

Conservation of native vegetation and traditional camel herding in Rajasthan, India

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About the authors

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Description of the Kumbhalgarh camel herding system

The Kumbhalgarh camel herding system is an example of a sustainable human-animal relationship. The system is globally unique, and represents an important part of the biocultural heritage of Raika people in Rajasthan, India.

The camels of Kumbhalgarh are one-humped or dromedary camels (*Camelus dromedarius*). The Kumbhalgarh camels may not represent a distinct breed, but they could be classified as a sub-set of the Marwari breed from the area which once constituted the kingdom of Marwar, ruled by the Maharajah of Jodhpur. These camels are very tall, sometimes having a withers height of more than two meters.

This herding system has faced increasing pressures due to decreasing demand for draft camels and lack of grazing rights. The number of camels grazing in the Kumbhalgarh area has declined significantly over the last couple of decades. This is in line with the general trend of the camel population in Rajasthan and India. Lokhit Pashu-Palak Sansthan has monitored the camel population in Bali and Desuri tehsils since 1995 by means of household surveys. There are now only a few herds left and all of these have become smaller. According to the survey data, the numbers have decreased by more than 60 percent in Desuri and Bali tehsils. Currently around 300-550 camels are estimated to seasonally use the forest of a Wildlife Sanctuary that is scheduled to be turned into a National Park. The number fluctuates throughout the year, as offspring are sold and new camels are born.

This study illustrates how a traditional herding system in which animals are feeding on native vegetation can be a part of sustainable agro-ecosystem and coexist with wildlife while providing other ecosystem services. It shows that it is possible to add value to camel products and improve sustainability of the farming system through promoting eco-tourism.

Traditional herding system

In the Kumbhalgarh camel breeding system male camels are produced as work animals. Additional products include camel milk, wool and dung. For this reason, herds are composed mostly of female camels. In each herd there is usually one male camel for breeding and one or two young males that have been trained as beasts of burden.

Camels are kept in herds of 12 to more than 100 camels. Camel herds are managed in migratory systems. Almost nine months of the year animals browse and graze on trees and shrubs, in the Aravalli forest and in the adjoining agricultural fields. During the rainy season (July to September) camels depend on forest vegetation for feeding. During the winter, they browse on trees in fallow fields, but also on gauchars and orans, as well as in hilly areas and along river beds.

The camels primarily live off resources that other livestock do not consume and that would not get utilized in their absence. Camels convert vegetation into a variety of products that benefit farmers and other people throughout the region and even as far away as Delhi. Since camel numbers are small and their very modest feeding behaviour is in balance with the agro-ecosystem, they positively affect nutrient recycling from the forest areas to the agricultural fields.

Feeding strategies: camel feeding behaviour and environment

Camel feeding behaviour is unique as the animals can feed on trees which are up to 2.5 m high. The food intake of camels is low in relationship to their bodyweight. About 5-10 kg of dry matter is sufficient for them to perform daily work, and camels are much more efficient than cows in converting vegetation resources that they are feeding on into milk.

Traditional knowledge of Raika people on camel feeding behavior

Camels avoid grazing on the same patch on consecutive days and always try to seek out fresh areas, a behaviour which prevents pressure on and damage to the vegetation. The Raika are well aware of the effects of the various trees and shrubs on the health of the camels and on the quality and taste of the milk. The milk is sweet when the camels feed on bordi or ber (*Ziziphus* sp.), but it becomes salty and bitter if the camels consume neem (*Azadirachta indica*) leaves. The Raika are also very knowledgeable about the use of plants for treating both camels and people. Almost all of the trees in the forest have some kind of medicinal effect. This is reflected in the camel milk which has positive effects for a range of illnesses (such as) diabetes and autism.

While cattle require 9.1 kg of dry matter to produce one litre of milk, camels need only 1.9 kg to produce the same amount, making them almost five times more efficient. Camels disperse over large areas and do not eat up plants completely but take only one or two bites before moving to the next bush or tree. Their flat padded feet do not carve up the surface so they do not cause erosion.

