

Let it be Banni
Understanding and Sustaining Pastoral
Livelihoods of Banni

Charul Bharwada
Vinay Mahajan



RESEARCH UNIT FOR LIVELIHOODS AND NATURAL RESOURCES
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Foreword

The Centre for Economic and Social Studies (CESS) was established in 1980 to undertake research in the field of economic and social development in India. The Centre recognizes that a comprehensive study of economic and social development issues requires an interdisciplinary approach and tries to involve researchers from various disciplines. The Centre's focus has been on policy relevant research through empirical investigation with sound methodology. Being a Hyderabad based think tank, it has focused on, among other things, several distinctive features of the development process of Andhra Pradesh, though its sphere of research activities has expanded to other states as well as to issues at the nation level.

The Research Unit for Livelihoods and Natural Resources (RULNR) was established in the CESS in the year 2008 with financial support of the Jamsetji Tata Trust. The core objectives of the RULNR are to conduct theoretical and applied research on policy relevant issues on human livelihoods and natural resource management, especially in areas related to river basins, forest and dry land ecosystems and to provide an effective platform for debates on policy relevant aspects for academicians, policy makers, civil society organizations and development practitioners. RULNR intends to adopt a multi-disciplinary approach drawing on various disciplines such as ecology, economics, political science, and social anthropology.

The present monograph "Let it be Banni" by Charul Bharwada and Vinay Mahajan is an attempt to understand the pastoralism in the Banni grasslands in Kutch of Gujarat State. Pastoralism is an important livelihood system that uses the scarce resources of dry land ecology and converts it into several useful products. Situating the inquiry in the larger context of history and recent developments in Kutch, the study tries to examine both the traditional and current system of breeding livestock, grazing practices, utilizing water sources and their economy. Based on both primary and secondary data, it brings out various factors that have impacted the grasslands and pastoralism and various ways adopted by the pastoralists of Banni to cope with these. It also brings out that mobility and free grazing movements are the key to the survival of pastoralism in Banni. The study suggests socially and ecologically sensitive interventions for sustainability of the pastoral system.

I hope that the research community, policy makers and development practitioners will find it useful.

Manoj Panda
Director, CESS.



While we are all trying striving to evolve sustainable systems,
here is a region, a community desiring to build future
around its ecology, history, skills and knowledge.

We need to be with them.

In constant struggle to save grasslands, their life.

In an effort to create a sustainable livelihood.

In their dream to let Banni be Banni.

Preface

It is cold winter of 1996. Since past three weeks we are in Kutch in the context of a study to understand its water problem. In this first visit to Kutch, like many others, we too are truly awed by its unique landscape and interesting people. One early morning, we leave Bhuj on our little LML Vespa to explore Banni. As we are moving away from Bhuj and the Bhujia hill range, a vast flat expanse of near nothingness begins to unfold. We have never experienced such a landscape before. Chill in the air is penetrating and driving through thick fog is making us feel like entering a new world beyond this.

We cross the army cantonments, cross the Rann of Banni and reach Bhirandiara. It is a small village. On both sides of the road are few shops, few acacia trees and very few, less than a dozen people. None of the houses are visible from the road while there are few makeshift shops on both sides of roads. Air is filled with the fragrance of boiling milk. Some men are stirring something in huge black pans kept over big makeshift *chullahs* near shops. They are making the famous *mava* of Banni. A small buffalo herd passes by. While sipping a cup of tea, we began chatting with Mamad, owner of the tea joint. He narrates several stories about this unique land; her beautiful and sturdy cattle, her good natured peace loving people; their cordial relations with erstwhile rulers of Kutch; invasion of this land by a foreign plant and extreme degradation of their once beautiful grasslands. He warmly offers fresh, hot mava saying, "You can not leave without having this." Yes. Indeed it is delicious. He takes money only for the tea as mava is offered with a gesture us being guests and not customers.

After few hours, we are at the highest point of Banni on Kalo Dungar at the height of 1500 feet, sitting on a huge boulder at this highest point of Banni overlooking the vast, limitless misty expanse of Rann of Kutch. There is infinite stillness and the quietness. Endless white layer of salt is breathtaking. Line of horizon is invisible and blurred by the reflection from salt. Sitting there, we feel at once connected to the past, to our history, to so many things we had read about Kutch and Indus Valley civilization. We could visualize camel caravans moving across the Rann; visualize the distant line that divided this land and her people in 1947. Can nothingness be so beautiful?

Images of our first trip to Banni are still fresh. Since that day, we have always felt like knowing more, understanding more. In a later trip to Kutch, Sandeep and his team told us about presence of an interesting tradition of bullock trade in Banni. We had a cursory meeting with one trader and were more curious to understand this land in some detail, some day. This study is a result of that curiosity and concern.

During our other field works and interactions with dozens of pastoralists across Gujarat, we realized how ignorant and insensitive we have been about these people, this occupation; their social contribution and relevance in fragile ecology. There is a need to understand and go beyond our popular belief that this is a 'backward' occupation practiced by 'ignorant' and 'illiterate' people; that they are least bothered about their ecology and its regeneration; that they know little science; and that it is an occupation of keeping few animals with whom these pastoralists make random anarchic movements to graze them.

We hope that this work will help in opening a small window in the complex world of pastoralism and pastoralists of Banni.

Charul Bharwada
Vinay Mahajan

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Glossary of Terms

<i>Aakhla</i>	Bull of cattle
<i>Amaanat</i>	Something kept in someone else's custody on trust
<i>Awada</i>	Cattle trough where water extracted water from virda / well is filled for feeding to the livestock
<i>Baldawala/Gameti/Dhagewala</i>	Terms used to denote a bullock trader in Saurashtra (Baldawala and Gameti) and in Sindhi language (Dhagewala)
<i>Baval</i>	Acacia
<i>Bet</i>	Higher elevation islands in the Ranns of Kutch
<i>Bhagia</i>	A pastoralist in Banni is called bhagia if he possesses excellent traditional knowledge about one or more aspects of pastoralism
<i>Bhunga</i>	Circular mud house with thatch roof made mainly by pastoralists of Eastern and Central Banni
<i>Charamani</i>	Money charged by a pastoral in Banni when he grazes livestock of others, from outside Banni.
<i>Chullah</i>	Hearth
<i>Crore</i>	Hundred lakhs / Ten millions
<i>Dargah</i>	Shrine
<i>Desi baval</i>	Native acacia, acacia nilotica
<i>Dhandh</i>	Largest wetlands in Banni
<i>Fakir</i>	A mendicant, who has abandoned the world
<i>Gamtal</i>	Village
<i>Gando baval</i>	Literally, mad acacia, term used for <i>Prosopis juliflora</i>
<i>Ganu</i>	A necklace of colourful beads tied around buffalo's neck
<i>Gauchar</i>	Pasture
<i>Ghee</i>	Clarified butter
<i>Girasdari</i>	A hierarchical system of estate holders for tax collection during Princely State's times
<i>Godla</i>	A castrated male of cattle to be raised for draft purposes
<i>Kafis</i>	A style of poetry, rooted in Sufism, popular in Kutch and <i>Sindh</i>
<i>Kerad</i>	Capers or <i>Capparis deciduas</i>
<i>Khad khatu</i>	Grass Department
<i>Kundhi</i>	Means coiled like a fish hook and in Banni's context refers to Banni's buffalo which has coiled horns
<i>Lakh</i>	One hundred thousand / One tenth of a million
<i>Lana</i>	Sueda
<i>Maldhari</i>	Pastoralist

<i>Masjid</i>	Mosque
<i>Mava</i>	Soft, solidified, dehydrated remains of milk when it is heated for long. Mava is used as a base in many Indian sweets.
<i>Pakha</i>	Huts made of grass reeds by Jat pastoralists of Western Banni
<i>Panchari</i>	Grazing fee / tax
<i>Panchayat</i>	Elected village council
<i>Panjra polys</i>	Community run animal shelter homes
<i>Pashu mela</i>	Animal fair
<i>Piludi</i>	Salvadora persica (saline piludi) & Salvadora oleoides (sweet piludi)
<i>Pir</i>	A muslim saint
<i>Saathi</i>	Literally meaning friend, used for a person hired to graze the livestock by a pastoralist at a monthly remuneration
<i>Sarpanch</i>	Head of the village council
<i>Seem - khabochiya</i>	Shallow small sized ditches around / beyond village boundary, accumulate water during monsoon.
<i>Suthi / Bana</i>	Denoting down payment in any deal.
<i>Tabelawala</i>	A person owning an animal farm or stable, used generally for buffaloes
<i>Talati</i>	A village level revenue official
<i>Talav</i>	Pond
<i>Taluka</i>	A Block, an administrative unit lower than District
<i>Vaccharada</i>	Castrated male calf till it is mature enough for farm operations
<i>Vidi and Rakhal</i>	Protected grasslands in the erstwhile Princely states of Saurashtra and Kutch respectively
<i>Virda / Khunryra</i>	A shallow well-like kutch structure to access sub-surface water
<i>Wada</i>	Enclosure of land for either cropping or penning animals
<i>Wadi</i>	Farms with irrigation source
<i>Wandh</i>	A hamlet or a settlement
<i>Zheel</i>	A low lying natural depression which stores water like pond.

Abbreviations

UNDP	United Nations Development Programme
ISRO	Indian Space Research Organisation
Sq. km.	Square kilometers
Kg.	Kilogram
Ltr	Litre
GUIDE	Gujarat Institute of Desert Ecology
ICAR	Indian Council of Agricultural Research
Ha	Hactares
Rs.	Rupee
BMCP	Bulk Milk Chilling Plant
NDDDB	National Dairy Development Board
MCM	Million Cubic Meters
LRK	Little Rann of Kutch
GRK	Greater Rann of Kutch
CAZRI	Central Arid Zone Research Institute
GSFDC	Gujarat State Forest Development Corporation
SPZ	Special Pastoral Zone
PWC	Prosopis Working Circle
GWC	Grassland Working Circle
PIWC	Protection Cum Improvement Working Circle

Acknowledgements

This study has been made possible by many people. Our first acknowledgement is due to Mamad, the tea joint owner who gave us our first lesson on Banni.

Many pastoralists of Banni have helped us learn and appreciate the complexity of this occupation and difficulties of their lives closely. Sometimes we just wondered at their grasp and memory of time, places and events. We sincerely thank all those pastoralists who have shared, talked and explained many things. In particular, we would like to thank Mirukaka of Dhadhhar, Ramzanbhai and his son, Naseer, from Sadai; Salimkaka from Sargu, Abdullakaka of Abdullah wandh; Karamkhan Jat from Bhagadia, Mir Khan Mutva from Gorewali; Miya Husain Gulbeg from Dhordo, Kaladhar Mutva for all the moving and interesting stories shared by him; Salambhai and Saley Mamad from Hodko, Wayadhanbhai, Ameenbhai, Ganibhai, Jumabhai and Saon Suleman.

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Chapter - 1

About the Study

1.1 Background to the Study

Pastoralism is an important occupation across all the ecologically fragile zones of the world - steppes, drylands, deserts and high altitudes. It is defined as raising of livestock on natural pastures and most pastoralists live nomadic or semi-nomadic life.

Unlike most other natural resource dependent communities, pastoralists resource use pattern spreads over a large geographical area giving rise to a mobile lifestyle. Of various resources used by the pastoralists, natural grassland is the most significant pastoral resource of arid regions. "Pastoralism is an efficient way to exploit natural grassland areas that are otherwise unproductive. Grass can not be digested by human beings, so raising animals that use this resource is a way for people to tap a rich energy source indirectly and open huge areas of semi-arid range land to productive use." (Barfield, 1993:12)

While overall perception of pastoralism as backward system of production continues to rule most planning efforts in India, there is growing work on various pastoral communities which demonstrates inherent suitability, sustainability and relative equity in pastoral regions of India. (Aggarwal A, 1999; Sabarwal, 2004; Brara, Kavoori, 1999; Srivastav, 1997) UNDP's (United Nations Development Programme) Dryland paper series sums up various works and approaches to pastoralism.

"Pastoralists have long been studied by anthropologists, interested at first principally in political systems and kinship, but since the 1950s also in pastoralism as an ecological adaptation to dryland environments. Thanks to these works, we now begin to understand what mobile pastoralists do in everyday life, why, and with what consequences. Animal scientists came at pastoralism from a different point of view, often seeing traditional livestock systems as inefficient, to be modernised with the help of genetically superior animals and new management systems. Range scientists at first followed the same path, promoting range management techniques developed in the prairies of North America. However, the spectacular failure of this imposing

approach prompted many range managers to rethink their science as it applied to the tropical drylands, with important results. It is now more widely understood that mobility is an ecological necessity, and that mobile pastoralism is often the best way to manage dry environments sustainably.” (Swift, 2003)

Pastoral livelihood systems in most semi arid regions of the world are characterized by low population density; open grazing over a large area; high mobility and high seasonal adaptability. The range of their mobility and the choice of the route and location is a result of interaction of complex factors like livestock type, rainfall, forage availability, market, outbreak of a major disease in a particular region, their social relations in an area, previous experiences etc. (Salzman, 1996; Barfield, 2000; Agrawal, 1999)

Despite being age old and resilient lifestyle, for most planners and policy makers there is an inherent negative bias towards 'mobility' which has often resulted in severe neglect of pastoral resource base and policies that either suggest or force sedentarisation of pastoralists. (Bharwada & Mahajan, 2006) It is unfortunate that mobility has never been viewed as a way to survive and maximize the resource use in fragile ecologies of arid regions.

1.1.1 Pastoralism in Gujarat

Indian pastoralism has always been closely linked to agriculture and has also provided several inputs to the traditional agriculture - bullocks, manure etc. Given the low suitability for agriculture, uncertain rainfall pattern and large tracts of grasslands; pastoralism has been an important occupation in large parts of Gujarat. Kutch, Saurashtra and parts of North Gujarat are traditional pastoral zones. For centuries, pastoralism has been the basis of survival in these arid regions. Large grasslands provided enough forage for various livestock breeds in different ecological zones within these regions. Pastoralists from different parts of the world have come and settled here since centuries giving rise to a rich pastoral mosaic particularly in Kutch and Saurashtra. In absence of any official survey or census of the pastoralists in Gujarat, it is difficult to know the total population of pastoralists. However, various estimates put it between 10 to 25 lakh, 2 to 5 per cent of Gujarat population as per 2001 population data.

History of pastoralism in Gujarat goes back to many centuries. Earliest evidences are of 3000 B.C. In recent archeological excavations at Oriya timbo, near Bhavnagar, numerous evidences of a well-developed pastoral settlement of Harrappan times (1700 B.C. - 1400 B.C.) have been found. Raising their livestock on natural grasses, these pastoralists lived nomadic or semi nomadic life. (Goswami, 1992; Ratnagar, 2004; Possehl, 1992)

Natural grassland is defined as plant community in which the dominant species are perennial grasses having few or no shrubs and trees. Associated with dominant grasses are less abundant grass species and variety of other herbaceous plants. (Misri & Singh, 1995:61) Gujarat has several natural grasslands like the famous Banni in Kutch; Vadhiar in north Gujarat; Panchal and Bhal in Saurashtra; grass islands known as bets in the Rann or near the coast like Nada or Aaliya bet respectively.¹ There are also other grasslands like the *vidis* or *rakhals*, protected by the erstwhile princely states.

First and only of its kind Gujarat wide formal recognition of these diverse and rich grasslands and pastoralists is seen in the 1965 report of Gopalak Samiti which gives a detailed account of more than 10 major grasslands of Gujarat. This committee gave several recommendations for the improvement of grasslands and pastoral livelihoods including conservation and special access to grasslands for the pastoralists. It also raised alarm at the likely dangers of afforestation programmes for pastoral livelihoods. Yet, the plantation of a woody exotic plant continued on many of the natural grasslands. Today, the invasion of exotic woody species *Prosopis juliflora*, locally known as *gando baval* - mad acacia, has severely affected most grasslands of Gujarat.

As per recent grassland mapping by the Indian Space and Research Organization, *Prosopis juliflora* has spread in more than 9.4 lakh hectares of natural grasslands.² Gujarat wide tree census of non forest lands by the state forest department brought out that out of total 25.1 crore trees, 4.31 crore trees are *Prosopis juliflora*, 17 per cent of total trees in the state.³ Besides this invasion, there have also been cases of encroachments and large scale transfers of grasslands to other land uses.

Present study is situated in this broader context of ecological degradation and overall neglect of pastoralism as an important livelihood system, as a way of life in most dryland regions of Gujarat. Kutch's Banni grassland is a unique dryland ecosystem and pastoralism has long history here. Banni is taken as a case to understand various socio-ecological changes and its impacts on the lives of the pastoralists, *maldharis*, living here.

Pastoralism is on a down slide world over, especially due to destruction or privatization of commons. Despite several setbacks, Banni pastoralism continues to work reasonably

¹ Bet is a Gujarati word for an island.

² Jadhav Ravi et. al. 2004. *Grassland Mapping in Gujarat using Remote Sensing and GIS Techniques*. Forestry and Environment Division. Space Application Centre, Indian Space Research Organisation. Ahmedabad.

³ Times of India, 4 December, 2004.

⁴ Maldhari is a Gujarati word for pastoralist. In Gujarati, mal means both animals and wealth; while dhari is the owner thus maldhari is the one who owns the wealth in the form of animals. It is a general term used for all the pastoral communities.

well. It is poised at a juncture where development pressure can compromise this lifestyle, and when pastoral economy of Banni is facing newer challenges.

What have been the major changes in Banni and the lives of the maldharis of Banni? How have these changes affected the livelihoods of the maldharis and what are the ways adopted by them to cope with these changes? Has it led to increased mobility or sedentarisation among them? Has it led to abandonment of the traditional livelihood systems and adoption of alternatives? These are some of the issues we have explored here.

1.2 Objectives of the Study

1. To understand the historical, ecological processes leading to degradation of Banni grasslands and their impact on the pastoral livelihood system of Banni.
2. To examine the current status of traditional pastures, system of accessing to grazing sources and the changes in the pastoralists' access to these pastures.
3. In the context of these changes, to understand various coping mechanisms adopted by Banni maldharis like changes in livestock types, its management; changes in the marketable products; access to grazing resources and pastoral mobility.
4. Based on the findings of the study, bring out the challenges and potentials and evolve a framework for sustaining the pastoral livelihood system in Banni.

1.3 Methodology for the Study

This study uses various methods to understand the livelihood system of Banni maldharis. It is multi-disciplinary in nature and has used both qualitative and quantitative analysis based on primary and secondary information. Livelihood system is explored and understood through three broad components - semi-structured interviews; group discussions and household survey.⁵ Field work for the study was carried out in three phases - First, November 2009; Second, February to April, 2010 and final works including the primary survey in January and February, 2011.

Semi-structured interviews were carried out with *bhagias*, local experts; community leaders, dairy officials, bullock and buffalo traders and with various people from local organizations.

⁵ There are various definitions of livelihood. Here, livelihood is broadly understood as "the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." (Carney, 1998:4) As quoted in Robison, Lance. 2009. Participatory Development and the Capacity of Gabra Pastoralist Communities to Influence Resilience. Doctoral Work, University of Manitoba

Personal meetings were held with relevant government and forest department officials. As we understood the region better, we realized that for the people of Banni - there are three subdivisions within Banni which signify broad ecological and socio-cultural characteristics and govern many aspects of pastoralism in each of those sub-divisions. These sub-divisions are known as East, West and Central Banni. In order to understand these variations and get a deeper quantitative insight into the pastoral system of Banni, a primary survey of 300 families was carried out in February 2011. The survey was carried out in 10 villages. 3 representative villages each from West and Central Banni and 4 from East Banni were selected and in each village 30 pastoral families were surveyed.

1.4 Relevance of This Work

As compared to many other natural resource dependent communities and livelihood systems of India, there is little work on the pastoralists and pastoralism. Given its spread and significance for the dryland systems, this work is a modest contribution towards understanding the pastoral lives, issues and their own perspectives. It also helps in understanding the 'adaptability' and 'resilience' of pastoral systems and pastoralists to major ecological and market changes. The study also helps question commonly held belief that pastoralism is a 'backward' production system and open grazing an inefficient resource utilisation.

We hope this work will add to the existing body of knowledge on the hitherto neglected natural resource and significant livelihood system in dryland ecology; and add to understanding of pastoralism. It is also significant in today's environment where society is struggling to understand and develop economic models that are sustainable, particularly where shared ownership and collective use of common resources make better economic sense; where communities have adapted to their ecosystems and developed robust societies.

Chapter - 2

Land and People

Salim is a passionate pastoralist of Banni and owns a big buffalo herd. In one of the drought years, he is forced to sell all his buffaloes. But he did not sell Patori, his most loved one. Deeply attached to her, he can not imagine life without Patori. As the drought becomes severe, taking care of one buffalo turns difficult. If he and Patori have to survive, they have to part. Patori has to be sold to someone having access to grass and water. He strikes a deal with a farmer from a nearby area. The new owner arrives to take Patori to her new home. As per the tradition, Salim removes the *ganu*, a necklace of colourful beads, tied by the owner. She no more belongs to him and he bids her a tearful adieu.

The new owner begins his return journey with Patori. Salim keeps watching them for long. He can not bear the pain of this separation. Moreover, he can not bear to see his beloved Patori bereft of jewel around her neck. He runs towards them, stops the farmer and against the local custom, ties back the *ganu* to her neck. As the farmer turns around to leave again, Salim stops him to tell something he has been longing to. With a sad requesting tone he begins, “My Patori is very loving, wise and calm. I know she will never trouble you. If she ever does, I beg you to not to ever curse her, abuse her or hit her. Please never ever get angry with her or be harsh to her. Take it as a weakness in my training and shower all your anger and curses on me.”

This is a story based on real life incident, narrated to us by a local pastoralist turned story writer, Kaladhar Mutva.⁶ Stories of extreme affection towards the animal, sacrifices for their well being, passion for high quality breeds are part of cultural traits in this pastoral land of Banni.

Land of Banni is a land of grasses. This bountiful grassland, once known as Asia's best tropical grassland, is endowed with several grasses and a clear blue sky. It is a land known for its huge and sturdy *Vadhiari* bullocks; land which has given to this nation one of the

⁶ This young writer from pastoral family is from a village Gorewali in Banni. He expresses the life and culture of his people through stories written in Sindhi language. This story is based on a real life case of a Jat pastoralist Haji Changa, nicknamed Chamu from village Sarada in Banni.

finest buffalo breed, Banni or *Kundhi*; land where people care for their livestock like their little children, understand the moods of their animals the way a mother understands her children. Proud owners of their herds and warm in their hospitality, the pastoralists of Banni will prefer to starve themselves but feed their animals. They have rich understanding of the local ecology, soil, grasses, animal breeding and have evolved a lifestyle consistent with their ecology.

2.1 History of Pastoralism in Kutch

On the edge of the Great Rann lies Kutch, the semi-arid north-west district of Gujarat, one of the most industrialized states of India. Natural landscape of mainland Kutch offers rich and interesting visuals - high hills, alluvial plains, undulating lands and Banni grasslands. The Arabian Sea in south and west, the Great Rann in the north and the Little Rann of Kutch in the east surround the whole landscape. There are no perennial rivers but 97 small seasonal rivers flow from the central highlands to north and south, many of them now dammed. Rainfall is highly erratic with an annual average of 350 mm. Complete failure of rains once in three years is part of cultural knowledge for Kutchis. Temperature variations are large from maximum 45° C in summer to as low as 2° C in winter. Low rainfall, arid climate combined with largely saline land and sub-surface water render large parts of Kutch, more suitable for pastoralism than agriculture.⁷

History of pastoralism in Kutch is quite old. Archaeologists believe that 7 to 8,000 years ago the rainfall increased in Thar Desert which increased the grasslands. This is also the time when sheep and goat rearing began in this region. (Goswami, 1992) Owing to its large grasslands and long coastline, pastoralism and maritime trade were the backbone of mainland Kutch's flourishing economy. Vast non-arable lands and low population density provided good grazing source for Kutchi pastoralists. In times of dry years, neighbouring Sindh offered good pastures. Agriculture was always poor and unprofitable. Large grain supplies from Sindh helped meet the food requirements of Kutchis. (Sampat, 1935) Sindh was also the market for selling their livestock.

As against farmers, the pastoralists were much better off, a fact invariably mentioned by the elderly pastoralists in Kutchi villages and supported by various historical records and

⁷ The coefficient of variation of rainfall in Kutch is as high as 65 per cent which means the dependability of a shower at the same time of year and season is low. This is not conducive for agricultural production. However, one good shower of 2 inches at any time during the monsoon is sufficient for good grass production. Thus, net productivity and conversion to economic gain is higher in pastoralism as compared to agriculture. In arid and semi arid regions of the world, in areas receiving upto 400 mm. annual rainfall, pastoralism takes precedence; and areas receiving 400-600 mm rainfall, agriculture is the primary occupation with crop residues supporting animal husbandry.

travel notes like the one by Captain Alexander Burnes, who traveled in this region from 1824-28. While quoting him in 1958, Rushbrook writes,

“The foreign trade by sea continued to be important . . . One of the striking features of the economy of the state at this time was the flourishing condition of the pastoralists as contrasted with the cultivators. On the grazing lands to the north of Kutch (Banni) and on the Rann islands, large herds of cows, buffaloes, camels and flocks of sheep and goats were maintained. A strong and hardy population, neither growing, nor eating grain, but living mostly on milk, exported enough butter and ghee to keep themselves in clothes, tobacco, opium and other necessities.”

Good pastures attracted many pastoral communities to settle in Kutch. Largest population is of Rabaris, traditional sheep herders and camel breeders, who came from Marwar and Sindh many centuries ago. Rabaris follow Hindu religion. Other smaller Hindu pastoral communities are Charans and Bharwads. The second largest pastoral group comprise of several Muslim communities like Jats, Node, Sandhi, Mutva and others. Based on their oral traditions, origins of these communities can be linked to Arabia and Central Asia. Rabaris are spread all over Kutch where as Muslim pastoralists are concentrated in the Western and Northern Kutch. It is estimated that pastoralist communities constitute 15 per cent of total population in Kutch.

These pastoralists reared cattle (both cows and bullocks), buffaloes, camels, horses, sheep and goats. Historically, Kutch has always had higher livestock population as compared to humans, an evidence of widespread pastoralism. However, past four decades have experienced decline in the livestock - human ratio. While human population increased by 207 percent from 0.68 to 2.09 million during 1961 to 2011; livestock population showed lesser increase of only 81 percent from 0.94 to 1.7 million during 1961 to 2007; an indication of decline in pastoralism.

2.2 Post Independence Developments in Kutch

Politically, Kutch had remained an independent state throughout the British rule in India. When most of the maritime states joined the Indian Customs Union, Kutch had struggled to remain independent. In 1947, India achieved its independence from British rule. Kutch remained a separate Indian state till 1956, when it was merged as a district in the bilingual Bombay state. In 1960, it became a district of Gujarat state. This relative independence was reflected in several pro-pastoralist policies of the state, especially in access to grazing resource and pasture management. There were 48 *rakhals*, protected grasslands, and an independent Grass Department which was wound up soon after the Indian state took over.

After independence, Kutch witnessed major socio-political and ecological changes that have constantly marginalized the pastoralists here. The first major blow was partition of India coinciding with the independence. The newly drawn international border prevented all trans-border migration. The age old link of Kutchi pastoralists with Sindh and Thar Parkar was severed as these became part of Pakistan, affecting their natural resource base and market. Many of them also lost access to their important pilgrimage centres. In case of Rabaris, temple of their goddess, Hinglaj in Baluchistan became inaccessible. *Dargah* of Sanwla Pir, most sacred religious place of Fakirani Jats fell just on the new international border. De-linking was not as easy as drawing lines on the paper; it took long time for the pastoralists to come to terms with this sudden loss. Most pastoralists admit to their continued links till the Indo-Pak war in 1971 after which the border was completely sealed and the security tightened. Several small grazing islands in the Great Rann of Kutch were closed to pastoralists due to security considerations, as army took positions along the border.

The new government initiated large-scale modern development activities in Gujarat. But there were no attempts towards a pastoral policy. Pastoralism never became a serious concern. Irrespective of the political party, the state has always advocated resource intensive 'modern' approach and all the developmental interventions made so far have kept marginalizing the local pastoralists. Being away from the political centre and state capital, the region's own voice was never loud enough, pastoral voice even smaller to raise their issues.

Be it bringing water from river Narmada located hundreds of kilometre away or getting thousands of tons of fodder annually from South Gujarat, the focus has always been on the imports from the resource rich regions rather than strengthening traditional economy and internal resources. The influential Kutchis living outside have also always favoured this approach.

Mineral wealth of the region has attracted large-scale lignite and lime stone mining; and salt making units in erstwhile pastures. Let us look at some of the recent examples. In 1999, 100 to 250 hectares of dense mangrove forest including a very important mangrove island named Bocha, which was a traditional grazing ground for local camel herding and fishing groups and a vast area of sparse mangrove vegetation was quietly transferred for a private port. In yet another case, an area of 321.56 sq. km. of Narayan Sarovar Wild Life Sanctuary was denotified to arrange for mining operations within the sanctuary. There have been several such cases of state supported quiet transfers of resources to industrial interests.

The grazing rights of pastoralists have never been formally recognized in post independence era. During the scarcity and droughts, fodder subsidies and other support is provided only to the cow and buffalo herding pastoralists which leaves the much larger group of sheep, goat and camel herding pastoralists without any support as these animals have been categorized as 'non-useful' in the relief manual. Despite their great contribution in milk, meat, wool, transport and manure, these animals are not included in the category of 'useful' animal in the Famine Relief policy, a colonial legacy continued till date. Post independence transfers of protected grasslands to the Forest department and closure of *khad khatu*, Grass department, in Kutch have had serious impact on both productivity and the biodiversity of traditional pastures.

After major losses in a massive earthquake of 2001 that killed more than 10,000 people, the government announced five-year tax holiday for the new investors to 'restore' and 'develop' Kutchi economy. As a result, more than 200 industrial units have set up their plants⁸. According to Industrial Entrepreneurial Memoranda, from 1988 to 2007, Kutch has received an investment of rupees 1,00,806 crores. These include chemical, steel, salt, industrial coke, ceramic and several other manufacturing units requiring large lands and water resources. Kutch accounts for 39.07 percent of the total projects currently under implementation in Gujarat.⁹ It has large reserves of limestone, bauxite, lignite and bentonite and is one of the preferred destinations for mineral based industries. Likewise auto and engineering, agro and food, oil and gas, ports, power and tourism projects have also been attracted to the district. Kutch has 12 Special Economic Zones, 13 Industrial Estates and 3 Industrial Parks spread all over the district.

