

## Grasslands and pastoralism\*

Nomadic pastoralism may have preceded the emergence of settled agriculture along prehistoric floodplains. Yet, grasslands and pastoralism are misunderstood to this day. In India, we do not recognize grasslands as distinct, ecologically valuable ecosystems<sup>1</sup>, and pastoralism, with its intrinsic dynamism and mobility, as a unique adaptation to the temporal and spatial variability inherent in grasslands<sup>2</sup>.

Our recent, limited appreciation of grasslands and the ecological basis for pastoralism is informed largely by work in tropical grasslands of Africa and the steppes of Eurasia. In India, we still know very little about our grassland ecosystems. Our floodplain grasslands are now almost entirely cropland; arid and semi-arid grasslands and savannas are becoming carbon forests (or solar and wind farms), and we are losing habitat for endangered fauna, while jeopardizing pastoralist livelihoods and cultures<sup>3</sup>.

One such threatened grassland is the Banni, in Kutch, Gujarat. It was once Asia's largest tropical grassland, with a long history of nomadic pastoralism. It is home to 22 pastoralist communities (Maldharis) with a population of ~40,000 people and 80,000 animals (mainly the unique Banni buffalo and Kankrej cattle). Banni is also an important habitat for large congregations of migratory birds – flamingos, raptors, waterfowl, and common cranes. Banni's pastoralists earlier ranged over a landscape extending to Sindh and Baluchistan, but this ceased in 1947.

In the mid-1960s, the Forest Department introduced an alien tree, *Prosopis juliflora* to Banni. Half of Banni is now *Prosopis* woodland, a desirable outcome from a forestry perspective<sup>4</sup>, but at the cost of grassland for livestock and wild herbivores. In the wake of this, the Maldharis have collectively filed claims to the Banni under the Scheduled Tribes and other Traditional Forest Dwellers Recognition of Forest Rights Act of 2006 (FRA). In anticipation of rights being

granted, the Maldharis' Banni Breeders' Association (BPUMS) has sought inputs to inform their Banni management plan from a consortium of institutions under an initiative called RAMBLE (Research And Monitoring in the Banni Landscape; [www.bannigrassland.org](http://www.bannigrassland.org); accessed on 30 December 2015). This unique inter-institutional collaboration comprises the BPUMS, Sahjeevan (a Bhuj-based community organization), the Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru and the National Centre for Biological Sciences (NCBS), Bengaluru. The overall goal of RAMBLE is to understand Banni's complex socio-ecological dynamics.

Recently, RAMBLE organized a meeting with the objective of bringing together researchers, practitioners and Maldharis to synthesize knowledge about the dynamics of grassland ecosystems, and the ecological and socio-economic basis for sustainable pastoralism. The meeting provided a forum for researchers to share findings from work in other arid and semi-arid grassland regions, and to contextualize this work for the Banni. The meeting was attended by 66 participants, including Maldharis from Banni and other pastoralists from Kutch.

The first day of the meeting was used to orient participants to the Banni landscape, its ecological and cultural richness, and the ecological and socio-economic factors structuring livelihoods of pastoralists. During the following days, there were 18 talks on different aspects of pastoral systems from India and Africa.

Shereen Ratnagar gave the keynote address on the earliest known livelihoods of people in the Kutch region during the Harappan period. In a 4000-yr-old archaeological perspective, she reviewed the historical changes in the landscape (and sea level). She talked about the dependence of agriculture on groundwater, as evidenced by interlinked water reservoirs, echoed in today's 'virda' system. She spoke of the 'first green revolution' with the arrival of drought-tolerant millets from Africa and traced the sequence of livestock domestication, suggesting that the buffalo preceded the camel and the donkey.

In a complementary palaeoecological perspective of the Banni region, A. S. Anushree (NCBS) presented insights from sediment cores dating back to the mid-late Holocene (4500 yrs BP). Occurrence of pollen grains, oxides of aluminium, coprophilic fungi and charcoal in these cores is linked to changes in vegetation composition, climate, relative abundance of herbivores and occurrence of fires, respectively. She suggested that the Banni may have been wetter than today (4500–2800 yrs BP), with more mesic and diverse tree and shrub taxa; it then grew drier (2800–1500 yrs BP), with evidence for both herbivores and fires peaking ~1500 yrs BP. Since then, the Banni has seen an increase in xeric taxa and a reduction in grass phytoliths, presumably a result of increased grazing.

Farhana Ibrahim (IIT Delhi) provided a recent history of Banni and its inhabitants. It was accorded little importance by the colonial administration, though the region was an important overland-trade route. Travellers' accounts describe the Banni as a climatically variable but productive landscape for livestock and wildlife. She also spoke of contemporary challenges to Banni's pastoralists, with competing demands on the landscape from state and private agencies, and development interventions altering the pastoralist way of life.

