for the farmers so that latest technology/practices could be transferred to the farmers well in time. The previous studies conducted in India showed significant impact of training on improvement of farm management practices and productivity [14, 15].

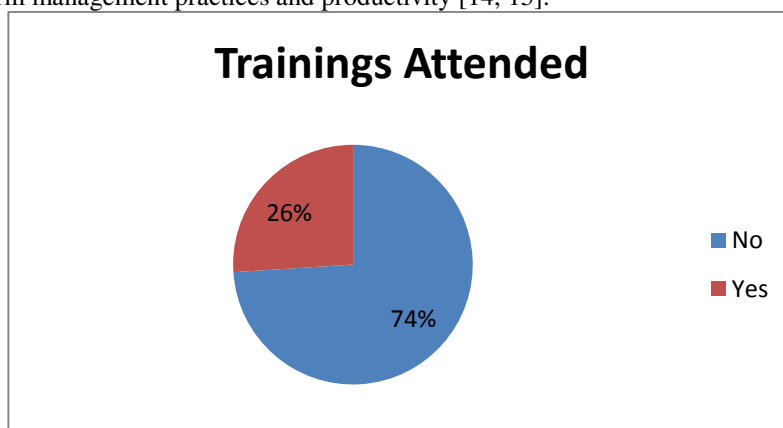


Figure 3: Percentage of farmers attended trainings

### Farm Size

Farm size may contribute significantly towards income, while better management practices, use of latest technology and adoption of latest trends further help to improve farm productivity [16]. Current investigation distributed the dairy farms on the basis of number of animals. Small farms includes less than or equal to 50 animals at a farm and it makes 35% of the research. Medium farms have number of animals between 51 and 100 that also makes 35% of the study. The remaining 30% of the study is large farms and it ranges from 100 animals and above (Figure 4).

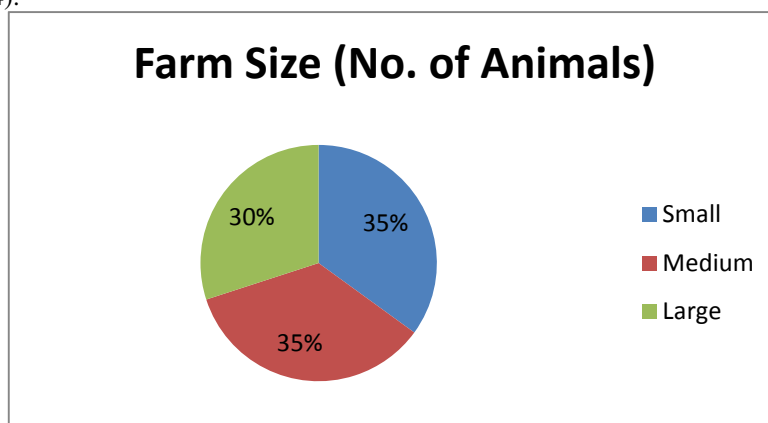
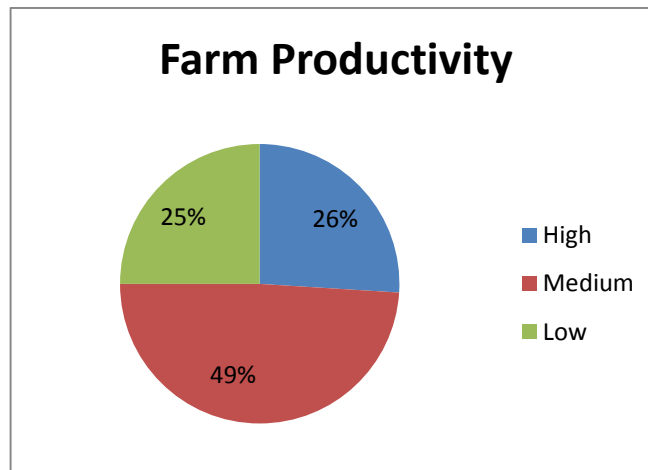


Figure 4: Percentage of farms regarding size (large, medium, small)

