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**Understanding „culture of pastoralism  
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Muslim pastoralists of north- west  
Rajasthan, India**

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Understanding 'culture' of pastoralism and 'modern development' in Thar: Muslim  
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## Abstract

The paper attempts to understand relation between pastoral cultures and irrigation based intensive farming regimes promoted by modern development represented by the Indira Gandhi Canal (IGNP) in western Rajasthan. Participant observation and development practice engagement with pastoral communities over last three decades gives opportunity to reflect on epistemic rationality that constitutes the discourse of modern development, formal statecraft of technocracy and rule by experts. Historical markers of pastoralism in the interconnected regions of north-west Rajasthan and bordering regions of Multan and Bahawalpur in Pakistan are situated to trace the *longuee duree* of pastoral life systems in Thar. This oscillation between enhanced moisture regimes following inundation and increased desiccation of a moisture deficient arid region has been at the core of sustaining culture of pastoralism among semi nomadic pastoralists of Muslim communities in north- west Rajasthan. The IGNP canal produces a space for modern development that opens up irrigated farming and an intensive natural resource use regime. This political economy of the IGNP canal systematically marginalizes pastoral natural resource use that was ecologically embedded. The varied experiences of adaptation responses of pastoral communities to this state led marginalization points to the tenacious ability of pastoralism to continually adapt to the radically changing ecology. The paper argues for a complementarity of pastoral and farming use as an inclusive development vision. Beginnings can be made with a compassionate engagement with cultures of pastoralism that are endowed with resilience rooted in a historically constituted rationality to adapt, innovate with changing times. This may hold cues for a sustainable future of Thar.

## Keywords

Muslim pastoralists, Bikaner, Sustainable Thar, Sufi Mysticism, ecological impact, IGNP canal,



## **Introduction:**

The Indian Thar is a hot desert and ranks among the few most populous deserts of the world having a long human history of settlement. This sustained human settlement has been made possible by unique attributes of the complex of eco systems and their natural endowments that make the natural setting of Thar. Equally ingenious and resilient have been life practices of different communities, mobile and sedentary, who have displayed remarkable forbearance and endurance in populating the region (Dhir, 2003). Different varieties of extensive pastoralism practiced by semi nomadic communities engaged in subsistence rainfed farming have been one of the core elements in settling and sustaining human history of this region in more than one ways.

The paper seeks to understand experiences of modern transformation of pastoral Thar with the coming of Indira Gandhi Nahar Project (IGNP) in north-west Thar especially since the last quarter of the 20<sup>th</sup> century. The IGNP planned in the late 1950s and completed by the 1990s, is a mega irrigation and settlement project. It represents one of the most ambitious attempts of 'modern development' in the Thar. The coming of the IGNP has entailed far reaching changes that have led to radical transformation of Thar. Over the years of its existence the IGNP has successfully managed to upscale the meta discourse of 'development' in Thar by taking ahead 'greening the desert' to next level of 'urbanize and industrialize' Thar in times to come (Hooja, 2001).

The focus is to comprehend changes in pastoralism, understood as a way of life and not as an economic system or a resource use strategy, that come in the context of formation and consolidation of the modern dispensation of 'development'. Most of development strategies and precepts that have informed the making of 'modern development' in IGNP region argue that pastoralism as a resource use system must / should / would be done away with, transformed into sedentary husbandry integrated with dairy industry and in a subsidiary position to the meta-narrative on agro industrial farming (Gujarathi & Shah, 1994; Hooja & Kavadia (eds), 1994). It could be said that this development thinking is rooted in perspectives on maximizing private economic profit derived from irrigated farming as the prescribed dominant land use system. Surplus gained from this agricultural enterprise, it is hoped, would then feed the diversification into non-farm enterprises and to the making of agro industrial complexes. The dominant assumptions of this economic thinking against pastoralism influenced formulation of apathetic development policy and tardy implementation of development schemes and programmes relating to livestock rearing. And over time the state withdrew itself from the concerns of pastoral development (Kavoori, 2005).

The ensuing discussion attempts to go beyond this tragic trope on fate and future of pastoralism by taking a closer look at experiences of modern transformation along the complex axis of nature-society-economy in and around IGNP area in the region. It would be appropriate to reiterate that sustainable modern development does not mean economic transformation alone but is better and more fully understood as holistic well- being incorporating dimensions of societal and ecological well- being.

The discussion strives to specifically engage with issues relating to complex 'culture' of pastoralism and 'modern development' to ask meaningful questions regarding integration and adaptation of the culture of pastoralism in the emerging geography of built environments, roads crisscrossing canal networks and agricultural fields. Far from assuming that contemporary pastoralism is in an inevitable crisis and should/would give way to agro industrial complexes in the rapid on-going transformation, the role of pastoralism needs to be understood keeping in view the historically evolved human ecology of the region and a realistic assessment of possibilities and limits of 'modern development' for a sustainable future of Thar. This is quite in order given the high environmental costs, increased economic disparity, intensification of private resource use that characterize the nature of transformations brought in these regions with the emergence of canal command area of IGNP. The paper questions unbridled optimism reposed in the narratives of transformations with the coming of the canal while at the same time seeks not to fall into a romanticist reinstating of pastoralism.



## **Methods and materials**

The paper bases itself on insights gained through interactions with pastoral communities over last three decades. Development practice among them gave an opportunity for participant observation /action in 1990s and 2000s. Participatory action research and implementation projects of CSOs, formal and informal community based organisations on interventions related to supporting livestock rearing practices, optimum management of land and water resources in the IGNP canal command area, and initiatives by subaltern musicians for reinvigorating their sufi music traditions have been some of the key proceses of engagement. The region of association has been around twelve old villages and around thirty five canal settlements in the IGNP Stage I Phase II and IGNP Stage II. These enagements have afforded ample opportunity to interact closely with more than hundred pastoral families that includes hereditary musicians of pastoralists, farmers and livestock keepers.

## **Review of Literature**

It has been observed that "...South Asia has remained more or less a white spot on the map of pastoralist studies..." (Cashmir,1996). Pastoralism and pastoralists in South Asia have been more often studied from a 'sedentary perspective'(Rao and Cashimir, 2003). Nevertheless in the past few dacades there have been contributions from anthropologists, social scientists, veterinary doctors, development studies researchers towards studying pastoralists in Thar. Many of these have been passionate ethnographic immersion in life contexts of communities and almost all discuss the relation of pastoralism with modern transformation understood as 'development'. These convincingly show the ability of pastoralists to successfully adapt their lifestyle and production strategies to changing environmental conditions and political economy of natural

resource use, social and ecological organization of planned migration, economic rationality of pastoral economics and its contestation with invasive modern development (Srivastva, 1989, 1991, 1999a; Aggarwal, 1992, 1998; Kohler-Rollefson, et al 1994; Kavoori, 1996, 1999; Robbins, 1988a, 1988b, 2001). These underscore the simple assertion that marginalization and displacement of the remarkably resilient pastoral way of life is more due to a political economy of state action that chooses to wrongly condemn them as irrational and rapacious. Mention must be made of the pioneering attempts to understand the culture of pastoralism as expressed in cultural practices of embroidery or the practices of renunciation among pastoral communities (Frater, 1992; Srivastava, 1997, 1999b,). Apart from these the scholars studying common property have made seminal and insightful contributions on the issue of pastoral use, policy and administrative neglect by state, and dissolution of common property resources, grasslands and water bodies (Jodha, 1982, 2001; Brara, 1987, 1989).

The questions asked in this brief paper are emboldened by the perspective and knowledge gained from this robust body of multidisciplinary research on pastoral communities of western rajasthan. The effort is to have a comprehensive understanding of pastoralism. As Khazanov eloquently observes in his detailed magnum opus “Pastoralism is not only a way of *making a living; it is also a way of living* (Khazanov,1994, p. xxxiii).

### **Historical roots:**

The presence of pastoralism in the region can be traced to prehistoric times. It has been observed that in Neolithic times, “settlements of semi nomadic people who primarily depended on pastoralism and secondarily on shifting cultivation” began to appear in Bahawalpur district (Grewal , 2004, p.3). Years of research on the Indus Valley civilizations has established that “it was host to a mosaic of processes, including local domestication of plants and animals, the dispersal of pastoral and agro-pastoral peoples between regions, and the adoption of food production by indigenous hunter-gatherers” (Fuller, 2006, p.55).

As Devra observes “just as rivers changed course, so too did the extent and expanse of the desert”(Devra, 2012, p.10). This oscillation between enhanced moisture regimes following inundation and increased desiccation of a moisture deficient arid region resulting from shifts in river courses can be discerned as a *longuee duree* environmental dimension of the making of human ecology of the north- west Thar region. The nebulous frontier between mobility (represented chiefly by semi nomadic pastoralism and hunting gathering) and sedenterization (represented by dryland cultivation and irrigated agriculture) sustained “...dual economies of wandering pastoralists and settled peasants...” (Devra, 2012, p.2).

