

## KEYNOTE ARTICLES

### Small Ruminant Production in Pakistan

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#### ABSTRACT

Livestock sector receives a considerable share by small ruminants (sheep & goat) with 85.7 million heads. Sheep (28) and goat (34) breeds in the country reflect valuable diversity in the gene pool. Mainly they are raised for meat with milk production as secondary product. Higher goat population (58 million) compared to the other livestock species indicates its economic importance and adaptation to different agro-ecological zones of the country. Small ruminants share about 57% of the ruminant population and 27% of red meat production (i.e., 2191 thousand tones). Despite diversity among these gene pool, small ruminants are not performing the potential these animals inherit. There are multiple factors which adversely influence small ruminant production like under and imbalanced nutrition, lack of well developed marketing system and disease prevention, etc. and thereby hijacks is the real profit associated with this enterprise. This paper briefly highlights the potential of small ruminants, possible constrains to their production and probable remedies to abate these threats.

**Key Words:** Small ruminant, Productive Potential, Constrains, Probable Remedies

#### INTRODUCTION

Livestock, being sub-sector of Agriculture, plays a significant role in national economy of Pakistan (Pasha and Khan, 2010). It shares more than 52 and 11 % of the agricultural GDP and total GDP, respectively. About 30-35 million rural population is engaged in this sector (Sarwar et al., 2002a). Small ruminants (sheep & goat) with 85.7 million heads have considerable share in overall share of livestock sector (Economic Survey, 2008-09). There are 28 and 34 breeds of sheep and goat, respectively. Variation does exist among sheep breeds, thin tail to fat tail, growth performance and wool production and likewise, goat breeds differ in growth rate, reproduction potential and milk production (Khan, F.U. 2006). However, higher goat population (58 million) than other livestock species reflects its economic importance, adaptation to the different agro-ecological zones of the country. Furthermore, high reproductive potential, short

*generation interval, ability to thrive on shrubs, bushes, and tree leaves, high digestive efficiency for cellulose, that make them suitable as meat-producing livestock. Small ruminants share about 57% of the ruminant population and 27% in red meat production (i.e., 2191 thousand tones). Despite having diversity in gene pool, small ruminants are not performing the potential these animals inherit. There are multiple factors which constrain this animal productivity like horizontal expansion, low availability of fodder, fibrous crop residues, orthodox feeding practices, nutritional imbalances and deficiencies, lack of communication, poor incentives to farmers and lack of effective marketing system etc. This paper briefly highlights the potential of small ruminants, possible constrains to their production and probable remedies to abate these threats.*

### **Small ruminant Profile and Contribution**

Small ruminant population increased from 80.3 to 85.7 million heads over the last four years with the growth rate of 1% per annum (Fig1.). Sheep population increased from 24.9 to 27.4 while goat population increased 56.7 to 58.3 million, from 2005 to 2009 (Fig. 2 & 3). Sheep has considerable share in production of milk (36 thousand tones), meat (117 thousand tons), Skin (10.37 million) and Lamb skin (3.08 million). Likewise goat has contribution in production of milk (719 thousand tones), meat (413 thousand tons), Skin (22.45 million) and kid skin (10.44 million). Sheep population is distributed in Punjab (25%), Sindh (15%), Balochistan (42%) and North West Frontier Province (18%) of Pakistan. Likewise, respective proportion of total goat population in Punjab, Sindh, Balochistan and North West Frontier Provinces is 37, 24, 23 and 16%, respectively. Regarding goat, Pakistan with population more than 58 million heads is considered the 3rd largest goat producing country, after China & India and its population is increasing (4.5 percent per annum) while its distribution is highly dependent on altitude. Higher goat population than other livestock species reflects its economic importance and adaptation to the different agro-ecological zones of the country.