### Farm Productivity

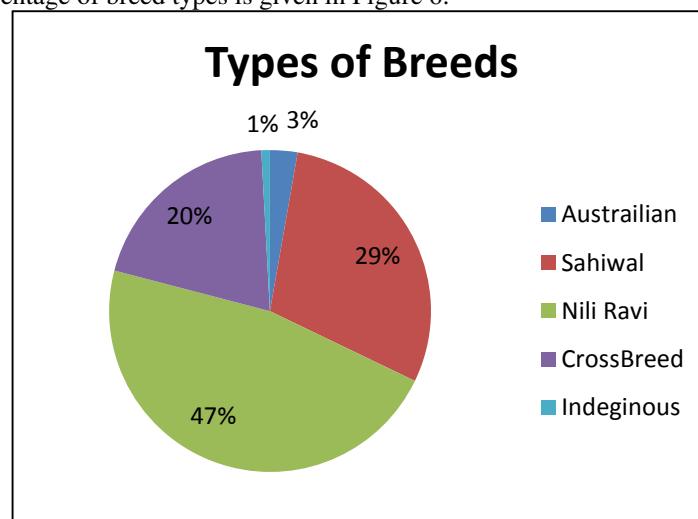
The farm productivity is described in terms of productive animals in the farm. The productivity percentage was calculated for each farm. Highly productive farms were 26% with 75% or above productivity. Medium productivity farms makes 49% of the research and the farms with productivity of 50-75% were included. The rest of 25% farms were having low productivity as their productivity percentage was less than 50%. Farm productivity is based on productive animals in the farm and it has a great influence on the total production of farm and ultimately on the income [17].



**Figure 5: Percentage of farms on the basis of productive animals**

### Types of Breeds

Breed selection plays very vital role in milk production and ultimately increasing profits. According to the study it can easily be seen that most of the farmers keep multiple breeds types including the highest percentage of 47% for Nili Ravi buffalos followed by Sahiwal cow (29%) and crossbreed cows (20%). The Australian cow and Indigenous breed buffalos were not popular as they made only 3% and 1% respectively in the farms under study. The Nili Ravi buffalos are not popular because of their productivity as their average productivity is very low compared to Sahiwal cows and Crossbreed cows. Popularity of Nili Ravi is because of the thickness of their milk which is the most liked milk features in Pakistan therefore the price of buffalo milk is higher as compared to cow milk. The third reason for keeping Nili Ravi buffalos is their compatibility with the climatic conditions of Pakistan. Sahiwal cows are also compatible with weather conditions of Pakistan as they are local cow breed and therefore well adapted in the farms with second highest farm animals in the studied area [6, 18] The graph of distribution of the percentage of breed types is given in Figure 6.



**Figure 6: Percentage of breeds kept on dairy farms**

### Feeding System Details

Feeding system has a significant influence on the milk production and animal's health. Observed from the study that in the overall usage of feeding system percentage for the feeding system A which represents fresh and dry was 33%, feeding system B which represents concentrate and dry is used by only 1%, feeding system C that represents dry and pasture makes the 14% farms choice. Usually small farmers use feeding system C because farmers with more than 20 animals do not feel comfortable while taking animals for pasture. The remaining 52% farmers are feeding their animals with feeding system D that is fresh, concentrate and dry. In Faisalabad district 20% farmers are using feeding system A, only 5% farmers are using feeding system C and rest of 75% farmers are using feeding system D. In Lahore district 35% farmers are feeding through feeding system A, only 10%

farms are feeding with feeding system C and the remaining 55% farmers use feeding system D to feed their dairy animals. According to the data taken from Sahiwal district 35% farmers use feeding system A, the 5% feed through feeding system C and the 60% of the farms use feeding system D to feed their animals. Rawalpindi is the only district that uses four feeding systems including A, B, C and D with 20%, 5%, 40% and 35% respectively. In the Jhang district 55% farmers use feeding system A, feeding system C is used by 10% farms and the rest of 35% farms feed their animals using feeding system D. Table 4 gives a clear view of the feeding system details. The previous studies showed that percentage of pastures feeding affects the milk production negatively if animals fed on dry pastures whereas more usage of concentrate improves milk production [19, 20].

**Table 4: Feeding system used by the dairy farms**

Feeding System	Total	Faisalabad	Lahore	Sahiwal	Rawalpindi	Jhang
A	33%	20%	35%	35%	20%	55%
B	1%	-	-	-	5%	-
C	14%	5%	10%	5%	40%	10%
D	52%	75%	55%	60%	35%	35%

A=Fresh+Dry, B=Concentrate+dry, C=Dry+pasture, D=Fresh+concentrate+dry

### Milk Selling percentage and Average Milk Price

According to the study mainly there are three different kinds of buyers of milk in the market that are business to business buyers that includes middle man, shop keepers and resellers it makes 27% of the farmers sales. The second kind of buyers are business to consumers that includes the end users of milk that consumes milk itself it makes 45% of milk sales of farms and the remaining 28% of the milk is sold to the Institutions and milk processors. The farms don't like to sell their milk to Institutions and processors because their average buying price is as low as Rs.48/Kg compared to Business to business average buying price of Rs.65/kg and Business to consumers average buying price of Rs.77/kg. The Table: 4.2 give a better understanding of milk selling percentage and average milk price. The analysis showed that milk prices in Pakistan are highly volatile and lower than other parts of the world especially Europe and America while close to the Asian countries especially India and Sri Lanka. Moreover, the direct sales are limited in Europe and America while more milk is sold to direct customers in developing countries like Pakistan might be due to less developed structure of entrepreneurship in dairy sector [21].

