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Small Ruminants Farming in Pakistan

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Abstract: Livestock play an important role in the rural economy of Pakistan. It produces food, enhances crop production, generates cash income, provides year-round employment, spreads risk and provides fuel and transport. In the mountainous, rainfed, saline affected and desert areas of Pakistan, where crop production is uncertain, farmers subsist on livestock farming. Sheep and goats are reared as a subsidiary source of livelihood in these areas and utilized for milk, mutton, skin and wool production. The growth pattern of goat population in Pakistan shows an annual increase of 3.04% per year. However, sheep numbers declined and a swift decline occurred during 1994-95 and the subsequent years, due to prolonged drought. Meat (mutton) production from both sheep and goats in the country has generally increased rapidly over the last two decades at a rate of 3.67% to meet the demand of ever growing population. However, a sharp decrease in mutton production has been observed during the prolonged drought of mid-1990s when hundred of livestock especially sheep died. On the other hand, high emphasis on wool production may lead to a reduction in mutton produced per head as both ewes and wethers that would otherwise be sent to slaughter may be kept for wool production.

Key words: Ruminants, sheep, goat, meat, milk, wool, hair.

Livestock play an important role in the economy of Pakistan by contributing 50% of the agriculture value added and 11% of national GDP during 2005-06. It is also a net source of foreign exchange earnings with approximately 8% share annually. Its role can be weighed from the fact that livestock is a notable component of the rural economy of Pakistan. It produces food, enhances crop production, generates cash income, provides year-round employment (more than 30-35 million rural population is involved in livestock production), spreads risk and provides fuel and transport (GoP, 2007). Realizing the importance of livestock sector in the national/rural economy and its role in alleviation of rural poverty the government gives high priority to its development and is working on bringing about radical changes for transforming it from subsistence to market-oriented approach.

In Pakistan, livestock production systems can broadly be classified into stall-fed and grazing-based systems. The stall-fed livestock farming is mainly found in the irrigated areas of Pakistan where some of the farm areas planted under fodder crops and large ruminants are mostly nurtured. Grazing-based livestock farming is the peculiarity of the mountainous, rainfed[1], saline affected and desert areas of Pakistan

[1] Stall-feeding based livestock is also present in the rainfed (especially high rainfall regions with good seasonal distribution) areas of Pakistan.

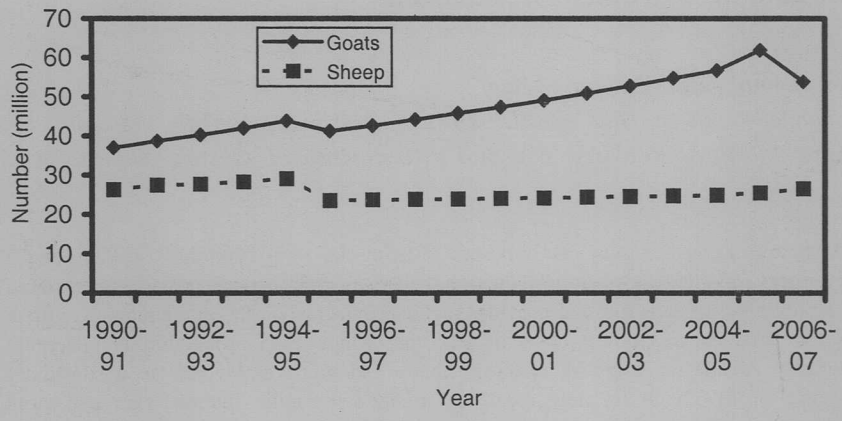

Fig. 1. Trend in goat and sheep population.

where the crop production is uncertain and the farmers subsist on livestock farming, including cattle, sheep, goats, camel and horses. Stall-feeding based livestock is also present in the rainfed (especially high rainfall regions with good seasonal distribution) areas of Pakistan. Sheep and goats are reared as a subsidiary source of livelihood for a large number of small and marginal fanners and landless laborers and utilized for milk, mutton, skin and wool production in these areas (Hasnain, 1985).

Sheep and goats are also important sources of export earning, especially through skins and hand-knotted carpets, ropes, bags and tents. This region can play an important role in meeting the world's increased demand. Ishaq *et al.* (2007) found small ruminants farming a lucrative enterprise with increasing return to scale in the southern parts of North West Frontier Province of Pakistan.

