

## GOAT—A POTENTIAL DAIRY ANIMAL: PRESENT AND FUTURE PROSPECTS

Arshad Iqbal, Bakht B. Khan, M. Tariq and M.A. Mirza<sup>1</sup>

Department of Livestock Management, University of Agriculture, Faisalabad

<sup>1</sup>UAF Sub-Campus Toba Tek Singh, University of Agriculture, Faisalabad

Goats are well-admired and documented worldwide for providing food in terms of milk and meat and their products. They are playing a key role in supporting millions of people who are poor, landless and living in the rural areas. Goats are not only well-embedded in the culture but socially acceptable too for reducing global poverty in particularly for the developing nations. A goat is universally called as "Poor man's cow" Globally about 90 % goats are found in the developing world. Asia alone produces about 80 % goat milk. Pakistan at present supports 56.7 millions head of goats consisting of about 25 well- recognized breeds found in different regions of the country. Goats annually contribute approximately 275 thousand tonnes of meat, 851 thousand tonnes of milk, 25 million skins and 21.4 thousand tonnes of hair to the national economy. They are also a source of foreign exchange and contribute 2.5 % of the annual milk production. Majority of goats, however, are meant for meat with the exception of some milch breeds. These typical indigenous milch breeds include Beetal, Dera Din Panah (DDP), Naachi, Damani, and Kamori. These dairy goats constitute about five million of the total goat population in the country. Usually small flocks of sheep and goats are raised together both in plains and subhilly areas. The goats are being kept under three main production systems viz: nomadic, transhumant, sedentary and household. Major feed resources available for goats are mainly ranges (60 %), while other feeding material available to these animals is along canal/river banks; pastures, roadside grazing, crop residues, tree leaves, pods etc. Goats are naturally bred under field conditions. Despite having their crucial role in rural lives throughout the world they have not been properly addressed the way they really deserve. The present paper will review the dairy potential of local dairy goat breeds along with their future scope as a dairy animal.

**Keywords:** Dairy goats, goat breeds, Pakistan

### INTRODUCTION

About 90 % of world's goat population is found in the developing countries, while continent-wise Asia leads, where 80 % of goat milk is being produced. In this regard main countries include India, China, Bangladesh, Iran, Pakistan and Turkey (Khan *et al*, 2003).

Pakistan being an agrarian country supports 56.7 million goats which are primarily being raised for mutton by millions of poor and landless communities. They are playing a significant role in the country's economy by producing approximately 275 thousand tonnes mutton, 25 million skins and 21.4 thousand tonnes hair. They also produce about 851 thousand tonnes milk which amounts to 2.5 % of the national milk supply (Ali, 2006, Anonymous, 2008). Furthermore, they are also producing manure (dung, urine) responsible to increase the soil fertility. There are about 25 well - recognized goat breeds found in different regions of the country. Majority of these are mutton type while some are promising milch type. Among these include Beetal, Dera Din Panah (DDP), Naachi and Kamori. The former three breeds are found in the Punjab province while the latter is from Sindh province. Among these breeds, Kamori has the largest population (3 million) followed by Beetal (1.92 million), while others are relatively smaller in number (Livestock Census, 1996).

### Dairy goats in global scenario

Dairy goat sector in developing countries is less developed; hardly less than 5 % of the milk is traded (Dubeuf *et al.*, 2004). Most of the milk produced by the goats is either fed to kids by the does or used for some domestic needs. Similar situation is prevailing in our local goat farming systems. In some cases, milk selling to the neighborhood is customary. Goat and sheep milk is usually mixed with cow /buffalo milk before marketing (Khan, 2008).

Goat sector is well-established in developed countries like Greece, Spain, France, Italy, Australia etc. Dairy goats are supporting millions of malnourished human population in the developing world. Goats are contributing through their milk more than that of cows in this respect. Moreover, goat milk consumption has become an upper edge for the humans afflicted with peptic ulcers, allergy and various gastrointestinal disorders which usually develop from intolerance to cow milk (Haenlein, 2004). Goat milk has also been found to be useful for diabetic patients in Japan (Nagura, 2004). This fact also favours goats for dairying and can prove an ideal preposition especially for developing world where majority of goat population is found with people having low economic status.

**Table 1. Goat population in different years in Pakistan**

Province	1976	1986	1996	2006
Pakistan	21.69	29.94	41.16	53.79
Punjab	7.77	10.76	15.30	37
Sindh	4.24	6.86	9.73	23
NWFP	4.69	4.10	6.76	18
Balochistan	4.44	7.30	9.36	22

(Source: Livestock Census, 2006)

According to the Livestock Census (2006), there are 53.79 million head of goats found in Pakistan. Province wise their population in Punjab, Sindh, Balochistan and NWFP is reported to be 37, 23, 22 and 18 % respectively. Present population of goats stands at 56.7 million.

### Production systems

Following are the four production systems of goat raising in Pakistan. Mostly extensive system of production is in practice.

**Nomadic:** In this system animals are on constant move along with the families movement which is

**Table 2. Goat production systems in Pakistan (%)**

Production system	Balochistan	NWFP	Punjab	Sindh	Pakistan
Nomadic	73	50	26	44	44
Transhumant	21	33	47	37	38
Household	3	17	18	12	12
Sedentary	7	--	9	7	6

Source: Ishaque (1993)

**Table 3. Average milk yield of selected dairy goat breeds of Pakistan**

Breed	Lactation Milk yield (litres)	Lactation length (days)	Average daily milk yield (litres)
Beetal	226-272	120-140	1.9-2.0
Dera Din Panah	205	130	1.6
Damani	100-113	90-120	0.9-1.1
Kamori	204	115	1.8-2.2

Source: Isani and Baloch (1996).

mainly dependant on the climatic conditions. Actually the major factors responsible for this movement include erratic rain fall, steep topography and low soil quality (Iqbal, 1994). Ultimately migration along with animals in search of feed and water. remains the only solution. About one million nomads have been reported in Pakistan (Khan *et al.*2003). This system of production is mostly found in Balochistan, Cholistan and Thar area in Sindh.