The arid zone was “...the habitat of thinly spread pastoral and nomadic population”, and pastoral variability was high” (Wink, 2004, p. 91). These muslim pastoral communities practiced a specific variety of Islam. The unique cultural geography of this larger inter connected region

imparted its own context to Indo Persian traditions characterized with shared cultural metaphors of lived popular culture (Shackle, 2000).

### **Study area**

The region in the north west Thar neighbouring the *rohi* in Bahawalpur and *bars* of Punjab was called *Chitrang*. Administratively these regions are part of Bikaner, Ganganagar and Hanumangarh districts in the north. And the western borders are shared with Pakistan.

Majority of the population in the region was of semi nomadic Muslim pastoralists like Jalukas, Johyas, Parihars, Balochs, Ludars, Utteras, Samejas, Machi, to mention the main ones. These pastoral communities would be around eight to ten thousand families living in permanent villages, many of them founded more than five hundred years ago as attested by oral histories and local area histories (Bhati, 1984). Most of them had more than 100 houses, some as large as four to five hundred houses each. Then there were settlements that were much smaller than villages (these had five, ten, or twelve houses) but were permanent hamlets (*dhanis*) mostly growing around a water source, a permanent well of sweet water. Besides these, there were several seasonal encampments of the semi nomadic pastoralists that grew around water points (*johads* and *tobas*) in the rainy season.

Traditions of origin and migrations popular among them recount their descent from Rajputs, like Parihars who trace their descent from the Parihar Rajputs of Mandore (Jodhpur) and other communities whose trace their origin to Sind, Cholistan and Balochistan. Another origin story of one of dominant pastoral group in the region, the Johyas, tells of how they moved towards south

west from the Sutlej valley coming towards the banks of Ghaggar and then further into north Rajasthan. Their ancestral abode was *Johiya Beed* (forest) near Marot, Bahawalpur (Bhati, 1984). The origin myths as recounted by elders among Johiyas goes on to tell how the different sub clans of Johiyas settled in villages in and around *Chitrang*.

### Environment and natural resources

In the north were regions where the rivers descend into plains from the Himalayas, from where the canals originate. The 'ooba' as it was referred to in local geographic lore had its share of undulating sand dunes but had more of tracts given to farming. Portions of this tract lie in the bed of the Ghaggar river



and hence are fertile tracts fit for cultivation. Mostly populated by Jats who practiced mixed subsistence doing both husbandry as well as rainfed cultivation. Especially after the canalization of nineteenth century, *Ooba* had been a geographical metaphor for prosperity with its agrarian landscapes that were preferred terrains of pastoral transhumant routes.

In the west this region developed in close cultural affinity to adjoining regions of Bahawalpur and Multan. Two thirds of the state of Bahawalpur was a "...region known as the *rohi* or cholistan which was part of the Great Indian Desert". Popularly the desert is referred to as *rohi* "...that is derived from from the Pushto word '*roh*', meaning a sandy desert (Ahmad, Ali,

Farooq, 2005, p 864). This was essentially a desert tract sparsely populated by mostly mobile and pastoral nomadic communities with very little scale cultivation, "...almost identical with the uplands (*bars*) of western Punjab"( Singh , 2006, p.98). Prominent among the muslim tribes of the region are "...the Samma, Laar, Sheikh, Bohar, Daiha, Baluch, Bhatti, Mughal, Panwar, Jooya and Langa" (Mumtaz, 1981, p.18).

The eastern limits of *Chitrang* merged with a tract referred to as *Bhandan* (local name for a region). As compared to *Chitrang* there were less grasslands and water in this tract. The rain water which used to collect in the *talais* and *johads* used to dry up soon. For harvesting this water in an efficient way the people in *Bhandan* had dug small *beras* or *kuis* (well) in the catchment area of *johads* which allowed them to harvest water when the *johads* dried up. The quality of land favored rainfed farming in the area and farmers used to take one crop in an year and graze animals on the fallow lands. This area was dominated by Jats who were livestock raisers as well. They relied on *Chitrang* grasslands and go on transhumant routes to Punjab as well especially during summers.

The southern parts of *Chitrang* were contiguous with a sandy tract of land called *lamma* in the local pastoral lore. The present area of Pugal, Khajuwala, Barsalpur used to fall in this area. The predominantly Muslim population of this area practiced nomadic pasturage and used to move with their animals as well as their families. The semi nomadic Muslims pastoralists of *Chitrang* shared marriage relations with them (Bhati, 1984).

The area was known for its water sources as well as pastures of open grasslands of *sewan* grass. These 'natural grasslands' had developed over many hundreds of years under climates marked by strong seasonality and high inter annual variation in rainfall. These grasslands are part of the strip that covers the 100 mm rainfall zones of Bikaner, Jaisalmer and Barmer districts (Prakash, 1993). What made the grasslands so prized for pastoralists was the abundant reserves of perennial grass *sewan*, popularly known as the "king of desert grasses". This protein rich grass was a boon for cattle. The trees and shrubs were sources of fuel wood and wood for construction. Apart from *sewan*, *dhaman*, there were many seasonal grasses that are wondrous gifts of nature that sprout at the gentlest caressing of sand by rain showers. Besides fodder many of them were also of medicinal value and even used as food for humans during drought. This rich bio diversity of nature is experienced by pastoralists as gift of nature in sustaining livestock that in turn made possible human survival. The pastoralists had intimate knowledge about these grasslands and used to classify them using a number of different criteria, including the season in which they are grazed, their nutritional quality and suitability for different types of livestock, topography and elevation, aspect, ecological zone and plant community, color, soil characteristics, water quality and quantity, distance from camp, and degree of utilization by live-stock. It was this intimate association with grasslands that inspire poetical compositions by *sufi* mystic Khwaja Ghulam Farid that abound in metaphors and plots to celebrate ecological bounties of the *Chitrang* region.

The rich expanse of *Chitrang* grasslands served as a refuge zone for pastoralists from neighbouring regions especially during times of drought. The grazing lands were not a problem as there was enough land available apart from the pastures or *gochars* which were kept aside in every village. The grazing of the livestock was regulated by keeping portions of the

gochars reserved in a particular year and by demarcating separately the grazing area of cattle and sheep because of their different grazing habits.

### **Livestock management**

These semi nomadic pastoralists who kept large herds of cattle, flocks of sheep, goat and camels had usufructuary rights granted to them by Rajputs rulers of Bikaner to use, protect and regenerate the grasslands of *Chitrang* region. These pastoralists were distinguished breeders of the Rathi breed of cow that had been reared by them over generations. Besides the Rathi cattle they also bred indigenous wool yielding breeds of sheep like Magra, Chokla, Pugal, Nali (Sen et al, 1981; Naqvi et al, 2013; Goba et al, 2000).

A field study of north west Bikaner by CAZRI done in late sixties found that more than 95% of the families were pastoralists and “animal husbandry formed the main stay of two-thirds of the workers, a household on an average had 2.05 bullocks, 11.80 cows, 6.66 young cows, 0.11 buffaloes, 0.06 young buffaloes, 2.37 camels, 50.47 sheep and 7.05 goats” (Malhotra *et al.*, 1967). The survey found that “approximately 97 per cent of the households kept cattle as one of the livestock. More than one-third of the households kept all types of livestock. About 50 per cent of the households were engaged in raising flocks of sheep (Malhotra *et al.*, 1967).

This tradition of cattle keeping that had continued for generations had special features as well. Many old pastoralists tell how each successive generation has furthered this tradition by maintaining and breeding more herds. They never used to sell or part with calves and bulls of



their cattle for preserving the purity of their herds. Closely regulated breeding practices was considered a mark of being a good and rich pastoralist. In fact cattle herd was regarded as an extension of one's own family. This was one of the reasons for the cultural taboo on selling milk that was considered equal to selling one's children.

### **Social organization**

This culture of pastoralism had developed subtle and flexible social systems to adapt pastoral strategies. Communal sharing of work among households was the intrinsic element of pastoral life. On the surface livestock rearing looks to be simple. But if one looks deeper into the myriad set of daily practices around rearing livestock one can appreciate many tasks that require considerable skill and ability to work in collective manner. There are many works in the daily life of pastoralist which require cooperation from one's kin for example taking herds and staying with them in grasslands entailed scouting for appropriate fodder regimes for herds of grazing animals (cattle and sheep), mixed feeders (browsers and grazers like camels and goats) or a combination of both, planning for going on long distance migrations, drawing water for herds and flocks, shearing of wool, milking of cows and collecting it to make ghee and then storing it in large containers, treatment of diseases among the animals, breeding of livestock. Since the rhythms of daily life are shared by many pastoralists most of the marriages in their families are arranged almost at the same time. The marriage season followed coming back from the migrations in the monsoon. The practice of giving away some cattle from the herd was done on ceremonial occasions like marriages. Someone breaking away from a family to go and settle somewhere else would get his share of cattle from the large herd of the ancestors.