Camel breeders believe that camel browsing is good for the vegetation. Browsing can stimulate tree growth and lead to development of new green shoots. While no scientific studies are available from India on the impact of grazing by camels on plants, detailed studies are available from the Sahara in Africa. Unlike slow-moving cattle and intensively grazing goats, which crop plants down to the roots and even climb into trees to forage, camels are economical feeders that never over-graze the

vegetation. No matter how rich or how poor the quality of the vegetation, camels take only a few bites from any one plant before moving to another.

Some of the plants are eaten frequently and represent the main part of camel diet. Others are available or eaten only in certain months or seasons. Camels also have certain preferences, and will consume some of the plants only in dire emergency.

Other features: Adding value to camel products to promote sustainable herding

Camel products represent a diversity of potential sources of income for the Raika people. Supporting them in adding value to camel production system as well as marketing of the products can improve social and economic aspects of sustainability.

Camel milk

Camels produce milk that is nutritious and has a good taste while also having therapeutic qualities. It can boost immune system and lower blood sugar level due to the presence of insulin-like substances. Camel milk is recommended by doctors for diabetes patients and lactose intolerant individuals. Camel milk ice cream is already in demand with tourists, and the development of a camel milk health drink for sale to visitors is an opportunity to be explored.

Camel wool

Camel wool is harvested and processed in the villages around Kumbhalgarh Sanctuary. A range of products, especially dhurries and fine wool shawls, are available. Other products such as mobile phone covers have found a ready market. The camels are shorn in March, around the time of Holi festival and the yield per camel is about 0.6 to 1.0 kg with a very fine wool quality.

Camel dung paper and camel milk soap

The production of paper from camel dung started in Sadri at a small processing plant. Camel paper contains the seeds and other remains of the 36 foraging species of the camel. The paper is designed into notebooks and greeting cards by local artists. Small-scale artisanal production of soaps made of camel milk has also been established in Sadri and helps provide income for members of the Raika community. The soap is sold to tourists and is gaining a reputation as a beauty product. There is potential to expand and diversify production.

Ongoing challenges: Changing attitudes as a way forward

One of the problems that Raika camel breeders and their families around Kumbhalgarh are facing is that the income for those who depend on camel breeding alone has declined. The situation can become so precarious that young herders have to leave home to work in the cities and help support the family. There is a trend towards urban migration. Boys of fifteen or younger may be sent to the cities to work in low-skilled jobs. Living conditions are often rather poor with low income and not all young people want to leave their family and way of life. Developing other sources of income can support family herds so that leaving the land will become an option rather than a necessity.

Supporting herding families

For the camel herds around Kumbhalgarh to survive, herding families need to be able to develop supporting sources of income, so that camel breeding can retain its appeal as a way of life and a viable career option for the younger generation. Creating opportunities in tourism, milk production and camel products can help assure the future. Eco-tourism could play a critical role.

Historically, Raika people have had a taboo on camel slaughter and eating camel meat. Sale of female animals was also banned, along with milk and wool sale as well as milk processing. The only products for sale included young male camels and camel manure. Nowadays, the attitudes are slowly changing and the Raika people are developing production of milk and other commodities for sale. However, camel milk production requires investment to deliver the right product to the market and to establish local small-scale processing operations.

The camels of Kumbhalgarh region have the potential to provide a major attraction for eco-tourism. This is the only place in India where tourists can visit camel breeding herds and walk among the resting camels. The friendly nature of the female camels offers a unique experience for tourists.

Lessons learnt

As attitudes change, this unique herding system can continue to be a sustainable farming activity for the Raika people. The unique feeding behaviour of the animals has positive environmental impacts on agro-ecosystems; these properties can be explored and used as income generation through sale of camel products. The sheep and goats that are traditionally kept by the Raika people also provide an important ecosystem service in terms of protection from fires. This should be further considered in regional development and planning to protect these agro-ecosystems.

The Raika have a tremendous amount of traditional knowledge about managing camels in balance with the ecosystem. Integrating this knowledge into management strategies is important for raising awareness and improving the situation in camel herding and to promote coexistence between the landscape and camel herders.

The health benefits of camel milk are beginning to be understood by scientists and medical researchers. Camel trekking could also provide an eco-friendly way of enjoying nature in the planned National Park. Working closely with the community, there is potential to develop innovative eco-tourism products of high quality which could achieve international recognition for Kumbhalgarh as the only National Park with expert-led, culturally authentic camel safaris.