On one hand there are imposing plans to 'modernize' the state, on the other an absence of any specific policy to deal with the pastoralism at the state level. Today there is a visible change in the occupational patterns. The decentralized sea-trade of the earlier times is all centralized at Kandla and Adani port. Livestock based economy which was flourishing at one time is struggling to survive as the earlier pastures are fast turning into industrial zones or saline wastelands or their productivity is reducing because of vast growth of *Prosopis Juliflora*. Irrigated agriculture, never significant part of Kutchi occupation, has flourished in some areas in last three decades. Industrialization is being thrust in a big way including water intensive projects like cement and chemicals.

As a result of this new developmental journey, the grasslands are being lost. Three major grasslands of Kutch - Coastal Mangroves, Naliya grasslands and Banni are experiencing varying degrees of impacts. Coastal Mangroves were first compromised in Kandla where

⁸ Based on the information from District Industrial Centre, Bhuj (July, 2004)

⁹ <http://www.vibrantgujarat.com/documents/profiles/kachchh-district-profile.pdf>

they have reduced from 500 sq.km. in the 60's to a mere 40 sq.km. due to the Kandla Free Trade Zone; followed by ongoing destruction of mangroves in Mundra Port, other coast dependant industries and now the west mangrove reserve forest is under pressure due to the mining and power industries that will require sea access through the six creeks in these mangroves; Naliya grasslands have been affected by large scale de-notification of the Narayan Sarovar Chinkara sanctuary opening way for lignite, limestone and bauxite mining and industries. Proposed power generation and ongoing large scale land allotment in Greater Rann are of serious concern for Banni's grasslands. Pastoralism of Banni needs to be viewed in this larger context of Kutch as this process has many impacts on local and regional resources that sustain pastoralism.

2.3 Land, Origin and Climatic Conditions

A drive from Bhuj to the Greater Rann of Kutch is an unusual experience. Vast expanse of flat lands makes it a unique sight. These are famous Banni grasslands spread over an area of more than 3,000 sq km. These inherently saline lands are not suitable for cultivation and are naturally suited for grasses. While travelling from Bhuj to Khavda in north, a few kilometres after Loriya, we come across a small board that reads - "You are passing over the Tropic of Cancer". This point marks the beginning of Banni. Banni lies between 23° 22' 15" N and 23° 48' 07" N latitudes and 69° 09' 14" E to 70° 10' 23" E longitudes with a perimeter of 367 km. On the southern side of Banni lies a salty waste that separates Banni from mainland Kutch, known as *Sukha Rann*, dry Rann of Banni.

For Banni's total geographical area there are various figures varying from the lowest 1868 sq. km. to 3847 sq. km. and it is difficult to know which one is the most authentic. During the course of our study, we came across 13 different figures worked out by various agencies and committees from 1959 to 2009. [Appendix-1] Whichever estimates we take up, its vastness is never disputed.

Like rest of Kutch, Banni's climate is hot and arid. During the summer months from April to June the temperature reaches a maximum of 48° C and in winter minimum temperature dips to 20 C. Monsoon begins in late June continuing till September bringing the rains from south-west. Rainfall is highly erratic and drought is a recurring phenomenon. Average annual rainfall is about 317 mm with a high coefficient of variation of 65 per cent. As per a study by Gujarat Institute of Desert Ecology, in a span of 95 years from 1901 to 1996 there have been 57 droughts. (Singh & Kumar, 1998:10) The cycles of droughts and the rains playing truant is the cultural knowledge of every person in Kutch and Banni. Scarcities are well reflected in many folk stories and poetry.

2.4 Ecology Favoring Pastoralism - Grasslands

Banni literally means *bani hui*, made up. Some geologists believe that Banni was formed by the detritus and sediments brought down and deposited, predominantly by many rivers like; Nara, Bhurud, Bhukhi, Nirona, Kayla, Khari, Kaswati, Panjora etc. flowing north-ward from Bhuj ridge. As Banni soils show no genetic relationship with the rock type of highlands of Bhuj ridge this theory is not accepted by many. On the other hand, these sediments show a strong affinity to the materials brought down by the rivers such as Indus, Luni, Banas and Saraswati which in the recent geological past flowed through this area from the north and east.¹⁰ Banni plains form a low alluvial table land rising 2.5 meters to 4.5 meters above Mean Sea Level.¹¹

As per the mythology, Banni has an interesting story of its origin. Once upon a time there was a saint, Saint Dhoram Nath. He performed penance on the hill Dhinodhar in Nakhtrana taluka near the edge of the Greater Rann of Kutch. When he opened his eyes after the penance, he first looked in the north. At this the sea receded and laid bare the Greater Rann. People believe that Banni is part of this vast land given up by the sea.

Availability of grasses and water are two most decisive factors that support pastoralism in any region. While grasses have always been abundant till recent times, water has generally been scarce here. This land has a rich diversity of grasses. From various sources, we were able to put together 56 different types of palatable grasses, sedges, plants etc. in Banni - saline and sweet; tall, short and are of varying shades of green.

Banni has 18 village panchayats. There are more than one village under some panchayats. Thus total number of villages in Banni vary from 48 to 54. Zone wise village panchayat and villages are given in Appendix - 2.

Based on its ecological and socio-cultural characteristics, Banni is further divided into three zones by the people of Banni. [For village locations, see Figure 1 and for location of Banni in Kutch please refer to Figure 3 and 5]

1. **Ugamani Banni** - East Banni. Area east of Bhuj Khavda road including villages Sargu, Reldi till Raiyado. (4 panchayats and 10 villages)
2. **Vachali Banni** - Central Banni. The central area that falls between west of Bhuj Khavda road and Western Banni is called Vachali Banni. (6 panchayats and 19 villages)

¹⁰ Singh and Kumar, 1998:8. Status of Banni Grasslands and Exigency of restoration Process

¹¹ Forest Department, 2009:1. Working Plan for Banni

3. **Aathamani Banni or Jat Patti** - West Banni. Western region that spreads from villages Bhitara and Hajipir up to Shervo and Mithadi. (9 Panchayats and 22 villages)

This study also uses the same division to understand micro variations in pastoral practices and other aspects of life in Banni.

2.5 Pastoral Communities

Good pastures attracted several pastoral communities from different parts of the world. Today, it is home to many pastoral communities like Raysipotra, Halepotra, Pirpotra, Hingorja, Sumra, Mutva, Node etc. who have migrated several generations ago from Sindh, Marwar and Baluchistan to make this land their homeland. It is quite common in Banni to get the identity from an ancestor. Potra is a term that literally means children or descendants. Thus, Rayasipotras are children of Raysi and similarly the Halepotra and Pirpotra. Rayasipotras are passionate cattle breeders known for their extreme love and affection towards their livestock. They are descendants of Raysi, a *fakir* of Dhal caste from Sindh.

Jats are the other pastoral people of Banni. Originally this was a pastoral group spread over the western coast of undivided India from Kutch to Baluchistan. However, after the partition the community got divided into two groups, one each on both sides of the border between India and Pakistan. Like all the other communities living in western Kutch, there is a great influence of Sindhi in their language too. It is believed that they have migrated from the Halaf region of Iran in search of better pastures probably in the medieval times. There are also stories of their moving out from their native regions due to conflicts. As per yet another in-depth and interesting research on Jats of Pakistan, this group shares many common socio-cultural aspects with the buffalo herding group of Iran known as 'Madan'. (Westphal-Hellbush, 1965)

All these pastoral groups follow Islam and have always had strong influence of Sufi traditions. Their traditional music, Sindhi *kafis*, also draws a lot from Sufism. In the past few decades, many of them have been influenced by the teachings of late Maulvi Abdur Rahim Node and have become followers of his Ahl-e-Hadish sect. He led people to believe in one God as against their erstwhile faith in various *Pirs* and *Fakirs*.

The other community in Banni is Meghwal who migrated from Marwar region of Rajasthan in the early 19th century, thus are locally known as Marwada. Their primary occupation has been leather tanning and shoe making. They also make several other beautiful artifacts from leather. They follow Hindu religion and are also strong worshippers of Ramdev Pir. Vadhas is another community involved in carpentry work making fine

lacquered furniture. “They are a peculiar caste in as much as they do not believe in any religion. However their social customs are found to be very similar to those of Muslims. Their names show mixed influence of both Muslim and Hindu traditions.” (Trivedi, 1964:10)

Cattle were always the most prized possession for Banni pastoralists. Many of their fairs, festivals and socialization revolve around their livestock. It is quite common among them to visit each other for sharing the pain and the joy of their herds. When a pastoral family loses many animals in a disease breakout; or when they leave for migration; or bring in new animals from elsewhere; there is a tradition in which friends and relatives visit such family.

One of the most important large scale social events of Banni is Haji Pir fair celebrated during early summer in March - April every year. This fair is celebrated for 3 days at the *dargah* of Haji Pir, near village Nara on the western tip of Banni. Haji Pir is remembered and revered by pastoralists and others alike for his valiant fight to save cows. People from all the communities and religions congregate at this fair as he is revered by all in this region.

As the story goes, Haji Pir, whose real name was Ali Akbar, had come to India with the army of Shahbuddin Ghori in the 12th century. Disillusioned and sad at the war and violence, he left his position as a soldier, denounced everything and became a fakir. After travelling in Punjab and Sindh, he came to Kutch and settled near Nara. He roamed widely in Banni and spent his life in serving others. Subsequent to his Haj pilgrimage to Mecca, he became Haji Pir. During an attack on village Nara for looting cattle wealth, one old woman lost her cow, the only means of her livelihood. Nobody dared to attack Ker Rajputs who had looted the wealth. She approached Haji Pir for help. His many disciples died fighting the Kers and then Haji Pir laid down his own life fighting to recover the cow.

2.6 Demography, Amenities and Infrastructure

Total human population of Banni was 10,949 as per 1991 census which increased to 17,202 in 2001. [Table - 1] Like most pastoral zones of the world, average density in Banni is also very low - 3.6 persons per square kilometres as against the average density of Kutch at 33 persons per sq. km. and Gujarat at 258.5 persons per sq. km. Just to get an idea of pastoral densities, average population density of largely pastoral countries like Mongolia is 1.77 and Kazakhstan is 5.96 persons per sq. km.¹²

¹² From www.worldatlas.com

Table 1: Zone-wise Population of Banni, 2001

Village	West Banni	Central Banni	East Banni	Total
No of families	874	1415	1468	3757
Total Population	3730	6604	6868	17202
Men : Women Ratio	959	921	980	953

Census, 2001. For village wise details, see Appendix - 3.

Among the surveyed villages of Banni, overall men to women ratio is 953. Central Banni has the least comparative ratio while East Banni has the highest men women ratio.

Different pastoral communities live in different regions of Banni. West Banni has Jat pastoralists and thus is also known as Jat patti, Jat belt. In Central Banni, Mutva, Halepotra, Sameja are the predominant groups. East Banni has Korar, Sumra, Hingorja, Theba communities. Villages surveyed by us have Jat, Halepotra, Sameja, Mutva, Khaskeli, Juneja, Korar, Theba, Node, Hingorja and Sumra pastoral communities. Berdo village in East Banni has a unique community - Khaskeli. Khaskeli community is found mainly in Pakistan. This is the only village in Kutch, probably in India, having people of this community.

Education is very low among Banni pastoralists. Average literacy rate among surveyed adult women is mere 6.3 per cent and is comparatively much higher among the men at 23.9 per cent. [Table 2] Over the years, there is major change in their attitude towards education. After facing several droughts, other stresses and near collapse of pastoral system in Banni, few years ago; many pastoralists have become keen to educate their younger generation. This is evident from the fact that while literacy among the adults is very low, it is much higher among the children between 11 to 17 years age - 38.6 per cent among the girls and 61.5 per cent among young boys.

They see education as a way to take their life forward in times of distress. Also, many of them have had bitter experiences of being cheated by traders, by the government officials due to lack of their ability to read. Among many families now even younger girls are encouraged to study, a welcome change for Banni. Within Banni, literacy levels are highest in Central Banni.

In terms of infrastructure, electricity and piped water supply connectivity was found in all the surveyed villages and most villages also have pucca road access. Transportation is a problem in these distant, remote villages. Out of the ten surveyed villages, only six have the state transport bus coming once a day, rest having to find their own means. Private jeeps ply few times a day between many villages.

Table 2 : Basic Information about Surveyed Villages

	West Banni	Central Banni	East Banni	Total
No of villages surveyed	3	3	4	10
Total families in these villages	500	350	465	1315
Pastoral families	475	315	360	1150
Total Population in these villages	2625	1700	2635	6960
Pastoral families as % of total families	95	90	78.5	87.45
Av. Family size	5.3	4.9	5.7	5.3
No of Families surveyed	90	90	120	300
Education - Female [% literate]				
11 - 17 years	46.2	45.8	28.9	38.6
≥ 18 years	2.0	10.0	6.4	6.3
Total above 11 years	11.3	16.4	10.5	12.4
Education - Male [% literate]				
11 - 17 years	51.7	73.7	58.0	61.5
≥ 18 years	13.9	32.3	23.9	23.9
Total above 11 years	21.9	41.8	30.4	31.7
Infrastructure				
Electricity	All	All	All	All
Piped Water Supply Connectivity	All	All	All	All
Villages having pucca Road Access	3	2	3	8
No of Schools	3	9	9	21
Primary Health Centre	0	0	1	1
State transport bus service	2	2	2	6
Water Sources - Talavs	6	15	26	47
Wells	1	3	2	6
Zheels	25	26	90	141
Virdas	460	200	1400	2060

Primary Survey, 2011

During health emergencies, people find it very difficult to reach nearby towns for accessing medical support. Due to increasing milk market, many villages now have at least one or more well to do pastoralists having their own motorcycle or jeep for milk transport. About 17 per cent of the surveyed families have motorcycles. These vehicles are an important source of emergency support. In most villages, with the coming of dairy since

past one and a half year, dairy vehicles come for milk collection every morning and at times they too provide emergency support.

Despite limited public transport, pastoralists of Banni are highly mobile and remain well connected with nearby towns like Bhuj, Mundra, Mandvi, Anjar, and Nakhtrana. As one of their close friends in Bhuj puts it, “If you visit any government office in Bhuj on Mondays and Tuesdays, you will invariably bump into few Banni pastoralists.”

All the surveyed villages have schools and most villages have more than one school with many wandhs having their own. Wandhs are like separate hamlets within the village. A typical village can have 2 to 10 wandhs. In many villages, each wandh has a school. Among 10 surveyed villages, there are 21 schools - all up to seventh standard.

Health facilities are very poor. Only one out of ten surveyed villages has a primary health centre and there are no private clinics in Banni. People have to access it from Khavda or nearby towns. Despite such large livestock population, there is no government or private veterinary services or centre in Banni. Many pastoralists are quite knowledgeable and experienced in dealing with varied livestock illnesses using local herbs and techniques. For many routine problems, pastoralists prefer to use traditional remedies.

There are multiple sources of water in Banni villages - traditional and modern. All the surveyed villages have public piped water supply, although its service is not very regular in most villages. Due to irregularity of water supply, many times villages have to depend on tanker water supply which is often inadequate. Despite piped water supply, nearly all villages have high reliance on their traditional water systems like *talavs*, *zheels* and *viridas* which are still in place. Due to geological unsuitability, very few villages have hand pumps in Banni. More than 50 per cent families reported to have their own *viridas*.

2.7 Productive and Consumer Asset Ownership

An inquiry into various productive and consumer assets owned by Banni pastoralists show that the consumer asset holding among them is not very high except for the mobile phones. Irrespective of their economic status, most pastoralists prefer to live in their traditional homes. Circular *bhungas* made of mud walls and thatched roof in Central and East Banni; and huts made of grass reeds called *Pakhas* in West Banni. There have been substantial changes in traditional home construction methods with an increase in use of external materials like tiles and stone. However, overall form and space design continues to be traditional.

Table 3 : Asset Ownership among Surveyed Families

Asset Details	West Banni	Central Banni	East Banni	Total
N	90	90	120	300
Families with traditional house	93.3	92.9	93.0	93.0
Productive Assets				
Zheel and Virda	74.4	45.6	52.5	57.0
Wada - Agricultural enclosures	6.7	23.2	9.2	12.7
Bullock or camel cart	1.1	1.1	1.7	1.3
Jeep or chhakda for milk	10.0	0	8.3	6.3
Consumer Assets				
Bicycle	22.2	38.9	26.7	29.0
Radio	11.1	16.7	18.3	15.66
Mobile	50.0	65.6	71.7	63.3
Motorbike	12.2	16.7	22.5	17.7
TV	0	0	0	0
Refrigerator	0	0	0.8	0.3

Source: Primary Survey, 2011

More than 57 per cent pastoralists have their own zheel and virdas. [Table 3] Since past few years, some Banni pastoralists have begun enclosing pasture lands and cultivating it for growing fodder crops in monsoon. Such an enclosure is called '*wada*.' This is a recent phenomenon and is discussed later. 12 per cent families reported being involved in cropping through such wadas. Central Banni has highest proportion of such enclosures. 29 per cent pastoralists have bicycles and 18 per cent of have motorbikes. For the remote villages of Banni, mobile phone is a necessity for communication with the outside world. 63 per cent surveyed pastoralists have a mobile phone. 15 per cent pastoralists have radio and we were told that the younger generation is very fond of listening to radio. Other modern gadgets like television and refrigerator are negligible here.

2.7.1 Livestock Ownership among Banni Pastoralists

Livestock ownership is very high and only 2 families out of 300 surveyed did not have any livestock. While cattle and buffaloes are predominant in Banni, pastoralists also keep sheep, goats, camels and few donkeys. Earlier there were significant number of camels too as that was the only means of transport in this vast land.

Table 4 : Livestock Ownership among Surveyed Families

Details	West Banni	Central Banni	East Banni	Total
Total surveyed Families	90	90	120	300
Families having livestock	90	90	118	198
Families having mixed herd [cattle and buffaloes]	1.1	35.6	28.3	22.3
Type of livestock owned among livestock owning families [%]				
Cattle	10.0	42.2	34.7	29.5
Buffaloes	100.0	87.8	93.2	93.6
Sheep and Goat	35.6	10.0	3.4	15.1
Camels	1.1	0	1.7	1.0
Horses	0	4.4	15.3	7.4
Donkeys	1.1	0	0	0.3

Source: Primary Survey, 2011

Of the total surveyed families, more than 90 per cent have buffaloes while only 30 per cent have cattle. Cattle population has reduced substantially over the years both in number of pastoralists keeping them and the herd size. Cattle ownership is lowest in East Banni and highest in Central Banni. Buffalo keeping is highest in East Banni where all the families own buffaloes. [Table 4]

Of the total livestock among the surveyed villages, buffaloes constitute more than 80 per cent followed by cattle which are about 8 per cent and sheep and goat forming 7 per cent population as evident from [Table 5]. Both West and East Banni have 88 per cent

Table 5 : Zone wise Livestock Composition among Surveyed Villages

Livestock Type	Per cent of total livestock			
	West Banni	Central Banni	East Banni	Total
Cattle	2.3	17.5	9.8	8.3
Buffaloes	88.8	63.8	88.0	83.9
Sheep-goat	8.8	18.1	0.8	7.1
Camels	0	0	0.2	0.1
Horses	0	0.6	1.2	0.6
Donkeys	0	0.0	0	0.0
Total Livestock	100.0	100.0	100.0	100.0

Source: Primary Survey, 2011

livestock population comprising of buffaloes which is comparatively less at 63 per cent in Central Banni. Cattle population is negligible in West Banni and highest at 17 per cent in Central Banni. Eastern Banni pastoralists have very negligible sheep and goat. Few horses were reported in Central and East Banni.

Table 6 : Herd Size among Surveyed Pastoralists of Banni

Details	West Banni	Central Banni	East Banni	Total
Cattle herd size				
N	9	38	41	88
Up to 5	22.2	78.7	61	62.5
6 to 10	66.7	15.8	22.0	23.9
11 to 20	11.1	2.6	9.8	6.8
More than 20	0	7.9	7.3	6.8
Mean cattle herd size	7.3	6.1	7.4	6.9
Buffalo herd size				
N	87	81	111	279
Up to 5	17.2	30.9	19.8	22.2
6 to 10	33.3	21.0	22.5	25.4
11 to 20	19.5	33.3	22.5	24.7
21 to 30	8.0	11.1	11.7	10.4
31 to 45	5.7	1.2	7.2	5.0
More than 45	16.1	2.5	16.2	12.2
Mean buffalo herd size	28.7	10.4	24.7	21.8

Source: Primary Survey, 2011

Some important features of livestock ownership and herd sizes in Banni are -

1. Cattle ownership is highest, 42 per cent, among the Central Banni pastoralists and least among the pastoralists of West Banni, the Jat pastoralists. Jats have been traditionally involved in buffalo herding and have rarely kept cattle which is also evident from the fact that in Western Banni, only 1 per cent pastoralists have mixed herd. In Central and East Banni mixed herd ownership is higher with 36 and 28 per cent families.
2. Buffalo ownership is more than 85 per cent across all the regions of Banni and is highest among the pastoralists of West Banni as Jat pastoralists have been traditionally involved in Buffalo breeding.
3. As against cattle, buffalo herd sizes are much larger. While mean cattle herd size in

Banni is 6.9, mean buffalo herd size is much larger at 21.8. [Table 6]

4. In Western and Eastern Banni, average buffalo herd is more than 24; in the Central Banni it is 10 buffaloes. Such significant variations in herd size may be due to difference in total resources, preferences and market. In West Banni, 6 pastoralists in village Bhagadia and 1 in Sherva have more than 100 buffaloes each (among surveyed).
5. In West and Central Banni, 70 and 85 per cent surveyed pastoralists have herds up to 20 buffaloes. Interestingly, both in West and East Banni more than 16 per cent surveyed pastoralists have large herds of more than 45 buffaloes

During the field work, we did cross group of well dressed pastoralist men riding well decorated horses. Many pastoralists of Banni were known for their horse rearing skills. Horses are for sale as well for status. Many of them still keep horses and love horse riding. Horse keeping is found highest among pastoralists of Eastern Banni. 15 per cent surveyed pastoralists in Eastern Banni and 4 per cent in Central Banni had horses.

2.8 Primary and Secondary Sources of Income

More than 90 per cent people among surveyed villages belong to pastoral communities and pastoralism is their primary occupation. Though, livestock and pastoral products form the largest share of their income, there are few other sources of income. Many pastoral families are involved in varied secondary occupations like charcoal making, casual labour etc. 86 per cent of surveyed pastoral families reported to be involved in one or more secondary occupation.

Charcoal making and embroidery are the two most significant occupations for supplementary income with more than 25 per cent families involved in it. [Table 7] Woody species of *Prosopis juliflora* [now onwards written as *Prosopis*] is a source of good quality charcoal. Charcoal making is a recent phenomenon which has come into existence in past 3 decades with the rise of *Prosopis* invasion, though it is officially banned. Ban on cutting *Prosopis* and making charcoal was lifted in 2004 but was re-imposed in 2008 by the Forest Department. While more than 30 per cent families from surveyed households are involved in charcoal making in Central and East Banni, only 14 per cent families in West Banni are involved in this occupation.

Banni women are highly skilled in exquisite embroidery. Bright colours, fine stitches and beautiful motifs are hallmark of their embroidery. Some stitches are common to all, while some stitches are specific to certain communities. *Bakhio*, *kandhlo*, *khuditebha*, *chher*, *chhidhar*, *aank*, *tun*, *lor* are some of the stitches used here. Traditionally, women used to embroider only for their personal and domestic use. Selling it was unthinkable.

Gradually, they have begun making it for the market. In Central and East Banni, more than 40 and 30 per cent families earn additional income through their embroidery but it is still very uncommon among Jat pastoralists. Only 1 per cent families in West Banni reported selling their embroidery. About 16 per cent families are involved in casual labour in nearby industries, government projects of road making, building, fencing etc. Being border region, army also hires casual labour for various works.

Table 7: Secondary Occupation among Surveyed Families of Banni

	West Banni	Central Banni	East Banni	Total
Total HH	90	90	120	300
1. Charcoal making	14.4	32.2	35.0	28.0
2. Embroidery	1.1	42.2	32.5	26.0
3. Labour	8.9	18.9	20.8	16.7
4. Farming	4.4	15.6	15.0	12.0
5. Pastoralism related business	0	5.6	4.2	3.3
6. Other	0	1.1	0.8	0.7

Source: Primary Survey, 2011

Economic disparity is not very sharp and there is not much variation in income across the three regions of Banni. Average net annual earning per family is less than rupees 24,000 for 70 per cent families; between 24,000 to 40,000 for 25 per cent; more than rupees 40,000 to 80,000 for a mere 4 per cent and only 1 per cent families earn more than rupees 80,000.

With this brief introduction to Banni and her people, we move to understand more closely the resource base and its use that keeps Banni's pastoralism alive.

Chapter - 3

Pastoral Resources, Use and Mobility

Banni's pastoralism survives upon its ecology, its breed type and the way in which pastoralists use their resources. Banni pastoralists are keen observers of nature and passionate breeders. For many of them purity of breed is critically important. Many have maintained pure breed characteristics across generations of their animals. Through generations of experience, pastoralists have gained deep understanding of the complex relationships between grasses and their types, breeds and breeding, salinity, Prosopis and micro resource variations across villages of Banni.

3.1 Livestock, Breeds and Breeding Practices

3.1.1 Livestock Composition

Buffaloes and cattle are the main livestock of Banni and constitute more than 75 per cent of total livestock. Banni's cattle is of Vadhiara breed and buffalo originally from Sindh, has adapted and evolved well to Banni's context and is now known as Banni buffalo. Besides cattle and buffaloes Banni also has sheep, goat, camels and donkeys however their proportion is very low.

It is not very easy to get an accurate picture of current livestock composition.¹³ As per Sahjeevan's 2008 survey buffaloes constitute almost 70 per cent of Banni's total livestock followed by sheep and goat while cattle form only 7 per cent of total livestock in Banni. [Table 8] For details of zone wise, village wise livestock population (2008) please refer to Appendix - 4. There are also horses and camels, though in very small proportion.

Of the total livestock, 45 per cent livestock is held in East Banni. Cattle population is lowest in West Banni. Jat pastoralists are traditional buffalo breeders and do not keep much cattle. It is important to note that the proportion of cattle is lower than sheep population.

¹³ Recent census figures were not yet made public and the figures given to us by the officials of revenue department seemed far away from our field observations. So for latest figures, we have used the data from the census carried out by a local organisation, Sahjeevan in 2008.

Table 8 : Livestock Composition in Banni - 2008

Livestock Type	West Banni	Central Banni	East Banni	Total	% of total livestock
Buffalo	14575	6264	16150	36989	69.9
Cattle	200	886	2623	3709	7.0
Sheep	2250	1990	1928	6168	11.6
Goat	1320	1696	1924	4940	9.3
Horse	9	222	851	1082	2.0
Camel	9	0	53	62	0.10
Total	18363	11058	23529	52950	100

Source: Census for M.Phil Dissertation by Bhatti, 2008

*Excluding the cattle population of 7000 from Misariyado village which remains outside Banni

3.1.2 Cattle and Buffalo Breeds

Pastoralists of Banni have been known for their fine breeding skills of Vadhiari bullocks and Kundhi buffaloes. It is difficult to say which animal, the cow or the buffalo was first reared by Banni people. It is possible that earlier this region had only cattle and buffaloes were brought in much later from Sindh by the pastoralists who migrated and settled here.

Vadhiari or Kankreji cows of Banni have their origins in Vadhiyar region of North Gujarat and are also known as Vagadia or Banniai cow and is one of the heaviest Indian cattle. A fully matured cow weighs about 450 kg while a bull weighs about 650 kg. This breed is characterized by triangular shaped face, a broad forehead and moon shaped portion between its strong curved horns. It has a smooth and shining skin. Known for their *Savai Chal*, or one and a quarter pace, Vadhiari bullocks are very agile, tall, big sized, ready to move with the smallest hint by the owner and serve for longer years. For generations, Vadhiari bullocks bred in Banni have sustained agricultural operations in Kutch, Kathiawar and many other regions around Banni. *Pag na pakka*, strong on hooves, as they are called, they are rightly suited for Kathiawari soils.

Banni buffalo is a sturdy breed that survives well in the harsh climatic and grazing conditions of Banni. Having faced recurring droughts, this buffalo has developed a strong water and fodder stress bearing capacity, good heat tolerance and ability to walk much longer distances as compared to most other buffaloes. It has unique coiled horns. Banni buffalo is well trained for open grazing. It is believed to have its origin in Sindh. Thus it is also known as Sindhan buffalo. Kuddan and Luaari, two villages of district Badin of Sindh are still remembered for having best buffaloes of this breed. Some people

believe that Banni buffalo is a cross of Sindhan and Kachhi breed of buffaloes. Gujarat has more than 5.25 lakh Banni buffalo population, of which 32 per cent are in Kutch. [Appendix - 5]

Table 9 : Comparative Characteristics of Banni Buffaloes

Buffalo Breed	Place of Origin	Av. milk production per lactation (ltrs.)	Average Milch Days	Av. age at First Calving (Years)	Inter-calving Interval (Months)
1. Jafrabadi	Gir Forests in Gujarat	1800 - 2200	302-310	4-4.5	18-24
2. Surti	Surat, Vadodara Dist. of Gujarat	1200 - 1800	350	3.5-4	15-18
3. Mehsani	Mehsana District of Gujarat	1500 - 1800	352	3.5-4	15-16
4. Murrah	Haryana, Punjab	1400 - 2500	300	3.5-4	16-17
5. Banni	Sindh, Banni	2500 - 2800	290-295	3-3.5	12-14

Source: Sahjeevan, 2010:10

During lactation they can give maximum up to 15 to 16 litres of milk per day. Reproduction cycles are fairly regular and inter calving interval is minimum as compared to other buffaloes. Banni buffalo has high adaptability to newer environments and newer owners. They are calm and easily adapt to the newer people taking care of them. As evident in Table 9, the average age for first calving and inter-calving interval are minimum among the Banni buffalo. The milk yield per lactation is about 2500 litres, highest compared to other breeds.

3.1.3 Breeding and Rearing Practices

Rearing animals is not an easy occupation. As believed by many, it is not just taking them to graze, bring them back, milk them and sit back. Pastoralism involves very careful breeding, caring and grazing practices and dealing with so many lives at a time requires carefully worked out choices in terms of how to manage the herd, how to limit the herd size, what will be the best herd size for one versus another pastoralist. While grazing practices are discussed at length later in this chapter, we discuss below some of the special features of breeding and rearing practices among Banni pastoralists.