Women play a major role in husbanding of animals. In fact there are some works which are only done by women like rearing of young calves, milking of cows, feeding and water them in the house, making curd and ghee from the milk which the women specialize in. In permanent settlements women do transactions with the local *bania* and maintain accounts of them. Many folk stories popular in the region celebrate the adeptness of women in handling livestock. The prominent role of women in livestock rearing, their combination of beauty and dexterity has been immortalized by Khwaja Ghulam Farid in many of his *sufiyana qalams*.

### **Land rights, water and grazing**

All the land was *jagir* land owned by Rathore Rajputs of Chhatragarh, Anupgarh and Sattasar or Bhati Rajputs from Pugal. There were no recognized individual rights in land and all cultivators were tenants without occupancy rights. Owning land was not important as land was abundant and no regular cultivation was practiced. Singh records that "...while there was head tax on cattle, and a house tax on people, there was no specific tax on cultivated land or crops" (Singh 1964, Quoted in Sinha, 1996).

What was more crucial for survival in the area was the usage as well as ownership rights over a water source. The *Jamabandi* (land rights record register) of 1965-68 of Chhatragarh records two major kind of rain water harvesting sources-*johadis* and *kuan* that existed in the area of Chhatargarh. More than eighty six per cent land of this village was used for grazing. The thirty six *johadis* belonged to and were maintained by semi nomadic pastoralists and were spread out in an area of several kilometers around Chhatargarh. Mostly the *johadis* used to get populated

during the rainy season when nomadic encampments grew in the thickets of trees that surrounded these. The diverse social groups that owned these johadis belonged to Chhatargarh and also had some who came from adjoining villages to graze their livestock in the grasslands.

The *kuan* were part of the permanent settlement of Chhattargarh. They used to retain water for longer period and were used after the rainy season. Elaborate customary arrangements between communities governed the usage of water from these *kuan* both for livestock as well humans. As told by many pastoralists the mode of utilization of water from communal wells was called the *siyari* or the *anga* system. Nine domestic animals formed one *anga* which meant that person having one *anga* would have to pull water from the well for even livestock of others for one day. Those who had less animals were combined with others like them. Each person utilizing the water from the well had to get his own things required for pulling water. These were two or four camels, one *lav* (rope), a *kos* ( wooden pulley), *charas* (a kind of leather bag), *killi* (a sort of hook), two *puchadio* ( ropes which were tied to the back of the camel). This customary system not only regulated the use of water as per the requirement but involved communal sharing by a large majority of the village.

Similarly Kela, another old big village on the eastern limits of Chitrang had three hundred and sixty *beris* dug around the village johads. While the *johads* were common for the village these *beris* were owned and maintained by castes or families. Sattasar had apart from its common *johads* in the village six *tobas* (small seasonal ponds) owned by Baloch pastoralists who used to camp there during summers. These were located dispersed at a distance of around eight to ten km from the village.

## **Culture and religion**

Though largely located in a scarce and frugal region this culture of pastoralism was endowed with exquisite musical traditions that sustained feelings of gratitude and abundance. Vast stretches of sandy plains and extensive grasslands interspersed with dunes merging into limitless horizons dotted with long lines of caravans form the geographical backdrop in which this musical tradition unfolded. Ecstatic *mehfils* during marriages, at dargahs during *Urs*, and in the solitary rendezvous of nomadic encampments in grasslands have been occasions that sustained



these magical musical traditions. These were sites where *Sama* (Sufi music gathering) unfolded as ‘listening from heart’, becoming the medium for aesthetic experience to transcendental heights.

*Sufiyana qalams* of Baba Farid, Shahbaz Qalandar, Bulleh Shah, Shah Bahoo, Shah

Latif, Khawaja Ghulam Farid, Shah Hussain, and Ali Haider some of the main great sufi mystics of North west India were popular and soul stirring renditions of *Mir* musicians form the kernel of these traditions. They are undoubtedly among the best traditions of Indian Islam “...of poetry and music as an essential means of devotional expression and the attainment of religious ecstasy” (Qureshi, 1972, p.20). It is this simple, ‘rustic’ mystical piety that reflects so vividly in many compositions performed by these hereditary musicians for generations.

This region was dotted with many *dargahs* which served as sites for these experiences. The intimate attachment of pastoralists with these *sufi* mystical traditions is also evident in the naming of these seasonal water points after heroes and *sufi* saints.



The musicians of these pastoralists were a community called Mirs or Mir I Alam as they were referred to with respect. Mirs have been known for their passionate and intimate renderings of the compositions of Sufi mystics of the north-west Indian subcontinent. In particular, compositions of Khwaja Ghulam Farid sufi saint who lived in the last quarter of the nineteenth century form the kernel of this tradition of the Mirs.

His are vivid descriptions of the pastoral landscape as well as the daily lives of these pastoralists. The compositions of Khwaja Ghulam Farid are dedicated to illumining the pastoral splendor of the *rohi*. Khwaja Ghulam Farid chooses rustic metaphors from the desert- like the blooming rich desert grasses after rains, the different shapes and colours of the clouds, the mushrooming of temporary encampments on the chains of sand dunes after rains, the rhythmic lilting sound of the bells of cattle marching in the vast sprawling grasslands, descriptions of dexterous and beautiful pastoral women milking cows, the travails of digging water ponds in the drought parched region. For pastoralists whose lives revolved around mobility on trade routes, trails of caravans, and free ranging pastoralism with its seasonal routes of transhumance, these compositions had an immense appeal (Ghai, 2010).



These are mostly sung in *Siriaki*, a dialect of West Punjab which has a strong affinity with Sindhi and Punjabi. In addition to this soul stirring singing, the Mirs are deft players of *been* (a kind of bagpipe) and *algoza* (a double barrel wind instrument) that with their reverberating and lilting melodies form a part of the ethereal music of the Mirs, setting the mood for *mehfi ls* that steadily unfold in the majestic serenity of vast horizons and star lit desert nights (Ghai, 2010). Music and the ecstasy associated with it was organized through reciprocal obligations dictated by social custom, of patrons to listen, and musicians to perform.

### **Economy and trade**

These pastoralists had limited links with the outside world mainly structured around transacting livestock products chiefly *ghee* and wool in return for daily necessities. Both *ghee* and wool from *Chitrang* region were prized items of trade networks of the Bikaner region. In fact wool produced from these tracts contributed to making Bikaner as one of the large wool market of Asia. Beginning as reciprocal forms of exchange for daily necessities these transactions over time incorporated elements of monetization that created its own cycles of indebtedness. Milk, curd and butter milk which was in plenty and was not sold in this area as selling it was considered inauspicious. Many old pastoralists remember a time when they had so much *ghee* that it had to be stored in huge containers made of iron. Some traders would come from Bikaner and buy this *ghee* and carry it back packed in leather bags loaded on camels. Livestock was sold in times of distress like droughts or for expenditure during marriage, death. At that time given the slow and few modes of communication banias and the moneylenders of the

Chhatragarh or nearby villages like Pugal and Mahadeowali were the only contacts of these pastoralists with the ghee and wool markets in Bikaner city.

The mode of transactions was always determined by these *banias* who were middlemen between them and the outside world of better integrated markets. Whatever weight the bania calculated of wool or ghee the pastoralist had no choice but to believe in it. From what some pastoralists remember of these transactions with *banias* in Chhatragarh, Pugal one can say that regular weights were not used to weigh the produce. The *bania* would weigh wool by telling the weight of his foot. 'The foot of the *bania* used to be less heavy in Pugal from Chhatragarh...' so goes a popular pastoral proverb that testifies to the market acumen of pastoralists. Another way of weighing wool and deciding rates was by estimating the weight of one sheep in the flock and using it as a benchmark for assessing produce from the total flock. This system called *lani* (which literally means act of shearing as well as quantity of wool from one sheep per shearing) was very popular and continues to this day. Like wool was weighed through assuming the foot of the *bania* as weight, the unit for buying *ghee* was the weight of the thumb of the *bania*.

## **IGNP and Modern Development**

Brought as feats of scientific technology to transform 'waste' tracts into 'productive' lands, the new hydraulic regimes of canals were to fundamentally alter the pre modern dynamic complementarity between pastoralism and farming. These were beginnings of a framework of 'modern development' by colonial and later on the native state of Bikaner that followed a two pronged strategy one of privileging cultivating castes while downplaying the claims of nomads/pastoralists on land *per se* and two, to increase the extent of cultivated land through summary settlements in wastelands, now redefined as *chaks*.

The IGNP was conceived in 1948 by the genius Rai Bahadur Kanwar Sain, the then Chief Engineer of the Bikaner State to 'irrigate untold millions of acres in the Rajputana desert from the Punjab rivers'. Ideologically propped up by Jawaharlal Nehru as the 'kingpin' of State planning for developing the desert, the IGNP was started with generous loans from the World Bank and a favourable policy framework enabled by the Indus Water Treaty of 1960 between Indian and Pakistan under the watchful gaze of the World Bank.