### **Sheep and Goat Breeds**

There are 28 sheep and 34 goat breeds in the country reflecting a diverse gene pool and rich genetic potential. Punjab, Sindh, NWFP, Balochistan and northern areas & Azad Jammu Kashmir possess 7, 3, 7, 4 and 7 breeds, respectively. Lohi, Thalli, Kajali and Sipli breeds of Punjab while Dumbi, Kachi and Kooka breeds of Sindh are famous for meat production. Pakistan does possess diversity for goat breeds as there are 34 goat breeds with 04, 14, 03, 03 and 10 in Punjab, Sindh, NWFP, Balochistan and northern areas & Azad Jammu Kashmir, respectively (Isani and Baluch, 1996). Among four goat breeds of Teddy and Beetal goats are in higher number and have main share in meat production in this province. Goats are primarily a meat animal but also maintained for milk. Beetal, Dera Din Panah, Nachi and Kamori are famous milk breeds. Teddy goat

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got better distribution and popularity because of better prolificacy and faster growth rate. About 49-76% small ruminants are in flocks of 1-50 heads while 05-20% of small ruminants are in flocks of 200 heads or more. In goat, adult body weight may vary from 20-120 kg while flock size varies; 6-15 animals/flock are most common (Khan et al., 2008). About 70% of goats are distributed in flock size less than 50 while 28% are in flock size more than 200 animals (GOP, 1996). Economical production traits of some sheep and goat have been summarized in tables 2&3.

### **Small Ruminant Production Systems**

Nomadic, transhumant, household and sedentary are four systems for small ruminant production found in the country. Nomadic; about one million nomads have been reported in the country. This system of production is mostly found in Balochistan, Cholistan and Thar area in Sindh. Nomadic people don't have any fixed base and move throughout the year and stay where they found green herbage or water. In Transhumant production system, flocks move for better grazing place (May-June) and come back in winter to their respective areas. This system can be seen in tribal areas, D.I. Khan, D.G. Khan, Cholistan, Azad Kashmir and Balochistan except Sibbi. Small ruminants maintained under these two systems get more than 90% of their feed from rangeland (Khan et al., 1999). Household and sedentary is a sort of 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. The flock size is usually small, ranging from 5 to 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. Household and sedentary systems are mostly found in the Punjab province. Distribution of small ruminant among major production systems of Pakistan has been presented in Table 1.

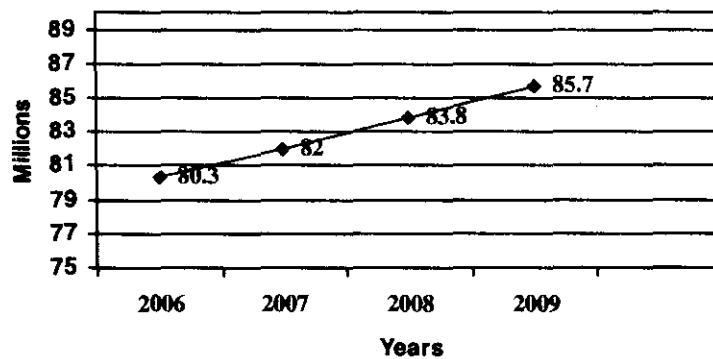
### **Constrains in Small Ruminant Farming**

Widespread breeding of genetically inferior animals and lack of breeding programmes for, meat, dairy and reproduction are the main constrains face development of the small ruminant sector. However, among different environmental aspects, nutritional aspect of small ruminants needs emergent attention because small ruminants are getting only 62 and 74% of the required digestible crude protein and total digestible nutrients, respectively (Fig. 4). The growth performance can be enhanced up to 40% just by manipulation of macro and micro nutrients, with the existing gene pool (Sarwar et al., 2002b). Inadequate and imbalanced nutrition is considered a dilemma of small ruminant production. Ruminants also face fodder shortage period in hot summer and sever cold (Fig. 5). Inadequate availability of soil minerals not only hamper plant growth but also reduce availability of these minerals in animal feeds and thereby hinder animal

productivity (Table 4). Furthermore, current feeding system (traditional, based on fodder & forage) fulfils only maintenance needs of the growing sheep (Sarwar et al., 2002b). Rearing of these animals on nutrient rich diets can significantly improve their growth and productivity (Table 5). Some other important factors like outdated and limited marketing facilities, inadequate economic incentives to small producers, limited animal health coverage, poor transportation and handling methods of meat and milk, lack of effective extension technologies for proper goat farming system, subsistence production system and small holdings, disease prevention and parasitic infestation also constrain small ruminant production by hijacking the real profit associated with this enterprise. Keeping in view the above scenario, following issues are awaiting significant attention and sincere effort of the livestock related people in order to exploit the real potential by these animals.

