

Sheep and goat milk in pastoral societies[☆]

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Abstract

Approximately 25% of the world's land surface supports about 20 million pastoral households or about 180–200 million people. Pastoral societies raise livestock often under extreme, extensive conditions on marginal rangelands that cannot be cultivated or used for other agricultural purposes. The animals provide the owners with milk, meat, wool/hair, leather and dung and, in addition, can be used as a source of cash, for transport and as pack animals. In most systems, several species of livestock are shepherded by pastoralists with sheep and goats being the most common and widespread. Traditionally, in pastoral systems in which sheep and goats were shepherded with cattle, cows were the main source of milk; when shepherded with camels, she-camels were the main source of milk; and when shepherded with yaks, naks were the main source of milk. Today, in general, the ratio of sheep and goats to other livestock is increasing, as is the ratio of milk produced by sheep and goats to other livestock. Sheep and goats raised by pastoralists are generally low-producing in terms of milk and offspring but are well-adapted to the climatic conditions and are relatively tolerant of local diseases. Goats generally produce more milk and have a longer lactation period than sheep, but sheep milk has higher fat and total solid contents than goat milk. Sheep produce about 40–60 kg of milk per lactation and goats up to 100 kg. In some areas, these small ruminants are particularly important for milk during the dry season and during droughts. Milk provides valuable products for pastoralists: butter and yoghurt for immediate consumption and storable ghee and dried curds for later use.

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1. Introduction

Milk and milk products from sheep and goats can serve two very different purposes. On the one hand, these items are sold as gourmet items in fashionable, specialty stores and on the other hand they are used by pastoralists as part of their subsistence living. Milk for the former is usually obtained from high milk-producing sheep and goats kept under ideal intensive conditions. The animals

are often machine-milked and the milk is processed using modern facilities. Hygiene methods, which are generally government inspected, are enforced. Furthermore, early weaning systems of the lambs and kids are often practiced so that all the milk (and milk products) are consumed by humans. This is not the case, however, in most pastoral systems where the sheep and goats are generally low milk-producers. These small ruminants often survive on little energy and/or water intake and are maintained under extreme environmental conditions. In general, the animals are hand milked by women and children and there is competition for the milk between offspring of the animals and humans. Milk is usually processed into its products using traditional methods under poor hygienic conditions with little, if any, precautions being taken.

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Whereas, there is a fair amount of data on milk production of sheep and goats under intensive conditions (Yener, 1989; Haenlein, 2001; Armagan, 2002), there is a paucity of such data under pastoral conditions. Studies under pastoral conditions are generally anthropological in which there are descriptions of livestock raising and milk processing, but a lack of quantitative data on milk production. In this paper, I review the contribution of sheep and goat milk to pastoral societies.

1.1. Pastoralists

Approximately 25% of the world's land surface supports about 20 million pastoral households or about 180–200 million people. Pastoral societies are generally defined as ones that raise livestock under extensive conditions using natural rangelands as the main forage for the animals. The animals provide the owners with milk, meat, wool/hair, leather and dung and, in addition, the animals can be used as a source of cash, for transport and as pack animals.

Pastoralists generally raise their livestock on lands that cannot be cultivated or used for other agricultural purposes. These lands usually fall under the categories of deserts, mountains and steppes of the world. In broad terms, these include the Sahara, Sahel and Horn of Africa in Africa, the Middle East and much of the area from Pakistan and western India to Tibet and Mongolia in Asia, and the mountains of Peru, Bolivia, Northern Chile and Argentina in South America. Several types of pastoralists have been described.

1.1.1. Nomadic pastoralists

Their livelihood is based on livestock and their products, which can be consumed, sold and bartered. These pastoralists usually cover great distances with their livestock, following pasture availability throughout the season (Blench, 2001). They lack permanent settlements and, consequently, use mobile homes such as tents and yurts. In describing mountain nomadism, Kreutzmann (2004) stated that these pastoralists are generally strongly affiliated with one another. Today, exclusive nomadic pastoralists are declining in number due to efforts by governments to sedentarize them (Meir, 1997; Kressel, 2003) and due to severe environmental conditions such as droughts which force the nomads to search for wages in urban settings (Pantuliano, 2001).

1.1.2. Transhumant pastoralists

These pastoralists use a regular seasonal movement between set areas. Movement could be vertical, as is typical in mountains, where pastures at high altitudes are

used in summer and pastures in the lowlands are used in winter. In tropical systems, movement could be between higher and lower rainfall zones, exploiting the forage in each site. Transhumant pastoralists often produce crops and even hay. These nomads, at least in the mountains, are not necessarily strongly affiliated but are often hired by the owners of the livestock (Kreutzmann, 2004).

1.1.3. Agropastoralists

Blench (2001) described agropastoralists “as settled pastoralists who cultivate sufficient areas to feed their families from their own production. Agropastoralists hold land rights, use their own or hired labour to cultivate land and grow staples. While livestock are still valued property, their herds are on average smaller than other pastoral systems, possibly because they no longer rely on livestock and depend on a finite grazing around their village which can be reached within a day. Agropastoralists make greater investment in housing and other local infrastructure and if their herds become large, they often send them away with more nomadic pastoralists.” They are also referred to as sedentary pastoralists (Baars, 2000). In the mountains, the shepherds are traditionally members of the extended family (Kreutzmann, 2004).

1.2. Livestock

Pastoral societies often depend on seasonal rainfall for adequate forage. Prolonged drought or environmental extremes can be disastrous to their livestock. For example, the severe droughts of 1984–1986 in northeastern Sudan resulted in the death of 95% of the camels, sheep and goats (Anon., undated-a). The winter of 1997–1998 was extremely severe in the Tibetan Autonomous Region when an estimated three million head of livestock perished. Unusually early and heavy snowfall was followed by extremely low air temperatures which prevented the snow from melting. Livestock were unable to reach the forage under the snow and, consequently, many perished. Sheep and goats suffered most but mature yaks were also affected. In some townships, 70% of the livestock was lost. Nearly 25% of the million nomads were affected and hundreds of nomad families lost all their livestock (Miller, 2000). The devastating drought in the Registan Desert, Afghanistan, in 1998–2002 resulted in the death of many nomadic pastoralists as well as over 90% of their sheep and over 60% of their camels. About 60% of the pastoralist households lost all their livestock (Degen and Weisbrod, 2004).

Pastoralists often shepherd more than one species of livestock (Table 1). Consequently, the rangelands can be better exploited as some livestock species are mainly

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