**Transhumant:** In this system, flocks have to move in summer months (May-June) towards areas having better feed availability and have to be back in winter to

their respective areas as they can not survive there for long time due to onset of severe winter. This system can be seen in tribal areas, D.I. Khan, D.G. Khan, Cholistan, Azad Kashmir and Balochistan except Sibbi.

**Household and sedentary:** It is actually a settled farming in which animals are allowed to graze early in the morning by the shepherd in close proximity of the villages on marginal lands or fellow lands etc., followed by their arrival back in the evening at the same destination. The flock size is usually small ranging from 5-30 animals. This system can be seen in two ways, one either small ruminants alone or the other system where small ruminants are mixed with other livestock. These two systems are almost the same from management view point. Household and sedentary systems are mostly found in the Punjab province.

### Milk production potential of goats

There is no recent study undertaken about milk production potential of Pakistan goat breeds. However, some data are available regarding their performance.

Devendra and Burns (1983) have reported an average lactation yield of about 195 litres in 224 days in Beetal goats while Kaura (1943) has reported a yield of 320 litres in 133 days in the same breed. Selected specimens producing 4.5 litres/day have also been found. However typical milk yields in Pakistan are 205 litres in 130 days lactation period.

Shah (1994) also reported milk yield in local goat breeds viz. Damani (110 litres in 110 days); Beetal (290 litres in 130 days); DDP (245 litres in 135 days); Naachi (110 litres in 100 days) and Kamori (210 litres in 115 days).

The milk yield reported is under different feeding management conditions, which however, can further be exploited. A milk yield of 2 to 4 litres in Kamori has been reported by Kaura(1943).The Naachi goat breed has also been reported to produce 150 litres of milk in 120 days lactation period under arid and semi arid conditions (Personal Communication, 2008).

Devendra and Burns (1983) have described the yield of Pakistani goat breeds: Beetal (140-228 litres in 208 days), Kamori (228 litres in 120 days) and Damani (104 litres in 105 days). Wahid (1973) in Beetal has described a yield of 323 litres within a lactation period of 186 days. In general, most of the estimated milk yields are given without considering the milk consumed by the kids; hence the actual milk yield could be higher than that reported. The lactation yields were found to be the highest up to first three lactations followed by a steady decline towards seventh lactation.

The milk production performance of some local and exotic dairy goats and their crosses with Beetal is given in Table 4. A significant improvement (97.3 %) has been found in a cross of Beetal with Sannen and Alpine.

**Table 4. Performance of pure (local and exotic) and crossbred dairy goats**

Breed/cross	Lactation yield (litres)	Lactation length (days)
Beetal	156.9	186
Alpine	308.4	245
Saanen	286.4	243
Malabari	65.3	173
Alpine x Malabari	98.0	187
Saanen x Malabari	127.3	191
Alpine x Beetal	257.1	223
Saanen x Beetal	309.6	241

Source: Panhwar (2005)

#### Milk composition and milk products

In general, milk composition of goats has received little attention by the researchers. The differences in composition, however, could be attributed to their breed, stage of lactation and environmental factors. Milk composition of indigenous goats have been studied and reported in few cases. Devendra and Burns (1983) have reported 4.9 % milk fat in case of DDP. The trend of manufacturing dairy products from goat milk does exist. Products like, butter, cheese, ghee and yogurts are prepared from goat milk especially in some European countries, Middle East and Indo Pakistan. Milk produced by the local goats in majority cases is in smaller quantity and consumed by the young kids. In very exceptional cases, if found

surplus is consumed for domestic purposes. As far as goat milk is concerned it is found very useful for human infants. It is also popular due to its unique composition compared to milk of some other species (Table 5).

**Table 5. Comparative percentage composition of milk of different farm animals**

	Cow	Goat	Sheep	Buffalo
Fat	3.8	4.2	5.3	7.65
Protein	3.2	3.5	5.5	4.37
Carbohydrates	4.8	4.5	5.4	4.82
Minerals	0.7	0.8	0.9	0.94
Water	87.5	87.0	79.46	82.22

Source: Ensminger and Parker (1986)

Recently a study for doctoral thesis was undertaken for the genetic evaluation of Beetal performance traits at the Department of Animal Breeding and Genetics, University of Agriculture, Faisalabad (Ali, 2006). Some of his findings have been incorporated in this article.

#### SUGGESTIONS AND RECOMMENDATIONS

1. Dairy goats need a serious consideration in respect of research and their development.
2. Provincial governments should establish independent small ruminants (including sheep) research institutes addressing separately the goat as a dairy and meat animal. This will help solve food security issues.
3. Distribution of improved bucks (at subsidized rates) of various goat breeds for improving the performance of goats.
4. Conservation of milk and meat goat breeds separately in their respective home tracts is required in the larger interest of conservation of genetic resources of the country.
5. Establishment of dairy goats improvement association, which can play a vital role to improve their milk production.
6. Nutritional aspects of the goat in terms of quality and quantity need special attention for optimizing their productivity.
7. Ranges being the major and the most important source in small ruminant feeding need improvement.
8. A strong link between farmers, extension workers and researchers still does not exist. This needs to be established and strengthened.
9. Proper health cover and strengthening of extension services by the respective departments are still awaited.

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