- ❖ Improvement of the existing markets
- ❖ Enhancement of preventive and curative animal health coverage
- ❖ Establish independent small ruminants research institutes
- ❖ Distribution of progeny tested rams or bucks at subsidized rates
- ❖ Conservation of meat and milk breeds separately in their respective home tracts
- ❖ Nutritional aspects of the small ruminants in terms of quality and quantity need special attention for optimizing their productivity
- ❖ Rangeland improvement
- ❖ Association among farmers, extension workers and researchers
- ❖ Government incentive for propagating small ruminant production

**Fig.1: Small Ruminant Population Trend over last Four Years**



Average growth rate 1.025% per ann.

Fig.2: Sheep Population Trend over the last five years

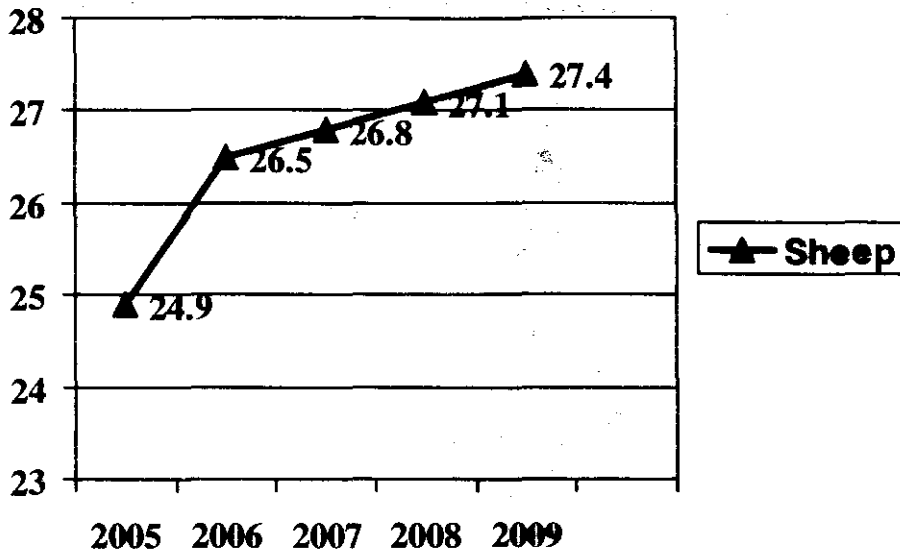
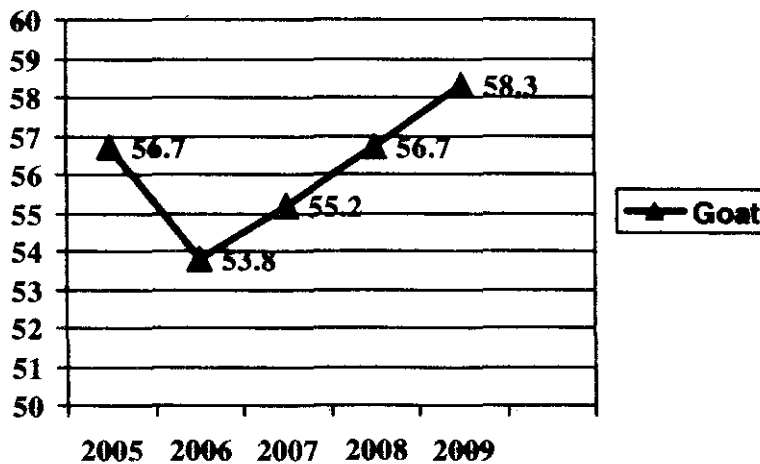
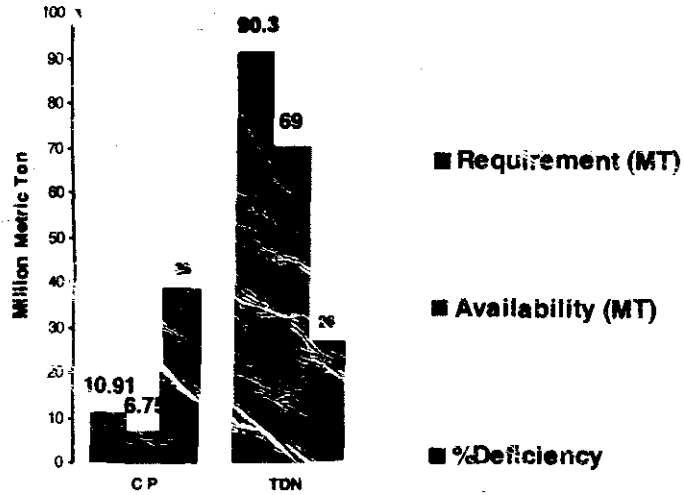