Pastoralists of Banni have been particular about maintaining superiority of breed. Special care in bull selection, careful rearing of calves, strict checking of inbreeding, special feed and taking care of the animals like their own family members have been some important

considerations for the Banni breeders. Earlier pastoralists did not sell milk. Unlike commonly believed, it was not the unavailability of the milk market or low milk rates but their deep concern for the quality of progeny which prevented them from selling milk. It was believed that keeping the young calves starved of mother's milk would mean gradual deterioration in the breed. Calves were let loose to suckle their mothers till they were fully satisfied; the remaining milk was used in household consumption. Milk products like *ghee* and *mava* were made from the surplus milk. A 1960 report well captures the concerns of older days,

“*Maldharis* of Banni are interested in rearing good breed of cattle rather than earning from their products - an attitude which seems to have been conditioned by natural environments. They milk their cattle only once a day in the morning, when the herd returns to the village after grazing. As the animals also live a hard life, the output of milk is comparatively very low. But *maldharis* are indifferent to this. They are hesitant to sell milk and require some persuasion, if a needy outsider wishes to buy milk from them. According to old tradition which is deep rooted among them, they believe that selling milk is like the selling of a son, and hence they rarely sell milk. They also apprehend that if a *maldhari* starts selling milk, he will be tempted to earn more and more from this source. The result would be insufficient milk for their calves and the consequent deterioration in the quality of the breed. However, they are of late inclined to sell milk, if it is taken away in bulk. This is because they have to sell *ghee* at a very low price.” (Trivedi, 1964:29)

There is a tradition amongst pastoralists to name each one of their animals. Generally, a buffalo is named soon after it is born. Some of the common names are Madan, Bhuri, Chhali, Manjri, Mor, Dadam, Bhojal, Chaandri, Nangal.

Cattle keeping enjoyed special sanctity among the pastoralists. Cows were revered. As explained by a senior leader of Banni, Ramzaanbhai, “My father had 500 cows. In his days horses were used for local commuting. My father will never come close to his cows' enclosure atop a horse as a mark of respect for the cows. He will invariably get down at some distance. This is our milk source and we must approach it with *adab*, respect and dignity; was the sentiment in those days. My father never used to leave his cows alone. He will go and pitch his tent wherever the cows went for grazing. People never stepped over the spilled milk. Another remarkable point about earlier practices is that he and all the pastoralists of his generation will never enter their cows' enclosure wearing any footwear. Footwear will be removed at some distance, just the way you will remove your shoes while entering a temple or a mosque. After all you can't take the dirt of your shoes near such a sacred animal.”

Generally for a herd of about 25 - 30 buffaloes, they keep one bull. A big herd owner prefers having his own bull. Those having small herds of 4 - 5 buffaloes find it difficult to afford a bull and prefer shared ownership of a bull with other family members.

Bull has always been considered the jewel of the herd. Most of them always kept only Vadhiara bull though they may have Tharparkar or Sindhi cows. The importance they attach to their bull can also be understood from the fact that during the fieldwork whenever we tried taking a picture of any herd, the owner pastoralist will invariably ask us to focus more on the bull. If we tried taking his picture and if his herd was around, he would immediately run to his herd, stand next to the bull and ask us not to miss some of the remarkable aspects of his bull like his looks, or horn or tail while taking picture. Quality of the bull is also an indicator of the breeding skills and preferences of the owner.

Box 1: Checking Inbreeding

The most fascinating example of Banni pastoralists' ability to check inbreeding is the case of village Misariyado. This village has 150 families having around 7000 cattle. All of them have migrated to Abdasa's open grazing grounds and are living there since past 30 years to protect their cows from the *Prosopis juliflora* menace in their native village. During a good monsoon, they return to Misariyado for 2 - 3 months.

They keep moving in Abdasa and set up their camps there. It is a big mobile enterprise. They are divided in 5-6 camps and each camp has about 25-50 families and 1000-1200 cows. All the camps are within a radius of 20-25 km. Each camp has 4-5 bulls for reproduction and thus totally there are around 20-25 bulls. For most of us, it will be wonder to check inbreeding in such large herds that too in open grazing system. But not for these pastoralists. They manage it through their careful observation and common sense.

Out of 7,000 strong herd, there will be around 3,000 female calves. In a camp, there may be 600-700 calves. They know the father bull for each one of these!! When we expressed our utter surprise and disbelief Pathai Jam from this village said matter of factly, "Why are you so surprised? We can recognize the animals from their features just the way you can recognize handwritings of so many people. Each is unique."

They also know the age of each of the calf. Since there are only 4-5 bulls, it means each of them on an average would have fathered around 150-200 calves. They know from the age of these calves as to which group of around 150-200 calves is going to be in heat in a particular season. Accordingly, they remove the father bull(s) from the herd temporarily and bring in new bull from another camp or most often begin using two new bulls from their own herd.

A superior male calf born within the herd is reared to be a bull and there is an elaborate process involving careful selection of the young male to be reared as bull. Some important considerations for the selection are -

1. It must be an offspring of a pure breed parents;
2. its family history, background, structure and appearance of father bull;
3. milk yield, appearance and health of the mother;
4. father bull's ability and success rate in impregnating the buffaloes;
5. Outer signs and symbols of breed purity like white mark on the forehead, white hair or mark on the tail; shape and size of horns etc.

If the bull has to be brought from outside his own herd then besides the above criteria the pastoralist will also assess the care taken by the owner pastoralist in rearing and raising his bull. Generally the bull is used for breeding from the age of 2.5 to 3 years. Special diet is given to the bull. It often consists of jaggery mixed feed concentrate up to 4 to 8 kg daily; 500 gm. pure ghee or edible oil twice in a month. During the breeding season, many Jat pastoralists also give 2 eggs daily for about 5 days.

Though there is no evidence to prove, many pastoralists have shared that the expert breeders, *Bhagias*, among them have skills to evolve specific traits and behavioural patterns in their herd. Cows of some pastoralists are known for high milk yield while some for their beauty or peaceful nature or gentle behaviour while milking. A pastoralist prefers losing a year without conception within his herd than compromising with a weak bull.

Pastoralists share that by carefully done repeated crossing with Banni bull, they can visually transform any non Banni buffalo into Banni buffalo within 3 to 4 generations. Complete change in genetic characteristic may take 6 to 7 generations. This transformation will be so perfect that many 'experts' may not be able to distinguish the original mother lineage. However, Banni's *bhagias* will be able to tell its origin from its skin colour, eye color and type, tail, horns, legs, forehead etc. For example, a Surti buffalo will carry part of its brownish eyes and hair even after crossing it with Banni bull. Explaining it in detail as to how they actually determine it, Salimbhai tells Vinay, "It is simple. Though you have been living here for so many years and speak good Gujarati but from your Gujarati any Punjabi will be able to make out that it has Punjabi influence and that you may be originally from Punjab."

It is very important to prevent any inbreeding to maintain the purity of the breed. For this some rules are followed very strictly. A father bull and his female progeny are never

crossed. Male and female progeny from the same parents are never crossed. Pastoralists have phenomenal capacity to keep track of the animal's ancestry going back three to four generations. (Singh et. al. 2010: 102) Another ingenious way to keep track of the ancestry over generations is simply by giving the same name to the female progeny as that of her mother.

Box 2: Amazing Skills to Recognize Progeny.

There are several examples of pastoralists having fine skill of distinguishing and recognising the ancestors and related descendants of an animal simply by visual observation of their progeny. Such expert pastoralists are locally known as *bhagia*. Two cases deserve special mention here.

Haji Musa is a well known *bhagia* of Laywara village now living in Ludiya of Pachham. Like most other children, he too spent his childhood playing, teasing and running around with buffaloes owned by his family. His father and grandfather had handed down very high quality pedigree buffaloes to him and he was fully dedicated to carry forward the same tradition. After his buffaloes conceived, he had to visit Ahmedabad and stay there for about two months. Meanwhile, about 12 to 15 of his buffaloes had delivered. On his return many people came to meet him as part of the social custom.

On one such day, the dams (mother buffaloes) had gone out grazing. Guests thought of testing his knowledge as *bhagia* and challenged him to identify and relate each of the calf to its respective mother! There was a stunning silence. It was a real tough test. He was away for the past two months and had not witnessed the deliveries. How to identify their mothers? He went to the enclosure where the calves were kept and began examining all the features of each calf and began comparing them with the mother buffaloes - in their absence of course, as they were out for grazing. And guess what? He could perfectly match all the calves with their respective mothers.

He was just 35 years old then. All those present were dumb struck with his ability at such a young age. No wonder he has maintained 108 year old pure bloodline. He has won national award by the Life network for his contribution to the preservation of pure breed.

Most pastoralists change their bull every three years and thus need a new bull after three years. This is done either by exchanging their bull with other pastoralist or rotating a bull from within the herd. Because of this practice, most pastoralists have the habit of keeping track of several bulls in their area, their characteristics, pedigree etc. The reason is that sooner or later they will need to choose one from these available bulls.

If a herd owner does not have his own bull, he can go to any bull owner and borrow the bull for servicing females of his herd. Most bull owners would not mind lending their bulls as it would expand the progeny and would also be an act of help to a needy fellow pastoralist. Such a lending is always free of any charges but conditional. Owner puts conditions about the upkeep of his bull and specifies the type of feed, amount of fodder

etc. to be given. During the lending period, the owner may also visit the borrowing pastoralists to check the well being of his bull.

Besides such short term lending it is a common practice among them to support a good, serious breeder without expecting any financial returns. While we were interviewing Salimbhai of Sargu village, he received a call from asking for the price of a bull. Salimbhai gave a strange response saying "Nothing if you take the bull from me and depending upon the quality may be up to rupees one lakh if from the market." Finally he gifted a bull to the caller. Looking at our surprised faces, he explained, "I know him. He is a very sincere breeder. A bull with him will expand the good progeny which further ensures the breed survival and expansion."

Such sentiments in one of the most commercial states of the country, in 21st century are both surprising and inspiring. Pastoralism of Banni though commercially successful, is based on a different value of finance and markets that strengthens relationships beyond commerce. Stressing upon this, Sandeep Virmani tells us, "In a state where privatization and markets determine relationships, the values of common property and shared knowledge being open source in the best interest of the community is something that the present finance model needs to learn from."

Pastoralists often keep track of their favourite animals' ancestors and progeny. During the Banni animal fair of 2009, Mantharbhahi of Ludiya village refused to sell his buffalo when he was offered an incredible amount of Rs 2.11 lakh for his buffalo named Vadhai. Shocking for most of us. When asked the reasons, quick came his answer. "This is pure Banni buffalo. I can recall her whole family tree. This buffalo is very precious as it will give us pure breed for many years to come. Fruits of a tree can be enjoyed only if you do not cut the tree. There is no way I will sell her."

Explaining Vadhai buffalo's details like a family member, he introduced us to all her family members. "Vadhai's mother is from Jat village Motichur. Vadhai has two more sisters and one brother. 3 years ago her mother was sold to a buyer from Ahmedabad for Rs. 1.51 lakh who sold her back to a Jat from a village in Abdasa in Kutch at Rs. 70,000. Vadhai's youngest sister is with him and he wanted both the mother and sister to be together. Another sister and the brother were sold for Rs. 1 lakh and Rs. 82,000 respectively to Bhikhabhai of Mehsana who has a herd of 50 buffaloes. I purchased Vadhai for Rs. 72,000 when she was one year old."

A good breeder pastoralist's mind is a treasure of data with good memory and large capacity to store information about his and many other's animals across generations.

While there are many examples of love and pride towards the animals, there are also practices like starving the new born male buffaloes of poorer progeny to death.

We end this section by another story from Kaladhar Mutva which brings out their transparency, honesty and skills. *Diyaru Utthiyaran Jetro Sukh* - the joy equivalent to marrying off the daughter is a story of a lost buffalo.

In an unusually dry year, Sindh is reeling under severe drought and Banni has had good rains. A Sindhi buffalo strays in Kutch with a Banni herd of Aamad. Not knowing its owner, he keeps the buffalo in his herd. Many years go by. Aamad dies and now his wife takes care of the buffalo and her progeny. His wife is getting older but is constantly worried about someone's *amanat* with her. Her son is also not aware that this is a Sindhi buffalo. One day a visitor comes from Sindh to their village and happens to see this buffalo in the herd. He is taken aback by the striking similarity of this buffalo with his herd back in Sindh. He shares this with the old lady. Her face suddenly brightens up and tears roll down her eyes. She runs inside her house and brings something. She narrates the whole story of how his buffalo had strayed in their herd without their knowledge. And that his buffalo has given birth to many others. She and Aamad had kept a separate account of all the income from the ghee and sales of his buffalo and her progeny. Since money can get easily lost, they had converted all the earnings from his buffalo into jewellery. "This is all your amanat. Please take it back. Your buffalo now has a big family and these six are your buffaloes. Please take them too. I will be able to meet death peacefully now." Saying this she puts a small, beautiful pouch in his hand. The man says, "Allah has given me enough. I will take a little gold as a token of your extremely touching gesture and will leave all buffaloes with you. Please donate three of them to your masjid." Happy as if her daughter's wedding is just completed, few days later, the old woman dies peacefully.

Such stories demonstrating love and pride towards their animals are also a way to educate the younger maldharis in ethics and values associated with the way they practice pastoralism.

3.2 Diversity of Grasses

"Oh, that used to be a heavenly land for the pastoralists. "These were the words we often heard about Banni while meeting other pastoralists of Gujarat during a state wide study on the pastoralists. Being one of the best tropical grasslands of Asia, the land of Banni has been endowed with rich diversity of palatable grasses.

Grassland is an important ecosystem that not only provides livelihoods to many

communities of semi arid tracts, prevents its soil and water erosion and also supports wildlife. Describing the vegetation of Banni Salim Ali, the noted ornithologist writes in 1945,

“It is covered in large parts with *Lana* and *Lani* bushes (sueda and salsola), about 12 inches high and in close-packed tufts of up to two feet in diameter. Portions subject to frequent inundation are under coarse grass, in parts dense and tall, in others scraggy and short. Scanty patches of thin *kandi* and *babool* jungle lie strewn about the edge of Banni, and the leafless wild caper or *kerad* bushes are common everywhere.” [Trivedi, 1964:4]

On a hot afternoon of summer 2010, we were in the field trying to make a list of all grasses of Banni. While talking to an old, affectionate and passionate pastoralist in West Banni, Karam Khan, we asked him about the number of grasses that grew in Banni. His eyes sparkled, his voice moist and excited, he began giving us the names and characteristics of grasses of Banni one after the other as if he was seeing them all right there. His explanation of each grass, its colour, characteristic and height was so visual. After a while he paused and asked, “How much you want to write? This land is a treasure of grasses. More water it gets, more treasure it springs out. Your book will run out of pages but not the list of grasses.” Every time we spoke to the people, the fond memories of erstwhile abundant pastures came alive to them. With some sadness one of them said, “You want to know about earlier Banni? There was not a thorn here in Banni. You could walk entire Banni barefoot.”

Banni has had a rich diversity of grasses and several other vegetations. Several scientific studies have documented various plant species in Banni. Banni Development Agency recorded 22 grass species while an additional 11 plant species were recorded by ICAR in 1977. In 1982, Pandya and Sidha recorded about 41 plant species including grasses, herbs, shrubs and trees. Bharara recorded 30 different grass species in Banni. In 1994 Kadikar recorded total 25 grass species of which 12 were palatable and the rest were salt tolerant.

In 1998, Gujarat Institute for Desert Ecology recorded 23 grass species at their Dhordo experimental regeneration site. While in 2002 Bhatt and others listed about 10 grass species from entire Banni region. (Geevan, 2003:21)

Recent work by Gujarat Institute of Desert Ecology has documented 183 different types of vegetation in Banni including 33 types of grasses, 82 types of herbs and 16 types of trees as apparent from Table 10. For detailed list of all the vegetation of Banni, refer to Appendix - 6.

Table 10 : Diverse Vegetation of Banni

Vegetation Type	Varieties found in Banni
Climbers	9
Grasses	33
Herbs	82
Sedge	6
Shrubs	17
Trees	16
Twiner	3
Under Shrub	17
Total	183

Compiled from Annual Progress Report of 2008-09 of Integrated Grassland Development in Banni by Gujarat Institute of Desert Ecology. [Detailed list in Appendix-6]

Though not as part of a scientific work, interestingly, during our focus group discussions in various villages of Banni and talking to several elderly pastoralists of Banni we were able to list down about 30 varieties of palatable grasses in Banni. *Jhinzavo*, *Dhaman*, *Chichani*, *Shiyalpuchh*, *Laamp*, *Danoi*, *Mandhanu*, *Khevai*, *Saaon*, *Kuritaral*, *Dhrab*, *Kuyali*, *Muth*, *Unai*, *Savani*, and *Dhabhado* are the major grasses found in Banni. Some grasses are saline and some are sweet; some tall, some short and are of varying shades of green. Sweet grasses add strength to animal and sweetness to milk. Saline grasses provoke more thirst in the animals and add salinity to milk.

Except in the zheel areas where there is perennial sweet water, tree cover has always been sparse in Banni. Such areas always had good cover of Desi Baval (*Acacia nilotica*), *Khijado*, *Kandhi* and *Pilu*. Over past 4 decades, in most villages, *Prosopis juliflora* has taken over these diverse trees.

3.3 Grazing Sources and System

Various sources for grazing in Banni are - village pastures, other villages' pastures within Banni, wadas within Banni, agricultural fields outside Banni and fodder purchased from the market. Among surveyed families, grazing in the village pastures remains the most significant source.

Second significant source is pastures of neighbouring neighbouring villages. Accessing other villages' pastures is highest during winter. More than 70 per cent pastoralists of Central and East Banni use other villages' pastures during winter. During summer too, it remains fairly high with more than 45 per cent pastoralists using neighbouring village pastures. This practice is understandably least observed in Western Banni villages as these villages have larger pasture areas. [Table 11]

Table 11 : Most Frequently Accessed Seasonal Grazing Sources

[figures in per cent]

Details	West Banni	Central Banni	East Banni	Total
N	90	90	118	298
Monsoon				
Village pastures	100.0	94.4	95.8	96.6
Neighbouring village pastures	4.4	25.6	33.1	22.1
Purchased fodder	0	1.1	9.3	4.0
Wadas of Banni	1.1	0	0	0.3
Sources outside Banni	0	0	0	0
Winter				
Village pastures	100.0	97.8	95.8	97.7
Neighbouring village pastures	26.7	78.9	75.4	61.7
Wadas of Banni	3.3	12.2	15.3	10.7
Purchased fodder	3.3	2.2	11.0	6.0
Sources outside Banni	0	0	10.2	4.0
Summer				
Village pastures	80.0	75.6	83.9	80.2
Neighbouring village pastures	15.6	54.4	64.4	46.6
Purchased fodder	11.1	37.8	38.1	29.9
Sources outside Banni	0	12.2	18.6	11.1
Wadas of Banni	1.1	1.1	1.7	1.3

Source: Primary Survey, 2011

As each pastoralist accesses more than one resource in any season, its total does not add up to 100 per cent. The percentages indicate the proportion of pastoralists accessing that particular resource from among the total surveyed pastoralists.

On the other hand, Central Banni villages are very closely located and have the highest invasion of *Prosopis* in their pasture land which considerably reduces the available pastures in these villages. As the heat increases and fodder begins to reduce, some of the pastoralists begin buying fodder from the market. Purchasing fodder is more recent, about two decades old phenomenon as the pastures have been increasingly invaded by *Prosopis*. During monsoon and winter only 4 and 6 per cent pastoralists need to buy fodder respectively and that too occasionally for those animals that are either sick or too young and weak to go grazing. During summer the proportion of fodder purchase increases considerably. In Central and Eastern Banni more than 35 per cent pastoralists buy fodder where as in Western Banni due to better pastures only 11 per cent pastoralists need to buy it.

Few pastoralists of Banni pursue agriculture in enclosed pastures, known as wadas. This phenomenon is more common in Central and East Banni. Some families reported using these wadas particularly in winter after the crops are harvested. As can be seen in Central and East Banni 12.2 and 15.3 per cent pastoralists use wadas.

Agricultural fields outside Banni are another regular source - accessed maximum during winter and summer months by peripheral villages. Villages bordering Khavda, Pachham, Nakhtrana, Anjar and Bhuj do access these fields. Though overall its proportion remains small across all seasons and regions, it is highest in Eastern Banni and absent in Western Banni. 18.6 per cent pastoralists of Eastern Banni villages like Dhadhhar and Berdo go to the wadis of their neighbouring villages.

3.3.1 Pastures of Other villages

Accessing pastures of other villages is common practice and is lifeline for the survival of livestock. Due to variations in rainfall, there is uneven availability of grasses across Banni. Such practice allows them to easily move from grass scarce areas to grass rich areas.

When the grazing sources in their village become scarce, pastoralists look for villages having better grazing source in the near by areas and request the respective village to let them camp or graze. However, this is just a formality. For Banni pastoralists, all the grass is nature's gift for livestock thus no one ever refuses to let others graze. They understand that they all live in harsh conditions. This year this village has better rains and good grass but who knows about the next? Not only the host village will happily allow, but many times also make food and water arrangements for the immigrants from other Banni villages.

Outside animals are allowed to graze in 'their' pastures, so that they may be allowed to do the same in another year if their pastures receive less rain. For this reason it is a matter of concern amongst West Banni's Jat pastoralists that Central and East Banni's pastoralists are fencing large areas into wadas, disturbing this age old arrangement.

For example, livestock of one of the surveyed village Sadai, in Central Banni regularly grazes in about 8 surrounding villages like Hodko, Erandawali, Ghadiyado, Zazarwali, Vad, Vadali, Gedhudi Wandh and Bhirandiara. And once or twice in a month it goes to little far off villages like Misariyado, Madan, Sarada, Sherva, Bhagadia, Reladi and Neri. [See Banni village map in Figure 1] This means that the livestock of Sadai actually is dependent on pastures of 15 villages.

Table 12 : Seasonal Grazing and Water Sources : Nani Dhadhhar

Season	Grazing Source	No.	Grazing & Water Source	No.
Monsoon	Rau vari dhui, Layvaro bhon, Khatu vari khan, Tango sim, Moto kunro, Vaghura plot, Kavi vedh, Sadai sim plot.	8	Kabur varo talav	1
Winter	Karad vari mori, Budha vari sim	2	Juno talav, Fatal talav, Sayab varo zil,	3
Summer	Ecology plot	1	Vaghura no chhachh -1, Hanj talav, Kunji varo chhachh, Gole varo chhachh, Vaghura no chaachh - 2, Sayab varo zheel	6
All season	Kandhi vara plot, Chhachhi vara plot, Vaghura vari mori, Van vari sim, Vat vara plot	5	Dunno oliya sim	1

Source: Compiled on the basis of resource mapping exercise by Sahjeevan, 2008

There is an elaborate system of accessing grazing resources from all directions. A detailed analysis of information gathered during a resource mapping exercise by local organization Sahjeevan, working with Banni pastoralists brings this out in more detail. Village Nani Dhadhhar is in the north - east of Banni with a total population of about 180 families and has about 50 cows and 600 buffaloes. Analysis brings out that the grazing and water sources of this village spread over a large area and overlaps with neighbouring villages. As can be seen from Table 12 and Figure 2 there are 30 different grazing sources and 12 water sources spread across 6 to 7 kilometres radius from the village location.

Table 13 : Annual Grazing Calendar of Pastoralists of Thikariyado

Months	Location / Direction	Grasses Accessed
January - February	1-2 km. North of village	Gandhiro, Shiyal Poonch
March - May	8-9 km. West of village	Kal, Oin
June - September	6-7 km. South of village	Khevai, Danai
October-December	3-4 km. East of village	Laampdu, Sonval

Compiled on the basis of information in a recently published Gujarati monograph on Banni, [GUIDE, 2010:39]

Some sources are exploited all round the year while some are used seasonally. For example during monsoon, 8 locations are used for grazing and one location, Kabur Varo talav, as both grazing and watering resource. During winter season the grazing sources are spread over 2 locations and water and grazing sources are in 3 locations. During the summer too, the resources are spread in all the directions. Besides, some sources are exploited all round the year.

It is not just the variation in locations, but pastoralists also access variety of grasses during the year as can be seen in the example of village Thikariyado. With the onset of summer, the grasses become sparse and the distance to be travelled for grazing increases gradually reaching up to 9 km. as observed in Table 13. If there are good rains in one village, it is common to let the livestock from many villages come and graze as in case of Sargu. [Box 3] Sargu is not only of its kind. In March, 2011 while we are writing this, half the livestock of village Nana Sarada from Central Banni has camped in village Bhagadia and other half in Chhachhala since past 3 weeks.

These examples also illustrate that how the grazing source is accessed from different locations in different seasons in order to prevent overgrazing in one area and allow for regeneration.

Box 3 : Guests not Encroachers

Sargu is a small livestock rich village of about 60 households, 200 cows and 800 buffaloes. In order to protect their pasture land from any enclosures for agriculture, a recent phenomenon growing in villages of Banni, pastoralists of Sargu had passed unanimous resolution to never do and allow any enclosures for agriculture in their village.

About five years ago village Sargu had good early rains in May - June and abundant grasses came up in short time. As it was peak summer, naturally grasses in other villages had dried up. Several livestock herds numbering to about 4000 animals and 100 men came and camped in Sargu for about 2 months till their villages had grasses. Livestock from Banni villages like Dediya, Erandawali, Vad, Dumado, Gorewali, Sarada; Pachham villages like Soyla, Mindhiara, Godpur, Akli, Ludiya and Kakkar and few villages of Abdasa and Lakhpat had also come.

People of Sargu not only allowed them to camp but many times different families used to make food for these 100 men and give it to them. As Salimbhai puts it, "They are our guests. It is their need. Since God has given us grasses, they are here."

Such act of warm welcome to other pastoralists and sharing pastures with them is quite common in Banni.

Pastoralists of ten surveyed villages, access pastures of several surrounding villages. While a much detailed information of how each of those villages access multiple villages' pastures and how in turn other villages access their pastures is given in Appendix - 7; Table 14 brings out the interdependence for grazing across all the zones of Banni. All the three villages of West Banni access more than 5 villages' pastures; in Central Banni 5 to 9 villages; and in East Banni 2 to 8 villages regularly. For example, Village Sherva's livestock regularly goes to seven villages - Bhagadia, Chhachhala, Dumado, Gorewali, Hodko, Mithadi and Sarada.

Table 14 : Accessing Grasses from Multiple Villages - Surveyed Villages

No.	West Banni			Central Banni			East Banni			
	Bhagadia	Bhitar Nana	Sherva	Dumado	Mithadi Moti	Sadai	Berdo	Bhojarado	Nani Dhadhar	Sargu Moti
1	Bhitar	Bhagadia	Bhagadia	Adhiyaang	Bhagadia	Bhirandiara	Chhachhi	Bhirandiara	Dediya	Dhediya
2	Chhachhala	Luna	Chhachhala	Erandawali	Bhitar	Erandawali	Lakhabo	Chhachhi	Moti Dhadhar	Dumado
3	Chhari Dhandh	Mithadi Moti	Dumado	Hodko	Gorewali	Ghadiyado		Misariyado	Udai	Erandawali
4	Mithadi Moti	Sarada	Gorewali	Karanwali	Sarada	Ghedudhi Wandh	Sumarasar	Vagura	Lakhara	
5	Sarada	Udhama	Hodko	Sargu	Udhama	Hodko		Udai		Luna
6			Mithadi	Siniyado		Sadai				Nari Sargu
7			Sarada			Vad				Vad
8						Vadali				
9						Zararwadi				

Source: Primary Survey, 2011. For details see Appendix 7

It is important to mention that as these 10 villages' livestock goes to its neighbouring villages, similarly the livestock from those villages also access the pastures of these ten villages. Similarly, there are seasonal in migrations to many of these villages. For example, in Bhagadia, after the rains buffaloes from Laiyari village of Abdasa taluka and cattle from Jalu and Nakhtrana come to graze every year. Buffaloes from Ahmedabad are often brought in on *charamani*.¹⁴ At the time of survey, half the livestock of Sarada Nana village was in Bhagadia and the remaining half was camping in village Chhachhala. 2500 government camels come in every year to graze for few days. [Appendix - 7]

¹⁴ Charamani is the amount paid for a practice in which Banni pastoralists get outside livestock for grazing in Banni for certain period of time at a pre-decided charge per animal. Many tabelawalas, buffalo stable owners, and Rabaris of Ahmedabad send their buffaloes on charamani to Banni.

Village Berdo has huge buffalo population of 6000 so they prefer not to access other villages' pastures. As they say, it will not be enough and we can not finish others' grasses for our livestock. They purchase large quantities of fodder from the market and their dependence on the outside fodder continues almost throughout the year. The incidence of such practice is negligible in other villages.

Till now, there was no practice of cutting and storing grass in Banni. Since past 2-3 years, some pastoralists have begun cutting small quantities of grass and storing it for summer. It is never enough to meet the requirement for the whole herd for the summer but it helps to sustain in the last few days before the rains and to feed the sick and unwell stock.

3.3.2 Wetlands of Banni

Besides extensive pasture areas, there are several seasonal wetlands in Banni. Natural depressions and low lying areas within Banni are filled with rain water during the monsoon and become seasonal wetlands. These wetlands served as both water and fodder sources for the pastoralists.

Forest Department reports about 254 small and large wetlands in Banni. Locally, pastoralists have categorized these wetlands in four categories based on their sizes - *kar*, *chhachh*, *thhathh* and *dhandh*, *Kar* being the smallest and *Dhandh*, the biggest. Some of the known wetlands are Chhari Dhandh, Vakeria Dhandh, Kheerjog, Vinzar Varo Thhathh, Hodko Thhathh, Servo Dhandh, Bhagadio Thhathh, Keero Kar, Kunjevri Thhathh, Hanjtal.¹⁵

Chhari Dhandh is the largest wetland covering an area of 227 sq. km. *Chhari* in Kutchi means a saucer shaped area with shallow depression and *Dhandh* is a Kutchi Sindhi word means enough or perpetual water.¹⁶ Seasonal rivers such as Chhari (Dhurud), Laiyari, Gajansar and large catchment areas of Kiro, Palkhiari and Vazira hills are the main sources of water to Chhari Dhand. There are many varieties of trees, shrubs and grasses - palatable and otherwise. Chhari Dhandh is bordered by stands of Tamarix, *Salvadora persica* (*Khara pilu*) and *Salvadora oleoides* (*Mitha pilu*) interspersed by numerous shrubs. *Deel* grass from Dhandh is used for roofing houses and *Lai* grass found here is used in making walls of their homes. Area around Dhandh is used as a grazing ground and as water source for animals. Camels and buffaloes are also brought from the surrounding villages for drinking water. People used to do fishing in Dhandh and sell it

¹⁵ Forest Department, Gujarat State (2009:5)

¹⁶ Forest Department, Souvenir Chhari Dhandh

before it was declared the Conservation Reserve. Large number of migratory livestock comes from outside Banni. Pastoralists and the Forest Department believe that Chhari Dhandh has been degrading and many factors have contributed to its degradation.

