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Chapter 11

TROPICAL SHEEP PRODUCTION SYSTEMS

J. de S. Neto and E.A.P. Figueiredo

Sheep were among the first livestock species to be domesticated by man. The domestication occurred as early as 8,000 to 10,000 B.C., probably in the area known today as Iraq and Iran (Mason, 1977). Sheep served an important role in the transformation of man from a hunter to one who managed the resources to his benefit. Sheep are still important to mankind with large numbers of people living mostly on products obtained from sheep.

Sheep are adapted to and perform well in a variety of environments throughout the world.

Although they are economically less important than wool sheep on a world wide basis, tropical hair sheep serve an important role as a source of human food in developing areas of the tropics. According to Fitzhugh (1983), tropical sheep generally are found in areas of low altitude and latitude. In the Caribbean there are about 2 million head. In Brazil there are approximately 6 million head of hair sheep in the Northeast.

The type of vegetation found in various regions producing tropical sheep is related directly to the rainfall pattern, temperature, humidity, and other environmental factors, which, along with the social and economic aspects, determine the characteristics of the animal production systems.

This chapter attempts to describe the general form of the tropical sheep production systems where this species, together with others (cattle, goats, horses, donkeys, etc.), are the main components of the animal production system.

Finally, based on the information presented, strategic research is proposed to improve the production system, especially that concerned with improving productivity of tropical hair sheep.

Principal Factors Influencing the Production System

Resources Available

This is the main factor influencing the production system. For example, more fertile soils are used more commonly for cultivated agriculture. As a result, areas with poor soils or lower productive potential are available for animal production. One example of this is the caatinga region of Northeast Brazil, which has been used for sheep and goat production because alternative uses are limited. Similar situations exist in other areas. The alternative of using the more productive resources for sheep production should be considered an option, but is not likely to find favor in developing countries where the human population places pressure on the available resources, requiring their use for cropping to produce human food.

Complementariety of Production

Tropical sheep are used, and needed, to provide additional income and high quality supplement to the human diet (Gutierrez, 1987; Primov, 1982). In general, they contribute meat, milk, skin, and wool, depending on the breed. Manure (fertilizer or fuel) may be an important by-product in some areas. Arújo Filho (1987) reported that in the caatinga region of Northeast Brazil, the best results were obtained with combined grazing involving both sheep and goats, which produced 14.5 kg Bw/ha/year versus 12.3 and 11.4 kg Bw/ha/year, goat and sheep respectively, when grazed singly.

Tradition, Social Conditions, and Development

Tradition and social organization of animal producers in many parts of the world are influenced strongly by the land resource available and patterns of its use. In Northeast Brazil, the most common activity on poor farms with limited resources is sheep and goat production. However, because of tradition and the status that cattle provide, many producers pay more attention to cattle and crops. This fact may be justified by the labor supply available in large families and by a possibly larger gross income from cattle and crops in good years than from small ruminants only.

Theoretically, the policy of agricultural development aims to reach all strata of producers. However, the requirements needed (land tenure, installations, facilities, etc.) to obtain the benefits of technology and development programs often make it difficult to affect producers of small ruminants. In this way, the ability to respond often is restricted by the social and cultural conditions.

It is clear that these problems, added to other cultural factors, have influenced small ruminant production systems in tropical areas. Studies in Brazil (Neumaier, 1984) show that producers are receptive to technology and desire to improve the level of productivity of their flocks, but they often are limited in their ability to respond. Government policies often influence significantly the development potential of an area, and small ruminants often are ignored or receive low priority in developing these policies.

Demand and Prices

The level of demand combined with political constraints of movement of animal products across boundaries may limit the potential production increase in some countries. The per capita consumption of meat often is low because the majority of people do not have funds necessary to buy more animal products. Another reason is that the meat production from tropical sheep may be restricted to certain limits because of nonexistence of effective market infrastructure for live animals or their products. This is the situation in Northeast Brazil where the animals are sold at the property to neighbors and abattoirs of the neighboring village.

The resources in tropical regions certainly could support a higher level of production of sheep if the choice is made to use the resources for this purpose. Although there are production problems to overcome, the technological constraints often are less

serious than socioeconomic ones (including price).

In general, livestock production in the developed countries is more intensive in the use of capital as meat prices are relatively competitive with prices of other products required in the production system. In the developing countries, mainly in South America, high interest rates, high inflation, lack of capital, low prices of the products, and generally low wages make small ruminant exploitation much more intensive in the use of labor (Valdez and Nores, 1979).