The main components that have been accomplished till now are the 445 km long lined canal running parallel to the Indo-Pak border, nine branches, seven lift schemes and twenty-one direct distributaries apart from 8187 km. of minor canal network. The state claims to have opened more than 9.5 lakh hectares of area for irrigation. Another 2 lakh hectares is being planned to be opened for irrigation in the Barmer district. Apart from this the IGNP provides drinking water to all the major towns and cities of the western Rajasthan, and more than 3500 villages and



settlements in the command area as well as outside it. IGNP is a gigantic settlement and irrigation project that is supposed to benefit more than 2 million people (Reports of IGNP Dept, & IGNB GoR).

IGNP Stage II that begins near the Pugal region is markedly different from the Stage I in terms of type of land & soil, nature of older livelihoods. There are high sand dunes with small flat areas in between and large flat plains intercepted by small and medium sized dunes, many of which are shifting. The area is devoid of any natural drainage. The soils in the area are of aeolin origin, "...generally deep, coarse textured, droughty and calcareous. They have low fertility, have high infiltration rates with excessive drainage and are highly susceptible to erosion" (CADA-IGNP, September 1992, p.3).

For the state the bringing in of the IGNP has meant concerted efforts at 'populating', 'developing' and 'greening' the desert, ideals that it has pursued zealously. The IGNP initially known as the Rajasthan Canal Project (RCP) was one of the most significant projects of the modern state in the desert in Rajasthan. The IGNP had multiple objectives like "...provision of water for drinking, irrigation and industrial use; develop the vast land resources, settlement of the thinly populated areas; drought proofing; checking the spread of desertification and improvement of the eco-system; and overall development of the area through creation of infrastructure for exploitation of natural resources..." (Reports of IGNP Dept, & IGNB GoR).

The IGNP brought with it a pervasive, permanent presence of the modern Indian state with a new set of institutions. The workings of these institutions set in processes of systematically

dismantling the domain of customary practices and sanctions of natural resource use, control and regeneration. Natural resource use practices that were earlier mediated through communal social relations, patrimonial-kinship ties and feudal hierarchies were now subjected to actions, whims and dictates of the bureaucracy of these institutions. The older forms of land and water based resource use practices were sought to be replaced by a singular insistence to practice water intensive irrigated farming. This new 'prescribed' regime of natural resource use was aggressively defended by a new set of rules and prescripts having the legitimacy of the modern state.

Over the last thirty years the sprawling canal network of the main canal, branches, distributaries, minors, and water courses of IGNP has inscribed a new hydraulic spectacle traversing the vast sandy plains and sand dunes. This has become an intrinsic element of the arid landscape of these regions. The canal command area created by this hydraulic network has set in processes of reshaping the distinct natural resource regimes of the Thar by demarcating and dividing them into slices of private (6.2 ha. each) agricultural land holdings.

The IGNP is not a mega- irrigation project alone. It is a settlement project as well. Successive waves of new allotments and settlers over the last quarter of a century have given way to the creation of a densely populated and a heterogeneous society. There is a rise in population density from six to seven persons per sq. km to more than thirty persons per sq. km during the last 40 years (Census Bikaner District 1981,1991,2001). The coming in of new communities from other parts of Rajasthan, and from outside the state, has contributed to the growth of a new pattern of settlement. Settlers in chak *abadis* and *dhanis* in chaks have emerged as important

stakeholders besides the older inhabitants from older villages for access to basic amenities and natural resources.

These changes are far reaching, and strike at the core of the traditional society in a manner that had never occurred before. The IGNP reconfigured a new relation with natural resource resources regime of Thar in terms valuation in monetised terms where intensive use and consideration of quick profits took precedence over an historically evolved relation where nature was venerated and regeneration was a collective task as important as consumption of these finite resources in a fragile ecology. This is reflected in greater control of market through increased monetisation, changed consumption patterns, natural resource valuation in money terms.

The contribution of IGNP in scaling up agriculture needs to be evaluated carefully. One of the things that is certain is its contribution to the emergence of a framework where commercial agriculture is increasingly seen as the only viable livelihood in a region that had virtually no large tracts and prior experience of intensive farming. Given the fact that promotion of high yield variety commercial cropping has been the cornerstone of Rajasthan's agricultural policy the contribution of IGNP has been impressive. Compared to 1956, the end of the First Five-Year Plan, when only 12.7% of the gross cropped area in the state was irrigated by 1990, the end of the Seventh Five-Year Plan, the proportion had increased to 24.9% (GOR, 1992), mainly as a result of IGNP (Vyas, 1998, p.224).

Despite these impressive increases enhancing crop yields, sustaining regularity of adequate water flow in the canal network down to the level of field channels, and increasing utilization of actual

irrigation potential of these lands have been long standing critical factors of success. Studies made in Punjab showed that areas purely under canal irrigation had lower yields than those with conjunctive and pure tube well irrigation (Sharma, Rao & Sharma, 2009, p.109).

As has been observed in most other such canal irrigated regimes in drylands regions water logging and increased salinity have been recognized as the twin menaces that lead to degrading environmental degradation and increased desertification (Merry, 1992; Joshi and Dhir, 1997). Lack of natural drainage in the region has been one of the impediments to such large surface irrigation transfers that "...create negative groundwater externalities of unforeseen magnitude which fail to be tackled by normal quick fix solutions" (Sharma, Rao & Sharma, 2009, p.107).

It would not be inappropriate to say that the coming of the IGNP has accentuated certain key issues relating to livelihoods of vulnerable communities and ecology of the region.

Moreover, the colonisation of desert grasslands and water sources - the common property resources - has led to marginalisation of pastoralists and created a political economy of natural resource use that has set in conditions for greater pauperization of poor allottees, stifled collective initiative, intensified resource use and control by private property and greater penetration of market and tightened hold of state (Goldman, 1994; Ghai, 2002).



## **Marginalization, Adaptive Dilemmas and More÷**

All the attributes that constituted this complex culture of pastoralism were impacted in different ways ranging from complete dissolution, adaptive transformations and marginalization to muted persistence in pockets. The emergence of the canal command area of IGNP transformed the very existence of natural resources endowments of grasslands and water sources that had made possible the practice of extensive pastoralism. These were parceled into private agricultural holdings of 6.2 hectares each served by an intricate canal network. Whatever patches of grasslands were left after this invasive land modeling were made into fenced enclosures handed over to the Forest Dept. It would not be an exaggeration to say that emergence of the canal command area transformed the essential integrity of this fragile ecology. The enhanced soil moisture regimes in the canal area have led to the disappearance of “this tussocky and highly nutritive grassland which is a severe blow to this genetic diversity since this perennial grass grows only in this region” (Prakash, 1993, p.467).

The adaptive responses constitute a spectrum ranging from rapid de stocking of herds, altering herd composition, negotiating with Forest authorities for allowing grazing, adaptation to newer cycles of grazing that ranged from short term migration to available open tract near the Indo Pak border to elongation of transhumant cycles, and permanent encampment in towns of Punjab. This took the form of reducing herd sizes for survival in the command area and intensification of migratory pasturage for retaining large herds of both cattle and sheep. In the command area a survey done in 1995 revealed that the small ruminant populations rose in absolute terms though the average herd size got smaller from more than 300 to between 50 and 100. This was seen as

providing a cushion against the uncertainties of the irrigated agriculture. From the large herds of cattle (100-150) the dominant trend that got stabilized was of keeping a fewer number of milch animals (10-20) by adopting stall feeding and getting integrated with dairy markets. These were adaptive strategies that were often negotiated at household level or at the level of collective decision making for settlements depending on the realities of the command area (Ghai, 1995). The strategies of intensifying migration again point to carefully timed and planned interventions. Contrary to perceptions of outsiders including experts about migration for pastoralists these processes undertaken at the cost of greater risk and drudgery brought reproductive benefits for herds and improved access to markets. That this adaptive stance is a response to greater penetration of capital and intensification of land use for farming has been discussed for other areas of Rajasthan as well (Robbins ,1998). Here it would be important to point out that these pastoral adaptations have to be understood in terms of cultural significance of livestock in the lives of these pastoralists. For people whose material and symbolic world revolved around livestock the thought of losing this wealth was not tenable especially for the generations that had grown with rearing livestock in times of when there was less water in the region. In fact for many of them abandoning rearing livestock when water had now come with the canal looked paradoxical to the tenets of life they had acquired over generations.