“The construction of a series of check dams and irrigation reservoirs on the streams which previously used to flow unhindered in to the area together with the laying of numerous roads / bunds in Banni has affected the water movements thus contributing to the gradual shrinkage of the Dhandh over the years. This is further aggravated by siltation by windblown sand. Substantial portions of the area around the Dhandh have been gradually invaded by *Prosopis juliflora* has grown in large proportions altering the habitat of the area” (Forest Department, 2009:6).

There is another view substantiated by a water balance study carried out by a local voluntary organization, Arid Communities and Technologies (ACT). Sharing the findings of this study, Sandeep Virmani tells us, “This study suggests that it is a myth that damming has reduced waters substantially into the Dhandh. It shows that only about 16 to 19 per cent of water is curtailed due to upstream dams. The study further shows that the Chhari Dhand is not degrading, though there are threats of overgrazing and disturbing the nesting of birds over fishing. *Prosopis* has changed the habitat only to a small extent.”

3.3.3 Bets in the Rann: Erstwhile Grazing Source

Besides the grasslands of Banni, another special source of grazing was the ‘*bets*’, small grass rich islands in the Rann. These bets are small elevated islands of silt deposits brought by Indus and other rivers many centuries ago. Variety of grasses used to grow in these *bets*. For the pastoralists living in Banni and for those on the edge of the Rann of Kutch, Banaskantha and Tharparkar (now in Pakistan) these *bets* were an important monsoon resource and camping sites during their annual migrations to and from Sindh.

During a discussion with 62 years old Haji Mamadbhai of Pachham, north of Banni, he instantly gave us names of 27 *bets* with a feeling of nostalgia. These were Sarbelo Nano, Sarbelo Moto, Karamshai, Kanjarkot, Vegakot, Taivariyu Kunju, Laiwaro, Bhiyar, Locan, Tratal Bavlo, Moto Bavarlo, Sapewari Mori, Mori, Dharamsara, Kunver, Chhad (now in Pakistan), Ghumba, Bidio, Ker Moto, Ker Nano, Sindhar, Sanj, Chhapako, Double Bidiyun, Nani Trangadi, Moti Trangadi and Vongharo etc.

Till the 1965 Indo-Pak war, there was not much army movement in the Rann and pastoralists could access the grasses on these *bets*. Gradually with more and more security measures, pastoralists began to lose access to these *bets*. After 1965, this access was completely stopped and in recent times, access not only to the *bets* but to the Rann has also become impossible.

3.3.4 Purchasing Fodder from the Market

Purchasing fodder from the market is a very recent phenomenon in Banni. Pastoralists of Banni, like other places, have always relied upon their pastures and till about a decade ago purchasing fodder was non-existent. With shrinking of grazing sources, reducing quality of grasses and better returns on their milk, it is becoming an annual feature of Banni's pastoralism, though the reliance on fodder is still very low and largely limited to summer months. Among the surveyed pastoralists, 30 per cent pastoralists use it as a significant source of fodder for their animals during summer. During winter and monsoon it is negligible across Banni except in Eastern Banni [9.3 per cent] and that too only in village Berdo which has very large buffalo population. Purchased fodder use is least observed in Western Banni where pastures are relatively better and highest in East Banni. Earlier during scarcity, pastoralists used to migrate within or outside Banni. With increasing cost of transport on one hand and better milk prices over the years giving better returns, now some of them find it better to buy the fodder and remain within Banni than migrating out.

3.4 Daily Grazing Cycle

Daily grazing practices of Banni pastoralists are little different as compared to pastoralists of other regions of Kutch and Gujarat. Unlike in most other pastoral regions where grazing is most often during the day time, the harsh weather conditions of this land has given rise to the tradition of night grazing. Traditional daily grazing cycle is well captured in Bhirandiara monograph.

“There are no shady trees to protect the animals from the blazing sun. There is also no water outside the *jhils* sometime after monsoon. Cattle are, therefore, not taken out for grazing in the morning and brought back in the evening as is the usual practice elsewhere, but they are taken out in the afternoon, and allowed to graze during the night, returning home in the morning. Here they are watered, after which they rest in or near the *vadas* or enclosures where at least some shade is available. In the afternoon, after the heat of the sun abates, they again proceed to the grasslands. Grazing at night four to five miles away from the village must throw additional burden on the *pastoralist* for the safety of his charge from preying animals that might be on their nocturnal prowl. Because of long habit the shepherds do not lose the sense of time and direction through roaming in the dark. Even cattle are known to develop this sense in this region.” [Trivedi, 1964:32]

The practice of night grazing still continues. Generally a buffalo herd leaves in the late afternoon at around 5.00 p.m. Each herd has a leading buffalo in whose neck a bell is tied. If any buffalo of the herd loses its way, the familiar sound of the bell brings it back

to its own herd. They graze all through the night and return to their owner's home in the early morning between 4 to 5 a.m., the time for milking them. After milking and watering them, they are again left to go grazing till early noon. They return by 11 - 12 in the noon and rest till about 4 p.m. under the shady areas of their homes after which they are again milked. Depending upon the season and availability of grasses, typically a herd travels 2 to 8 km. in a day. During monsoon when grasses are good in and near their villages, herd travels less and during summer due to overall scarcity, it has to travel long distances. It is interesting as to how the herds develop a good sense of direction and village boundaries and return to their villages and owner's home without anyone accompanying them.

Cattle have the same grazing cycle. While buffalo herds are left unaccompanied except during the 'heat' period to ensure that competing bulls do not fight and injure each other, cattle herds always have to be accompanied. Earlier they had to be accompanied due to fear of attacks from wild animals. Now, they need to be accompanied due to fear of consuming *Prosopis* and their higher vulnerability to theft by outsiders. Also because cows in a large herd begin to run around helter skelter with a slight perception of a threat so their movements need to be controlled. But small cattle herd of about 10 cows can be left unaccompanied.¹⁷

3.5 Grazing Norms among Pastoralists of Banni

Like any other pastoral system, as seen above, in Banni too pastoralists access diverse grazing sources from all over Banni. Being natural grassland and fragile ecology, open grazing is the most optimal way of utilizing scarce resources of the region. They access pastures within the notional borders of their own villages, pastures of nearby villages within Banni, pastures of far-off villages within Banni due to rainfall differences, make seasonal movements within Banni from low lying areas to highlands during monsoons and at times migrate to places outside Banni in times of scarcities. During a normal rainfall year, village and its surrounding pasture lands remain the most accessed source in both winter and monsoon. A recent paper by Virmani, Das and Bhatti who have been closely working with Banni pastoralists for more than two decades, well sums up the grazing system of Banni.

“Pastoral community in Banni has tremendous knowledge of their grassland ecosystem....Pastoral people categorise grazing patches on the basis of different criteria like soil type, distance of water bodies, periodicity and quality of drinking water for animals, grass, shrubs, trees' cover and diversity, topography of land and surface of movement, wind flow, size of grazing patch, and distance from villages. Animals generally grazed with traditional restrictions which based on

¹⁷ Based on discussions with Ramzaanbhai, Sadai.

ecological decisions like situation of grazing area, growth of grasses, and availability of water. In order to prevent overgrazing and allow the grasses to attain its maturity they do not allow grazing before Diwali so that seeds are spread ensuring production of grasses next year.” (Virmani et. al. 2010: 371)

Field observations and our discussions with several pastoralist show that the grazing practices of Banni pastoralists are governed by well practiced norms:

1. There are mutually agreed upon and known village pasture boundaries like this is Bhagadia's pastures or Sadai or Bhirandiar's pastures. But within the village there are no family demarcations for grazing in village pastures. Each family within the village has equal right over the village pastures irrespective of the number of their livestock.
2. Though customary boundaries of villages are acknowledged, they are not restrictive to other pastoralists of Banni for accessing pastures. Thus, whole of Banni is like a large unfragmented, collectively used pasture land where livestock movements across the villages are far more fluid than those observed by other pastoralists in revenue villages outside Banni.
3. Accessing pastures of other villages is common and like lifeline for the survival of livestock. Within Banni, there are always micro variations in rains leading to difference in the quality and quantity of available pastures. Accessing pastures of grass rich areas by the pastoralists of grass scarce areas is very common across Banni.¹⁸
4. Neither the village having surplus will refuse grazing, nor will the deficit village will take undue advantage of such a tradition and if the deficit is too high, they will themselves think of migrating to places outside Banni to not to burden other villages.
5. Grazing movements across villages are restricted only when the livestock of any village suffers from a mass disease break-out in order to further prevent other livestock from getting affected. This is like voluntary quarantine to save Banni's livestock.
6. Generally a pastoralist having his own herd will not get outside livestock on *charamani*, grazing charge. Those having no livestock may bring in from outside but that is very subjective. However, during scarcity, no matter how much an outsider wants to pay, no pastoralist would take outside buffaloes.

¹⁸ Such an innate pastoral wisdom is consistent with the well established understanding that movements across the diverse zones of grassland allow an optimal resource use and the maximum number of livestock to sustain compared to a situation where such movements are not allowed.

3.6 Water Sources for Livestock

3.6.1 Using Diverse Water Sources

Though grasses in Banni have been abundant earlier, water has always been scarce in this arid land. Low rainfall, high aridity and high rate of evaporation mean low water availability for both humans and livestock. Unlike many other parts of Kutch this inherently saline land has no durable source of groundwater. Yet, the people of Banni have evolved ingenious ways for sustaining their own life and pastoralism. Like grazing, pastoralists of Banni access different water sources for their livestock. Traditional water sources like zheel and virdas, talavs in villages and in the open pastures, seasonal wetlands; modern piped water supply, tankers etc.

Table 15 : Zone wise Water Sources among Surveyed Villages

	West Banni	Central Banni	East Banni	Total
Total Surveyed villages	3	3	4	10
Total talavs	6	15	26	47
Total wells	1	3	3	6
Total zheels	25	26	90	141
Total virdas	460	200	1400	2060
Total hand pumps	3	3	3	9
Piped water	All	All	All	All
Tanker water	All	All	All	All

Source: Primary Survey, 2011

Our survey showed substantial spread of traditional water sources, both for humans and livestock. [Table 15] Traditional water sources were highest in East Banni. 9 villages have one handpump each and all the villages have piped water supply. Yet, zheels and virdas remain a significant source of water for both human and livestock. Average zheels per village vary from 8 to 23 and virdas from 67 to 350. Eastern Banni shows the highest numbers of zheels and virdas. Village Berdo alone has more than 1000 virdas in its 90 zheels.

Pastoralists have high dependence on traditional systems for watering livestock. As there is enough water in talavs, during monsoon, village talavs and talavs in the open pasture lands are the most accessed water resources among the surveyed pastoralists in all the three zones - more than 90 per cent in each. [Table 16] Zheels and virdas are of little use during monsoon as there is enough water in other sources. With the onset of winter, people begin to dig virdas.

Table 16 : Seasonal Water Resources Used by the Pastoralists

	West Banni	Central Banni	East Banni	Total
Monsoon				
Village talav	98.9	91.1	92.5	94.0
Seem talav - khabochiya	24.4	37.8	39.2	34.3
Zheel and virdas	4.4	14.4	0.8	6.0
Village wells	0	11.1	0.8	3.7
Piped water	17.8	21.1	38.3	27.0
Tanker water	0	1.1	0	0.3
Hand pump	0	0	0	0
Talavs & virdas of other villages	0	0	0	0
Winter				
Village talav	100.0	97.8	95.8	97.7
Seem talav - khabochiya	30.0	58.9	56.7	49.3
Zheel and virdas	56.7	73.3	56.7	61.7
Village wells	5.6	30.0	24.2	20.3
Piped water	31.1	58.9	61.7	51.7
Tanker water	0	14.4	1.7	5.0
Hand pump	0	1.1	0	0.3
Talavs & virdas of other villages	1.1	2.2	5.0	3.0
Summer				
Village talav	11.1	2.2	2.5	5.0
Seem talav - khabochiya	3.3	13.3	7.5	8.0
Zheel and virdas	58.9	33.3	48.3	47.0
Village wells	4.4	11.1	1.7	5.3
Piped water	47.8	67.8	54.2	56.3
Tanker water	1.1	15.6	5.8	7.3
Hand pump	0.0	1.1	0.8	0.7
Talavs & virdas of other villages	24.4	56.7	40.8	40.7

Source: Primary Survey, 2011

*Seem talav is a small pond outside the village habitat areas and khabochiyas is a small depression or pit where water is accumulated during monsoon.

During winter, talavs, zheels and virdas are the major source. As it starts getting hotter surface water sources like talavs begin to dry up and pastoralists begin to dig virdas one after the other and virdas continue to give water till they become saline. Also, many of them turn to piped water.

During monsoon, village talavs and seem khabochiyas are most used resources followed by the piped water supply. Village talavs continue to be prime source during winter too with more than 97 per cent pastoralists using it followed by 61 per cent using zheels and virdas and little more than 50 per cent accessing piped water. In terms of diversity, people access maximum types of resources in winter.

During summer, piped water becomes a prime source in Central and Eastern Banni with 67 and 54 per cent pastoralists using it; while zheels and virdas continue to remain prime source in Western Banni with 58 per cent pastoralists accessing it. This is partly because there are more wetlands in Western Banni which continue to give water for longer. Besides, the piped water supply is quite irregular in the villages of Western Banni.

Village wells are used more for drinking water, thus its use is low for watering animals. During winter, 30 per cent pastoralists in Central Banni and 24 per cent pastoralists in Eastern Banni access well water for their animals. During summer, piped water and virdas become the most accessed source in Banni - 56.3 and 47 per cent respectively.

It is important to note that like for grazing sources, even in case of water sources pastoralists do access water from other villages and from areas beyond their villages. This use is highest during summers when more than 40 per cent pastoralists access talavs and virdas of other villages

3.6.2 Traditional Water System: Zheel and Virdas of Banni

We would like to share the traditional system in more detail explaining what it is, on which principles it works, why it is still so popular and most reliable and how its use is governed by the people. People of Banni had no way to survive without evolving brilliant methods to use the rain water absorbed by the soil. Capturing their life around water, a well known scholar on Kutch, Ramsinhji Rathod (1959) writes:

“Main problem in the development of Banni is water. Sweet water is available only in three *Zheels*,¹⁹ out of forty, and some *pastoralists* survive on them permanently.

¹⁹ Zheel is a low lying area where water accumulates and recharges the soils up to shallow levels.

All others along with the herds of their cows take shelter in Kutch-Kanthar villages (along southern coast of Kutch) in summer and scarcity. In monsoon sweet water accumulated by rains is available.....Once this water is exhausted, they have to make several *khunyra* (*virda*) in every *Nes* (settlement). Sweet water is found in *khunyra* at a depth of 10 to 12 feet....after a few days' use the *khunyra* becomes saline so new *khunyra* has to be dug.....and in summer digging any *khunyra* gives saline water.”

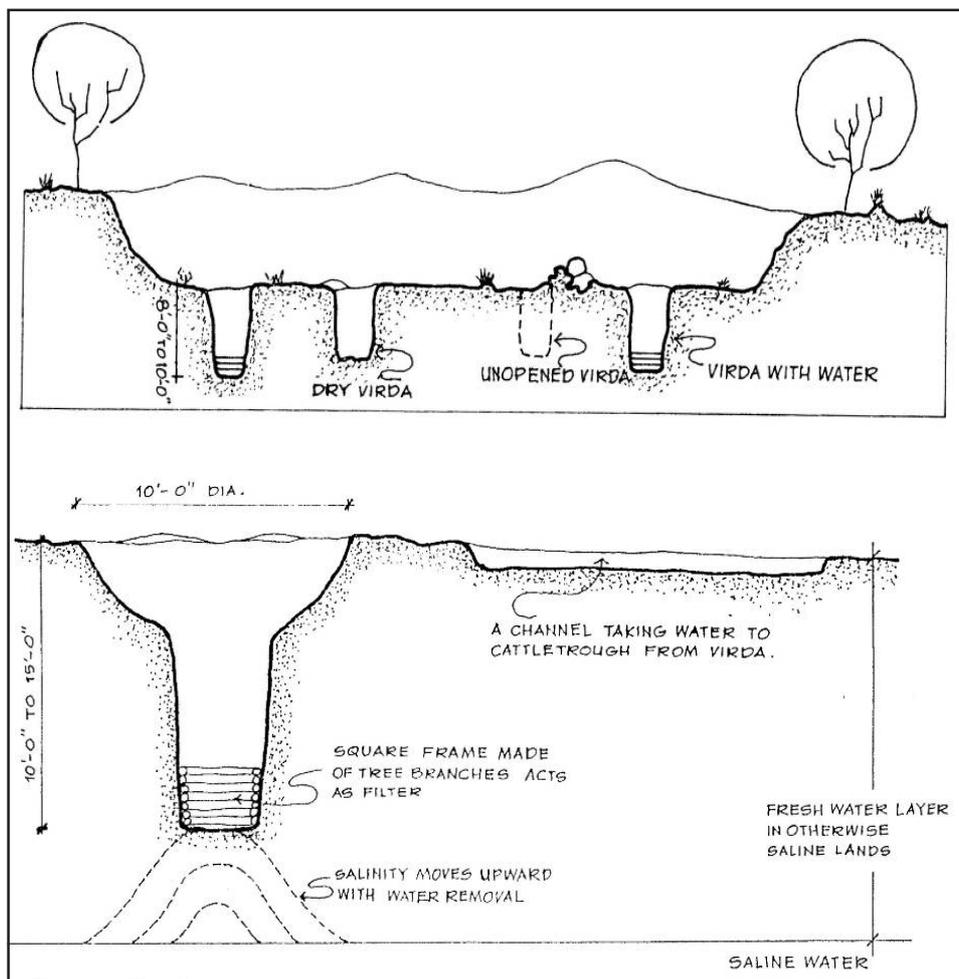


Figure 3 : Section through Zheel and Virdas of Banni

Over generations people have carefully understood the water movements, water absorption and salinity characteristic of Banni and have developed corresponding water securing mechanisms. Zheels and virdas or khunyras are two most important man made sources

of water in Banni. Zheels are like talavs made around the village, often owned by the families which dig them. In order to reduce the rate of evaporation from the zheel and also to use this as a resting place for the thirsty humans and animals, zheels are always surrounded by thick grove of native Babul trees. As zheels begin drying up, people dig deeper to tap sub-surface water through an ingeniously evolved structure called virda. These virdas are the only internal source of sweet water in Banni grasslands. Such virdas are dug in low lying area where rain water accumulates and is stored in otherwise saline lands.

A typical virda is like a dug up shallow well in zheel and is about 10 to 15 feet deep. Digging it in the zheel which is a low lying area increases the water holding capacity of Zheel and reduces the total depth required to be dug to lift virda water. The upper 10-12 feet diameter of virda narrows down to a square pit at the bottom with each side about 4 feet. This square structure is complex in its design and is reinforced so that the clay at the bottom does not cave in to clog the entire virda at the bottom. The square frame made out of tree branches acts as a retaining structure and is tied with locally made ropes. Grasses are placed and tied in between the tree branches and they act as filter. The virda is connected to an awada - cattle trough, by a dug up open channel for conveying water lifted from the Virda to awada. Awada is used for watering livestock. When it rains, fresh water accumulates in these low lying areas and virdas get filled with both water and silt. Depending upon the rain and water requirements the virdas are reopened one after the other by removing silt.

As fresh water is drawn, the saline water gradually starts moving upwards from greater depths to the bottom of the virda. When the lifting reaches the bottom, that virda becomes saline as shown in the Figure 4. There is a well designed system for selecting the virdas to be opened considering the amount of time it requires to get saturated again after its salinisation. Generally it takes anytime between 20 days to 2 months for a virda to become saline depending upon the withdrawal. Availability of sweet water in virda depends upon the rainfall and the immediate topography in which virda is located.

The process of making a virda is a community process that follows the tradition of 'aabath' or collective shramdan. It is culminated with a jamanvar - cooking and eating together. Virdas are owned by individual family. A single family may have 5 to 15 virdas in a village. Drinking water can be filled from any virda if required; water for cattle has to be used only from one's own virdas. Though the piped water supply has reached most villages of Banni, sourcing water from virdas is still a widespread practice. Owing to irregularities and taste of the piped supply, many people still prefer to drink virda water than pipe or tanker water.

As discussed in this section, Banni's pasture and water accessing systems are well evolved and there are collectively accepted norms that govern the use and control of these resources. All the villages access multiple villages' pastures which suggest that Banni grassland is treated like a huge collective pasture land by the pastoralists and as per their tradition every livestock has a right to graze.

3.7 Mobility among Banni Pastoralists

Like all pastoralists, migration has been common among Banni pastoralists. Migration outside Banni was not very common and only during dry years or droughts did they leave Banni. Banni pastoralist strongly believe that for them mobility is life. This is best evidenced by a popular Jat pastoralist saying,

“दूध मे नुं माखण कढनु नहीं, घघे के वखनु नहीं, पखे के छडनु नहीं;
जदे हे थिन्दो, कयामत आंजे नजीक आय”

'Dudh me nu maakhan kadhanu nahi, ghaghe ke vakhanu nahi, pakhe nu chhadnu nahi' which means - never remove the butter from your milk, never sell the intricately embroidered *ghaghra*, petticoat and never stop living in temporary homes you build in the grassland. The day you leave it, will be doomsday.

There is a deeper concern in this beautiful saying. Selling fat from the milk will mean becoming more commercial at the cost of breed purity and nutrition - so true for many pastoral households today. Selling embroidered clothes means commercializing a social relation based upon free exchange. Advising people against living in permanent homes has a deeper meaning for pastoral survival. It suggests that mobility is a key to pastoral survival as it ensures optimal utilization of resource, prevents overgrazing in one area and allows regular rejuvenation of resources. Sadly, mobility which is an important strategy for pastoral survival and resource sustenance is often considered 'backward.' It is never understood and acknowledged by the policy makers and government officials as key to sustainable pastoral livelihoods.

3.7.1 Earlier Migrations

Earlier, before partition, during drought years they used to migrate to Sindh where they could access both pastures and market. While their livestock sustained in good lands of Sindh, many of them laboured in the fields of Sindhi farmers and used to get wheat in return as their wages which helped them sustain themselves. In those days there was no milk market. Milk was turned into ghee and sold in the villages of Sindh which also gave them additional income for their survival there. [Figure 3] Such migration was more

common amongst buffalo owners. Proximity to Sindh and socio-cultural similarity with it were additional reasons for preferring Sindh over other parts of Gujarat. Cattle pastoralists often preferred to go to Saurashtra as they had good relations with farmers who would give them shelter. There were also mass migrations to Sindh once every 8-10 years or so in times of severe scarcity and famines.

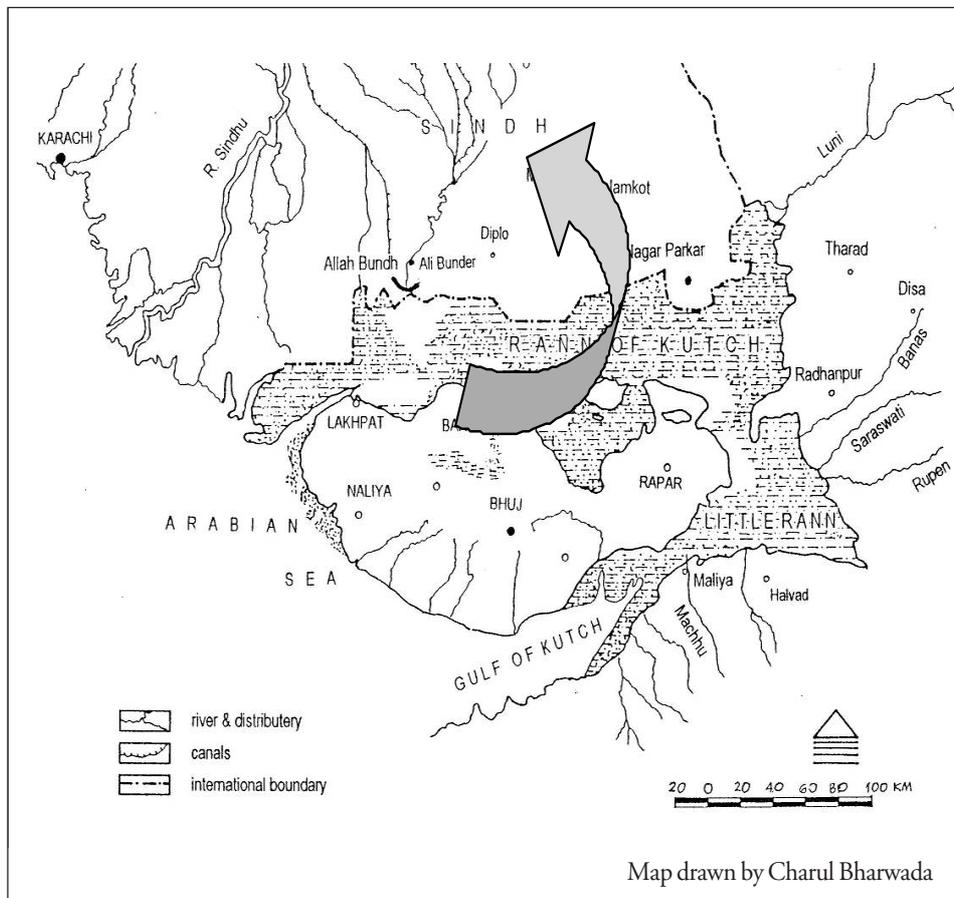


Figure - 4 Sindh: Important Resource Region for Dry Years till the Indian Independence [1947]

Severe drought of 1985 - 87 changed many things for them. For the first time Banni experienced such a large scale out migration in the post independence period. All the ten surveyed villages reported out migration from their village in 1987. It appears that

in some ways this southward migration also helped in connecting the pastoralists of Banni with remaining Gujarat. That was also the time when Banni was facing major grassland degradation; *Prosopis juliflora* menace was already reaching an alarming state.

In early 1990s, a new trend began in Banni - taking long term shelter in the agricultural fields of water rich areas of Kutch, mainly Bhuj, Anjar, Nakhtrana and Mandvi. Pastoralists began camping in the agricultural fields with their families. They got both water and fodder from the farmers and gave manure to them in return. Additionally living outside Banni opened up newer possibilities for milk market which was difficult in Banni till the dairies arrived recently.

3.7.2 Current Mobility

Currently, migrations in Banni are of two types - within Banni and outside Banni. During a normal year, more pastoralists migrate within Banni as compared to outside Banni, 28.7 per cent and 11.7 per cent respectively. When the grass becomes scarce in one's own village, pastoralist's first preference is to migrate to another village within Banni having better grasses. This migration is very common during summer and can typically vary from 2 weeks to 2 months. For example, while we are writing this in March 2011, half of Sarada village's total livestock has migrated to Bhagadia's pastures and its other half has moved to Chhachhala.

Pastoralists from Central and East Banni migrate more as compared to the Western Banni where only 14.4 per cent migrate within Banni and 7.8 per cent migrate outside Banni. [Table 17] Except in Central Banni, more pastoralists migrate with their families. In Western and Eastern Banni, more than 70 per cent surveyed pastoralists migrate with families where as in Central Banni only 36 per cent migrate with families. In general, Banni pastoralists are very conservative towards their women and there is strong resistance towards socialisation of women with outsiders. Within them, the pastoralists of Central Banni are more conservative. One of the major reasons for higher proportion of pastoralists migrating without families in Central Banni can be extremely patriarchal attitude of the Halepotra and Rayasipotra maldharis living in Central Banni.

In case of few villages on the edge of Eastern Banni like Berdo, Lakhabo etc. they prefer to go to wadis of Anjar as they are closer. Depending upon micro variations in rainfall within Banni, there are seasonal migrations across Banni. Villages with less resource may go and camp in the villages with more resources. This has been discussed earlier in detail.

Table 17 : Migration among Banni Pastoralists

Details	Western Banni	Central Banni	Eastern Banni	Total
Total Surveyed Families	90	90	120	300
No of families who have migrated at least once since independence	88.9	71.1	79.2	79.7
Migration during a normal year				
Within Banni	14.4	37.8	32.5	28.7
Outside Banni	7.8	11.1	15.0	11.7
Migration with families	70.2	36.5	74.7	63.3
Migration without families	29.8	63.5	25.3	36.7
Migration at the time of survey [from total village HH]	3.7	1.1	5.4	3.6
Permanent migration outside Banni [from total village HH]	2.72	2.29	12.9	6.17
Reasons for migration [Multiple Reasons]				
Fodder and Water shortage	83.3	72.2	76.7	77.3
Good milk prices outside	7.8	12.2	18.3	13.3
Gando baval	6.7	13.3	15.8	12.3
Water shortage	2.2	2.2	17.5	8.3
Fodder shortage	1.1	2.2	2.5	2.0
Others	1.1	1.1	0.0	0.7

Source: Primary Survey, 2011

Every year, low lying villages of Western Banni get flooded during the monsoon. Traditionally, the pastoralists of these areas migrate to highlands within Banni along with their livestock and families, a practice continued till date. These highlands are used as monsoon pastures till the onset of winter. This shift also allows the pastoralists to access different grass zones - high lands in monsoon and low lying areas during winter and summer. It also helps in preventing over exploitation of resources in one area.

As seasonal flooding is an old annual phenomenon, people in this part of Banni build their houses on stilts unlike their counterparts in central and eastern Banni. On arrival of the monsoon, the whole village shifts to their pre-determined locations like pastoralists of Bhagadia and Chhachhala move to Gogul dhui and similarly other villages move to other highlands [Table 18]. As can be observed that their monsoon camps are anywhere between 4 to 20 km. from their main village.

Table 18 : Monsoon Pastures and Camps for Western Banni

Village Name	Monsoon Locations	Distance from the main village
1. Bhagadia/Chhachhla	Gogul Dhui ²⁰	8 - 9 km.
2. Sarada, Sherva	Between Dumado and Hodko	7 km.
3. Bhitara Wandh	Gorewali in Banni	15 km.
	Nara in Lakhpat	20 km.
4. Bhitara Mota /Luna	Thado (towards Hajjipir)	12 - 13 km.
	Gaar	5 - 6 km.
5 Burkal	Vajeera	6 km.
6. Mithadi	Banoori (Gorewali)	4 km.
7. Udhama	Patgar (nr Gorewali)	8 - 9 km.
8. Mota Luna	Uthamana Dungar	10 km.