Government Policy

The role of the state in the development of agricultural production is very important for the evolution of animal production systems. In many countries, government policy interferes in some way with the free market for animal products. In general, the direct impact of price control policies on tropical sheep has not been of large importance, since it is very difficult to control the marketing and consumption of the small volume involved because of the diffuse nature of the industry.

A more important factor is the impact that the elevated prices of the inputs have on the buying power of the rural population, limiting the possibilities of producers to make the necessary investments to improve the production system.

Because tropical sheep are produced under smallholder conditions, government programs to provide assistance or credit to small producers may be much more difficult and expensive to administer. Credit often is viewed as the principal constraint (Winrock International, 1983).

Production Systems

Tropical sheep contribute to several production systems (Fitzhugh, 1983) that largely are dependent on natural resources and socioeconomic constraints. Categorization of agricultural and livestock production systems is difficult, and the approach often is influenced by the background of the investigator. Kolors and Bell (1979) combined geography, environment, and people. Whitless (1976) classified the systems by region. McDowell and Hildebrand (1980) focused on the small producer with integrated crops and animal production systems. It is difficult to separate tropical sheep from other animal species and crops in production systems.

The tropical sheep production system may be characterized as (a) extensive; (b) dual or multiple purpose, involving many products and functions; and (c) market-oriented to satisfy the products necessary for subsistence in combination with other animal species with or without crops.

Tropical sheep are important components of the production systems of the Northeast region of Brazil, and are exploited by small producers with areas less than 10 ha. Sheep raised in this manner constitute more than 50% of the sheep population of the region. To these producers, the main reason for producing tropical sheep is to supply meat to low income rural people.

Skin production appears to be the second reason, and skins are

sold to tanneries. In such a region, the native caatinga is the basic source of feed, but because of its seasonality, forage restricts animal performance. The lack of an adequate diet during a long period of the year probably is responsible for fluctuation in body weight, high slaughter age, and low milk production, the latter contributing to high lamb mortality.

In these systems, cattle generally have priority in the use of feed resources of the ranch. But producers are conscious of the necessity to adopt management practices that may alleviate the nutritional deficiency associated with seasonal variation in feed supply. In this respect, Queiroz et al. (1987) showed a common characteristic of the production systems, in that tropical sheep, together with cattle, were the most important livestock activities. Cattle and sheep grazed together during the dry season (systems 1 to 3); in system 4, however, they introduced only cattle in the cotton field grazing (figure 11.1).

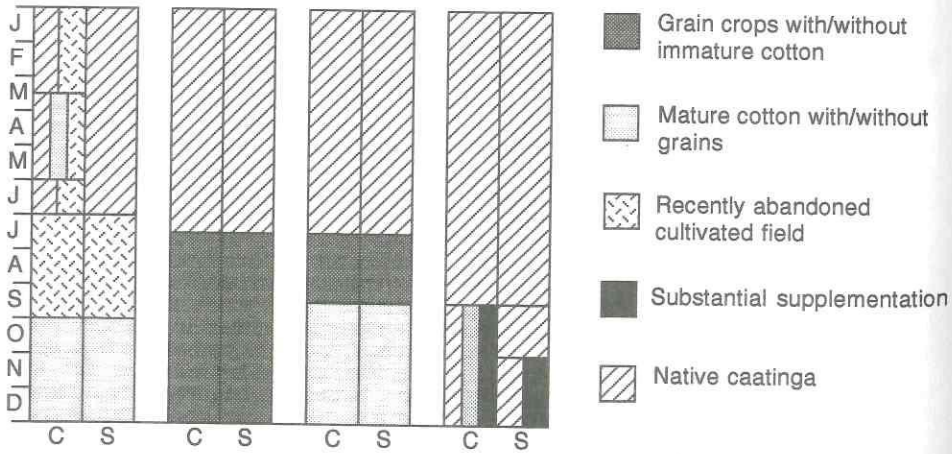

Figure 11.1. Diagrammatic representation of grazing systems of cattle (C) and sheep (S) used in farms, Northeast Brazil.

Adapted from Queiroz et al., 1987.

