

## Sheep Production System in Arid and Semi-arid Regions of India

S.M.K. Naqvi, Kalyan De and G.R. Gowane\*

ICAR-Central Sheep & Wool Research Institute, Avikanagar via Jaipur 304 501, India

**Abstract:** India is the third largest producer of sheep in the world and it engages a large percentage of population in rural arid and semi-arid region as a sustainable livelihood option. These zones are characterized by higher rate of evaporation than the rate of moisture received. Coincidentally, it was observed that the sheep breeds of arid and semi-arid region are hardy breeds which can manage the extremes of the temperatures and fodder scarcity for significant period of time. They are heavier in body weight, have good quality fibre for carpet or *namda* production and usually reared for mutton production. This is indicative of the natural selection that acted upon the sheep evolved in this region to suit the prevailing environmental situation. It is probably the genetic resistance of these breeds to heat that has resulted in their adaptability. Research on native sheep breed indicated that they take different physiological, blood biochemical and entomological adaptive action to combat nutritional stress. Selecting animals for heat tolerance needs a new understanding by livestock breeders and development agencies. Phenotypic modification for suitable adaptation to harsh climate is seen in the sheep breeds of arid and semi-arid region. All these breeds are having long legs making them tall. It is essentially required for migration. Morphological modification in terms of body shape and size also reduce heat load and minimize water loss. Some behavioral adaptation like feeding and reproduction is affected by environmental constraints. To avoid high temperatures during the day, nocturnal feeding was reported in bighorn sheep. Sheep in this region mostly tend to lamb during the favorable period of the year to ensure offspring survival. Ruminants of this regions show some adaptive mechanisms to conserve water during heat and drought. They reduce urine volume as well as faecal moisture. The retention of water from urine takes place mainly at Henlé loops which is located in the medulla of the kidney. Management plays an important part in ameliorating the effect of hot climate. The constructive management measures are, provision of shade, diminishing the ground reflection, suitable shelters, restriction of feeding during hotter parts of the day, postponement of shearing to cooler season, and control of mating so that late pregnancy occurs in comparatively cooler season. Feeding resources are less and therefore alternate feeding resources need to be searched and experimented for arid and semi-arid regions. Lopping of fodder trees like Khejri (*Prosopis cineraria*), Ardu (*Ailanthus* spp.) and Neem (*Azadirachta indica*) serves as the best options during harsh climate of the year. The scientific breeding of sheep in the arid and semi-arid region remains the best strategy for sustainable livelihood option for masses.

**Key words:** Sheep, morphological adaptations, behavioral adaptation, ruminants, feeding resources, breeding.

Sheep husbandry has served as the sustainable livelihood resource option for people living in the arid and semi-arid regions of the world since time immemorial. Although nature has been a little biased towards these regions by imparting less vegetation resources, in contrast, all these regions have been gifted by nature with the real sustainable livelihood options for survival of the rural population and that is sheep. The human population of India in 2011 as per 15<sup>th</sup> Census report was 1.21 billion, of which rural population constitutes 72.22% and the urban 27.78%. Out of total

livestock in the country, around 38.2% are cattle, 20.2% are buffaloes, 12.7% are sheep, 25.6% are goats and only 2.8% are pigs. India ranks third in sheep population and account for 6.86% of world population (Livestock Census 2012) with 65.06 million sheep to its record. In India, livestock rearing is mainly the occupation of landless, small and marginal farmers. The small ruminants suite the need of small land holders and village system due to low initial investment, ease of rearing and high feed conversion efficiency. Besides this they are very well adapted to harsh climate, long migration, resistance against tropical diseases,

\*E-mail: gopalgowane@gmail.com