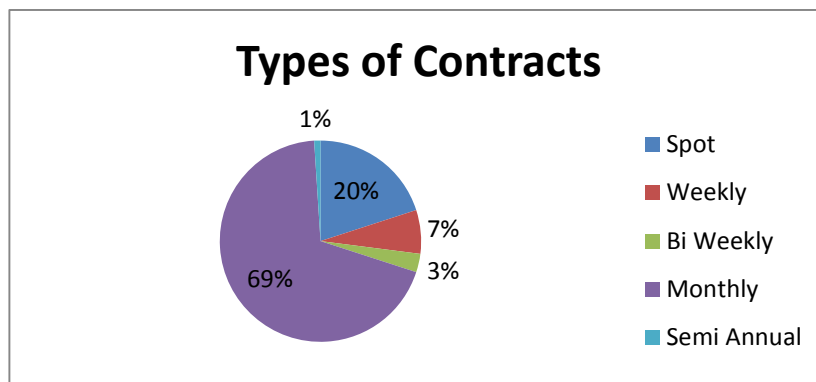
**Table 4: Percentage of milk selling to various buyer types and average milk prices**

Buyers	Milk selling Percentage	Average Milk Price/Kg (Pakistani Rupees)
<sup>1</sup> B2B (Middle man)	27%	Rs.65
<sup>2</sup> B2C (End Users)	45%	Rs.77
Institution & Processors	28%	Rs.48

<sup>1</sup>B2B: Business to business; <sup>2</sup>B2C: Business to customers

### Types of Contracts used by Farmers

The study tells us that the dairy farmers of the studied districts use five different kinds of contracts. The first type of contract used by the farmers is spot which makes 20% of the population; this type of contract is basically used by the farmers with the business to consumers/buyers where level of trust is low and the small dairy farmers are short of cash and their income is the working capital and also consumption expenditure. The second type of contract used by the farmers for receiving payment is weekly which constitute 7% of the study. Bi weekly contract makes just 3% of the study. The 69% of the study constitute of monthly contracts which is used by many types of customers including business to business, business to consumer and institutions and processors. The remaining 1% is the semiannual contact which is used by very few Institutions and processors. The pie chart of types of contracts is given below in Fig: 4.7.



**Figure 7: Milk selling contract by the dairy farmers**

**Level of Trust on Contracts:**

The level of trust on contracts is a very important factor of the study, on this depends most of the business of Dairy farms. According to the farmers overall opinions 14% of their contracts were highly trusted. Eighty percent were ranked trusted by the customers while 3% were considered distrusted and the rest of 3% were considered highly distrusted by the farmers. Farmers with their business to business customers were 13% highly trusted, 63% trusted, 17% distrusted and 7% highly distrusted. Dairy farms with business to consumers ranked 8% highly trusted, 89% trusted and 3% were ranked distrusted. In the end the farmers ranked 30% highly trusted, 57% trusted, 7% distrusted and 6% highly distrusted to their Institutions and processors (Table 5). Therefore according to the study it is recommended if a farmer is trying to be on the safe side from the bad debts business to consumers, Institutions and processors are the best options while business to business customers have the highest rate of bad debts. All a farmer wants is to secure its payment to maximize its profits [20].

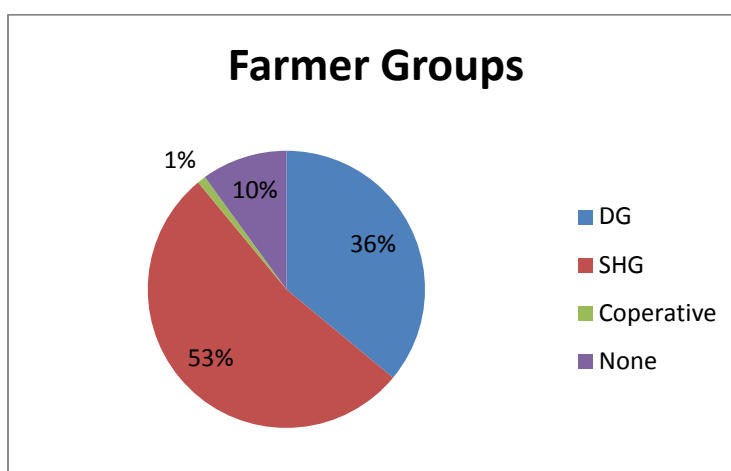
**Table 5: Trust levels of farmers on buyer type**