Jayashree Ratnam (NCBS) made a compelling case that India's savannas and grasslands are functionally distinct ecosystems, not degraded forests and wastelands. Drawing comparisons with savanna ecosystems in climatically similar regions of Africa, Australia and Latin America, she argued that India's savannas are misclassified, presumably a legacy of a timber-oriented colonial forest administration. Reassessing this classification would significantly alter management and conservation of India's savannas.

Niall Hanan (South Dakota State University, USA) reviewed the pessimistic narrative of arid and semi-arid grasslands being degraded by open pastoralism. Long-term studies of vegetation dynamics in Africa's Sahel demonstrate that these systems are resilient, and that nomadic pastoralism is an ecologically

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appropriate means of livelihood in these dynamic and fluctuating ecosystems. Sumanta Bagchi (IISc, Bengaluru) emphasized the importance of long-term studies to understand the dynamics of these variable ecosystems. He drew on long-term (~100 yrs) records across a series of grasslands in North America to suggest that abrupt thresholds or tipping points are relatively rare occurrences, often associated with woody encroachment of these grasslands.

A series of talks focused on the co-existence of wild ungulates and domestic livestock in landscapes with open pastoralism. Wilfred Odadi (Egerton University, Kenya) spoke on the benefits of planned grazing (high density, short rotation) by livestock in northern Kenya: better forage quality and increased wildlife abundance. Kavita Isvaran (IISc) presented work comparing blackbuck behaviour in protected and grazed landscapes. She suggested that blackbuck alter their activity to balance the better forage quality with the higher risks associated with human-dominated landscapes. Yashveer Bhatnagar (Nature Conservation Foundation, Mysuru) presented work from the Himalayas, which suggests that beyond a threshold there is a negative influence of increased livestock stocking rates on wild herbivores.

Two speakers described the marginalization of the rights of nomadic pastoralists. Pernille Gooch (Lund University, Sweden) spoke of how Himalayan Van Gujjars have resisted pressures to sedentarize and struggled to maintain nomadic lifestyles despite increasing landscape fragmentation and conflicts with the forest administration. Christine Noe (University of Dar es Salaam, Tanzania) spoke of the shrinking space for nomadic pastoralists in Tanzania, where 40% of the country is now protected for wildlife to the exclusion of communities that customarily used these lands.

Several talks addressed the challenges to pastoralists in the face of landscape

change and development interventions. Ovee Thorat (ATREE) spoke of the Banni, where insecurity over land tenure is resulting in the Maldharis 'privatizing' the commons by creating agricultural and grazing enclosures. Siddhartha Krishnan (ATREE) described how the Konar shepherders of southern Tamil Nadu are coping with landscapes increasingly dissected by highways, with fewer fallows due to changing cropping patterns, and smaller grazing areas due to expanding wind farms.

Finally, in a series of Banni-specific talks Priyanka Runwal (NCBS) examined the piosphere effect resulting from livestock grazing and found no changes in herbaceous vegetation composition along a grazing gradient. Kadambari Devarajan (NCBS) and Chetan Mishra (Kota University) examined the occupancy of wild canids. Devarajan found that jackals and Indian foxes overlapped in space, but desert foxes were found away from villages. Mishra found that desert foxes selected areas dominated by saline *Suaeda*, and avoided *Prosopis* thickets.

Ramesh Bhatti (Sahjeevan) described Banni's livestock diversity and the valuable relationships of the Maldhari elders with their livestock and the grasslands. Pankaj Joshi (Sahjeevan) presented the Maldharis' traditional knowledge of grasslands, and an alternative map of the Banni as viewed by them. Aarati Halbe and Sushma Iyengar (Kutch Mahila Vikas Sangathan) discussed how the art and crafts of the region have been shaped by pastoralism.

The presentations resonated with a number of issues – ecological, social, and cultural – that pastoralists in Banni and its neighbourhood face today. The discussions helped to focus on the research needed to better understand Banni's long-term spatial and temporal dynamics, and the ecological and socio-cultural drivers of resilience of these pastoral systems.

These questions are of relevance in the Banni, of course, but also more widely. It is estimated that globally there are about 200 million pastoralist households (with ~ a billion heads of livestock)<sup>5</sup>. The role of pastoralism as a way of life is unlikely to diminish in the context of climate change, with a warmer, in parts drier, and more variable future<sup>6</sup>. Despite its historical and ongoing marginalization, pastoralism may, in fact, be a significant component of our collective future.

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