It could be argued that the macro picture of the tragic trope of fate and future of pastoralism got constituted through mutually reinforcing findings and prescripts by arid zone scientists, planners and a bureaucracy with a pronounced sedentary bias. Once having drawn up it was carried on in essential terms to be applied to most of the regions of this arid zone of the Thar. It was argued that “due to high density of livestock and grazing pressure, the grassland in western Rajasthan

have deteriorated to an alarming extent causing not only erosion problems but also serious imbalances in the supply and demand” (CAZRI, 1988, pp.41-48). This situation of environmental degradation was accentuated by a “...higher rate of increase of population in the extremely arid tracts poses a serious situation specifically when viewed in the context of limited resource potentials in such regions” (CAZRI, 1988, p.4). Thus the resultant spectre of increasing desertification had to be combated. Interestingly it was known fairly early on that the anthropogenic factors contributing to desertification comprised of land use for farming especially irrigated intensive agriculture besides over grazing (Hare et al., 1977). But the case against pastoralists got murkier as they were singled out for ‘over exploitation of natural resources and were increasingly regarded as anachronistic remnants from past that had to give way to ‘modern development’ rooted in sedentary realities.

The dominant image of the pastoralist in the bureaucracy, planners and scientists, who plan and execute strategies of development of pastoralists often regard them as ‘uncouth’, illiterate / ignorant’, ‘backward’, ‘stubborn and deaf to reason’, and ‘rapacious in recent times. They have been seen as reckless devourers of nature who with their overgrazing practices have been seen as responsible for degradation and increasing desertification. If we look closely at the epistemic and ontological basis of much of this prophesying from corridors of bureaucracy and ivory towers of academic establishments these reveal themselves as prescriptions of the “...ubiquitous professional-class "recommending” for the benefit of development's alleged client”, the pastoralists in this case. Contrary to what these prescripts and advices aim at these “...end up in dis-embedding their subject matter from dominant sites of power and knowledge” (Goldman, 1997, p.26).



This perspective of indifference towards pastoralists has adversely affected policies and practices for development related to pastoralists. This apathy towards them has expressed itself in the general neglect of the animal husbandry related issues. This is conspicuously seen in the case of small ruminant production notably wool and mutton. The development of linkages between pastoralists, the primary producers of raw wool, and wool markets has been a neglected concern. At the turn of the century Bikaner used to be one of Asia's biggest wool markets, a status which it retained till the coming of the economic liberalization in the nineties which saw a growing dependence on imported wool. The policy context of 'modern development' encouraged "...tendency for backward linkages to go abroad, consequent to the steady reduction in import duties in the liberalised regime", and these made "...the growth prospects of the processing sector more vulnerable to the vagaries of international fluctuations" (Ray, 1999, p.1214). The situation is quite similar to "...several countries where international and even domestic market share has been lost to competitive foreign producers and their aggressive marketing policies" (Hatfield and Davies, 2006, p.37). Not only did it have dire consequences for wool industries it perpetuated conditions for increased "...deprivation of actual wool producers" resulting in pushing "...rural households towards giving up sheep husbandry"(Ray 1995, M-150).

As per the recent Livestock Census, Rajasthan accounts for almost 14 per cent of total sheep and 35% of total wool production in the country. And the market demand for meat and wool has been increasing steadily over the last decade. Despite this market imperfection and poor

infrastructure have been often discussed as major impediments in the realization of full economic potential of small ruminant production system (Arya, 2015).

In overemphasizing of the connection between desertification and pastoralists the state manages to divert the attention from the issues related to the paradigm of modern development that has guided policy for formulation for land utilization in arid regions. It has been pointed out that right from the beginning laws for land tenure and policies of land use did not pay much attention to the physical conditions and capability of land. The state 'has had no legislation reflecting its concern for grazing lands and there is no coherent pasture policy' (Jodha, 1982, p.341). After the Settlement operations of 1955, commons were systematically divided into "a range from private *khatedari* at one extreme to *de jure* pasture (*charagah*) and 'unoccupied' lands belonging to the state (*siwai-chak*) at the other end" (Brara, 1989, p.2252). The ecological potential of pastures that benefitted many was ignored in favour of promoting cultivation. Most of these land reforms hence were 'regressive and counterproductive to the spirit of commons' (Brara, 1989, p.2253). Many land use plans drawn up in the early days of development planning for the desert mooted the idea of developing pasture lands and policies for controlled and rotational grazing (Bhattacharya, 1977). It has been pointed out time and again that the deterioration of grasslands is related to a range of factors the chief being the '...absence of a policy regulatory framework and lack of will on the part of state to take measures to regulate grazing' (Roy and Singh, 2013, p.242).

Nowhere has this been more blatantly visible than in the case of the land use planning for IGNP region. In spite of urging for '...urgent thinking on livestock with an ecological approach and a

practical bias” (Prakash 1993, p. 467) the hold of ‘modern development’, in which private intensive and irrigated farming occupied the centre stage of rural transformation, was such that these were systematically ignored.

Among the 'critical success factors (CSFs)' outlined from time to time consideration of extensive land use practices supporting pasture development, afforestation, etc to build a complementarity if not to promote livestock rearing have been fairly high on the priority list (Hooja and Kavadia 1994). The sedentary bias of Command Area Development Authority (CADA) in planning studies draw conclusions that only appreciate the benefits of irrigation opportunities with the coming of IGNP and the recommendations emphasize that the semi nomadic pastoralists would gain if they switch over to irrigated farming in settled farms. It is interesting that not much is made out of opinions of pastoralists about retaining their herds or opening up regions in this new irrigated regime to support grazing lands.

The government's (i.e, forest department) effort to develop what's remaining of the sewan pastures has proven to be a farce. What was earlier an open grazing system was now regulated one part of it barricaded and fenced, access to which gave ample opportunity for corruption. People have to pay bribes of Rs 50 to Rs 70 (1 to 1and half US dollar) per animal for grazing, as against the official fee of Rs 3 (0.04 US dollars).

Here it may be pointed out that new scientific researches in rangeland ecology have challenged these long held notions of over grazing and carrying capacity (Scoones and Graham 1994). This new rangeland ecology has consciously sought to integrate traditional knowledge of pastoralists

with the greater rigour now available for understanding grazing land eco systems through scientific and socio-economic research. As opposed to the past where grasslands were considered to be potentially stable (equilibrial) systems which became destabilized by overstocking and overgrazing they are now thought as non-equilibrial complex adaptive systems where diversity and flexibility are key attributes of these 'instable yet persisting dryland eco systems' (Warren, 1995).

The dialogues with pastoralists reveal how their ostensibly 'inchoate', 'inarticulate' expressions and theories of social change are as relevant as our supposedly rational and 'scientific' research and planning on their lives. Many among them are repositories of traditional ecological knowledge that reflects generations of acute observation, experimentation and adaptation to a harsh environment. Contrary to the modern rationality this pastoral rationality is embedded in deep structures of culture understood as way of life intimately connected with nature and less dominated by economic values of market production.

The cultural productions and reception of music in this pastoral society bear an imprint of this transformation. Once an intimate part of the daily material life of the region these traditions mostly exist as an alienated presence found in traces, having been dropped not only because of the changing work rhythms of a society now organized around the strict demands of irrigated farming. This sedentary turn towards irrigated farming has brought with it a different notion about self, and a notion of identity that is believed to have made a transition to 'civilization' from an earlier existence like that of their livestock. This changed notion of self and 'Muslim' identity is further strengthened by the increasing popularity of Deobandis who zealously propagate

conservative Islamic orthodoxy that shuns music and considers it heretical. This new orthodoxy of Islam presents an entirely different perspective than the one that has guided these pastoral groups whose Islam had been constituted through ceremonies, chiefly music sessions held in praise of sufi saints of the region. This had dire consequences for the Mirs who have been faced with the twin spectre of pervasive livelihood crisis as well dissolution of their musical traditions.

In response to this cultural dissipation the Mirs of north west Pugal region have been involved in an attempt to invoke the resilience and adaptability of their tradition to carve a reinvigorating discourse in the modern context. The work over all these years has contributed to rejuvenation of traditional styles of singing, given them exposure to new performances, reforging of dignified ties with traditional patrons, revived core repertoire of the musical tradition and in the process given a new lease of life to contemporary well-being of subaltern musicians otherwise languishing away into the dust of time in the interiors of Thar.

The engagement of pastoral communities with IGNP till now has shown that they have been capable enough to carve their specific adaptations, mostly at household level. Persisting traditions and rapid on going change are two forces which are simultaneously at work on the same material of society in a context that is impregnated by 'processualism of tradition' and 'structuralism of change'. The growth of an evolved 'culture' of pastoralism and variegated adaptive responses to coming of modern transformations in contemporary times testify to capabilities and rationality of communities associated with pastoralism in this region. The only problem is that sometimes accepting their point of view becomes dangerous as it questions so much that we, the outside world profess.



## **Towards a Sustainable 'future' of Thar**

This paper has been intended as a discursive piece to inspire debate and reflection regarding inevitability of intensive irrigated farming or the future of wide ranging pastoralism. The discussion in preceding sections has tried to argue that the culture of pastoralism has been historically evolved as a subsistence system, often complementing farming systems and has adapted itself to a diverse spectrum of possibilities for human existence in north- west Thar. It could be said that in its singular insistence on promoting intensive farming regimes and private capitalist valuation of nature as embodied by the canal command area of IGNP, the paradigm of modern development by the Indian state compromises with the essential ecological attributes of the region. It has been pointed out that "...over-use of water for irrigation and neglect of the livestock sector are the major factors responsible for some adverse land use" (Kar, 2014, p.194).