	Overall	B2B	B2C	Institution & Processor
highly trusted	14%	13%	8%	30%
trusted	80%	63%	89%	57%
Distrusted	3%	17%	3%	7%
Highly distrusted	3%	7%	-	6%

<sup>1</sup>B2B: Business to business; <sup>2</sup>B2C: Business to consumers

**Farmer Groups**

The farmers associated with groups had benefits that they receive by being members of such groups. According to the study almost 90% of the dairy farmers have joined any kind of farmer groups to cooperate with the dairy farmers in the region and to cooperate and share experiences with their fellow dairy farmers. The 36% of the famers are attached with the Dairy group, 53% have made or joined Self help groups and only 1% farmers are attached with cooperative groups. The pie chart in Figure 8 give a better understanding of farmers associated with different groups. The dairy farms that are attached with farmer groups have plenty of benefits related to the farm including milk marketing, input procurement, market information, security for credit, trainings and veterinary services [22, 23].



DG: Dairy group, SHG: Self help group

**Figure 8: Association of farmers with groups**

### Benefits from Group Membership

When the farmers are in the group they enjoyed a lot of benefits that includes milk marketing, input procurement, market information, security for credit, trainings information, conduction of trainings and veterinary services. The distribution of benefits received by dairy farmers are milk marketing 18 which makes 8% of the total, 16 farmers get input procurement benefits that makes 7% of the total, 85 farmers get market information benefit that makes 38% of the total study, 5 farmers receive security for credit benefit and it constitute just the 2% of the study. 15 farmers receive the training benefits and it makes 7% of the observations. 85 farmers enjoyed the benefit of veterinary services and it makes 38% of the total research. Table 6 give a better understanding of the group membership benefits.

**Table 6: Group membership benefits to the farmers**

Benefits	Benefits Distribution	Benefits Distribution Percentage
Milk Marketing	18	8%
Input Procurement	16	7%
Market Information	85	38%
Security for Credit	5	2%
Trainings	15	7%
Veterinary Services	85	38%

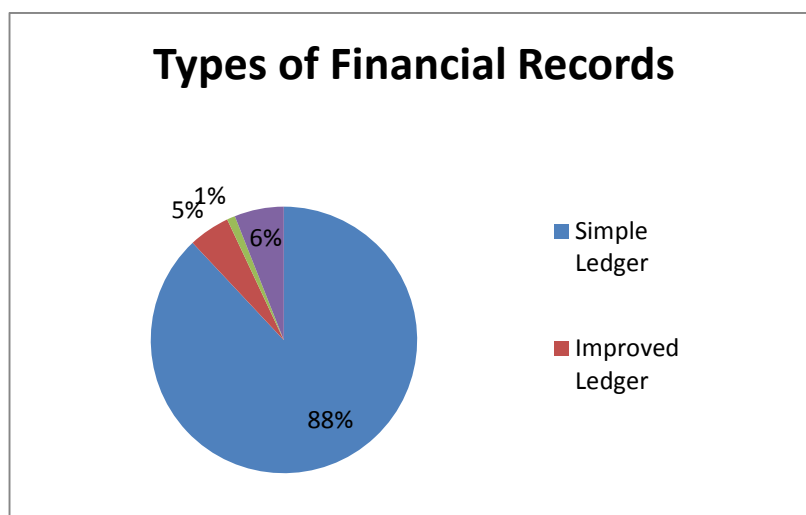
### Financing

To start a dairy farm or any other business, person needs financing and financing can be in terms of credit or capital. But the problem in dairy sector is you can't easily get a credit from any person and the institutions like banks and financing institutions, their terms and conditions are not very user friendly and complicated. Government is also not supportive and the dairy farmers are doing everything on their own. That is the reason only 5% farmers from the current study use credit financing for their farms and remaining 95% farmers use capital financing for their farms. In Ireland more than 70% farmers are using credit financing at their farms, In China there are few restrictions on credit financing, therefore credit financing trend in China is similar to Pakistan [24, 25].

### Types of Financial Records

There are many types of financial records but in the current study only four types were used. The most frequently used financial record type was simple ledger this type was used by 88% of the farmers for record keeping and analyzing their income expense statement. Hiring Accounting services was used by 6% of the farmers, this type was usually used large scale farmers because small farms do not need it and they cannot even bear the cost of hiring accountants. Improved ledgers were used by only 1% of the population and books of accounts were applied by just 5% of the farmers from the current study. The pie chart distribution is shown in Figure 9.





**Figure 9: Financing record type kept by farmers**

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