Source: Compiled from personal discussions with various pastoralists

Since past two decades many pastoralists have been going outside Banni to irrigated farms having assured source of water. They camp in such farms for longer duration with their livestock. In the process many have established good relations with farmers and have been living there for many years. Fodder is accessed through a mix of open grazing; from the farmer's field; by purchasing it from market. The water is arranged from the farm. The farm gets dung manure in reciprocation. Pastoralists choose wadis in a way that they are closer to towns or on the roadside for easy access to markets.

Livestock of some Banni families is now permanently out and does not return even if there are good rains as they have well developed relations with the farmers, milk traders or other customers of those areas. This means assured fodder and assured milk market. As Mirukaka of Dhadhhar explains this quoting the example of his own village, "Our 400 buffaloes are in Mandvi since last 8 years. Main reason for going out was water and milk market outside Banni. Fodder is still there to some extent but water is a big problem. If water is there we will stay put and manage somehow. It is so uncertain. When eastern winds blow, they dry up water in pucca wells of revenue areas. How can our shallow virdas match up Earlier the outward mobility was once in 8-10 years for fodder and water. Now it is more frequent."

Six per cent of total families in the surveyed villages are living out of Banni since many years. Reasons for such long term out migrations in most cases are search for fodder and better milk market.

²⁰ Dhui literally means a higher elevation point

In some marginal cases it is for jobs and business in Bhuj or other urban centres. Such migration is mostly to the irrigated field areas of Kutch and other urban centers. It is highest in Eastern Banni where 12 per cent of total village families are living out of Banni since many years. Some have even settled in Mumbai and continue an active relationship with Banni.²¹

Case of the pastoralists of Misariyado is most striking where the whole village has migrated out of Banni in order to save their cattle from *Prosopis juliflora*. About 150 families of cattle herding pastoralists of village Misariyado have been living a nomadic life with their 7000 cattle in villages of Abdasa since past 30 years. Some of them return to their village only during monsoon months. When we visited this village in February 2010, it had a deserted look with nearly all the houses locked.

3.8 Immigrant Livestock in Banni

During good rainfall years, livestock from Kutch, Gujarat, Saurashtra, Rajasthan and Maharashtra used to come here for grazing. Nutritious grasses and environment of Banni raised it to the status of an animal sanatorium. It is experienced that if one leaves his weak animal in Banni, it soon gains good health. *Tabelawalas*, buffalo stable owners, of Mumbai and many Rabaris from Ahmedabad and elsewhere regularly used to send their weak or non-lactating buffaloes to Banni for few months. Likewise, many farmers from villages of Kutch used to leave their buffaloes with some pastoralists at a nominal charge. Over past few years, getting animals from *tabelawalas* has reduced while others continue to send their animals specifically from the villages on Banni's periphery. There are also regular seasonal migrations of livestock from outside Banni. During monsoon, Dhebar Rabaris of Anjar area bring their sheep and goat herds in many villages of Banni. Of 10 surveyed villages 4 have immigrant livestock from outside Banni in their pastures.

²¹ There is a group of Banni Jats who have migrated and settled near Cambay for many generations. Few descendants from Central Banni have settled near Nal Sarovar. Their language and attire have changed but the mud work in their homes continue to be same as in Banni. These groups have no contact with Banni.

Chapter - 4

Changing Pastoral Economy

Economy of Banni is largely livestock dependent. Pastoralists here are skilled breeders and livestock sales form an important source of income. Like any pastoral economy in Banni too, income comes by selling various pastoral products - animals, *ghee*, milk, *mava*, dung, wool etc. Traditionally, raising and selling bullocks and buffaloes were the pillars of Banni's economy. Making and selling ghee was also a major source of income. Sheep and goats were also raised and sold including their wool. Milk was never considered a source of income and unlike now, calves were freely allowed to suckle their dams.²² However if anyone including a traveller asked for milk, pastoralists would give it for free.

4.1 Current Pastoral Economy

While livestock sale continues to be an important source of income, there is a sea change in pastoral products sold by Banni pastoralists. Banni's current pastoral economy consists largely of bullock, buffalo and milk sales which together form more than 90 per cent of Banni's total pastoral turnover followed by other sources of income like ghee, sheep, goat, dung for manure etc. Pastoralists never earn from the leather of the dead animals.²³

As per our conservative estimates, currently annual turnover of Banni's pastoral economy is to the tune of Rs. 55 crores. [Table 19] Milk sale forms the highest gross income, more than 60 per cent followed by bullock and buffalo sales. Of various pastoral products, today milk forms more than 95 per cent of gross income. Though the gross income from milk is very high, net income from milk will be much lower as the expenses involved in maintaining lactating buffaloes and the pregnant ones are quite high. Animal rearing gives higher net returns compared to milk. Unlike earlier, income from *ghee* is almost negligible. Manure sale forms only 3 per cent of total income. It may appear a small economy in terms of turnover but significance of Banni's economy lies in the nature and scale of livelihood it supports.

²² Mother of an animal is called dam.

²³ It is customarily given to people of Meghwal community who removes the skin and uses it for making various leather artifacts.

Table 19 : Current Pastoral Economy : Annual Turnover

Product	Sales	Unit price	Annual turn over [Rs in lakh]	Per cent share
Animal Sales				
Bullock Sales [Nos]	13000	7500	975.0	17.6
Buffalo Sales [Nos]	2500	35000	875.0	15.8
Sheep - Goat [Nos]	2000	1500	30.0	0.5
Pastoral products				
Ghee	3000	350	10.5	0.2
Milk sales ['000 litres]	13854.6	25	3463.7	62.7
Manure Sales [trucks]	11500	1500	172.5	3.1
Total			5526.7	100.0

Ghee production: Calculated at average 250 kg per month for whole Banni.

Quantity of manure worked out from total cattle and buffaloes on the basis of 24 trucks lannum for every 100 animals.

Annually Banni pastoralists contribute about 1.38 crore litres of milk, 13000 bullocks, 2500 buffaloes and other useful things like *ghee* and manure to farmers and many others. Bullock trade provides employment to around 1200 to 1500 persons for 5-6 months a year.²⁴ Every year around 10,000 farms get bullocks, the most critical means of their production.

4.2 Bullock Trade of Banni

During one of our other studies in Saurashtra, many farmers shared with us the stories of Vadhiara bullocks and their kind Sandhi traders. Farmers seeking new bullocks used to wait for these bullock traders also known as *baldawala*, bullock people, to arrive with their herds. For long we wondered as to who must be these people? Later we learnt that they were pastoralist traders coming from Banni and Pachham region of Kutch. They were also known as Sandhi, *gameti* - those who graze cows, in Kathiawari or *Dhaghewala* in Sindhi.

Bullock trade of Banni is an interesting trading institution that has flourished for many generations. It has worked on faith, care and mutual concerns and continues to be so. In many cases, the trader - farmer relation extends across generations. Despite mechanization

²⁴ Number of herds taken to Saurashtra vary from 150 to 200 herds every year. Each herd employs 5 to 6 persons during its cycle from purchasing calves, nurturing, selling and payment recovery. The cycle is for about 5 to 6 months

due to tractors, the demand for bullocks has not reduced in Saurashtra. One of the key reasons is the heavy soils of Saurashtra which do not allow smooth operation with tractors, especially in monsoon, principal cropping season.

Main market for bullocks is in various districts of Saurashtra like Morbi, Gondal, Rajkot, Vankaner, Jamnagar etc. Most of the bullock trade takes place between mid September to end of December. Bullocks are taken to Saurashtra in herds of 75 to 100 by Banni pastoralists - traders. There are about 150 bullock traders in Banni, most of them in Central and East Banni. Today this trade has estimated annual turnover of Rs. 10 crore. Annually about 13 to 15,000 bullocks are sold from Banni and it supports agriculture of about 10,000 farmers annually.²⁵ [Table 20]

Table 20 : Banni's Bullock Trade: Scale and Significance

Details	Estimates
Total number of traders	150
Annually number of herds going to Saurashtra	150 - 200
Average Annual Bullock sales*	13,000
Average purchase price per pair of calves	Rs. 6 to 10,000
Average selling price per bullock pair	Rs. 12 to 15,000
Total annual turn over	Rs. 10 crore
Rate of return	20 per cent
Number of farmers supported annually	10,000
Number of people getting employment annually	1200 to 1500 persons for 5 to 6 months.

Estimated from focus group discussions, Interviews with many bullock traders and Bhagia of Banni.

** Including young calves purchased from outside and raised in Banni to be bullocks.*

How does this bullock trade work? How do the pastoralists raise young calf to be a bullock? How are the bullocks sold, at what terms? What changes have come in this trade in the recent years? There are many interesting dimensions to this trade. Its whole cycle can be understood through its important stages like - procurement of calves, rearing the calves to be bullocks, taking the bullocks for sale to Saurashtra, striking the deal with the farmers, handing over the bullock to the farmers, collecting payments and closing the deal.

²⁵ Annual sale of 13,000 to 15,000 bullocks from Banni may appear little contradictory given that Banni's total cattle population is less than 5,000 cattle. However, this number indicates total sales which includes sale of calves purchased by Banni pastoralists from outside Banni and reared to be bullocks and then sold.

Two types of pastoralists are involved in this trade - one, who breed bullocks and also trade in it; two, who breed bullocks in small numbers and depend more upon purchases of male calves from other pastoralists and farmers for their bullock stock. Traditionally, most of the traders used to keep large cattle herds, breed bullocks themselves and then go for selling them in Saurashtra. During past 2 decades, due to spread of *Prosopis juliflora*, cattle breeding has substantially reduced in Banni so the pastoralists have to depend more upon purchasing young calves from outside and from small breeders within Banni.

4.2.1 Procuring Young Calves

Earlier the young male calves, largely from one's own herd, were reared to become bullocks as most pastoralists dealing with bullock trade had their own cattle herds. Trading was an extension of his cattle rearing occupation. At times they also used to buy from village shopkeepers, barbers, farmers or anybody else since many people used to keep few cows then. Over the years due to sharp decline in local cattle population, the herd size has reduced considerably. Now, the pastoralist can not depend only upon his own calves or only upon Banni's cattle population. Most of them purchase young calves from various sources. Many young calves or bullocks are purchased from the villages bordering Banni like Dhora, Ludbai, Fulai, Dador, Vang, Bibar, Nirona, Jura, Loria. They even go up to Lakhpat and Abdasa for purchasing calves. Other sources for calves are - other pastoralists in Banni or Kutch; farmers of Kutch or Saurashtra and panjrapols.²⁶ Buying from the *panjra polys* is a more recent, around 20 years old, phenomenon.

Large animal fairs were another source for getting young calves. Such fairs used to be held annually in places like Radhanpur, Varahi, Tharad and many of Banni's pastoralists traders used to procure calves from there. Pastoralists told that such fairs were great source of good quality calves and bullocks. They also said that if someone was looking for a matching calf or bullock to make a good pair, they would invariably find a suitable match in these fairs. Since a decade or so these fairs have stopped.

Earlier if they bought male calves the preferred age for buying young calves was 6 to 8 months. However, it was not very common to buy the calves. They were then castrated and reared by the pastoralists for 2-3 years. Many times they were sold at younger age too. Now they have to purchase very high proportion of the calves from others; it involves large financial investment and higher costs for rearing. They can not afford to keep the

²⁶ Panjrapol is a shelter home for weak, infirm and unproductive cattle. Cattle is taken care at no cost. It is run on charities from donors. Any one having such an animal can leave her animal for shorter or longer duration.

calves with them for long durations. Now, older calves of even 2 to 2.5 years age are procured from early February till late June up to the onset of monsoon. They are reared by the pastoralists till the beginning of monsoon. Around August - September, they are taken to Saurashtra for sales. It is good time to migrate with large bullock herds as there is good availability of grasses in common lands during this period.

Before making his purchase decision, an individual pastoralist trader considers several factors like initial purchase price, rearing period, quality of calves, labour or help available and his own investment capacity. The purchase price of the bullock is low in February and goes on increasing reaching highest towards June - July. Longer rearing duration means higher rearing expenses but it also gives more time to the pastoralist to get better quality bullocks by controlling its feed quality and grazing sources. If they purchase earlier, they get better quality of calves. Availability of people within the family to share the rearing work or possibility of hiring labour for grazing the calves also helps in deciding when and how many calves will be purchased by a pastoralist.

Individual investment capacity is one of the most decisive factors. There is no formal credit support for bullock trade and they use different ways to meet their financial needs for larger investments. They often take loans from family members or many times make a partnership within the family or community where one invests money and other labour. At times they also raise short term credits. Some of them take high interest loans from the market. If they take loan from within the pastoralist community (Muslims) there is no interest charged. However if they take loan from Hindu money lenders the interest rates vary from from 24 to 36 per cent annually though this is not widely prevalent. Depending upon his resource availability; pastoralist makes trade offs among the quality, purchase price, investment period and rearing expenditure. To sum up, a trader who buys early in the year will get good quality calves at a lower price but will need to rear for longer period till selling season incurring higher operational expenses on feed and hired labour with a longer investment blocking period.

4.2.2 Rearing the Calves

Calves are skilfully reared by the pastoralists to become bullocks before selling them to the farmers. Earlier male calf was allowed to suckle the dam to his full satisfaction, a practice almost non-existent now. It was understood that more he suckles, faster he will grow and better price he will fetch. After the male calf was fully satisfied, two teats were kept for the female calves and two for the household consumption. When the dams returned from grazing, all the male calves were released in the enclosure to suckle. Mother's milk was the most important part of their diet. Recalling the care with which

the calves were raised earlier Mirukaka says, "If any pastoralist had not let the calves suckle enough, we and the farmer could judge by seeing the calf. Farmer will also sense something lacking in the health of the bullock." He further adds, "If there was drought in Banni, the young calves to be raised as bullocks were first to be taken to grass rich places like Nakhtrana, Lakhat and Abdasa so that their health does not suffer. Buffaloes could remain in the village and their health could be compromised but not of bullocks as it is to be prepared for hard laborious tasks for the farmers." Special diet of jaggery, feed, oil (mainly mustard) etc is fed to them so that they are ready to work in the farms at an age of around 4 years.

Earlier, castration was done at an early age of 3-4 months, as soon as the calf was able to graze by itself. It is believed that if the castration is delayed the grown up bullock retains some elements of *aakhla*, bull, and thus will not be able to become a good work animal.²⁷ Castration is generally done by the pastoralists as many among them can do it well and do not need external help. As the procurement age is delayed now, the older calves purchased from outside may not be castrated. This is particularly true when the calves are procured from the panjrapol. Late castration affects the sturdiness of the bullocks.

Unlike now, earlier many farmers also preferred to buy young calves and rear them. They preferred to purchase 6 to 8 months old calves, soon after the castration. They used to raise and train the calves for 2 to 3 years themselves before using them for agricultural operations. Now the farmers prefer ready to work bullocks. Due to many reasons, purchasing age among the pastoralists and farmers has gone up considerably in recent times.

Pastoralists have interesting nomenclature for calves based on different features and of different age. Non - castrated calf is called *Lavero* and the one castrated is *Vachbrado*. The adult castrated male is *godlo* and the non-castrated is *aakhlo*. Different age is indicated by the number of their teeth and they have different names for it. Young one, without any teeth is *kheera*; *dudhiya* is 1.5 to 2 years old indicating that its still suckling; *be-dantiya* is with 2 teeth; *chaar dantiya* is when four teeth; *chh-dantiya* for 6 teeth. Getting 8 teeth indicates becoming an adult bullock from a calf and is called *aathori*. Anyone with less than 8 teeth is considered *vachbrado*. Attaining eight teeth means a joyous time for the pastoralist and they say, "*daante poora thai gaya*," meaning complete in teeth and ready for field operations.

²⁷ Logic behind this seems to be that if the male has to be used only as a tool of labour in the farm, it should not have developed any sexual tendencies and thus must be castrated as soon as possible. [As told by a pastoralist]

4.2.3 Moving to Saurashtra: Selling Bullocks to Farmers

In the past typically, pastoralists left Banni for trading their bullocks in Saurashtra after the monsoon. This long march meant a journey lasting for about four months, from August to November, covering more than 300 km. distance. A typical herd would comprise of 80 to 100 bullocks and would always have animals of different ages. The reason for moving with a mix age herd was different preferences among farmers. Some farmers needed to put them to farm work in 6 months. Some liked to raise them for two years themselves. Some liked an even younger calf. Some farmers used to purchase even 2-3 pairs of calves of different ages to maintain a steady supply to them. With time, more and more farmers particularly the young generation now prefer ready to use bullocks.

Banni pastoralist traders are widely respected by the farmers as they provide a critical means for their agricultural production system and transportation. Pastoralists are always warmly welcomed in all the villages across Saurashtra. Both farmers and traders have deep trust on each other. Pastoralists camp outside a village with their herds. On the arrival of these *baldawala*, farmers soon congregate, assess the bullocks, their growth, quality and prices. Buying and selling of bullock is an important event for both sides. There is an evolved process of making and finalizing the deal, collecting the payments over 3 years and also facility for the replacement if the buyer is not happy. There is a formally printed agreement form. After the negotiations, price is settled and the deal is finalized. Finalisation of a deal is marked and celebrated at the farmers' house where first the bullock is tied and then a small piece of jaggery is consumed by both of them as *shukan*, a custom to mark any auspicious occasion or beginning of good work. Tea is served and oil is smeared on the horns of the bullock.

As the bullock has been socialized in the herd, isolating it from the herd and leaving it alone at the farmer's house is not easy. Also, till the bullock is sold to the farmers, it has never been tethered to the post since its birth but now onwards it will always be tied - a difficult shift for the animal to let the freedom go. Also this is a big change of everything for this animal - change of living habitat, owner, and herd. Not easy to accept. There can be strong protests by it, at times aggressive. But the pastoralist has a way to deal with this.

The bullock is first taken to the farmer's house in a group with 4 - 5 other bullocks and is offered lot of feed. While the pastoralist owner keeps talking and caressing it, farmer quietly ties him up after which the group leaves. Gradually the bullock gets used to its new owner and habitat and eventually develops a lasting bond with the farmer. After few days of keeping the bullock if the farmer is not satisfied, he can go back to the trader and return this bullock and strike a new deal for another bullock. Differential amount is

settled as per the deal. There are never any conflicts. No pastoralist would ever force an unwanted bullock on any farmer.

After camping for few days in one village, the herd moves to a new village. Annually, trader pastoralist spends 2 to 4 months like this selling his herd. In the past, often during his return journey, he used to buy new born calves from farmers to be raised and sold as bullocks. Now this practice is discontinued as young calves are rarely purchased.

4.2.4 Buy now, Pay Later: Interest Free Installments

Typically the price of a single bullock may range between Rs. 6,000 to Rs 8,000 and the pair between Rs. 12,000 to Rs 20,000. When the deal is finalized, the farmer pays *suthi* or *bana*, of Rs 500 to 1000 as down payment. Remaining amount is divided in 3 equal installments to be paid over the next 3 years at the time of Utasani [after Holi], around mid March every year. No interest is ever charged on the pending amount even if the payments are delayed. Being followers of Islam, these traders consider interest income to be *haraam*, illegitimate, both ethically and religiously. In case of poor monsoon or crop failure, the farmer may request for an extension and the pastoralist would postpone his collection. There have been cases, where the farmers' grand children have paid on the basis of records.

Box 4 : Annual Long March to Saurashtra

In late September, 2010 Musabhai from village A left with his bullock herd for Saurashtra. Before that he had spent around two months in Naliya, Narayan Sarovar, Nakhatrana and Kothara purchasing bullocks. He had procured some from Misariyado's cow herds in Abdasa and from *Maldharis* of Banni. Out of animals he purchased, 35 were working bullocks. Average cost of the herd was Rs 5,500 (with calves costing between Rs 4,000 to Rs 8,000 and each adult bullock around Rs 10,000). They were 8 men. 6 were hired for grazing during the migration and one person was for cooking, each of 7 being paid a monthly salary of Rs 5000 plus food, smoke etc. Earlier pastoralists always walked with their belongings and bullocks, at times took camels for loading. But now the modes are changing. Musabhai had a jeep, a faster substitute, accompanying his herd carrying beddings, cooking utensils, all kinds of cooking material, medicines for the bullocks etc. They also took one lactating cow with them to meet their own milk needs during migration.

Till they were in Kutch up to Surajbari Bridge, the herd moved around 15-20 km. per day, taking around 10 days to reach Surajbari from Banni. After Surajbari, the speed reduced. As they enter Saurashtra, agricultural lands expand and the

grazing grounds become smaller. Here they can not cover more than 8-10 km. per day depending upon where they are.

For camping, they have to look for a spot with enough water and grazing source. Generally, they camp in the outskirts of the village, graze in village's common grazing lands and water is sourced from *awadas*, cattle trough, of the village panchayat. Musabhai acts as a pilot. He moves ahead, scans the possible locations, talks to respective village and finalises with them. Many years' experience has taught him enough to find best locations for his herd. They have never faced any problems with the host villages. Availability of grazing resource is as important, if not more, as the likelihood of having prospective buyers at a specific location.

There are no tents. Their camping is in the open. Since its end of monsoon, they often face rains. "What to do? This is our work. Bullocks can not be left. So we all get wet together and then dry up, then again get wet and it goes on." Herds can't be left to themselves. This year too they faced such situation twice.

They cook and take their meals twice a day, once in the early noon, at 11 or so and in the night. And tea, of course 4-5 times a day. Grazing hours for the herd are planned keeping in mind the visiting hours of the farmers who come to see the bullocks. Most farmers come in the morning and evening, so the grazing slots are between 12 to 6 pm during the day and from the midnight to 5 o'clock in the morning.

They have to protect the herd and their camp from theft. Sentry in the night is necessary. The cook is their sentry till the midnight after which sentry is not needed as the herd is taken out for grazing.

All through their journey they passed through 150 to 200 villages and camped in about 50 locations. Their selling points are spread over Rajkot, Jamnagar, Junagadh districts. This year they did not have to go beyond Rajkot as all of their bullocks got sold there in the villages of Lodhika, Morbi, Padhari, Tankara, Gondal, Kotda and Jetpur. They did not face any harassment from communal forces. All their 100 bullocks were sold at an average price of Rs. 18,000 per pair, with price varying from Rs 12,000 to Rs 30,000 per pair. They served around 75 farmers.

Generally their selling cycle lasts for four months but this year they returned in early December 2010, after 3 months.

[Real case where names have been changed.]

There are almost no cases of defaults. None of the pastoralists we spoke to could recall any case of default. "There may be delay but never any default in payment from farmer's side." said Ramzaanbhai of Sadai. Elderly farmers always taught their children and young farmers to never keep bullock trader's money because if they default, it will ruin their village's credibility and no trader may come to their village due to which the small farmers will have to suffer. Farmers are very particular about their credibility with bullock traders. When the last installment is paid, the pastoralist trader will place Rs 100 - 200 in the hand of any of farmer's children, indicating that it was a very satisfactory experience for both the parties. This money is termed as *Dhaarna* or *chhoot*.

4.3 Buffalo Trade of Banni

Bullock sales bring in money over 3 years and thus for daily necessities pastoralists were more dependent upon the *ghee* sales. Traditionally sale of female buffaloes was low as milk was important for earning from ghee. Today, Banni buffaloes enjoy a good market outside Banni. Increase in buffalo market has also been influenced by the fact that Operation Flood of 70's focused on fat based pricing increasing demand for buffaloes over cattle.²⁸ There is a general perception that Banni buffalo is the most profitable buffalo in the country, as it gives high milk yields at low input costs. Special characteristics that make Banni buffalo a better choice for buyers are:

1. Age of first calving is low compared to other buffalo breeds of Gujarat like Mehsani or Jafrabadi. Inter calving period is shorter.
2. Longer lactation period giving milk for about 8-10 months. Some of them continue to yield milk even up to their next delivery.
3. Dry period is relatively small as it can conceive within few weeks after the previous delivery. But it is a practice among the pastoralists to not to milk the buffalo after around 7 months of conception as they believe it affects the quality of the progeny.
4. Its adaptability to newer environs is very high and it adjusts to new place like Mehsana, Bombay and Pune in 2-3 days without any loss of milk.
5. High immunity to disease and high resistance to water and fodder stress leading to lower rate of disease and illness.

Pastoralists generally decide the number of buffaloes to be sold as per the number of new born. If there were 3 new born female calves, he will sell 3 lactating buffalos which

²⁸ Buffalo milk has higher fat content as compared to cow milk. Though cow milk is considered more nutritious, buffalo milk fetches higher price to the seller.

will help him maintain his herd size. This trend is fast changing with the coming of dairies in past 2 years. As the milk is giving good returns, as the rains have been good in past 5 years; there is a tendency to retain the lactating buffaloes instead of selling them. Unlike bullock trade which is governed by personal relations with the buyers and where buyers and sellers have relations across generations, buffalo trade of Banni is more market driven.

Earlier Ahmedabad was a good market for Banni buffaloes. Weekly Friday animal market at Juna Vadaj in Ahmedabad was quite a popular destination among Banni pastoralists and many of them used to migrate with their buffalo herds, camp outside Ahmedabad in some vidis or farms, graze their animals in those vidis, stay for few weeks till their buffaloes delivered and the new stock was sold. Today, Banni buffaloes have good market in Central, North and South Gujarat; Mumbai and some other parts of Maharashtra like Pune, Nasik etc. There are two types of buyers - individuals and *tabelawalas*, those having large animal stables in cities like Mumbai, Pune etc. Most buyers from Gujarat comprise of individual farmers who buy it either for self consumption or for their farm based animal husbandry. Buyers from Maharashtra are largely various *tabela* owners.

Due to difference in the nature and purpose of buying, buyers have different preferences while selecting buffaloes. While individual buyers look for milk, appearance, nature; *tabela* owners are solely interested in its milk output. Individual owners do not mind little less milk output to begin with and generally prefer buffaloes in their first lactation but *tabela* owners prefer those in 3rd or 4th lactation when the milk yield is highest. Individual owners, mostly farmers from water rich, irrigated areas sustain the buffaloes largely on the fodder and water from their farms. On the other hand, *tabela* owner has to purchase every blade of grass and thus his concerns and calculations are very different compared to a farmer. While individual buyer generally purchases one or two buffaloes, *tabela* owners may buy 20 to 25 buffaloes in a single deal. Many times few individual buyers get-together and buy in a group as it is economical both to buy and transport.

Price for a good lactating buffalo varies from rupees 30,000 to 100,000 and its average ranges between rupees 35,000 to 45,000 per buffalo. Prices also vary across the year, corresponding to the delivery season with simple demand supply logic. In June-July, which is the delivery period of buffaloes, each of Banni villages may have 50 to 100 lactating buffaloes. Due to higher supply the prices are lower during this period. Towards the end of winter and onset of summer, the prices reach its peak and the choices become narrow.

Deals are struck in several ways - directly by meeting the pastoral owner or through an intermediary. The intermediary can be a village level mediator (known both to the buyer

and the seller), a village level or an outside agent, a local trader in Banni or any peripheral village or a big trader in the city. More than 90 per cent deals are realized through an intermediary, because of mutual acquaintance to both the parties which makes the deal more reliable and financial transactions smoother.

Generally the buyer visits and checks the buffalo personally before finalizing the deal. If the buyer purchases through an agent, the agent charges rupees 200 per buffalo as his commission and all the costs for visiting different villages to examine buffaloes are met by the buyer. In some cases, where the buyer has a long standing relation with the agent, he may just give his requirement to the agent and request him to find an appropriate buffalo and finalise the deal on his behalf. For this special service, the agent charges Rs 1000 per buffalo including his commission and expenses. Agents have their own ways to keep updated information and they know the number of buffaloes ready for sale in each village, their owners, broad prices and quality.

As far as traders are concerned, whether from Banni or outside, they purchase buffaloes themselves, keep them in their *wadi* or *tabela* for a short period of few weeks till they find a customer. Typically a trader may earn a profit of around Rs 1,500-2,000 per buffalo. This is a return over his short term investment. Interestingly, the village level mediator does not charge anything for his services.

Unlike bullocks which are sold on a 3 year no interest credit, buffaloes are not sold on credit. Earlier they used to do so but in the past, many pastoralists had bad experiences in dealing with their buffalo buyers and recovering their payments. As most buyers buy it for milk selling and many of them are *tabelawala*, their attitude and culture is very different as compared to the farmers who buy their bullocks. If the pastoralist knows the buyer or if the buyer is another pastoralist - particularly Rabaris from Ahmedabad, he may sell on credit.

4.4 Changing Face of Banni: Dairies, Milk and Other Pastoral Products

4.4.1 Arrival and Impact of Dairies

Despite having fairly large daily milk production, there was no milk dairy in Banni till 2009. This always forced the pastoralists to sell all their milk to the traders at rates dictated by the trader. While the consumers in Bhuj got the milk at Rs. 22 to 25 per litre, the producer of Banni had to sell the same to Bhuj traders at Rs. 12 to 14 per litre. The price of milk in monsoon during the flush season would drop to rupees 6 to 8 per litre and only rose to 12-14 in the dry periods, forcing people out of the business. If the price was unacceptable to pastoralist, the trader may simply ask him to take back his milk knowing well that he can not take such a highly perishable item back home. Pastoralist

had no choice. This was barely enough to meet his cost of production. With increasing costs for keeping the livestock and low returns many pastoralists of Banni were on the verge of leaving the occupation. Young generation often got into menial labour jobs or worked as truck cleaners.

In 2008, average daily milk production in Banni was little above 46,000 litres [Table-21]. Of all the zones, East Banni produces more than half of Banni's milk while Central Banni produces only 20 per cent of total Banni milk.

Table 21 : Zone wise Seasonal Daily Milk Production in Banni

Season	West Banni	Central Banni	East Banni	Total	West Banni	Central Banni	East Banni	Total
	litres per day				%			
Monsoon	18260	11940	30490	60690	30.1	19.7	50.2	100.0
Winter	14145	9255	26165	49565	28.5	18.7	52.8	100.0
Summer	6180	5435	16675	28290	21.8	19.2	58.9	100.0
Daily Average	12862	8876	24444	46182	-	-	-	-

Source: Compiled on the basis of data collected for M.Phil. thesis by Bhatti, Ramesh 2008

After a long sustained effort since year 2000, for almost a decade, by the local organizations like Sahjeevan and Kutch Nav Nirman Abhiyaan, this dream began taking shape around 2009. Today, there are 4 dairies in Banni. [Table 22] All the four dairies have their bulk milk chilling plants [BMCP] where the milk is collected and further transported to their main plants in or outside Kutch as there are no processing units in Banni. Each dairy serves varying number of villages.