This kind of a perspective also frees up space for understanding life form whose cardinal features have been collectively surviving in vastness of a harsh ecology. The assets that this pastoralism has sustained be it the hardy indigenous breeds of cattle or their products like milk, wool and mutton or rich cultural traditions that celebrate pluralism and have deep lessons on substantive meanings of frugality, abundance and ecological sustainability need to be evaluated differently and planned for in the contemporary times.

Hopes for a sustainable future of Thar lie in a critical and self-reflexive analysis of the institutional practices of development, modernity coupled with a more compassionate

understanding of the complex nature of the rangelands, greater appreciation for pastoral life, and more facilitating environment for integrating pastoral production systems. This positioning of 'development' as 'dialogue' holds as much promise for us as for pastoralists who still carry on in whatever muted forms.

These questionings are emboldened by several studies in recent years (Blench, ODI & FAO 2011, Kar, 2014, McGahey, D., et al, IUCN 2015, Tessema et al, 2014) that have highlighted the critical importance of pastoralism in its contribution to sustain natural economy that makes possible and acts as an environmental cushion for the fast urbanizing world. Extensive land use systems need to be promoted and regenerated with reference to arid and super arid regions. The region's strength on agro-forestry and livestock-based economy need to be promoted for a sustainable agricultural land use. Better market integration for mutton and wool has to be planned and regulated by state in regions like the one under discussion. In a world that is increasingly becoming intolerant, plagued with xenophobic conflict, unbridled consumerism, heightened and often cut throat individualism, and social stress, the deep message of frugality inherent in this popular pastoral culture of *sufiyana qalam* is coterminous with love and dignity of all life. There is sense in learning from this remarkably resilient way of life. It may hold insights and cues for transition to a sustainable world.



## Glossary

<i>Rohi</i>	open scrub jungle
<i>bars</i>	upland open scrub jungle
<i>Chitrang</i>	dunal plains that are natural grasslands with clayey water catchments
<i>dhanis</i>	permanent hamlets usually in the agricultural field
<i>Johads /tobas / talais</i>	rain water ponds of different sizes in village as well as grasslands
<i>Beed</i>	thickly wooded forest
<i>Ooba</i>	local geographical name for region north of Chitrang
<i>Rohi</i>	wilderness, wide expanse of desert interspersed with scrub and grasslands
<i>Bhandan</i>	local geographical name for region east of Chitrang
<i>beras or kuis</i>	open dug deep wells located in catchment of large ponds (johads)
<i>lamma</i>	local geographical name for region south of chitrang
<i>sewan</i>	<i>lasirius Sindicus</i> , protein rich grass fodder
<i>dhaman</i>	<i>Cenchrus setigerus</i> , leafy grass with abundant foliage
<i>gochars</i>	village pastures demarcated by state
<i>Sufiyana Qalam</i>	sufi mystical compositions
<i>Siyari or anga</i>	a traditional system of water drawing arrangements from a shared community well
<i>Khatedari</i>	land tenancy rights guaranteed by state
<i>Been</i>	bagpipe like instrument
<i>Algoza</i>	double barrel flute
<i>Mehfil</i>	informal gathering usually in evenings or on festive occasions entertained by live performance of music
<i>Lani</i>	quantity of wool from shearing of one sheep, used as a weight measure by pastoralists in selling raw wool to traders
<i>Chak-</i>	part of a village or villages which has been separately demarcated for convenience of cultivation by irrigation
<i>Chak abadi-</i>	land set apart in a chak in the Indira Gandhi Canal Project area for purposes of habitation.
<i>Charagah-</i>	community pastureland recorded in land rights register
<i>Jagir-</i>	Tract of land having a feudatory title with hereditary rights
<i>Bania-</i>	Moneylender
<i>Kuan-</i>	Well
<i>Urs-</i>	The day of passing of sanit celebrated as spiritual wedding with God

*Sama-* "listening and from that an assembly of listeners and often include singing, playing instruments, dancing, recitation of poetry and prayers, wearing symbolic attire, and other rituals.

*Dargah-* Sufi shrine

## References:

- Ahmad, Aijazuddin. 1994. MUSLIMS IN INDIA Their Educational, Demographic and Socio-Economic Status with Inter Community Comparisons based on Field Survey Conducted in 1991, Vol II: Rajasthan. New Delhi: Inter-India Publications.
- Ahmad, Farooq, Ali Zulfiqar, Farooq Sameer. 2005. Historical and archaeological perspectives of soil degradation in Cholistan, Sociedade & Natureza, Uberlândia, Special Issue: May: 864-870.
- Agarwal, Arun. 1992. The Grass is Greener on the Other side, A study of Raikas, Migrant Pastoralists of Rajasthan. London: IIED, Drylands Network Programme.
- Agarwal, Arun. 1998. Profits on the Move: The Economics of Collective Migration among the Raika Shepherds in India. Human Organization 57: 4: 469-479.
- Allchin, Bridget. 1976. Palaeolithic Sites in the Plains of Sind and Their Geographical Implications. The Geographical Journal 142: 3: 471-489 ; Stable URL: <http://www.jstor.org/stable/1795298> Accessed: 13/04/2020
- Arya, Prawin. 2015. Sheep Production system in Rajasthan Sheep wool and meat. <http://www.biotecharticles.com/Agriculture-Article/Sheep-Production-System-in-Rajasthan-Sheep-Wool-and-Meat-3373.html> Accessed 12.07.20.
- Asani, Ali. 1988. Sufi Poetry in the Folk Tradition of Indo-Pakistan. Religion & Literature, The Literature of Islam 20: 1: 81-94, USA: University of Notre Dam.
- Bernal, Victoria. 1997, Colonial Moral Economy and the Discipline of Development: The Gezira Scheme and "Modern" Sudan. Cultural Anthropology 12: 4: 447-479. Stable URL: <http://www.jstor.org/stable/656632>, Accessed: 12/04/2019
- Bhati, Hari Singh. 1984. [In Hindi] *Pugal ke Bhatiyon ka Itihas* (A history of Bhatias of Pugal), Bikaner: Sankhla Prakashan.
- Bhattacharya, B. D. 1977. A Regional Development Plan for the Rajasthan Desert: Land Use Issues and Objectives. The Town Planning Review 48:3: 299-307. Stable URL: <http://www.jstor.org/stable/40103546> Accessed: 11/04/2015
- Brara, Rita. 1987. Shifting Sands: A Study of Rights in Common Pastures. Jaipur: Institute of Development Studies.
- Brara, Rita. 1989. Commons' Policy as Process the Case of Rajasthan, 1955-1985. Economic and Political Weekly 24: 40: 2247-2249+2251-2254. Stable URL: <http://www.jstor.org/stable/4395430> Accessed: 23/01/2020

Command Area Development Authority-IGNP, September 1992. A Report on Hydrological Barrier Studies: IGNP Flow Command STAGE -II, 1991-92. Bikaner: Government of Rajasthan.

Casimir, Michael J. 1996. Some recent publications on pastoralism in arid lands of western India (Rajasthan and Gujarat): A review. *Nomadic Peoples* 39:155-162.

Central Arid Zone Research Institute (CAZRI). 1988. Progress in Arid Zone Research 1952-1987. Jodhpur: CAZRI.

Central Arid Zone Research Institute (CAZRI). 1998. Fifty Years of Arid Zone Research 1947-1997: An Annotated Bibliography. Jodhpur: Scientific Publishers.

Census Bikaner District 1981,1991,2001, New Delhi: Census Division, GoI

Cressey, George B. 1957. Water in the Desert. *Annals of the Association of American Geographers* 47: 2: 105-124. Stable URL: <http://www.jstor.org/stable/2561502>  
Accessed: 12/04/2019

Cressey, George B. 1960. The Deserts of Asia. *The Journal of Asian Studies*. 19: 4: 389-402. Stable URL: <http://www.jstor.org/stable/2943579> Accessed: 13/04/2019

Dhir, R P. 2003. Indian Thar Desert in Retrospect and Prospect. *Proceedings of National Science Academy* 69A:2: 167-184.

Devra, G.S.L. 2012. Environmental Crisis and Social Dismemberment in Northwest India During the Pre-Colonial Period. *Occasional Papers, History and Society New Series*,3, Delhi :Nehru Memorial Museum and Library.

Eaton, Richard. 2000, *Essays on Islam and Indian History*. Oxford: Oxford University Press.

Fagan, P J. 1893, *Bikaner Survey and Settlement Report*, Unpublished Report, Bikaner Archives.

Frazer, Judy. 1995. *Threads of Identity. Embroidery and Adornment of the Nomadic Rabaris*. Ahmedabad: Mapin Publications.