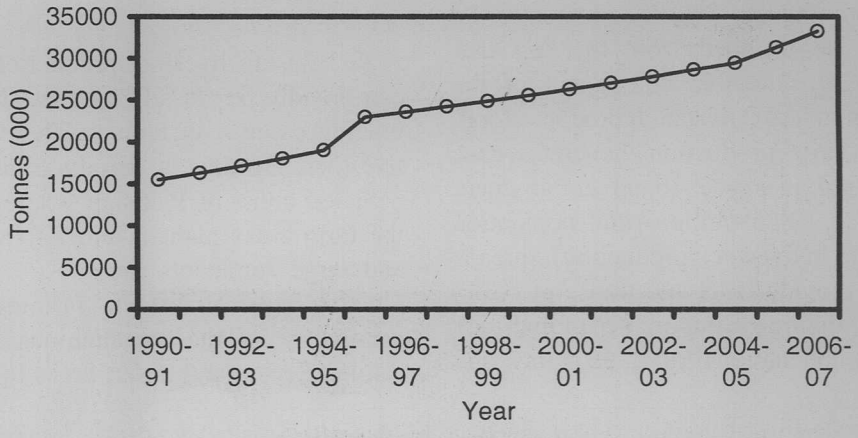

Fig. 2. Trend in milk produce.

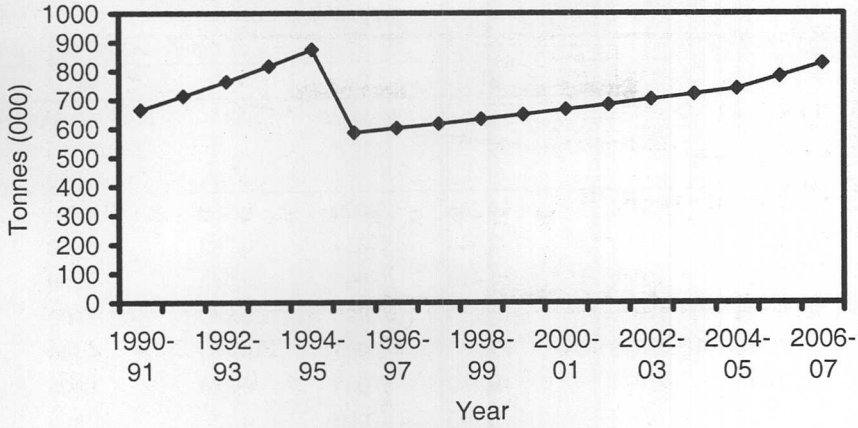

Fig. 3. Trend in mutton production.

The above discussion indicates that small ruminants (goats and sheep) farming is an important component of the economy of the arid areas of the country and has a significant contribution by producing food, generates cash income and provides employment, fuel and transport. This paper reviews the performances of small ruminants, which are produced mostly in the arid areas of the country. Trend and compound growth rate (over a period of time) in population of sheep and goats and their produces (milk, mutton, wool and hairs) since 1990-91 are discussed in the following sections.

The study is based on time series data, using data from Economic Survey of Pakistan, Statistical Bulletins and Agricultural Statistics of Pakistan. Rahman, (1999) and Aquino *et al.* (2002) estimated the long term trend by applying linear semi-log trend function. The following semi-log trend function was used to find out the trend and to estimate the growth rate since 1990-91.

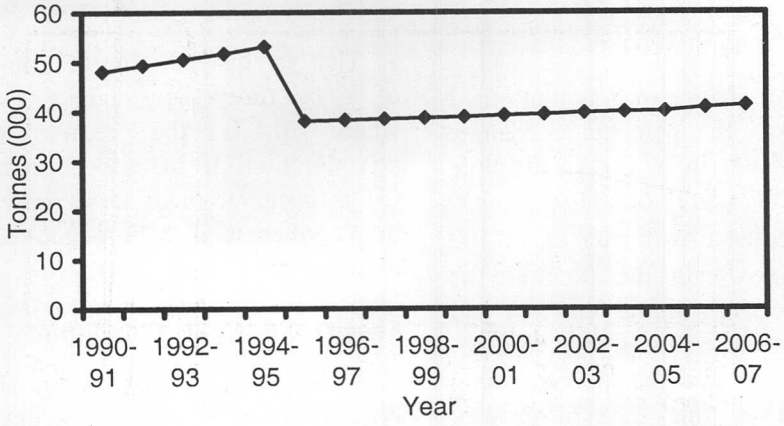

Fig. 4. Trend in wool production.