Table 22 : Milk Dairies in Banni

Name	Location	Began on	Capacity	No of villages served	Daily collection	Rate per fat (Rs.)
1. Sarhad Dairy	Bhirandiarra	23 Feb 2010	10,000	32	6000	3.4
2. Umiya Dairy	Hodko	16 Dec 2009	5,000	10	3500	3.4
3. NDDDB Dairy	Bhirandiarra	15 May 2009	5,000	23	4700	3.5
4. Mother Dairy	Dhordo	6 Jan 2010	5,000	20	5000	3.4
Total	-	-	25,000	-	18200	-

Source: Compiled from discussions with respective dairies in March, 2010

For example, Mother dairy located in north Banni, serves 20 villages. There are 4 collection centres each in Bhitara, Gorewali, Erandawali and Mithadi. Pastoralists always had a

deep desire to have a dairy in Banni. Each of these centres has a *Sahayak*, helper, who collects the milk from his surrounding villages and keeps it ready for the collection truck to take it to the BMCP. Mother dairy pays Rs. 3.4 per fat percentage point,²⁹ though less compared to NDDB dairy, pastoralists are happy because this ensures hassle free transportation and sales of their milk. All the four dairies in Banni maintain nearly the same price.

With dairies paying well to the pastoralists, local traders have also begun paying better. Trader rates have gone up from Rs. 13 of pre-dairy days to Rs. 25 per litre for buffalo milk. Coming of dairy has changed many things for the pastoralists of Banni - income, life style and self respect. While milking practice has largely remained same as earlier there is one change. Earlier, all the villages milked their animals only once in the morning. But now with a well developed milk market, the villages of central and eastern Banni milk their animals twice while the remote villages in the western Banni continue to milk only once a day. One of the other favourable impacts of dairy is the revival of interest in pastoralism even among the younger generation, which was on the verge of giving it up about 6-7 years ago.

Table 23 : Zone wise Milk Selling to Different Buyers

Figures in %

Sold to	West Banni	Central Banni	East Banni	Total
1. Dairy	73.9	93.6	54.8	69.4
2. Banni traders	0.9	2.6	17.6	8.3
3. Outside traders	25.2	3.8	27.5	22.3

Source: Primary Survey, 2011

Focus group discussions and the primary survey brought out that despite dairies, many pastoralists continue to sell considerable part of their milk to the traders except in Central Banni. Amongst the surveyed households, in the West and East Banni, 26 and 45 per cent milk is sold to the traders respectively. [Table 23] Pastoralists are careful and cautious in making their choices about where to sell how much milk and their concerns are long term going beyond immediate economic returns. However exploitative their relationship with the traders may appear, it is many generations old and goes beyond buying and selling milk. Choosing to sell to a trader is a complex function of many variables like fear of dairies suddenly stopping and their losing generation old link with the traders; village distance from dairy versus the traders, their own need for long term credits from the traders etc.

²⁹ While we are writing this, the rates have gone beyond Rs 3.7 per fat percent point. It means if the milk has 7 percent fat, its price is around Rs 26 per litre.

Pastoralists do not have access to any formal credit. They take credits from the traders for various purposes; from some they even take the feed on credit. Over these years, traders have helped and stood by them; supported them in their times of need; suddenly they can not break the old link because of dairy. In a way it is time tested marketing and support source. On the other hand the dairies are too new. Though the dairies pay well and have a good future in Banni; though it is more convenient to sell the milk to dairy; many still prefer to continue their links with the traders. Given several stories of dairy closure in Kutch, it may take time for the pastoralists to completely rely on the dairies.

4.4.2 Economics of Buffalo Keeping: Pre and Post Dairy

Overall income of every pastoralist family has increased considerably after coming of dairy. While animal sales give them bulk income once or twice in a year, milk gives them regular income. Average net monthly income from a buffalo herd of 10, 20 and 30 is respectively little more than rupees 3,600; 7,000 and 10,300 per family. [Table 24 and Appendix 8] During the field work all the pastoralists shared that before the dairies, they were having severe losses.

Irrespective of their herd size, the pastoralist always used to make loss on his milk sale. If all the other factors, costs and returns are kept same and if we calculate the income based on last year's pre-dairy milk rates of maximum up to Rs. 15 per litre, all the pastoralists run into severe loss.³⁰ However, in reality these figures of losses will be shadowed by many other factors. They will give less feed, try to save on many other expenses and thus actual figures may not run into such large losses. But this exercise certainly helps in understanding what most of them have been saying that till the dairies came, it was a loss making occupation.

But there is an important caution here. From this, it may appear that Banni's pastoralism can not survive without dairies. As breeders, most of their animals were not kept 'in milk' as their objective was only to rear the animal and sell it. Therefore their input costs were negligible. It became a loss making occupation in the 80's and 90's due to several consecutive droughts which killed the animals thus leading to loss of their capital. To attribute that pastorals cannot be viable without dairying would be a mistake.

³⁰ Another key reason, besides low price for milk for losses was enormous increase in the cost of feed, a major expense item in milk production. When the milk price was Rs. 12 - 13 per litre, he could barely meet his feed expenses from milk sales. In five years, from 2006 to 2011, price for a 50 kg. bag of cotton seed cake has increased from Rs. 360 to 700 per bag; and wheat chaff has increased from Rs. 330 to 540 per bag.

Table 24 : Economics of Buffalo Keeping (Before and After Dairy)

Details	Buffalo Herd Size		
	10	20	30
% Families in each category among the surveyed HH	51	21.9	11.6
Pre Dairy projected scenario[^]			
Total Income	156000	321050	483550
Total Expenses	192900	400800	604700
Net Annual Income	-36900	-79750	-121150
Av. Monthly Income	-3075	-6645	-10095
Post Dairy Income[*]			
Total Income	237000	485750	729250
Total Expenses	192900	400800	604700
Net Income	44100	84950	124550
Av monthly Income	3675	7079	10379
Difference in Income before and after dairy [per cent]	183.67	193.87	197.26

^{*}Based on Actual Case Studies. Milk @ Rs. 25 per litre

[^] Projected for understanding economics without dairies when milk was @ Rs. 15 per litre

Source: Worked out on the basis of 5 case studies of different herd size and personal discussions with several buffalo expert pastoralists [As per the rates and prices of February, 2011]

For detailed calculations, see Appendix - 8

4.4.3 Other Pastoral Products

Livestock products like ghee and wool were also sources of income. Banni's *ghee* was always in great demand in Kutch. There is no old data to understand the proportions of sales of ghee and wool. However, 1960 Bhirandiarra study is of some help in looking at the pattern of sales and income from various products. *Ghee* and livestock sales formed the largest proportion of their total income then. As late Ramsinhji Rathod, keen traveler and keen observer of nature and expert on many aspects of Kutch's history and culture writes in his much acclaimed work on Kutch,

“*Ghee* made out of the milk from Banni livestock had very high quality. On this land, livestock gets very good nutritious saline grasses. After grazing on these, a fragrant and tasty *ghee* is prepared from the milk. The *mesuk* made in Khavda with this *ghee* is very popular. [Rathore, Ramsinhji, 1959:240]

Table 25 : Annual Production and Sale of Livestock Products - 1960

Product	Quantity Produced (B. Mds.)	Quantity Sold (B. Mds.)	Income (Rs)	% share (In Income)
Milk	1726-20	328-00	4026	4.7
Ghee	438-20	367-30	73650	85.2
Wool	54-15	54-15	8780	10.2
Total	-	-	86456	100.0

Compiled from Trivedi, 1964:30

B.Mds is Bombay maund , a unit of weight during the rule of British. 1 B. Mds = 28 pounds = 12.75kg.

As evident from Table 25, 85 per cent of total income from pastoral products was from ghee. It also corroborates what people have been saying that earlier they never used to sell milk. Milk selling had just begun around the time of this 1960's study. Only 19 per cent of total milk produced was sold amounting to less than 5 per cent of total income from pastoral products.

While earlier *ghee* was an important item of sale, currently ghee making is very low. A report by Indian Council of Agricultural Research reported that in 1977 from Banni about 400 tonnes of *ghee* was sold annually which had come down to about 300 tonnes by 1985 as per an official note on Banni and is likely to be negligible at present.

Earlier when there were no dairies, milk prices were very low and transportation poor, it was very difficult to manage such a highly perishable item for long without processing it further. Also on the other hand, use of other cooking media was very low. Unlike now, people used *ghee* as main cooking medium so there was large market for *ghee*. Ghee had better shelf life too. Making of *ghee* involves lot of hard daily labour for women - making huge quantities of curd, churning it into butter and then clarifying it for making *ghee*. This also meant labourious task of collecting large amount fuel wood. Drudgery of making *ghee*, reduced market for *ghee* and increased milk market have together contributed to sharp reduction in ghee making.

With falling wool prices and reduced sheep population, wool is no more a source of income in Banni unlike earlier when it was about 10 per cent of total income from pastoral products.

Mava, dehydrated milk, is used as a base for many traditional sweets and is also consumed as a sweet after adding sugar or jaggery to it. *Mava* is another pastoral product made and sold in Banni. Villages like Bhirandiara, Bhagadia and many other interior villages where transportation is poor, *mava* is made, stored and sold later in bulk. *Mava* has a good

market in Bhuj and Khavda for various sweet preparations. Due to easy access to dairy and better returns, over the last two years, mava making is gradually reducing. Last year, special mava makers were invited in some villages. Most of them came from far off villages of Uttar Pradesh. They camped in the village for monsoon and winter when the milk quantities are high. In March 2010 in village Bhagadia there was one such camp but in March 2011 after a year when we went again, they were not there and people had stopped converting their milk into mava as dairy is giving better returns on the milk. Pastoralists of Misariyado village daily produce about 3000 kg of mava in their Abdasa camps. Known as Bamba mava, it is always in great demand in Bhuj. On reaching Bhuj, this mava gets sold in no time, an hour or two at most. Traders from various places wait with their taxis everyday at Bhuj bus station to buy this delicious mava.

Dung manure was not a source of income for Banni pastoralists. As there was no market for dung in those days all the manure remained within Banni, one of the factors sustaining productivity of these lands. Bhirandiara study reported that manure selling had just begun then and pastoralists were not very particular about selling it. Occasionally when some truck came, they used to load it and it used to fetch them Rs 8 for a truck. 1985 note on Banni Development Scheme has reported production of 6 to 7,000 cartloads of dung manure. On an average, a herd of 100 buffaloes produce one truck load of dung in 15 days and is sold at the rate of Rs 1500 to Rs 1700 per truck load. Over the years, dung selling has become a wider practice among the pastoralists. 96.5 per cent of surveyed pastoralists reported that they sell dung. However it still forms negligible proportion of their total income. In the long run, this practice can have detrimental effect on the soil health of Banni.

Large scale livestock population also generates large quantities of animal skins in the region. Till date, the pastoralists have never sold their dead animals. People from Meghwal community take away the dead animals for free and they can keep all its produce - meat, skin etc. They remove the skin, tan the leather and make beautiful artefacts from the leather.

Traditionally, each pastoral family had a long standing relation with a particular Meghwal family. Members from that Meghwal family were called every time an animal died. They used to take away the dead body and in return fulfilled the footwear needs of the pastoral family. They also made *Chadai*, open top water container for pulling up water from the *viridas*, for pastoral family. Meghwals did not pay for the dead animals and received free buttermilk from the pastoral families. It was barter without specifying an exchange rate. Meghwal family was called *Hataar* of pastoral family. A *Hataar* family was generally tied to 3-4 pastoral families. *Hataars* continue to come now too, to take away the dead animal but the earlier reciprocations have gone.

4.5 Banni's Pastoral Economy: From Breeders to Milkmen?

Over last five decades many changes have come in Banni's pastoral economy. Nature of the bullock trade has undergone a change. As the cattle have reduced, two things have emerged - one, calf procurement has extended beyond Banni and now, pastoralists buy mature calves from other farmers, pastoralists and from panjrapols. Two, in the earlier times it was always the breeder pastoralist who also engaged in migration with his herd for bullock selling in Kathiawar. Now, no pastoralist has a large cow herd for having a viable bullock herd to be taken personally to Kathiawar. So there are pastoralists who act like traders and procure from those having few bullocks to sell. Due to growing religion based communal harassment by fundamentalist groups, discussed later in the study, recently pastoralist traders have begun moving in a group instead of moving individually.

Introduction of tractors led to decline in bullock demand for some years. But soon the farmers of Saurashtra realised that their soils were getting harder due to compaction with tractors. Also, sharp increase in fuel costs and reducing sizes of land holdings make tractor owning unprofitable. Tractors also meant high capital expenditure when the returns are so uncertain. And to top it all, they could buy bullocks on 3 year interest free installments, not tractors!

Emergence of large scale milk market with growing urbanization; changes in the consumption pattern of local people; emerging need for cash and increased interactions with the market have led to increased demand for milk and the need to sell it. Both rose exponentially with every passing decade. With the coming of dairy in Banni, milk has become a major source of income which was never sold till the time of independence and which never meant major income till the dairies came as private traders always paid poorly for milk. As the milk economy has begun favouring pastoralists, their interest in selling buffaloes has reduced which in turn has pushed up buffaloes' price.

In recent times, first big change has been the shift from cows to buffalos and the second big change might be on its way where the emphasis may change from breeders to *doodh walas*, milkmen, with the dairy boom supported by good rains.

Pastoralists have persisted, struggled and kept going. At times by changing livestock composition, at times by changing their products for sale, by migrating, by changing herd size, by increasing or reducing their dependence on outside markets. They have kept finding newer ways to keep sustaining themselves in this occupation even when it appeared that leaving it was the only way. Last five years have redefined pastoralism of Banni and has rejuvenated younger generation's interest in pastoralism.

Chapter - 5

Not so Green: Changing Grasslands

Way back in 1996, while we were trying to understand the water problem of Kutch, we had first learnt about Banni from the people of Kutch. After saying that Banni was one of Asia's best tropical grasslands, they would add, but not anymore. Y D Singh, ex-director, Gujarat Institute of Desert Ecology had told us then, "I had first come to this land in early 60's. Grasses used to be so tall and dense that we had to put a flag on our jeep to indicate the movement for avoiding accident".

In past five decades there are many changes in the flora, fauna and grasses of Banni. Average green forage production in 1960 was reported to be 4700 kg per ha. and in 1998 report it was 620 kg. per ha.³¹ This is 87 per cent reduction which explains constant refrain by Banni people that our grasses have gone. It is a huge difference to be explained only through methodological differences, if any. More than 84 per cent pastoralists felt that grazing and water sources for their livestock have reduced and its quality has deteriorated. [Table 26] Banni has always been a nesting place to many migratory birds. Both birds and wildlife have also reduced. As shared by the pastoralists till 1960s, several wild animals like wolf, hyena, jackal, ox, wild boar and blue bulls were found.

Table 26 : Grassland and Water Resources of Banni in Last 50 years : People's Perceptions

Details	Western Banni	Central Banni	Eastern Banni	Total
N =	90	90	120	300
Grazing sources for livestock - Reduced	86.7	83.3	83.3	84.3
Quality of Grasses - Deteriorated	90.0	90.0	85.8	88.3
Water sources for livestock - Deteriorated	90.0	93.3	80.0	87.0

Source: Primary Survey, 2011.

³¹ 1960 figures from Trivedi, 1964:4 and 1998 figures from Singh et al. 1998:57.

Today, Banni grasslands are severely degraded and area under grass cover has sharply reduced. There is also considerable loss in the diversity of the grasses. This has impacted the pastoral livelihood of Banni in more than one way. Cattle population has sharply reduced; migrations have increased; dependence on market for feed has increased; a new trend of purchasing fodder is emerging. Both scientific community and the local people attribute this degradation to two major factors - increased soil salinity and uncontrolled *Prosopis* invasion. Several other post independence processes have also led to change in pastoralists' access to traditional pastures. [Table 27] Following is a discussion of some of these processes that have changed the grassland of Banni.

5.1 Partition of India

As the nation rejoiced on the newly gained independence in 1947, the country was partitioned in two - India and Pakistan. The line dividing the two countries also happened to affect Banni separating it from Sindh. Initially it did not mean much to the people of both sides and the mobility did continue across the border but 1965 onwards things began changing rapidly and gradually the border became totally impervious.

Table 27 : Post Independence Processes that Impacted Banni Grasslands

What Happened	When	Purpose	Impacts on Grassland
Partition of India	1947	-	- Loss of seasonal traditional pastures and markets in Sindh.
Grassland turned into protected forest	1955	Efficient grassland management	- People losing their control over pastures
Damming of rivers flowing to Banni	1955-81	Irrigation for agriculture	- Annual monsoon water that rejuvenated grasslands stopped. - Increase in soil salinity.
Introduction of <i>Prosopis juliflora</i>	1960	Prevention of Rann ingressions	- Severe invasion of grasslands. - Reduction in palatable grasses. - Livestock movements affected.
Construction of Punjabi Road	1965	For army's wartime movements	- Increase in salinity and Rann ingressions in Banni villages.

Compiled by Authors, 2011

There were several *bets* in the Greater Rann of Kutch which were camping points during their migration to Sindh and many times when the fodder dried in their own village pastures, Banni pastoralists used to take their livestock to these *bets* as discussed earlier in this study.

As the line was drawn, the border needed defending. Gradually, with increasing tensions in Indo-Pak relations, security in the border region began increasing with more army contingents getting deployed at various strategic locations. Gradually many areas were closed to civilian entry. And today, it is almost impossible to access any of those erstwhile grazing sources. Banni pastoralists have lost both pastures and market as a result of partition. They have also lost relationships and the culture of Sindh that nourished their lives and soul.

5.2 Increased Soil Salinity

During summer and winter, winds coming from the Greater Rann of Kutch bring in salt particles to Banni land. These particles settle on the soil and further increase the surface salinity of already inherently saline Banni. Earlier, this was getting washed out and leached down by the water from rain water falling on Banni land and by the sweet water brought in by the north flowing rivers like Khari, Bhurud, Nara, Kayla, Kaswati and Panjora. Low permeability of Banni soils flooded Banni which washed the surface salinity annually. This was an important annual cycle for maintaining the soil salinity and productivity of grasslands, like a natural equilibrium.

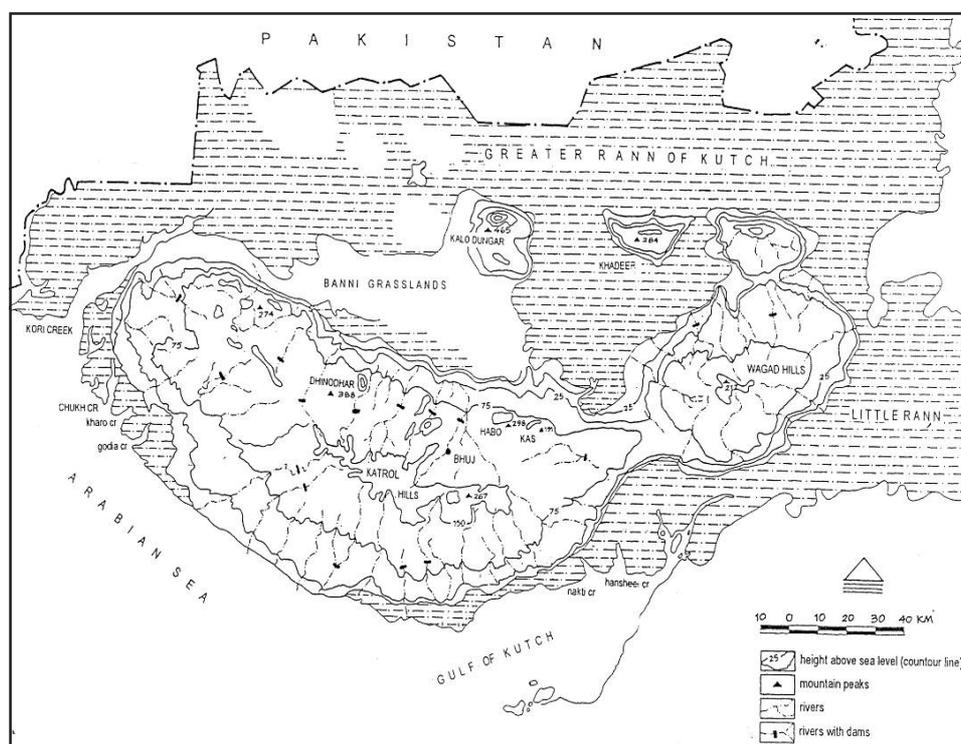


Figure - 5 : Dams on the Rivers flowing Northwards to Banni

In order to develop water resources for irrigation in mainland Kutch, one after the other all these rivers were dammed. From 1955 to 1980 more than seven such rivers were dammed affecting the sweet water flow in all the three zones of Banni. [Table 28 and Figure 5] Together these dams have a storage capacity of 168 Million Cubic Meters (MCM), volume enough to spread a 6.6 cm thick sheet of water over entire Banni. Making of these dams, gradually cut off the annual sweet water supply, reduced washing of surface salinity and hence increased the salinity in Banni soils.

Due to high evaporation and evapo-transpiration, surface water reservoirs operate at a very low efficiency in Kutch. An analysis of all irrigation projects showed that from 1984 to 1995 the average efficiency was only 28 per cent. Assuming an average of 30 per cent efficiency, rivers dammed around Banni can irrigate only 57 sq. km. farm land as against keeping about 3000 sq. km. of grassland alive, if rivers were not dammed. A highly improbable 100 per cent efficiency will also mean only 190 sq. km. farm land irrigation.

Table 28 : Damming of Rivers bringing Sweet Water to Banni

River	Dam	Completion Year	Gross Storage Capacity (MCM)	Gross Command Area (sq. km.)	Affected Zones in Banni
1. Kayla	Kayla	1955	13.98	44.52	Central
2. Panjora	Gajansar	1960	9.52	-	West
3. Khari, Pur	Rudramata	1970	64.74	54.0	Central, East
4. Bhurud	Nirona	1970	30.19	36.4	Central
5. Kaswati	Kaswati	1976	8.88	23.61	East
6. Nara	Nara	1981	41.03	30.74	West
Total			168.34	189.27	

Source: GUIDE, [1998:35]

A survey carried out in Banni by the Soil Survey Division to assess the salinity at different locations and at different soil depths brought out some astonishing facts. About 50 per cent of top soil, up to 30 cm depth, is highly saline with salinity levels of more than 15 Mmhos/cm.³² Another remote sensing study to understand the change in Banni's land cover brought out that between 1989 to 1997, saline areas expanded at an alarming rate of 65.61 sq. km. annually and increased by 83 per cent, from 710 sq. km to 1300.8 sq.

³² Working Plan. 2009

km.³³ Increase in salinity has severely affected the grass cover and its quality in Banni. While highly saline areas have no vegetation, coarse and less nutritional grass species have replaced good grasses in many less saline areas resulting in drastic reduction in sweet grass.

Another factor that has affected the grass productivity in many villages on the edge of the Rann is Rann ingression. During monsoon in the natural course, the sea water used to enter the Greater Rann of Kutch through Kori creek in the west and it travelled as far as Kuver Bet and further, depending upon the tidal force and wind velocity. To facilitate the army movements during 1965 Indo-Pak war a road was constructed one kilometre east of India Bridge to connect the Pachham island with Kuver Bet. This road now lies unused but its structure remains. This had two major impacts. One, it stopped the eastward flow of tidal sea water which began ingressing in south and flooding several northern Banni villages. Two, it also stopped the westward flow of river Luni which brought in sweet water to Banni.

Table 29 : Rann Ingression 1960 - 1989

Period	Area Ingressed (Sq. km)	Rate of Ingress (Sq Km / Year)
1960-61 to 1975	118.63	7.90
1975 to 1984	58.00	6.40
1984 to 86	62.67	31.33
1986 to 1989	4.75	1.60
Total	244.05	-

Source: Jothimani P and Garg J K, 1992

In the span of 12 years from 1980 to 1992, inundated area increased by 24 per cent - from 827 sq. km. to 1033 sq. km. As evident in Table 29, from 1960-61 to 1989, Rann ingressed in 244 sq.km. area at an average rate of 8.41 sq km every year. (Jothimani et.al 1992) Inundation is minimal during 1986 to 1989 due to three years of severe drought in this period. Northern periphery villages like Laywara, Udhma and Old Bhitara, all near the edge of the Rann, have been inundated and abandoned since many years.

5.3 Invading Grasslands: *Prosopis juliflora*

Prosopis juliflora, is locally called *gando baval*, mad acacia, literally. Common name for *Prosopis juliflora* in English is mesquite, in Hindi *vilayati babool*. One of the most invasive plants, *Prosopis* has gradually invaded more and more areas of Banni severely affecting its grass cover.

³³ Singh, 2004:148 Grassland Action Plan for Kachchh District

From discussions with the forest department officials and many others, it appears that the *Prosopis juliflora* was introduced with an objective of greening saline and drylands as this plant has some remarkable characteristics like high salinity tolerance, high aridity tolerance, ability of quick coppicing growth from the stumped plants, extensive lateral root system and a deep tap root that helps it absorb water from far off distances, nitrogen fixing properties and high dormancy period in its seeds. All these help *Prosopis* to grow rapidly even in very hostile conditions.

While these characteristics did help the widespread rapid growth of *Prosopis*, there is another characteristic of the plant which led to loss of indigenous plants. *Prosopis* has allelopathic properties. Allelopathy is a process in which a plant releases allelopath chemicals that stall the growth of other plants around it. This gradually leads to elimination of all other plants and biodiversity around *Prosopis* and facilitates its rapid invasion. This process is further accelerated among vegetation surviving under stress - like those with pests, diseases, or less than optimum access to nutrients, sun or moisture.

Grasses are naturally fragile, as compared to other vegetation like trees and thus more susceptible to allelopathic attack. In case of Banni already fragile and stressed ecological conditions exist which have proved to be disastrous for native grass growth. This also scientifically explains continued remarks by the people that nothing grows under and around this plant.

Despite its invasive nature, there are various uses of *Prosopis*. Due to high calorific value, it is used as a fuel wood. For the same reasons, it is also used for charcoal making. (GUIDE, 2009: 73) It is also used by the local people for furniture making and as timber; for extracting gum, wax and honey. Its crushed pods are used as one of the ingredients in animal feed along with wheat straw, groundnut husk, rice husk and cotton seed.

5.3.1 History of *Prosopis juliflora*

Native of South America, Caribbean and Mexico, *Prosopis juliflora* was first introduced in 1877 in Sindh, north-west province of pre independent India. Earliest recorded introduction of *Prosopis* in present India goes back to the ruler of the princely state of Marwar who introduced *Prosopis* in Rajasthan in 1913. Fascinated by its excellent growth rates in his region, the then ruler of the state declared it a 'Royal' plant in 1940 and exhorted the public to protect it. Since then, this specie was gradually introduced in many parts of the country. In areas adjacent to Little Rann of Kutch (LRK), *Prosopis* was introduced by the ruler of Radhanpur during 1899 - 90. (GUIDE, 2009: 37, 60) In

Gujarat, regular plantations of *Prosopis* began on the saline fringes of the Rann of Kutch from 1953. Its large scale plantation (around 31,500 ha) was taken up by the forest department along Banni - GRK border around 1961. It gradually spread throughout the fringe of the desert. By 1977, many areas of the Rann and desert were invaded by it. As per an estimate by the scientists of Central Arid Zone Research Institute, *Prosopis* has spread over 5000 sq. km. area of Indian land. Many native species have already been lost due to *Prosopis* invasion.

While searching for documents to understand the grazing policies of the princely states of Saurashtra at a dusty Archival office in Junagadh, we stumbled upon an interesting correspondence dating back to 1944. It was a correspondence between the Garden Superintendent of Radhanpur state and Director of Agriculture of Junagadh state about the appropriateness and apprehensions about *Prosopis*. Radhanpur official had sent a detailed note on its benefits and recommended its plantation in Junagadh and had also offered to supply the seeds. In a response to this, the Director of Agriculture, Junagadh has made some remarkable comments, way back in 1945 when not much was known and experienced about this plant. Here is a part of his handwritten note. Notice his concerns, reservations and predictions about its likely impacts on grasslands. Sadly, they have come true in Banni.

“...the plant has tendency to branch out too much...on account of its profuse tendency of branching out, it would not allow any undergrowth to flourish...As such it is neither useful as a forest plant, nor is it desirable to be introduced in to grazing areas...For the latter areas (i.e. grazing areas), Babul (*Acacia Arabica*) is well suited and would not be anytime inferior to P.J....Where *A. Arabica* grows well as grazing area plant, P.J. should have no scope. *A. Arabica* also gives pods which are relished by cattle, sheep and goats. If (it is) desired to be introduced as a trial measure only, it may be done so as a hedge plant or as a plant to strengthen the anti erosion bund to be compared with *Inga dulcis*. It should not be introduced otherwise since it is feared it may compete out the useful *Acacia Arabica* and being hard to eradicate would be more a nuisance than useful.” [Letter dated 18 September, 1945. Signed by the Director of Agriculture, Junagadh State].

This plant, disliked by the farmers and pastoralists across different regions of Gujarat and fairly favoured by the Forest Department was promoted on large scale till recent times despite its known harmful effects. Its contribution for fuel wood in arid regions can not be underestimated. Yet, there are radically different views about this plant and its usefulness. Most communities whose livelihoods depend upon the natural resources,

share similar views - it is poisonous plant; very harmful to their farm, their grazing sources, indigenous and native vegetation of their region; and dries up their water sources.

A farmer once told us, “Yes, the forest officials will say that it's very good. But none of them have ever lived with it. They only plant it.” A study carried out by Indian Space Research Organisation on grassland status of Gujarat emphasizes how *vidis* and *rakhals* and other grasslands formed an important ecosystem in Saurashtra and Kutch and outlines various threats to these grasslands including *Prosopis*. While describing its impacts the study states,

“*Prosopis juliflora* has spread to many of these locations [grasslands], threatening the survival of grasses. Hence it is important to examine area under *Prosopis*. It has spread to almost all land use environments. It now grows luxuriantly around villages and hutments, on crop fences and in crop lands, along margins of inland water bodies, along banks of streams and rivulets, in degraded forests and grasslands, sea shores where it often forms impenetrable thickets. It has even invaded into reserved forests and protected grasslands.” (Jadhav et. al. 2004: 7-8)

If this is such a damaging plant to grasslands, why was it brought to Banni? How? Why no actions have been taken after understanding its negative impacts on the grassland? These questions remain unanswered.