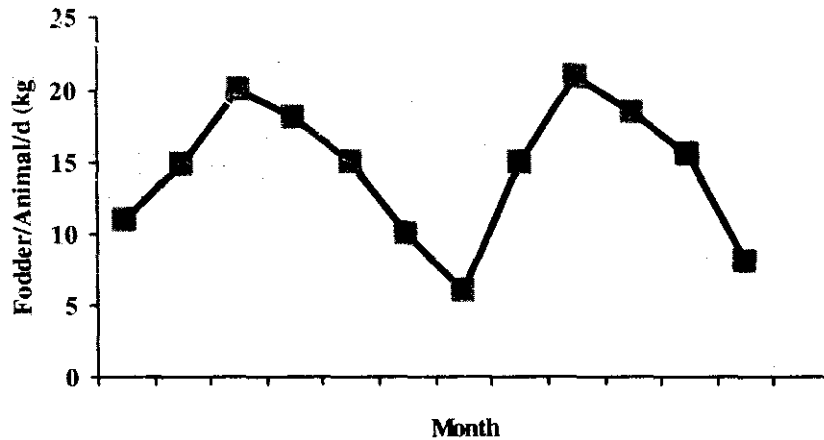
Fig.3 Goat Population Trend over the last five years



**Fig.4 : Nutrient Availability and Requirement for Livestock in Pakistan**



**Fig. 5: Seasonal Availability of Fodder in Pakistan**



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**Table 1 : Distribution of small ruminants among major production systems of Pakistan**

System	Percent	Herd Size	Goat: Sheep
Nomadic	06	60-300	60:40
Transhumant	32	50-150	40:60
Sedentary	62	15-30	Depends on altitude and Customs
Household		1-5	

Source; Adopted from (Khan, F. A. 2006)

**Table 2 Economic Production Traits of Selected Sheep Breeds in Pakistan**

Breeds	Province	Birth Wt. (Kg)	Weaning Wt. (Kg)	Growth rate (g/d)	Adult Wt. (Kg)	Dressing %
Kajli	Punjab	4.00	21.50	146.00	78.00	55.00
Lohi	Punjab	3.30	21.30	149.00	61.00	50.00
Salt Range	Punjab	3.00	21.00	150.00	35.00	45.00
Dumbi	Sindh	3.00	20.00	142.00	40.00	40.00
Kachi	Sindh	3.10	22.50	162.00	42.00	50.00

Sources: Qureshi et al. (2002), (Rafiq et al., 2003), (Shah and Khan,2004)

**Table 3. Economic Production Traits of Selected Goat Breeds in Pakistan**

Breeds	Province	Birth Wt (Kg)	Weaning Wt. (Kg)	Growth rate (g/d)	Adult Wt. (Kg)	Dressing %
Teddy	Punjab	1.60	16.00	120.0	34.00	50.00
Beetal	Punjab	3.70	25.00	178.0	36.00	50.00
Dera Din Panah	Punjab	2.70	25.00	186.0	45.00	50.00
Jattan	Sindh	3.50	36.00	271.0	78.00	50.00
Kacchan	Sindh	3.50	35.00	263.0	68.00	48.00

Source: (Isani and Baluch,1996), (Hasnain, 1985)

**Table 4 Seasonal plasma macro mineral (mg/L) profile of lactating and non lactating sheep**

Mineral	Critical value (mg/L)	Season	Lactating Sheep	Def. %	Non-Lactating	Def. %
Ca	80	Winter	60.5	24.37	63.6	20.5
		Summer	76.7	4.12	91.78	+ 14.72
Na	3000	Winter	2589	13.7	2750	8.33
		Summer	2383	20.57	2277	24.1
K	200	Winter	177	11.5	171	14.5
		Summer	158	21	195	2.5

Source: (Khan et al. 2007)



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**Table 5.: Growth and mortality in lambs as altered by feeding management system**

Items	T1	T2	T3
Growth Rate (g/h/d)	-25.87	19.92	66.26
Mortality (%)	8.33	8.33	0.00

**T1: 8 h grazing, zero stall feeding**

**T2: 8h grazing plus experimental ration @0.58 kg/h/d**

**T3: 1.25 kg/h/d, Zero grazing**

[Source: (Munir et al., 2008)]

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