Fuller, D.Q. 2006, *Agricultural Origins and Frontiers in South Asia: A Working Synthesis*. *J World Prehist* 20: 1-86 <https://doi.org/10.1007/s10963-006-9006-8>  
Accessed 19.12.15

Gellner, Ernest. 1969. *Saints of the Atlas*. Chicago: University of Chicago Press.

Geertz, Clifford. 1973. Thick Description: Towards an Interpretative Theory of Culture. In *Interpretation of Cultures: Selected Essays* ed. Clifford Geertz, 3-30. New York: Basic Books.

Ghai, Rahul. 1995. Tradition and Change among Pastoralists of Chitrang A Report on the Ecological Conditions of North West Bikaner. Arid Zone Environmental Research Centre- Uttari Rajasthan Milk Union Ltd. Trust, Swedish International Development Agency.

Ghai, Rahul. 2002, Whither Commons! State and Land Use in the Canal Command Area in the Pugal Region, Bikaner. Shanti Maitri Mission, Arid Zone Environmental Research Centre- Uttari Rajasthan Milk Union Ltd. Trust and Aga Khan Foundation.

Ghai, Rahul. 2010. *Qissa Mir-e-Alam*: Experiences of Reinvigorating *Sufiyana Qalam* Tradition with Marginalized Musicians. In *Interrogating Development: Insights from the Margins*, edited by Frederique Apffel-Marglin, Sanjay Kumar and Arvind.Mishra, 185-204. New Delhi: Oxford University Press.

Gilmartin, David. 1994. Scientific Empire and Imperial Science: Colonialism and Irrigation Technology in the Indus Basin. *The Journal of Asian Studies* 53: 4: 1127-1149. Stable URL: <http://www.jstor.org/stable/2059236> Accessed: 23-12-2015

Goldman, Michael. 1994. There is a Snake on Our Chests, State and Development Crisis in India's Desert. Unpublished PhD Thesis, Department of Sociology, Santa Cruz: University of Santa Cruz.

Goldman, Michael. 1997. "Customs in Common": The Epistemic World of the Commons Scholars. *Theory and Society* 26:1:1-37. Stable URL: <http://www.jstor.org/stable/658067> Accessed: 23/10/2019

Gommans, Jos. 1998. The Silent Frontier of South Asia, C. A.D. 1100-1800. *Journal of World History* 9: 1: 1-23. Stable URL: <http://www.jstor.org/stable/20078711> Accessed: 14/05/2020

Gray, Alice. 2013. Of Permaculture and Pastoralism: Heroes and Villains. New South Wales : Permaculture Research Institute.  
<https://www.permaculturenews.org/2013/05/24/of-permaculture-and-pastoralism-heroes-and-villains/> Accessed: 22/09/2019

Grewal, J S. 2004. Historical Geography of Punjab. *Journal Of Punjab Studies* 11:1:1-18.  
[https://punjab.global.ucsb.edu/sites/default/files/sitefiles/journals/volume11/no1/2\\_grewal.pdf](https://punjab.global.ucsb.edu/sites/default/files/sitefiles/journals/volume11/no1/2_grewal.pdf) Accessed: 24/11/20

Gujarathi & Shah. 1994. Socio Economic Impact of Irrigation on Pastoralists in the IGNP Command Area. In *Planning for Sustainability in Irrigation*, ed. Rakesh Hooja & P.S. Kavadia, 153-159. Jaipur: Rawat Publications.

Habib, Mohammad. 1974. 'Chisti Mystic Records of the Sultnate period'. In *Politics and Society During the Early Medieval Period*, ed. K A Nizami, 374-392. Delhi: Peoples Publishing House.

Hare, F. K., R. W. Kates and A. Warren. 1977. "The Making of Deserts: Climate, Ecology, and Society". *Economic Geography* 53:4:332-346.

Hatfield, Richard and Davies Jonathan. 2006. *Global Review of the Economics of Pastoralism*. The World Initiative for Sustainable Pastoralism. Nairobi: International Union for Conservation of Nature.

Hooja, Rakesh & P.S. Kavadia eds. 1994. *Planning for Sustainability in Irrigation*. Jaipur: Rawat Publications.

Hooja, Rakesh. 2001. *Greening the Desert*. Jaipur: Rawat Publications.

Jodha, N S. 1982. The Role of Administration in Desertification, Land Tenure as a factor in the Historical ecology of western Rajasthan. In *Desertification and Development: Dryland Ecology in Social Perspective*, eds. H S Mann and Brian Spooner, 333-350. London: Academic Press.

Jodha, N.S. 2001. *Life on the Edge*. Delhi: Oxford University Press.

Joshi, D.C. and R.P Dhir. 1997. Waterlogging and salinisation in Indian arid Region. In *Desertification Control*, eds. Surendra Singh & Amal Kar, 245-276. Jodhpur: Scientific Publishers.

Kalanov, Komil and Alonso Antonio. 2008. Sacred Places and 'Folk' Islam. In *Central Asia, UNISCI Discussion Papers* 17:173-185, Madrid: Universidad Complutense de Madrid

Kenoyer, J. 1991. The Indus Valley Tradition of Pakistan and Western India. *Journal of World Prehistory* 5: 4: 331-385. Stable URL: <http://www.jstor.org/stable/25800603>\_ Accessed: 20-12-2015

Kar, A. 2014. Agricultural land use in arid Western Rajasthan: Resource exploitation and emerging issues. *Agropedology* 24: 2:179-196.

Kavoori, P. 1996. *Pastoralism in Expansion: The Transhuming Sheep Herders of Western Rajasthan*. Unpublished Phd Thesis. The Hague: The Institute of Social Studies.

Kavoori, P. 1999. *Pastoralism in Expansion: The Transhuming Herders of Western Rajasthan*. Delhi: Oxford University Press.

Kavoori, P. 2005. Pastoral Underdevelopment and the Developmental State: Or why the Government Has Given Up on the Pastoralists of Rajasthan?. *Geography Research Forum* 25:28-42.

Khazanov, A. 1984. *Nomads and the Outside World*. Madison: University of Wisconsin Press. Second edition: 1994. Madison: University of Wisconsin Press.

Ilse Kohler-Rollefson, Paul Robbins, D.V. Rangnekar, Sangeeta Rangnekar, Richard Cincotta and Ganesh Pangare and Arun Agrawal, et al. 1994. Pastoralism in Rajasthan and Gujarat. London: ODI Pastoral Network.

Leshnik, Lawrence S. 1972. Pastoral Nomadism in the Archaeology of India and Pakistan. *World Archaeology*, 4:2:150-166. Stable URL: <http://www.jstor.org/stable/123973> Accessed: 11/04/2018

Livestock Census India. 2012. New Delhi: Government of India.

Livestock Census, Rajasthan, Different Years <http://www.cazrienvic.nic.in/>,  
<http://animalhusbandry.rajasthan.gov.in/>

Malhotra, S P, Bharara and L P, Joshi .1965. Report on the socio-economic survey of livestock breeders of Anupgarh-Pugal region of western Rajasthan. Jodhpur: Central Arid Zone Research Institute (CAZRI).

Malhotra, S P. 1974. Socio Economic Structure of Population in Arid Zone. Jodhpur: Central Arid Zone Research Institute (CAZRI).

Mann, H S and Spooner Brian eds. 1982. Desertification and Development: Dryland Ecology in Social Perspective. London: Academic Press.

Mcintosh, Jane R. 2008. The Ancient Indus Valley New Perspectives. USA: ABC CLIO.

Metcalf, Barbara D. (*Not dated*). A Historical Overview of Islam in South Asia, Introduction <http://press.princeton.edu/chapters/i9061.pdf>

Metcalf, Barbara D. 1995. Presidential Address: Too Little and Too Much: Reflections on Muslims in the History of India. *The Journal of Asian Studies* 54:4:951-967.  
Stable URL: <http://www.jstor.org/stable/2059955> Accessed: 20/01/2013

Merrey, J Douglas. 1992. Reorganising Irrigation: Local level management in the Punjab (Pakistan). In *Desertification and Development: Dryland Ecology in Social Perspective*, eds H S Mann and Brian Spooner, 83-110. London: Academic Press.

McGahey, D., Davies, J., Hagelberg, N. and Ouedraogo, R.. 2014. Pastoralism and the Green Economy – a natural nexus?. x + 58p. Nairobi: International Union for Conservation of Nature and United Nations Environment Program.

Miller, Daniel and Dennis Sheehy. 2008. The Relevance of Owen Lattimore's Writings for Nomadic Pastoralism Research and Development in Inner Asia. *Nomadic Peoples* 12:2:103–115.

Mumtaz, Kamil Khan. 1981. *Habitat and Desert: The Case of Cholistan*. Bahawalpur: UNESCO & Cholistan Development Authority.

Naqvi, S.M.K Kalyan De and G.R. Gowane. 2013. Sheep Production System in Arid and Semi-arid Regions of India. *Annals of Arid Zone* 52: 3&4:265-274.