5.3.2 *Prosopis* in Banni

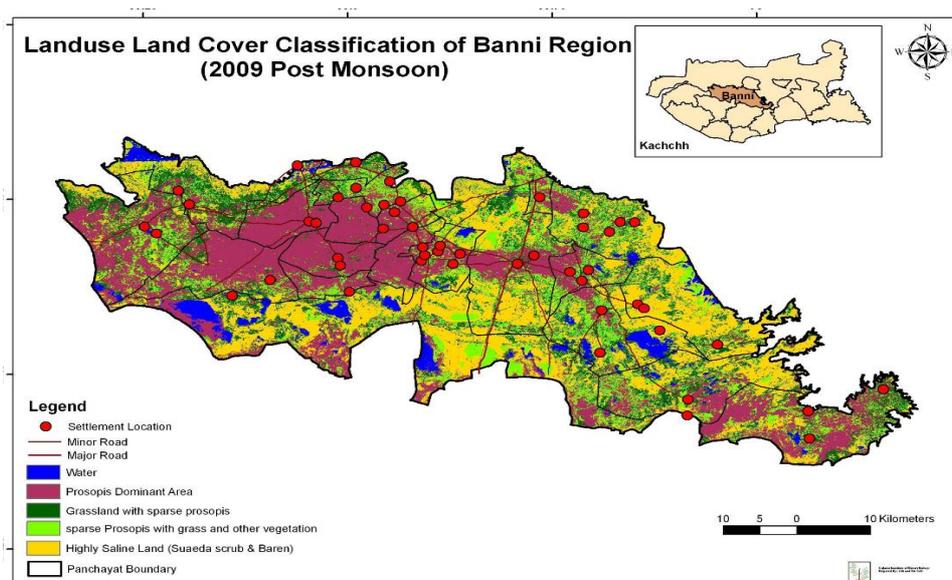
In Banni it was introduced around 1961, by the forest department in an effort to check the Rann ingressions. The forest department planted it in an area of 31,550 hectare along the Rann fringes under the scheme for Immobilisation of Rann of Kutch. (ICAR, 1977: 59) Gradually it began spreading in Banni. It grew around the villages and homesteads; on the margins of the water bodies, along the roads, in all kinds of grasslands...virtually everywhere and today it has become the most prominent vegetation in Banni's landscape. Its spread was further aided by the fact that during summer when grasses are in shortage, *Prosopis juliflora* pods become a ready feed for the grazing animal. Seeds rejected with the faecal matter quickly germinate and take root as they get both manure and moisture. Open grazing system of Banni further accelerates its rapid spread.

Land cover changes documented by Gujarat Institute of Desert Ecology convincingly bring out how the grasslands have been invaded by *Prosopis* in Banni. In a decade from 1997 to 2008, there is 347 per cent increase in *Prosopis* dominant area but sharp reduction in the area of water bodies and area under mixed vegetation, 75 and 53 per cent respectively. [Table 30]

Table 30 : Change in Land Cover [1997 - 2008]

Major Land Use Classes	1997 Cover		2008 Cover		% change
	Area	% of the Total	Area	% of the Total	
Grass with sparse Prosopis	51,395.5	19.63	55,081.74	21.04	7.2
<i>Prosopis</i> Dominant area	16,133.66	6.16	72,073.48	27.53	346.7
Prosopis with other vegetation	117,879.1	45.03	55,451.94	21.18	-53.0
Suaeda scrub (Incl. Barren Land)	60,889.29	23.26	75,324.72	28.77	23.7
Water	15,474.21	5.91	3,839.64	1.47	-75.2
Total area	261,771.8	100.00	261,771.5	100.00	0.0

Source : Gujarat Institute of Desert Ecology, 2010



Source: Gujarat Institute of Desert Ecology, Bhuj

Figure - 6 Prosopis Juliflora Spread in Banni [2009]

This also indicates how Prosopis takes over other vegetation and severely affects the biodiversity of grasslands. Figure - 6 shows the most recent condition of grassland invasion by Prosopis prepared by Gujarat Institute of Desert Ecology.

Table 31 : Prosopis Density in Banni - 2008 [Density as plants per hectare]

West Banni			Central Banni			East Banni		
Panchayat	Summer	Winter	Panchayat	Summer	Winter	Panchayat	Summer	Winter
Bhitara	442	567	Dhordo	1450	1450	Berdo	96	100
Chachhala	517	521	Dumado	333	417			
Bhirandiara	450	460						
Luna	590	633	Gorewali	1358	1475	Bhojardo	589	733
Sarada	792	950	Hodko	683	722	Dadhhar	475	492
			Mithadi	917	972	Misariyado	667	683
			Sadai	617	639	Raiyado	758	800
			Servo	875	950	Sargu	650	650
			Udai	242	242			
Average	585	668	Average	809	858	Average	526	560

Compiled from Annual Progress Report of Integrated Grassland Development Project, Banni [2008-09]

During a field study of 10 villages for preparing grassland action plan for Kutch, Bhuj based Gujarat Institute of Desert Ecology (GUIDE) found that the density of *Prosopis juliflora* in Banni villages varied from 18 plants per hectare in village Chhachhala to more than 200 plants per hectare in Luna, Sadai, Sarada and more than 300 plants per hectare in Burkal and Bhojrado with an average of 163 plants per hectare for Banni. (GUIDE, 2004:179)

Recent annual report of Integrated Grassland Development Project by Gujarat Institute for Desert Ecology brings out the high spread of Prosopis in terms of its village wise density. Prosopis density varies from 96 to 1450 plants per hectare across Banni villages. As evident from Table 31, Central Banni villages face highest Prosopis invasion where village Gorewali has 1475 plants per hectare and average density in Central Banni is more than 800 plants/ha. Both West and East Banni are almost equal with little more than 575 trees/ha. Density in East Banni is marginally lower than West Banni. Village Berdo has the lowest density among the surveyed villages. For the whole Banni, Prosopis density comes to 640 and 695 trees per hectare for summer and winter respectively indicating an increase of more than 300 per cent from the year 2004.

Table 32 : Prosopis Invasion in Banni [Actual and Projection]

Year	Area (ha)	% cover of Total Banni Area
1980	37893.00	9.85
1985	35046.00	9.11
1988	76786.00	19.96
1998	118675.00	31.23
2005	149275.78	39.28
2010	171017.48	45.01
2015	192736.38	50.72

Source : Compiled from ISRO data and Sastry et al (2003)

Several other scientific studies have brought out the negative impacts of Prosopis on grass cover and its species. (GUIDE, 1998:3; ISRO, 1992; Jadhav, 1993; ISRO, 2001; Sastry et. al. 2003; GUIDE, 2008-09; Forest Department, 2009.) As per grassland mapping done using remote sensing and GIS techniques by the Indian Space Research Organisation, from year 1988 to 1998, rate of spread of Prosopis in Banni was more than 4000 hectare per year.

By 1998, 31.23 per cent of Banni's area was invaded by the Prosopis and projections by the same team of scientists for 2015 predicts that 50 per cent Banni is likely to be covered with Prosopis! [Table 32] Another study by Jadhav and others from ISRO brings out how on one hand Prosopis cover increased at the rate of 26.73 sq. km. per year while pure grassland area reduced at the rate of 30.39 sq. km. per year. (Jadhav et. al. 1992) All these studies bring out the scale of spread clearly but what needs to be further emphasised is that it has spread in the best grassland areas of Banni. As livestock tends to wander frequently in good grass patches, Prosopis seeds are voided there which quickly germinate.

5.4 Prosopis, Cattle Reduction and People's Perceptions

Over the past five decades, major changes have occurred in the livestock population. Being a fragile and drought prone region, there have been large scale livestock losses during the low rainfall years as can be seen during the years 1977, 1987-88 and 1997 - which were drought years. Severe drought of 1987- 88, had major impact on the livestock not only in Banni but all over Gujarat. Banni had lost more than 50 per cent of its livestock in this period as evident from the data. More recently, owing to continuous good monsoons in past 5-6 years, the recent data shows considerable increase in the livestock population.

Table 33 : Changing Livestock Population [1957 - 2008]

Year	Cattle	Buffalo	Sheep	Goat	Others	Total
1957	24000	11000	-	35000		
1960\$	-	-	-	-	-	48000
1977	6295	8769	5173	4379	919	25535
1982	9625	22174	12555	3957	1125	49436
1988	6461	13119	2522	2352	302	24756
1992	6058	16774	1399	1006	808	26045
1997	5489	20713	1879	1412	327	29820
2008*	3709	36989	6168	4940	1144	52950
% change [1977-2008]	-41.1	321.8	19.2	12.8	24.5	107.4

Source: Except 2008 data the whole data is taken from GUIDE, 2003.

\$ Banni total livestock taken from Bhirandiara Monograph, 1960.

*2008 data is compiled from the primary survey by Ramesh Bhatti and Sahjeevan team. [Excluding the cattle of Misariyado which lives outside Banni for most part of the year.]

For the first time in past 50 years, the livestock population has crossed 1960 population. [Table 33] While cattle population has declined sharply, there is a constant rise in the buffalo population. In a span of 31 years from 1977 to 2008, cattle population has dropped by 41 per cent, whereas buffalo population has increased by a whopping 322 per cent.

Years ago in 1996, Jumabhai of Bhirandiara had told us that this area had largely cows but these were drastically reduced because of Prosopis leaving Banni bereft of cows, its traditional livestock. We listened but almost did not believe till he patiently elaborated further as to how the cows die after eating its pods. It was quite a shocking revelation for us as to how can a plant affect the livestock population to such an extent.

Few years later we chanced upon 1960 Bhirandiara study which mentions Banni as land of cattle. A comparison of the cattle population of village Bhirandiara for the years 1960 and 2008 showed an alarming cattle reduction by 95 per cent. [Table 34] Sheep and goat have reduced by 91 and 78 per cent during the same period. It is also striking that though there is marginal reduction in the proportion of households having livestock, from 88 to 85 per cent, there is 70 per cent reduction in the total livestock. This also indicates that there is considerable reduction in the average herd size among Bhirandiara pastoralists.

Table 34 : Change in Livestock Population Village Bhirandiara [1960 - 2008]

Livestock	1960*	2008**	Change [Percent]
Total HH in the village	154	228	48.0
HH having livestock	136	195	-
Cows	1726	82	-95.2
Buffaloes	738	1123	52.0
Sheep	2067	170	-91.7
Goat	422	90	-78.6
Horses	17	8	-53.0
Camels	1	0	-100.0
Total	4971	1473	- 70.3

*1960 data from Trivedi, 1964. *Census of India: Bhirandiara village monograph*

** 2008 data compiled from the survey by Ramesh Bhatti and team of Sahjeevan, Bhuj

In case of Bhirandiara this reduction is probably explained by the fact that being most connected and the only village on the main road connecting Bhuj to Khavda; many people have opened up small businesses in their roadside shops, many are involved in milk business and *mava* making and thus may have reduced their herd size.

Table 35 : Changing Livestock Composition in Banni [1977 to 2008]

Year	Cattle : Buffalo: Sheep & Goat
1977	72 : 100 : 109
1982	43 : 100 : 74
1988	49 : 100 : 37
1992	36 : 100 : 14
1997	27 : 100 : 16
2008	10 : 100 : 30

Source: Dixit, 2001 and Bhatti, 2008

Banni level data about changes in livestock composition is equally alarming. In 1977, cattle to buffalo ratio was 72:100 which reduced to 10:100 in 2008. As apparent from Table 35, small ruminants like sheep and goat's proportion has also reduced sharply - from 109 for every 100 buffaloes to only 30. In general, cows are more adaptable and stress tolerant in harsh ecological conditions of Banni than buffaloes. While the statistics show deterioration in the grasslands, why have pastoralists begun shifting to buffaloes? Is it because of the market forces. Or because of some major changes in the preferences among the pastoralists or are there some ecological reasons.

5.4.1 Choosing Buffaloes over Cattle

To many it may appear that choosing buffalo over cattle actually makes more sense when there is such good milk and buffalo market and may take that to be the primary reason for this shift. It surely makes better economical sense to have more buffaloes and expand the herd than keeping cattle. But this is not so simple. Reasons for increase in buffaloes' population are manifold and not governed only by the market.

Earlier, cows were preferred over buffaloes because they are sturdier and stress tolerant as compared to buffalo. Pastoralists of Banni have developed good relations with farmers of irrigated farms in recent times and thus they can now take shelter with their buffaloes elsewhere in Kutch to tide over scarcity situations. In case of cows there are two sources of income - milk and bullocks. So, both male and female progeny is remunerative. In case of buffaloes, male progeny does not yield any revenue while females are source of double income - milk and the buffalo itself. Income has increased after the dairies. Banni buffaloes too fetch a very high price in the market.

Though *Prosopis* invasion has been the primary initiator of pastoralists reducing their cattle herds and drastic reduction in the population of cows, economic factors in favour of buffalo pastoralism have also added to this choice of livestock.

People attribute loss of cattle in Banni largely to the invasion of *Prosopis*. There are no formal or scientific studies in our knowledge that can explain the exact impact of *Prosopis* on livestock. We tried finding some answers by talking to the pastoralists and people working with them.

5.4.2 What Happens after Consuming *Prosopis*

Pastoralists reported everywhere that due to some biochemical reaction, consumption of *Prosopis* pods proves fatal for the cows. *Prosopis* pods are not the preferred diet of the animals. However during scarcity or during the summer months due to absence of sufficient grasses, the animals often consume *Prosopis* pods. After drinking rain water in the monsoon, many animals that have consumed these pods die. Some pastoralists say that after consumption of the pods, the cows develop some kind of tumor in intestine which germinates and chokes their intestines after drinking monsoon water. Pastoralists in all the surveyed villages have experienced this and reported that consumption of *Prosopis* by the cattle can be fatal.

Several scientific works support these observations by the pastoralists. A 1998 report by Gujarat Institute of desert Ecology does mention that consumption of pods create digestive problems among animals leading to inability to ruminate and at times lead to

loss of appetite and death. (Singh and Kumar, 1998:38) A paper presented in 2009 by Azeez and Chandra from Salim Ali Centre for Ornithology and Natural History, Coimbatore at the Prosopis symposium gives some further explanation to this mystery,

“As is well known that the tender leaves of the species are browsed by cattle: in several cases its toxicity over long periods of indigestion results in death. The pollen may cause allergic rhinitis, bronchial asthma and / or hypersensitive pneumonitis. Kingsbury (1964) examined mesquite poisoning in cattle and during autopsies found pods and seeds in the rumen that were nearly 9 months old after the cattle could have eaten them. Mesquite poisoning is also reported to permanently impair ability to digest cellulose and death is attributed to high sugar content repressing rumen-bacterial cellulose activity.” (Azeez and Chandra, GUIDE, 2009:95)

Another most common observation is that the cattle develop lockjaw after consuming pods and are gradually starved to death. Phenomenon of lock jaw has also been confirmed in a study by GUIDE.³⁶ Sheep's feet get infected by Prosopis thorns particularly after the rains and sheep find it difficult to move and graze. Similar diseases due to Prosopis have also been observed among Ethiopian herds by Haile during his study. (Haile, 2008:39)

5.4.3 Other Impacts of Prosopis

Prosopis not only affects grasslands and livestock but also invades the village lands, occupies settlement areas, blocks people's paths, roads and thus affecting people and livestock's free movements within the village and adversely affects water sources. Many pastoralists shared that there are areas in their villages which have become less accessible due to Prosopis invasion. Pastoralists explain the adverse impact of Prosopis to grasses in their own way.

“This *baval* is saline and grows well in Banni. It is a very hot tree and as you will see nothing can survive near or under it. In fact if you sleep under it during winter, you would not feel cold and will not need any covering sheet. Its roots are spread in a way that it sucks up all the moisture from the surroundings rendering all other vegetation near it dry. As a result all other plants and grasses die. This is a very poisonous plant and a curse for us, our livestock and our grasslands.”

Haile's work on Prosopis invasion and its impacts on pastoral livelihood in the Middle Awash area of Ethiopia also corroborate similar experiences of negative impact on cattle after consumption of pods - low milk yield; reduction in palatable plant species etc. 84

³⁶ Singh & Joshua. 2004: 196 in Grassland Action Plan for Kachhchh District, Gujarat Institute for Desert Ecology.

per cent pastoralists there rated it as undesirable for the community. The study has listed 21 negative impacts of this plant which include - invasions of various local and seasonal grass resources, impacts on seasonal mobility of herds, dangers of thorn to humans and livestock, invasion of settlement areas and public spaces, blockade of footpaths and cattle tracks, invasion of community burial places; impacts on local traditions and socialization, pods' danger to livestock, prevention of under canopy growth of grasses, endangering indigenous species and reducing water sources. (Haile, 2008:29)

It is remarkable to see the strong similarity in the impacts on lives and livelihoods of Banni and Ethiopia's pastoralists. In fact, while reading that study, we almost felt as if we were listening to the stories from Banni and not Ethiopia. Similar experiences have been quoted by several pastoralists from different parts of the world and India. This also means that world over wherever the governments have taken short-cuts to green their arid regions by planting *Prosopis* the biodiversity and livelihoods are adversely affected.

There is a small silver lining. From the data and our own observations during our field work, it is evident that in past 5 years, there has been an increase in the cattle population. There are two likely reasons. One, last 5-6 years have witnessed good monsoons in Banni and thus relatively abundant grasses. Thus there is no fear that the cows will consume *Prosopis* pods. Two, after the removal of ban on *Prosopis* cutting, there is reduction of *Prosopis* cover and increase in grass cover in some parts of Banni.³⁷ This has led some pastoralists to restock their cattle.

Karam Khan Jat happily informs us about his village Bhagadia that wherever this plant is removed, grasses like *Mandhanu*, *Khevai*, *Dunai*, *Saon* and *Dhrab* which had become extinct in recent past have resurfaced. In other villages too, the pastoralists reported that wherever *Prosopis* is removed, some of the extinct grass species have begun reappearing. Salimbhai of Sargu says that in Sargu native desi baval, *Acacia nilotica*, trees sprouted and grew up on the patches from which *Prosopis* was cleared.

Among the surveyed pastoralists, 83.7 per cent blamed *Prosopis juliflora* invasion to have degraded their grassland followed by 75 per cent blaming damming of rivers and 41 per cent blaming salinity increase as the reason for degradation.³⁸ [Table 36] In East Banni, pastoralists view damming of rivers as the biggest cause for grassland degradation. 33 per cent pastoralists felt that over grazing also causes degradation however most of them

³⁷ From 2005 to 2008, the Government lifted ban on *Prosopis* cutting. As a result many areas got cleared of *Prosopis*.

³⁸ We understand that damming of rivers and increase of salinity are related and are not mutually exclusive. Yet we wanted to know how people perceive.

qualified it by saying that much of overgrazing is due to *Prosopis* invasion since it has reduced the available grasslands.

Table 36 : Causes for Grassland Degradation : People's Perception

	West Banni	Central Banni	East Banni	Total
N=	90	90	120	300
<i>Prosopis</i> Invasion	95.6	91.1	69.2	83.7
Damming of rivers	50.0	82.2	89.2	75.3
Soil salinity increase	17.8	55.6	47.5	41.0
Overgrazing	22.2	30.0	43.3	33.0
Reduction in rains	26.7	20.0	13.3	19.3
Other reasons	22.2	7.8	5.8	11.3

Source: Primary Survey, 2011

While there are benefits of *Prosopis*, caution could have been exercised before introducing it near grasslands where open grazing system is practiced. Almost every pastoralist we met during our field work expressed deep anguish and helplessness about *Prosopis*. Often they became nostalgic remembering their fine native trees like desi *baval*, *piludi*, *kerad* etc.

Their sentiments reminded us of the comments made by an old pastoralist of Afar region of Ethiopia having strong pastoral traditions with extensive open grazing system, where *Prosopis* was introduced few decades ago and now the grasslands are fully choked with it. In Ethiopia, they call it *Woyane hara*, devil tree. His words sum up the collective feeling of the people of Banni. He says,

“We used to have only one traditional enemy, the Issa tribe, but now we have the worst one, *Woyane hara* (local name for *Prosopis juliflora*)....Some external people get confused about merits of *Prosopis* when they see local people using the tree for different purposes such as fuelwood, fencing, house construction, charcoal making, pods for livestock feed, because we do not have an alternative. We would prefer it though if we could eradicate *Prosopis* and get back indigenous trees and pasture land”. [Haile, 2008]

5.5 Coping with *Prosopis*: Two Cases

As described earlier pastoralists of Banni fundamentally changed their livestock composition because of *Prosopis*. There are two noteworthy cases to demonstrate how people have found different ways to deal with the *Prosopis* menace. One is an evidence

of their endurance and the other an evidence of potential of Banni as grassland. While people of Misariyado migrated en mass out of Banni to save their cows from Prosopis; Abdulla kaka and his family in Sargu village took the struggle head on to prove that if Prosopis growth is removed or controlled, how Banni can be restored as grassland by doing so on a four acre plot.

5.5.1 People of Misariyado - A Tough Choice between Cattle and Banni

The cows of Misariyado, 7000 strong, are a living testimony of two things - of tradition and the modernity. They are a grim reminder of the cattle tradition of Banni. Since past 30 years, the cows of Misariyado have been taken to Lakhpata and Abdasa blocks of Kutch and are brought to their native village for 2 - 3 months during good monsoons. After suffering huge losses of cattle due to growing Prosopis, they moved out of Banni around 1980 when the invasion was growing in their village and was severely affecting their cows.

The whole enterprise of 7,000 cows moves like a giant entity. Divided in 5 - 6 camps, they are huge herds in each camp. Grazing them; milking them and collecting 21,000 litres of milk every day; turning 14,000 litres of it to 3000 kg. of *mava*; collecting it from camps; loading 3000 kg of *mava* and 7000 litres of remaining milk onto truck; sending it to Bhuj; bringing tons of feed to camps on the return journey and add to it the rations, the salt, grains, vegetables, oil, medicines for humans and the livestock; and all those things needed to run a mobile life. This is the life of the cattle and around 150 families rearing them, shifting place every fortnight or a month; tackling occasional conflicts with local farmers and other pastoral communities; selling calves to bullock breeders; keeping tracks of the sires, male parent of an animal, and their female progeny so that at the desired time sires can be kept out of the camp to avoid inbreeding. Sure, a life of hardships away from native village. Well, you can blame it all primarily on Prosopis.

Pathai Jam Bamba of Misariyado says, "We decided not to shift from cows to buffaloes. Instead, we shifted from Banni to Lakhpata and Abdasa. *Gando baval* would not have allowed us to stay in Banni with so many cows." Says Pathai Jam of Misariyado. He proudly shares that their *mava* is the best and in great demand in Bhuj. He also says that how since the day God gave them the cow and its milk, they had not added a drop of water in it.

While older generation is happy with cows and this nomadic lifestyle and does not want to give it up; younger generation is not so happy. Life away from homeland is full of drudgery and social isolation. "Our elders do not understand this. We are so tired that we can sell these 7,000 cows right now, stay with our children and educate them, take up

any other occupation. The elders still want to add more cows. But in the coming 2 - 3 years the situation may change. Cows per say are not a problem but it has become difficult to keep their life going in Banni. Earlier the grasses were so good that they oozed fragrance. We used to make *rotla* out of grasses and eat but no more.” Says one of them.

Economic relations are held with the traders of Bhuj since many decades but it does not guarantee fair remuneration. Traders are clever enough to raise the price of feed as soon as the price of the milk goes a little higher. In summers they invariably increase the feed price so that their additional income is more than offset by the additional costs. Many cow herding families of Misariyado are debt ridden. Summer months are too difficult as the grasses are in terrible shortage, the heat is unbearable, the water stress goes up and milk yield reduces. It is possible that in near future Misariyado's herds of cows may be sold out and people shift to some alternative occupation.

5.5.2 Abdulla Wandh: People's Effort to Rejuvenate Grassland

In 1979 when Laywara village in northern Banni was flooded with tidal water and affected by salinity it had to be abandoned. Some of the families took shelter in the outskirts of village Sargu. Later on they formally approached the people of Sargu and took their permission to rebuild their settlement near Sargu. Sargu people granted so and thus came into being what is now known as Abdulla Wandh of village Sargu, a small hamlet of about 15 *bhungas* in which members of an extended family of Abdullabhai live with their 60 buffaloes and around 200 sheep and goats. In and outside Banni the wandh is also known for its evergreen grassplot of 5 acres.

The reason for choosing this location for the wandh was the presence of a 200 years old zheel here, called Aaloo Walo zheel. Abdulla Kaka had learnt about it from his father. When they came here they opened up about 50 virdas in zheel. In order to protect their animals from falling in the virdas and to ensure fodder security for their livestock they enclosed an area of about 5 acres around the zheel.

There was one *desi baval*, few small *kerda*, *khari* grass and lots of *gando baval* initially. All the *gando baval* was cleared. In the first year, sparse grasses grew up on their own. By third year, many different grasses came up without any seeding. Many *desi baval* trees also began showing up. Today there are more than 40 big *desi baval* trees and several new species of grasses like *Danai*, *Khevai*, *Khario*, *Kaluro*, *Kal*, *Chichmi*, *Saoon*, *Dhrab*, *Oin*, *Mandanu*, *Bichhti*, *Gatbeer*, *Chidio* etc. have come up. As Abdullakaka says, “This being originally grassland it had all the richness already hidden in it which sprouted up once protected.” For the protection of the grasses in wada, they need to keep a watch, more

in the monsoon, so that no animal breaks in to wada. They do not allow their own animals to graze inside. The grasses are harvested and stored after they throw their seeds. Newly sprouted *Prosopis* shoots are uprooted and thrown out.

When we visited the wada in March 2010, there were still some grasses and *Saoon* grass had already scattered its seeds which they said will sprout up after the rains. There was a lot of stored *Danai* and other grass with them. In October 2010 when we visited again, there were 2 to 2.5 feet tall diverse grasses in the grassplot indicating what the erstwhile Banni was.

Chapter - 6

Recent Developments: Reasons for Joy and Fear

Our first visit to Banni was in 1996 and the next in 2004. While 1996 was a drought year and many people had migrated out of Banni with livestock, 2004 was also not a very good year. Most pastoralists we met sounded resigned and helpless at the bleak future of pastoralism in Banni. Poor rainfalls, highly degraded grasslands with *Prosopis* invasion, severe forage shortages, and low milk prices were all leading to economically and ecologically an unviable occupation. Pastoralists were really struggling hard to keep the occupation alive - by migrating, changing herd size, purchasing fodder from outside, seeking shelter in a wadi in water rich zones of Kutch where both fodder and milk prices were better. We had come across many families camping near Anjar, Nakhtrana, Mandvi etc. Younger generation was seeing a dead end to their future with no returns in pastoralism and no alternative to look for. This is also the time when some of the well to do pastoralists began selling their herds and getting into alternative occupations like selling milk by shifting to nearby urban centres. Many of them felt that had they been educated, they may have been able to explore alternatives.

Table 37 : Recent Developments in Banni

Reasons for Joy	Fears - Threats to Banni's pastoralism
1. Past five years: Good rains, good grasses.	1. Since 2000 : Growing communal harassment to migrating herds of Banni.
2. 2010 : Recognition of Banni buffalo	2. Fear of losing grasslands to industrial interests.
3. 2009-10 : Arrival of milk dairies in Banni	3. Growing trend of enclosing lands for agriculture.
4. 2005 : Sham - e - Sarhad resort	4. Working Plan 2009 of the Forest Department which will fragment Banni's pasture lands and ban open grazing.
5. 2008 onwards : Pashu Mela [Animal Fair]	5. Feeling of insecurity due to no legal titles or tenurial rights to homes and pasture lands.
6. 2009 : Formation of Banni Breeders' Association	
7. 2005 - 2008 : Lifting of ban on <i>Prosopis</i> cutting and charcoal making.	
8. Revival of Younger generation's interest in Pastoralism	

Many developments of past five years, 2005 to 2010 have revived people's interest and confidence in pastoralism. While some developments have posed new threats to the pastoralism like never before, pastoralists of Banni are keen to continue and find ways to sustain pastoralism in Banni. [Table 37]

6.1 Reasons for Joy: New Life to Pastoralism

1. Good Rains and Arrival of Dairies: Firstly the nature has been kind for past 5-6 years by bestowing good rains in this region including Banni. Almost every village we went and every pastoralist we met did mention that after many years Banni has witnessed continuous few years of good rains. Gratitude towards nature could not be missed in their words and eyes.

Table 38 : Rainfall in Past 30 Years [1980 - 2010]

Years	No of years below normal
1980 - 1985	3
1986 - 1990	3
1991 - 1995	2
1996 - 2000	3
2001 - 2005	3
2006 - 2010	1

Analysed based on data from Irrigation Department. For details, see Appendix - 9

Analysis of past 30 years' rainfall data confirms what people have been telling us. As against 3 years of sub-normal rainfall in every five years from 1980 to 2005, (with an exception of 1991 to 1995 when there were two sub-normal rainfall years) only one year had sub-normal rains in last 5 years. [Table 38] Pastures got much awaited rejuvenation with relative abundance of grasses. With arrival of dairies the returns from the milk have nearly doubled leading to a reversal of milk economics which was highly unfavourable till recent times.

Good rains in Saurashtra during the same period led to rise in the bullocks' demand among Saurashtra farmers. Both good pastures and bullock market have also led to rise in the cattle population in Banni in past 3 years as shared by many pastoralist traders of Banni. Entire pastoral enterprise is livened up.

2. Recognition of Banni Buffalo: Another significant moment for Banni has been formal recognition of Banni buffalo as a distinct breed. After a sustained effort of Banni's pastoralists, scientists, local voluntary organizations, and universities for few years, in

2010 Banni's buffalo was recognized by the National Bureau of Animal Genetic Resources as a unique breed, first indigenous breed to be recognized after the independence! This has been a historical achievement for Banni and her pastoralists. This has also added to pastoralists' self pride and esteem.³⁹ This recognition has also brought the unique features of Banni buffalo like high milk yield and high stress tolerance in public domain. This is likely to give a boost to demand for this buffalo and to the efforts for conserving its habitat.

3. Sham-e-Sarhad Resort: Banni has always been a place of interest to many tourists - for its sprawling landscape, for its unique visual treat, for being a border region, for the white Greater Rann of Kutch. To tap its tourism potential it was thought of offering home stay to the tourists with an objective of initiating supplementary income generating activity in the region. However, the local people were not keen for the home stay as they felt that it would have a negative impact on their culture and privacy. After several talks with the people in 2005, a desert resort called *Sham-e-Sarhad*, dusk at the border, was started at Hodko village in Central Banni. This project has been a joint work of UNDP (United Nations Development Programme), Ministry of Tourism, with support from local non-governmental organisations like Kutch Mahila Vikas Sangathan, Shrujan, Hunnarshala, Sahjeevan and others.