Table 1. Trend and Rate of Growth in population of sheep and goats and their produces (Mutton, Wool, Hair and Skin)

Particulars	I	II	III	IV	V	VI	VII
	Constant (β_0)	Trend coefficient (β_1)	$t_{calculated}$	P value	R^2	Instantaneous growth rate (%)	Compound growth rate (%)
Goats	3.590	0.028	14.260	0.000	0.930	2.800	2.840
Sheep	3.290	-0.008	-2.344	0.034	0.280	-0.800	-0.797
Milk	8.756	0.046	34.410	0.000	0.970	4.600	4.707
Mutton	5.540	0.036	13.210	0.000	0.840	3.600	3.666
Wool	3.880	0.015	-3.280	0.005	0.420	1.500	1.511
Hair	2.040	0.074	10.480	0.000	0.880	7.400	7.681
Skin	3.473	0.018	6.290	0.000	0.725	1.800	1.816

$$\ln Y = \beta_0 + \beta_1 t + e \quad ...(1)$$

where Y = dependent variable,
t = trend over specific period,
β_0 = intercept term,
β_1 = coefficient of trend
ln = natural logarith
e = error term.

In this model the slope coefficient measures the constant proportional or relative change in Y for a given absolute change in the value of the regressor (in this case the variable t)

$$\beta_1 = \frac{\text{relative change in regressand}}{\text{absolute change in regressor}}$$

If the relative change in Y is multiplied by 100, it gives the percentage change, or the growth rate, in Y for an absolute change in t, the regressor. That is, 100 times β_1 gives the growth rate in Y; 100 times β_1 is known in the literature as semielasticity of Y with respect to t and gives the instantaneous (at a point in time) rate of growth. To find out the compound (over a period of time) rate of growth, the following formula was applied (Gujrati, 2004):

$$\beta_1 = \ln (1+r) \quad ...(2)$$

where,
β_1 = instantaneous rate of growth
ln = natural logarithm
r = compound rate of growth.

Hence taking antilog of β_1, subtracting 1 from it and multiplication of the difference by 100, would give compound rate of growth (Gujrati, 2004).

Instead of estimating model 1, researchers sometimes estimate the following linear trend model:

$$Y_t = \beta_0 + \beta_1 t + U_1 \quad ...(3)$$

That is, instead of regressing the log of Y on time, they regress Y on time, where Y is the regressand under consideration. If the slope coefficient in (3) is positive, there is an upward trend in Y, whereas if it is negative, there is a downward trend in Y.

Sheep and Goat Population

In Pakistan, a number of sheep and goat farming systems can be observed, of which four are more important, i.e., nomadic, transhumant, sedentary and house

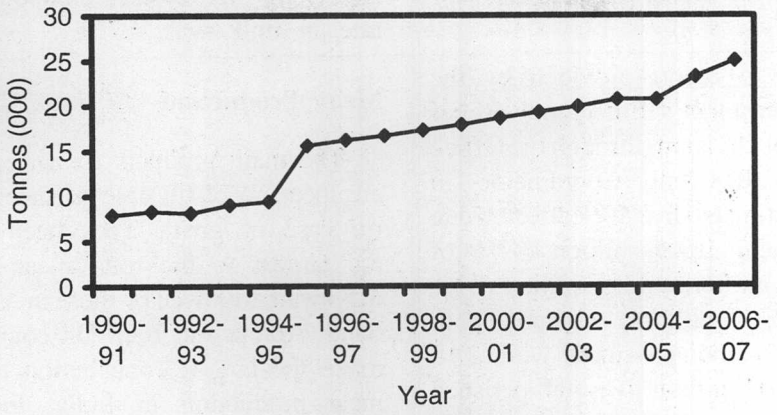

Fig. 5. Trend in hair production.

keeping. The dominant production systems are nomadic and transhumant. Siddiqui and Ansari (1986) reported that majority of sheep and goat entrepreneurs do migrate along with their flock for a limited period. They have their permanent abodes and return back as soon as draught conditions are over.

Upward trends in sheep and goat numbers have been observed worldwide. According to FAO (1983), Pakistan has shown the highest increase from 1974–76 to 1983 in goat population, followed by China and India. The growth pattern of goat population shows an annual increase of 2.84% per year (Table 1 and Fig. 1). Pakistan has also shown the highest increase in sheep population, followed by Turkey and China. However, sheep numbers declined since 1990-91 and a rapid decline occurred during 1994-95 and the subsequent years, due to prolonged drought (Table 1 and Fig. 1). Hardest hit areas were Balochistan, and parts of Sindh and Punjab

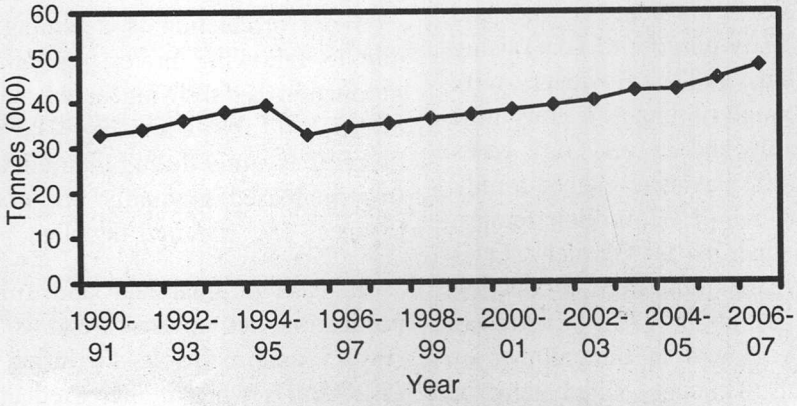

Fig. 6. Trend in skin production.

provinces, where sheep farming is very common.