The tropical sheep production systems in Northeast Brazil are characterized by a low level of supplementation. The objective of this practice is to ensure survival and not to put on weight. As a result, sheep often receive a supplemental feed only when they already are in poor condition. Studies conducted in Northeast Brazil, however, have shown that when confined, such animals had weight gains of approximately 172 g/day (Oliviera et al., 1986). The performance of animals fed in tropical environments seldom approaches that of animals in temperate regions. This may be in part genetic, but likely represents the suppressing effect of high temperatures on feed intake and utilization.

Reproduction management is somewhat limited. The majority of properties do not have a controlled breeding season; lambings occur year-round. Gutierrez et al. (unpublished data), in farm level studies in Northeast Brazil, showed a positive correlation between rainfall and the birth of lambs 5 months later (figure 11.2).

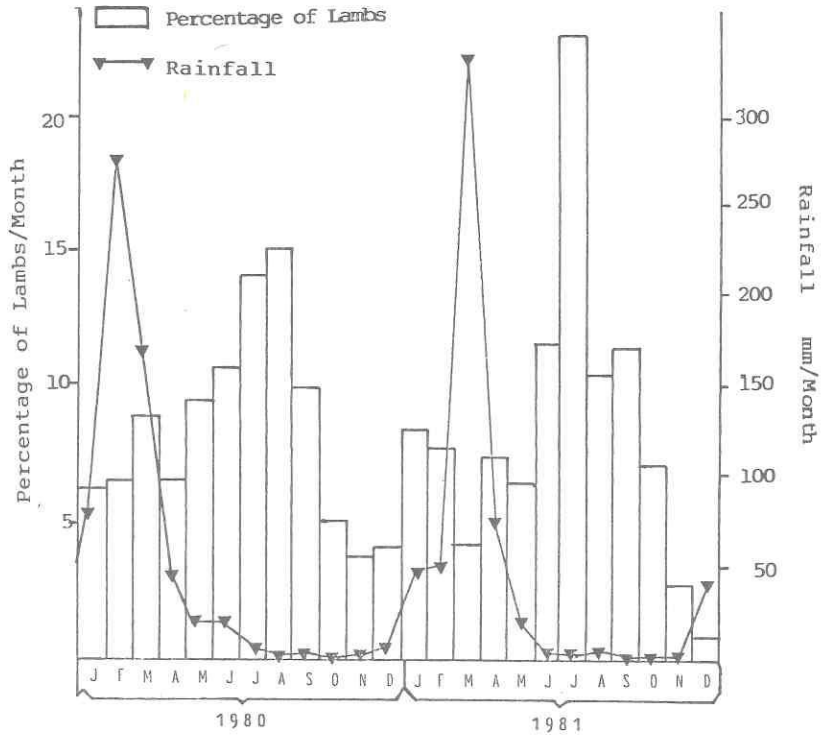

Figure 11.2. Lambing and rainfall distribution 1980-81 in Ceará State, Northeast Brazil.

Many producers do not use rams born in their own flock; this reduces inbreeding. Ewes on the range generally lamb unassisted and the newborn are subject to death because of mismothering or predation. Deworming, the only therapeutic practice widely used, is not universally practiced.

To the small producers who own the majority of tropical sheep, sheep are a renewable resource that periodically may be sold to obtain cash to meet family needs (Primov, 1982). Sheep are sold in small groups. The price of the animal is determined by weight on the basis of visual estimate. The ages at which animals are sold range upward from 12 months, with most being sold between 12 to 18 months. Sheep meat consumption is concentrated in the cities in the interior states. There is no well-established structure for marketing sheep meat. This often results in a lower price for sheep or goat meat. Conversely, the structured skin market is represented by the network of tanneries and skin traders in large cities.

The best approach to improve the sheep production systems of the small farmer would be:

- To stimulate the development of introduced forage with the objective of supplying the nutritional needs of animals without prejudice or reduction of the cropping areas. Good options that may contribute to this objective would be the use of crop residues and the use of legumes in the form of protein banks.

- To implement the use of hay or silage along with conserved forage in certain areas as a way of preventing feed scarcity in critical times.

- To develop programs of minimal cost for producers related to treatment and control of internal parasites.

- To consider greater use of fat tail or fat rump sheep in regions where feed supplementation in critical times is not possible, to encourage the use of more prolific sheep in areas where forage resources can support a higher level of production, and to develop large breeds for high forage producing areas or in confinement or to restrict their use to that of a sire breed.

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