Prakash, Ishwar. 1993. The Changing Ecology of the Thar Desert. *Proceedings of Indian National Science Academy B*59: 5: 465-470.

Oba, G, E Post, N C Stensth, W J Luisigi. 2000. The Role of Small Ruminants in Arid Zone Environments: A review of Research Perspectives. *Annals of Arid Zone* 39: 3: 305-322.

Possehl, Gregory. 1984. A Note on Harappan Settlements in the Punjab. In *Studies in Archeology and Paleoanthropology of South Asia*, eds Kenneth Kennedy & Gregory Possehl, 83-87. New Delhi: Oxford and IBH Publishing, American Institute of Indian Studies.

Qureshi, Regula. 1972. Indo-Muslim Religious Music, an Overview. *Asian Music* 3:2:15-22.

Ramanathan, S and Sanjoy Ghose. 1994. Irrigation Management Turnover: A User's Perspective The Case of the Indira Gandhi Canal, Rajasthan, India. *International Conference on Irrigation Management Transfer*, Wuhan: International Water Management Institute and University of Wuhan.

Rao, A. and Casimir. M. eds. 2003. *Nomadism in South Asia*. New Delhi: Oxford University Press.

Rao, K. K.1958. The Problem of the Indus and Its Tributaries: An Alternative View. *The World Today* 14:6: 266-276. Stable URL: <http://www.jstor.org/stable/40393886>, Accessed: 12/06/2019

Rao, Radhakrishna. 1992. Pitfalls of the Indira Gandhi Canal. *Ambio* 21: 6: 439. Stable URL: <http://www.jstor.org/stable/4313979> Accessed: 11/04/2019

Ray, Sunil. 1995. In the Shadow of 'Kotris': An Analysis of Wool Markets of Rajasthan. *Economic and Political Weekly* 30:47:M143-M145+M148-M150. Stable URL: <http://www.jstor.org/stable/4403482>, Accessed: 13/04/2018

Ray, Sunil. 1999. Declining Production Conditions of Raw Wool: Analysis of Emerging Conflicts in Sheep Husbandry in Rajasthan. *Economic and Political Weekly* 34: 20: 1209-1214 Stable URL: <http://www.jstor.org/stable/4407962> Accessed: 11/04/2018

Rajasthan Canal Project. August 1984. *Rajasthan Canal Project – Stage II, Revised Project Estimate, Vol-I*. Jaipur: RCP Dept. GoR.



Robbins, P. 1988a. Authority and Environment: Institutional Landscapes in Rajasthan, India. *Annals of the Association of American Geographers* 88:3:410-435. Stable URL: <http://www.jstor.org/stable/2564236> .Accessed: 11/04/2018

Robbins, P. 1998b. Nomadization in Rajasthan, India: Migration, Institutions, and Economy. *Human Ecology* 26:1:87-112. Stable URL: <http://www.jstor.org/stable/4603267> .Accessed: 11/04/2018

Robbins, P. 2001. Tracking Invasive Land Covers in India, or Why Our Landscapes Have Never Been Modern. *Annals of the Association of American Geographers* 91:4:637-659. Stable URL: <http://www.jstor.org/stable/3651226> Accessed: 20/01/2013

Roy, Ajoy K and Jai P Singh. 2013. Grasslands in India: Problems and perspectives for sustaining livestock and rural livelihoods. *Tropical Grasslands – Forrajes Tropicales* 1:240–243, Cali, Colombia: International Center for Tropical Agriculture (CIAT).

Saberwal, Satish. 2006. On the Making of Muslims in India Historically. *Sociological Bulletin* 55:2:237-266. New Delhi: Sage Publications.

Sain, Kanwar. 1978. *Reminiscences of An Engineer*. Delhi: Young Asia Publications.

Salzman, Phillip Carl. 1986. Shrinking Pastures for Rajasthani Pastoralists. *Nomadic Peoples* 20: 49-61.

Schimmel, Annmarie. 1982. *Islam in India and Pakistan*. Leiden: E J Brill.

Scoones, Ian and Olivia Graham. 1994. New Directions for Pastoral Development in Africa. *Development in Practice* 4:3:188-198.  
Stable URL: <http://www.jstor.org/stable/4028818> Accessed: 24-12-2018

Scoones Ian, 1999, New Ecology and the Social Sciences: What Prospects for a Fruitful Engagement? , *Annual Review of Anthropology*, Vol. 28, pp. 479-507 Stable URL: <http://www.jstor.org/stable/223403> Accessed: 07/08/2016

Scott, James. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press.

Sen, A K, P K Ghosh, K N Gupta, H C Bohra. 1981. *Sheep in Rajasthan*. Jodhpur: Central Arid Zone Research Institute (CAZRI).

Shackle, Christopher. 2000. Beyond Hindu and Turk: Crossing the Boundaries in Indo- Muslim Romance. In *Beyond Turk and Hindu, Rethinking Religious Identities in Islamicate South Asia*, David Gilmartin and Bruce B. Lawrence eds, 55-74. Florida: University Press of Florida.

- Sharma, Bharat, K V Rao and Govind Sharma. 2009. Groundwater Externalities of Large Surface Irrigation Transfers: Lessons from India Gandhi Nahar Pariyojna, Rajasthan, India. DOI: 10.22004/ag.econ.257992. International Water Management Institute, Conference Proceedings, <https://econpapers.repec.org/RePEc:ags:iwmicp:257992> Accessed 12.11.17
- Sinha, Saurabh. 1996. Resisting Change? Adaptations by traditional pastoralists to the Rajasthan Canal Project. International Institute for Environment and Development, 62. UK:IIED.
- Singh, Dool. 1964. Land reforms in Rajasthan. Research Programmes Committee, Planning Commission. Jaipur: Government of Rajasthan.
- Singh, Surinder. 2006. Islamic Mysticism in North West India: An exploration of the poetry of Khwaja Ghulam Farid (1841-1901 AD). In *The Islamic Path: Sufism, Politics and Society in India*, Saiyid Hussain Jafri and Helmut Reifeld (eds), 75-109. New Delhi: Rainbow Publishers.
- Singhvi, A K and Amal Kar. 1992. Thar Desert in Rajasthan: Land Man and Environment. Bangalore: Geological Society of India.
- Sørbo, Gunnar M. 2003. Pastoral Ecosystems and the Issue of Scale. *Ambio* 32:2:113-117. Stable URL: <http://www.jstor.org/stable/4315346> Accessed: 24-12-2015
- Spat, O. H. K. 1947. The Partition of the Punjab and of Bengal. *The Geographical Journal* 110: 4/6:201-218 Stable URL: <http://www.jstor.org/stable/1789950>, Accessed: 12/04/2011
- Srivastava, Vinay. 1989. [In Hindi] Raika jati ka vikas: kuch vichar ('Progress of the Raika caste: some ideas'). *Manav* 17:3:107-10.
- Srivastava, Vinay. 1991. Who are the Raikas/Rabaris?. *Man in India* 71:1:279-304.
- Srivastava, Vinay. 1997. Religious Renunciation of a Pastoral People. Delhi: Oxford University Press.
- Srivastava, Vinay. 1999a. Some characteristics of 'herding caste' of Rajasthan. In *Rajasthan: Ecology, Culture and Society*, M.K. Bhasin and Veena Bhasin eds., 303-19. Delhi: Kamla-Raj Enterprises.
- Srivastava, Vinay. 1999b. Renunciation in a pastoral community. In *Rajasthan: Ecology, Culture and Society*, M.K. Bhasin and Veena Bhasin eds., 321-35. Delhi: Kamla-Raj Enterprises.
- Stein, Aurel. 1942. Survey of Ancient Sites along the "Lost" Sarasvati River. *The Geographical Journal* 99:4:173-182. Stable URL: <http://www.jstor.org/stable/1788862> Accessed: 28/02/2009
- Vyas, V.S. .1998. Sustainable Irrigation in the Arid Regions of India. In *The Cornerstone of Development, Integrating Environmental Social and Economic Policies*, Jamie Schnurr and Susan Holtz eds, 221-239. Canada & Lewis, USA: IDRC.

Water and Power Consultancy Services (India). 1989. Ecological and Environmental Studies for Integrated Development of Indira Gandhi Nahar Project Stage II Draft Report. New Delhi: WAPCOS.

Warren, Andrew. 1995. Changing Understandings of African Pastoralism and the Nature of Environmental Paradigms. *Transactions of the Institute of British Geographers* 20:2:193-203. Stable URL: <http://www.jstor.org/stable/622431> Accessed: 24-12-2015

Wink, Andre. 2004. *Al Hind The Making of the Indo Islamic World Vol. III: Indo-Islamic Society, 14<sup>th</sup>-15 Centuries*. Leiden: E J Brill.

Workneh, Tessema, Paul Ingenbleek, Hans Trijp. 2014. Pastoralism, sustainability, and marketing. A review. *Agronomy for Sustainable Development* 34:75–92. <https://hal.archives-ouvertes.fr/hal-01234790/document> (accessed February 2020)