According to report provided by the Pakistan Government's Emergency Relief Cell of Cabinet Division (through the Office of the UN Resident Coordinator in Islamabad), estimated livestock affected due to drought were 10.65 million (47% of the total 22.5 million) and 5 million (21% of the total 23.8 million), respectively in Balochistan and Sindh provinces, while 2.18 million and 0.03 million livestock perished during the drought in Balochistan and Sindh provinces, respectively.

This sector plays an extremely important role in the country's economy, providing the main source of household income for many. Livestock also plays a crucial role in household food security, providing essential nutritional needs through meat and milk, particularly in remote pastoral areas with little or no access to alternative food sources. Livestock losses, therefore, had a profound impact on household food security (GoP, 2000).

Milk Production

All sheep breeds are kept for wool and mutton and primary purpose of goat raising is meat (Wahid, 1982). However, milk obtained from small ruminants is consumed within the family and in very rare cases marketed. In 2002 Pakistan reached a milk production volume of 32 million tonnes, slightly higher than that of Germany. Over the past six years, total milk production has increased by about 17%, which was achieved by a growth in the number of milking animals with only slight gains in milk yield per animal (Garcia *et al.*, 2003). An upward trend during the period was observed (Fig. 2) i.e., compound growth rate in milk was 4.71%.

Meat Production

The main products for sheep and goat are meat, wool (in case of sheep) and hair (in case of goat). The sheep contribute the largest to the total meat production in Kuwait, followed by those in Afghanistan, Saudi Arabia and Iran. On contrary, goats make the largest contribution to the total meat production in India, followed by Pakistan. Meat production from both sheep and goats in Pakistan has increased rapidly over the last two decades at a rate of 3.67% to meet the demand of growing population (Table 1 and Fig. 3). However, a sharp decrease in meat production was observed during the prolonged drought of mid- 1990s when there was high mortality of sheep and goats. High emphasis on wool production may lead to a reduction in meat produced per head as both ewes and wethers could be sent to slaughter may be kept for wool production.

Wool and Hair Production

Wool production is declining globally due to fallowing prices. In Pakistan the production is fallowing at the annual rate of 1.51% (Table 1 and Fig. 4). Production dropped abruptly during the mid-1990s and then increased gradually but not enough to meet the required level.

In case of goat hair and animal skin production, an upward trend is observed (Fig. 5 and 6; Table 1) during 1990-91 to 2006-07, when it increased at the rate of 7.681% per year. Goat hair is utilized as a raw material in making of carpets,

ropes, etc. The compound growth rate in hair was 0.08% per year (Table 1).

Recommendations

Small ruminant production is a sustainable rural activity in Pakistan and requires only limited investment. Therefore, policy for improvement of small ruminants production will enhance the income of small farmers manifolds.

Livestock products play an important role in household food security and poverty alleviation. Increased income can be earned through adding value to animal products. The adoption of suitable small-scale production and processing and development of market-oriented skills and transfer of appropriate and practical technologies will bring significant improvement in this regard.

There is good scope for export of livestock and livestock products to the markets of European Union, Gulf, Middle East, Central Asian countries, Malaysia and Afghanistan. The Muslim states of Middle East, Central Asia and countries like Malaysia and Afghanistan are relatively more promising markets because of religious and other geo-political bondages. In other words, frozen "Halal" meat could be easily exported to such countries. There is also high seasonal demand for live animals at the time of Haj. Expansion of meat export to these countries will help alleviating poverty in Pakistan as majority of the livestock producers are resource-poor farmers and landless households keeping subsistence sized herds. It shall also promote businesses falling under backward-forward linkages.

There is no control on grazing of community lands. Furthermore, no development efforts have been made so far to develop these land resources by motivating farming communities on participatory principles, together with conducive legislative measures. Therefore, it is high time to develop these barren land. As livestock feeding is a critical component of livestock management, especially in the rainfed farming systems, multi-cut fodder should be introduced to make the feed available throughout the year.

The availability of improved breeds should be enhanced and awareness campaign should be launched regarding the artificial insemination in order to make the available breeds more productive.

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