Beautifully designed and aesthetically adorable, this resort is a physical expression of Banni's pastoral people and their versatile architecture. Due to unbearable heat in the region during summer and the resort needing an annual upkeep because of its unique mud architecture, it operates only during winter months from October to March. It is managed and maintained by the younger people of pastoral community from various nearby villages like Hodko, Karanwali, and Erandawali. It has received tourism awards and has also come on the list of must-see places in Kutch. Annually about 2000 tourists visit this resort. The resort gets several visitors from Gujarat, other parts of India and abroad.

While every tourist finds this place unique and desires to return to re-experience this apparently barren but beautiful land, the opinion among the local people about the

³⁹ It would be important to briefly share the process of this recognition. Generally the breed recognition brings pride in the institution and scientists who identify the breed. Here the breeder association, Banni Maldhari Pashu Uchherak Sangh, was formed with the help of local NGO Sahjeevan and became the first applicant with the Dantiwada University, Sahjeevan and Department of Animal Husbandry, Gujarat. The representatives of the breeders association were also acknowledged for their knowledge and conservation efforts in National Bureau of Animal Genetic Resources' annual event with a standing ovation from about 125 scientists from across the country.

benefits of this resort is quite divided. Some feel that so many strangers visiting their land, has posed new threat to their culture, value system and privacy; some others believe that the recent government efforts to get the land of Banni for various purposes are indirectly the result of so many outsiders coming and seeing such a vast land waiting to be exploited by them for the industries, power plants etc. Many feel that this resort has brought them closer to the outside world, to the government officials and given them an opportunity to better interact with Banni's people and their lives while simultaneously enjoying their warm hospitality and bringing home an economic advantage. As Sandeep Virmani puts it, "This should be viewed as more than a livelihood initiative that highlights their pride in pastoralism and hospitality".

4. Pashu Mela: The Animal Fair: Pastoralists of Banni traditionally used to visit livestock fairs outside Banni in Tharad, Abdasa, and Ahmedabad but there was no tradition of livestock fair in Banni. In 2008, pastoralists of Banni with support from several others held first *Pashu Mela*, livestock fair, in Banni. Since then every year there has been a *Pashu Mela*. While we are writing this, four such annual fairs have been successfully organized with increasing participation every year.⁴⁰ While animal sellers are mostly from Banni, buyers come from Saurashtra, North Gujarat, Ahmedabad and as far as Mumbai. This has also led to revival of many forgotten traditional games like wrestling, camel race, horse race etc. Many new events have also been introduced to make it more participatory and educative - like milking competition, animal fitness competition, animal decoration competition etc. It is also becoming a place to exhibit the best animals and get the best deals.

We had attended 2009 fair in which one buffalo had become talk of that fair as the owner had declined an offer of purchasing it at Rs 2.11 lakh! "As a good breeder saving my good animals for good progeny in future is more important than making money out of it now." This was his answer when he was asked the reason for refusing to sell. He also shared that this was due to his long term vision as keeping this buffalo will bring in good progeny and better returns in future. With every fair the prices of buffaloes are going up as more people are getting interested in buying quality breed. It will not be an exaggeration to say that this fair has now become a much awaited event of Banni and is moving towards becoming a new tradition of Banni. The fair has brought in dynamism and inspiration to the pastoralists as this is the only mass event of this scale around their livelihood and culture. It is also an opportunity for Banni pastoralists to share with the outside world their culture, their breeding skills and their warm hospitality. Many people from different walks of life come to the fair not just as tourists but as people interested in their lives and livelihood issues.

⁴⁰ Year 2008 had two animal fairs, in February and October

5. Banni Breeders' Association: During the second animal fair (2008), pastoralists came together to form the Banni Breeders' Association.⁴¹ Besides providing a platform to all the pastoralists to discuss their common issues, to bring them to the notice of the government, the main objectives of this Association are - conservation and improvement of Banni breed; recognition of Banni breed as distinct breed of the country; conservation of grassland; establishing organized milk market for the region and create backward integrations like availability of water, animal feed, value addition and systematic livestock marketing.

After initiating and succeeding in the process of recognition of Banni buffalo breed and bringing in dairies to Banni, the association is currently taking up issues like grazing rights. They firmly believe that the conservation and improvement of their breed is possible only if the grasslands survive. The association is also demanding from the government that they must be heard and allowed to have active participation in the decision making in matters relating to Banni's land, livestock and livelihoods.

6. Lifting Ban on Prosopis Cutting and Charcoal Making: Since the plantation of Prosopis, its cutting had been banned by the Forest Department. However, it is a well known fact that the charcoal trader - bureaucracy nexus has been operating 'unofficially' for many years making huge quantities of charcoal from Prosopis in Banni. Several local papers brought out the stories exposing these links. Banni's charcoal making has always been a sensitive political issue as it is alleged that some of the local politicians have their own interests in the trade. Many pastoralists provided cheap labour in charcoal making particularly during the drought years. Many times the labour was brought from outside. Some of the well to do pastoralists themselves became small contractors in charcoal trade.

As Prosopis cutting was banned, charcoal making and its trade were illegal. Traders had developed a nexus with the forest department that allowed the traders to buy at lower rates from the people and sell at much higher price to the department. In 2005, for the first time, Prosopis cutting and charcoal making was made official by lifting the ban on the cutting. This led to large scale Prosopis cutting and charcoal making in Banni. As per an estimate by the forest officials in 2004, daily around 4000 vehicles carried charcoal outside Banni which increased by 10 times and reached to 45000 vehicles in 2006. (Maheshwari, 2008)⁴² Gujarat State Forest Development Corporation (GSFDC) began to purchase charcoal from the people at a much higher price compared to that given by

⁴¹ At present there are 965 pastoralists members in the Association and the annual membership fee is Rs 101. Executive committee of the Association has one member from each of 18 panchayats of Banni.

⁴² Maheshwari, D. V. 2008. in Indian Express on 25 April, 2008

the trader earlier. This brought in substantial income for Banni pastoralists. In 2008 the ban was re-imposed under the pretext of protecting the native ecology of Banni, as 'allegedly' people were cutting even indigenous green trees for making charcoal. As shared by many local people, the ban was reimposed at the behest of the traders as they had lost their charcoal income since people were selling it to GSFDC and sometimes to outside contractors directly.

Whatever may be the truth behind lifting and re-imposing the ban, a good outcome for Banni was that such large scale cutting drastically reduced *Prosopis* cover in many parts of Banni. Since rains were good during that period, diverse grasses came up in erstwhile *Prosopis* invaded areas. As told by the pastoralists of some villages, many extinct species and native trees began showing up. This vindicated what pastoralists have always been saying that if *Prosopis* is removed from their grassland, Banni can soon achieve its 'original' state. More than 80 per cent pastoralists feel that the removal of ban was useful for them, for grasslands and Forest Department.

6.2 Recent Threats to Pastoralism

While all the above discussed developments have brought in a new lease of life to Banni's pastoralism, there are some other developments which are causing much worry and concern among Banni's pastoralists. Some of them are:

1. Growing feeling of religion based insecurity due to communal harassment of Banni's bullock traders;
2. Fear of losing grasslands to industries after acquisition of large land areas by a chemical company in north - west Banni;
3. Overall insecurity due to no clear titles and land rights even for their houses;
4. Gradually growing trend of enclosing lands for agriculture and
5. Forest Department's 2009 Working Plan which will fragment Banni's pastures.

1. Growing Communal Harassment: In August 2002, we were at a workshop where pastoralists from various parts of Gujarat had come to share their issues. Everyone sitting in the hall was taken aback by what the pastoralists from Banni had to share. They shared about the recent cases of humiliation and harassment by fundamentalist groups while they were on the move with their bullocks and how they have been branded as '*kasai*', butchers, under the pretext of taking bullocks to slaughter house.⁴³ This indignity

⁴³ In Gujarat, taking an animal to slaughter house without having necessary permission is an offence. Due to religious sentiments cow is considered and worshipped as mother. Taking a cow or bullock in particular is a very sentimental issue and can cause tensed atmosphere and at times even communal clashes. Many Hindu fundamentalist groups use this sentiment to rouse the feelings against the Muslims and brand them as butchers.

was unbearable as for many generations they have been passionately involved in rearing and not killing them. No one had ever questioned their integrity on the basis of their religion. In fact as shared earlier, the farmers of Kutch and Saurashtra have always welcomed and respected them.

Growing communalization of Gujarat's social fabric is a well known fact. In this larger context such cases are on the rise and many pastoralists have been harassed, their livestock confiscated. After passing Bombay Animal Preservation (Gujarat Amendment) Act, 1994 such self-styled vigilant groups have become more active. This is a state level act subsequently ratified by the Supreme Court of India.

Of the ten surveyed villages, in five villages pastoralists are involved in bullock trade. Of these five villages, pastoralists in 3 villages have experienced such harassments and confiscation of their livestock by such organizations. Two years ago, a trader pastoralist from village Sadai was harassed near village Vandri. Matter could be resolved only after an ex-MLA intervened.

One of the most shocking cases in the recent times has been of a bullock trader Vaydanabhai of village Nani Dhadhar. On 5th October, 2009 his herd of 210 bullocks was impounded in a village near Anjar while he and some others were on their way to Saurashtra for bullock sales. Incidentally, Vaydanabhai is a registered member of Akhil Kutch Gaushala and Panjra Pol Federation which gives such memberships only after thorough verifications that the person seeking membership is in no way connected to selling animals to slaughter houses. After many efforts, appeals, cases and a favourable judgement by the lower court, it took more than one and half year 15 months. As a result, he lost two seasons of bullock trade. An elderly pastoralist leader of the region shared the agony of his people in a speech during animal fair, He said,

“Any one who has little knowledge of animals can judge from our bullocks that such healthy, agile, strong and young bullocks can not be going to slaughter house. But our plea falls on deaf ears. Government and its officials do nothing about it. Whenever a child is born in our family; a *pashu palak*, a livestock rearer, is born. We have sustained the farming of Kathiawar for centuries. We have kept the cows alive in droughts and famines despite so much spread of this poisonous *gando baval* in Banni. Is this the reward? Who is real *jivdaya premi*? (animal lover) We give life to the animals yet we are branded as *kasai*, butchers? Isn't this a deep insult to our entire pastoral tradition?”

Due to the increasing frequency of such incidents, a new phenomenon has emerged. The bullock traders prefer moving in groups and not independently. Some of them have already moved out of bullock trade.

Box 5 : Better to Die in Banni than Going Out

This is not a statement made by a staunch Banni grassland fan but by a constantly harassed pastoralist living here whose only offence is his religious identity. Middle aged Sumabhai of Simari Vandh (names changed) is born and brought up in Banni. He has been a cattle breeder all his life like his ancestors.

Except the difficulties of migration faced by every migrating pastoralist, life for Sumabhai was peaceful. In 2002, when he and some other pastoralists of Banni were passing through Kanam area in Central Gujarat, they were stopped by the members of a Hindu organization and were asked if the cows were being taken to slaughter house. They promptly showed their identity cards issued by the Collectorate of Kutch. Every pastoralist is entitled to such a card to prove his identity during migration. The card gives the details of the pastoralist and his livestock. But this did not help. Those workers wanted to 'save' the cows. His 110 cows were confiscated and taken to a panjrapol. He kept pleading that he is a pastoralist. But in vain. 70 of those cows died in four months.

He filed a case against the panjrapol and won it in the local court. He was threatened that if he did not accept out of court settlement, panjrapol will take him to higher courts. He could not afford further litigation. He was forced for an out of court settlement for Rs. 80,000 and was left with a paltry sum of Rs. 40,000 after paying for all legal expenses. Unbearable loss indeed. He vowed not to ever migrate out of Kutch. But his misery was not yet over. In summer 2006 his cattle were again impounded by a Darbar near Bhachau under the same pretext. This time in Kutch.

Such stories are not uncommon. With degraded pastures in Banni and growing hostility outside Banni, future seems hopeless. They feel it is better to die with their cattle in Banni than to go out to face indignities.

2. Fear of Losing Land to Industries: In north - west Banni, near Bhitara a large chemical company, Archean Chemicals has been allotted 60,000 acres [240 sq. km.] land, larger than Chhari Dhandh, for its first phase of operations and will be given additional 40,000

acres [160 sq. km.] for the second phase.⁴⁴ It will manufacture Sulphate of Potash using brine from the Greater Rann of Kutch. The company says that all its land is in the Rann, but local pastoralists have evidences to prove how the company has encroached upon village grasslands. They also share that the village people have never been consulted or informed about this company. It has been difficult to confirm the actual land acquired and its location as both the company and District Industrial Centre's office were not cooperative to share any information.

There have been several written applications and appeals by the people to various departments to let them know, to share concrete information about this company but there has been no information. One public hearing was held in October, 2010. Like most such hearings, the public was hardly heard. We had an opportunity to witness this hearing. Presentation by the company was too technical for local people to make any sense; nothing much was explained; people's queries got oblique answers and officials were too keen to wind up. People were supposed to be educated about this company through this hearing but that did not happen. A case has been recently filed in the Gujarat High court by Paryavaran Mitra, Ahmedabad based environmental organisation. Pastoralists of Banni fear that such large scale operations in and near their grasslands will ruin their grazing sources. As one of them angrily told us after the hearing,

“On one hand this Government is trying to protect every inch of this border. They have put so many army people to guard the whole Rann. We are not allowed to enter our Rann, to graze our animals in our traditional pastures. This company can take thousands of acres, enclose it and do what it likes. How can we, the poor people be threat to the security of the nation and not these huge companies and industries that eat away the poor people's resources?”

Rannostav is a much publicized, high profile annual festival organized by the Gujarat government and the state tourism department on the northern edge of Banni near the Greater Rann of Kutch. People from different walks of life come to experience the Rann. While celebrities and tourists from state, national and international locations are brought in and are proudly introduced to the rich and colourful culture of Banni and Kutch, people of Banni do not have access to any of its proceedings except a few powerful pro-government individuals within their community, we were told. There are divergent views on this state sponsored event.

⁴⁴ Annual Report of Central Salt and Marine Research Institute, Bhavnagar downloaded from <http://www.csmcri.org/Pages/About/Recent-Achievements.php> January, 2011.

Given the overall pro-industry environment with several instances of taking away people's lands for industries and overall feeling among the official circle that Banni lands are underutilized, most people of Banni feel that it is a way to introduce their vast 'unused' or 'underused' grassland to future investors and stakeholders. Sudden stream of outsiders in Banni is increasingly becoming a cause of deep concern among many pastoralists of Banni.

3. Phenomenon of Enclosures: Recently, a new phenomenon is emerging in Banni - enclosing lands for cultivation. Such enclosures are known as wadas. Till now, no one had ever thought of cultivation in Banni. Natural characteristics of Banni do not allow cultivation. There is a strong pastoral belief against cultivation among all the pastoral communities which prevent them from cultivating grasslands.

In 2005, some pastoralists tried growing wheat in a small enclosed farm locally known as *wada*. The result was good so more people were encouraged to do so. This trend is on the rise. Among the surveyed pastoralists about 12 per cent have such agricultural enclosures. Size of these enclosures varies from 5 to 25 acres. As per a survey by the revenue department officials in 2009, 3993 [16 sq. km.] acres land was enclosed under wadas in different villages of Banni.⁴⁵ They take monsoon crops of Jowar, Guvar, and Castor in these farms and after the harvest of the crops; local livestock is allowed to graze the stubble.

Many villages like Bhirandiara, Misariyado, Neri, Bhojardo, Udai, Chhachhi, Sadai, Hodko, Dumado, Gorewali, Dhordo, Mithadi, Adhiyang, and Thikariyado have such wadas. While most villages of Banni have few wadas, villages like Sargu and Berdo have collectively banned making of wada in their villages as it affects the village level pastures and smooth movement of the livestock. Discussions with some of the community leaders brought out that wada making by people was triggered by the enclosures made by the forest department and other agencies. People got the feeling that more and more land will be enclosed and they will lose it all so why not secure some land for themselves. Agriculture has increased exponentially in the last two years because it is felt that those who have 'encroached' land would be regularized in the settlement of rights.

6.3 New Working Plan and Pastoralism in Banni

6.3.1 Past & Present Administration & Tenurial Rights in Banni

Before independence in 1947, Kutch was under the princely rule. Historical works by Rushbrook etc. indicate that Banni had special status and different resource use laws in

⁴⁵ Kutch Mitra: 20 - 11- 09. (*Bannima wada daban na hatawata maldharion ni hizrat*)

pre-independence period. During the princely rule Banni was reserved grassland where only the livestock of Banni was allowed to graze. Even state's own livestock was not permitted to graze in Banni. For the state, it was a special breeding zone and no activity that would harm the pastoral interest was allowed in Banni. For the state's livestock, *rakhals*, protected grasslands were reserved in villages like Vatachhad, Vang, and Dador as informed by Ramsinhji Rathod. Banni was administered by the revenue department through a *girasdari* system where the *girasdar* used to charge *panchari*, grazing tax, per animal. Grazing tax was charged from Banni pastoralists for about 12 to 15 years after the independence. They recall paying it till early 1960s. Many of them have the old receipts of grazing taxes paid by them. Cultivation was strictly prohibited in Banni. It will be of interest to mention here that unlike now, given the concern for pastoralists and others keeping livestock, the princely state of Kutch had an exclusive grass department to manage the fodder needs of its people.

In 1955, Banni was declared a protected forest under section 29 of the Indian Forest Act, 1927. It is mandatory under the act to assess the rights of the people living in the protected areas and settle it before the final notification. This involves carrying out the settlement procedure by settlement commissioner based on whose report it is decided that who gets what rights in the protected forest areas. Section 29(3) of the act states:

“No such notification shall be made unless the nature and extent of the rights of Government and of private persons in or over the forest-land or waste-land comprised therein have been inquired into and recorded at a survey or settlement, or in such other manner as the State Government thinks sufficient. Every such record shall be presumed to be correct until the contrary is proved.”

After the process of settlement of rights; human habitat and other areas are demarcated and new plans are made defining the habitat areas and forest areas. This process has to be carried out by the revenue department after which the protected area has to be formally handed over to the forest department. People of Banni are also entitled to get the rights to their traditional resources under the new Forest Rights Act, 2006 (FRA). But no process has been initiated for FRA settlement.

It's more than 55 years since the first notification in 1955; sadly, the process of settlement has not even been initiated. Some work did begin towards end of 2008 when all the sarpanchs and talatis of Banni were called and asked for relevant information about each village. But after that not much has moved in this regard.

Banni's legal administrative status presents a peculiar situation. Being protected forest, officially it comes under the purview of the Forest department but continues to be

governed by the revenue department. In reality, depending upon the issue and situation each department owns or disowns matters related to Banni.

Due to pending settlement process, Banni people do not have any formal title and rights to lands of their villages and homes. This makes it difficult for them to access any government schemes or institutional credit facility. Though there are village panchayats, they have no powers, no rights like other revenue villages. As a result, they are not able to implement any land based schemes in their villages. Gradually this has led to high insecurity in people's minds. Given the broader investment climate in Kutch, and the way the industries seem to have taken over village lands in many parts of Kutch; people fear that their pastures may be lost any time. As Salimbhai sums up in his characteristic way, "Forest (department) says we do not belong to them, revenue (department) says we do not belong to them. Where do we belong? May be to God. Till He takes care, we have nothing to worry."

6.3.2 People's Views on the Recent Developments

Banni pastoralists view most of the new developments as good for them and their livelihood except the Rannostav and coming of a chemical company in the north-west Banni near village Bhitara. More than 90 per cent of surveyed pastoralists felt that milk dairies, Banni buffalo recognition and Banni animal fairs have been useful developments for them and Banni. [Table 39]

Table 39 : Recent Developments in Banni - People's Opinion

Recent Development	Useful	Harmful	Confused Response	Do not know	Not answered
Milk dairies	97.0	0	0	0.3	2.7
Banni buffalo's recognition	97.0	0	0	0.3	2.7
Banni animal fair	92.7	2.0	2.0	0.7	2.7
Banni Breeders' Association	83.7	0.3	11.7	1.3	3.0
Shaam-e-Sarhad Resort	28.7	52.0	11.0	5.3	3.0
Lifting ban on Prosopis cutting	81.7	11.3	7	0.6	0
Banni Rannostav	3.7	88.3	3.7	3.0	1.3
Coming of Archean Chemicals	3.0	94.7	2.0	0.3	0

Primary Survey, 2011 (n= 300)

More than 85 per cent of them felt that Rannostav and coming of the industries is harmful for Banni. While it brings the outer world to Banni's door step, there is fairly

mixed feeling about the resort. More than half of the pastoralists feel that it is harmful to Banni. It is the same feeling of cultural and other insecurities that many local people residing in tourist destinations experience. What comes out very clearly is that pastoralists evaluate any new development in Banni from the standpoint of its impact on pastoralism. If the development enhances pastoralism, it is positive. Sustaining pastoralism is the key desire among the pastoralists.

Table 40 : Pastoralists' Perceptions of Favourable Changes in past 5 years (%)

Details	West Banni	Central Banni	East Banni	Total
More people have returned to pastoralism	92.2	93.3	93.3	93.0
Improvement in overall economic condition of Pastoralists	85.6	81.1	67.5	77.0
Young generation's interest in pastoralism				
Quite interested	67.8	68.9	56.7	63.7
Little interest	24.4	26.7	30.0	27.3

Source: Primary Survey, 2011 (n= 300)

Most pastoralists feel that whatever the future may hold for them, past five years have been good for them and their livestock. Many of them who had either left pastoralism or were on the verge of leaving have restocked their herds. More than 90 per cent pastoralists share this perception. More than 75 per cent of them feel that there is a relative improvement in their condition in last five years. [Table 40] Most heartening for the older generation and promising for the future of pastoralism in Banni has been the revival of younger generation's interest in pastoralism.

Due to low returns and daily drudgery of milking, watering, feeding animals and related chores, many among the younger generation prefer labouring elsewhere to rearing their herds. But last five years have changed many of them. Some of them who had gone out of Banni or Kutch to pursue alternative occupations brought in several stories of indignities and difficulties of living outside Banni. On the other hand good rains, better grasses and better milk prices in Banni have made life economically better for many of them. This has led to revival of their interest in pastoralism. More than 63 per cent among the surveyed pastoralists felt that the younger generation is now quite interested in pursuing this occupation.

6.4 New Working Plan: 2009

In 2009, the state's Forest Department prepared the new Working Plan for Banni which has been approved by the Union Ministry of Environment and Forests, Delhi. Based on the state of land cover like grasslands, *Prosopis* cover in the satellite image of year 2003; working plan divides Banni in three major working circles -

1. Grassland Working Circle (GWC) for areas having good grassland cover;
2. Prosopis working circle (PWC) for areas having high density Prosopis and
3. Protection cum Improvement Circle (PIWC) having sparse or no vegetation and high salinity.

Main objective of the grassland working circle is to improve the quantity and quality of the grasses and improve the cover of superior grasses. For implementing this, the *Prosopis juliflora* will be first removed and the area will be treated for improving the grass cover. For practical operations, GWC is further divided into several felling series and each of these series is further subdivided into several coupes. One treatment cycle will be of five years. Once an area is taken for treatment, no open grazing shall be allowed in that area for 5 years. Grasses will be cut and stored by the forest department. After 5 years the livestock will be allowed stubble grazing after the grass is harvested. Once the plan is operationalised, Banni's livestock will not be allowed open grazing. [Figure - 7]

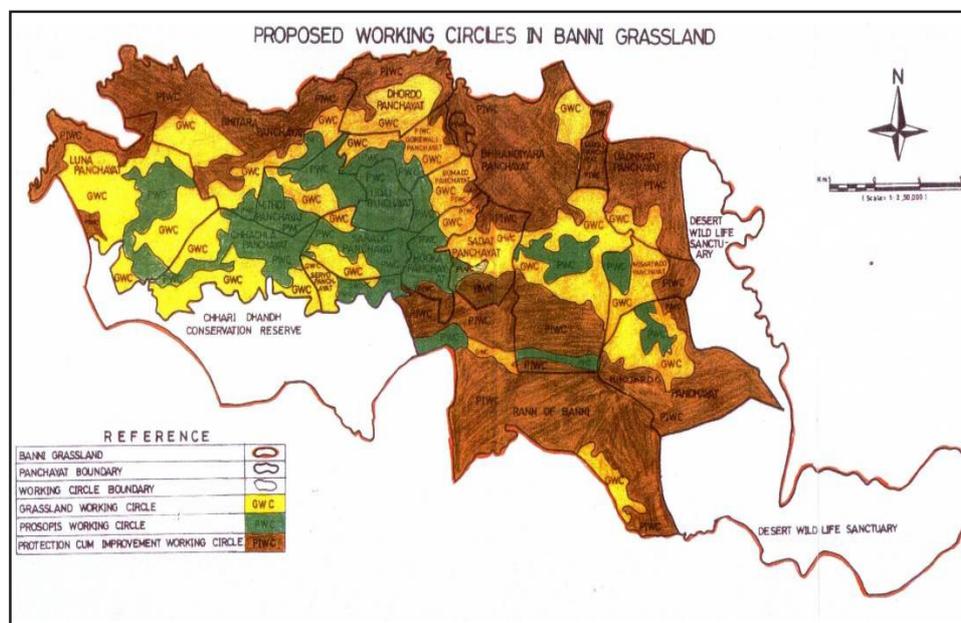


Figure - 7 Working Plan 2009 (Source: Forest Department, 2010)

As per the plan, the area under Prosopis working circle is primarily to be maintained as Prosopis cover with a plan to use and continue to restock it with Prosopis. Good grass patches of more than 5 hectares within PWC will be part of GWC. Local people will be involved in cutting to create sources of employment and income. While local people will be involved in the work, the department will have the power to decide various uses of Prosopis including making charcoal, pellets or collecting pods for further processing as per the market potential. Village panchayats will be involved on 80-20 basis where 80 per cent revenues from the sale of Prosopis or its products shall be given to the panchayats and 20 per cent revenue will go to the Government.

Area under Protection cum Improvement Working Circle (PIWC) is the shelter belt area along the interface of Banni with Greater Rann of Kutch and Rann of Banni. A buffer of 2 km. from the Rann borders inside Banni land and other areas largely consisting of mud flats, saline lands and very sparse vegetation come under this circle. Objective of this working circle is to protect the existing vegetation and regenerate the degraded lands by planting indigenous vegetative species so as to create a shelter belt against wind blown salt particles from the Rann. It also proposes to undertake soil and moisture conservation. This circle also aims to provide better habitat to wildlife.

A close look at the map of working circle also indicates that large parts of Central Banni will come under PWC making it almost impossible for the pastoralists of Central Banni to find pastures for their livestock. West and East Banni will also face severe fodder shortage as the areas will be closed for open grazing. Open grazing will be banned gradually in all the circles of Banni as more and more areas are treated.

6.4.1 Working Plan & Banni's Pastoralism

Analysis shows that of total land under the plan only 35.6 per cent land will be treated as grassland and of the remaining land 42 per cent goes to PIWC and 22 per cent to PWC. [Table 41] Of total area under the working plan, Central Banni has largest area (81446 ha.) under the working plan covering 43 per cent of total area and the East Banni has the least area, only 15.4 per cent of total area, under the working plan. Similarly the area under the Grassland and Prosopis working circles in East Banni are also only 14 and 6 per cent respectively. There are many problems and unclear issues in this Working Plan but it is beyond the present study to go into further details.

A very positive aspect about this plan is its formal recognition of Banni as grassland and not forest land. But it is not clear in the plan as to how will the pastoralists meet their fodder needs, access their grazing grounds after the implementation of Working Plan? Will the department demarcate the grazing areas for Banni's livestock or will it provide

them with cut and stored fodder round the year? As it appears from the study of various regulatory conditions described in the plan and our discussions with the relevant forest officials, implementation of this plan will lead to major changes in the current land use pattern of Banni. Current proposals forwarded in the Working Plan will completely stop pastoralists' access to pastures. Firstly it will fragment the land into different working circles and then ban any form of open grazing. Second level of fragmentation will occur as more and more enclosures or trenches around the treated areas come up. This will seriously obstruct the livestock movements for grazing, one of the fundamental features of Banni's grazing system.

Table 41 : Working Plan 2009 - Various Working Circles

	West Banni	Central Banni	East Banni	Rann of Banni	Total
Grassland Working Circle [GWC] [ha]	31217.06 (45.9)	25900.13 (31.8)	9634.55 (33.1)	569.3 (5.5)	67321.04 (35.6)
Protection cum Improvement Circle [PIWC] [ha]	18708.13 (27.5)	34964.36 (42.9)	16916.17 (58.1)	9630.14 (93.5)	80218.8 (42.5)
Prosopis Working Circle [PWC] [ha]	18149.25 (26.7)	20581.72 (25.3)	2542.03 (8.7)	96.9 (0.9)	41369.9 (21.9)
Total Area [ha]	68074.44 (100)	81446.21 (100)	29092.75 (100)	10296.34 (100)	188909.7 (100)
Per cent across zones					
Grassland Working Circle [%]	46.4	38.5	14.3	0.8	100.0
Protection cum Improvement Circle [%a]	23.3	43.6	21.1	12.0	100.0
Prosopis Working Circle [%]	43.9	49.8	6.1	0.2	100.0
Total	36.0	43.1	15.4	5.5	100.0

Figures in parenthesis are per cent values.

Compiled from the Forest Department's Working Plan, 2009

In a response to our question about the status of Banni's land, we got revealing responses. 50 per cent pastoralists said that there is a fight going on between the forest and the revenue department; 37 per cent did not know anything about its status; only 8 per cent said that it belongs to the Forest Department.

Our survey also brought out that none of the surveyed pastoralists were aware of the Working Plan 2009. This raises serious questions regarding the process of making of this

plan. Firstly, when the rights are not settled, and the land is not formally handed over to the Forest Department, can the Department make a Working Plan? Secondly, if no one knows about it in Banni, then clearly the people were neither involved nor consulted in the process of making the plan which is against the procedure of making such a plan. Even 2 years after its making and approval from the Central Ministry, why the plan has never been shared with the people till date?

One of the critical issues with the working plan is its base time. Considering satellite image of year 2003 for evolving various circles raises serious concern for the future of grasslands in Banni. It is difficult to understand why this year has been chosen as it is just prior to lifting of ban on *Prosopis* cutting when *Prosopis* cover was the highest. It would have been more in the interest of grassland if the forest department had taken the earliest possible image when the *Prosopis* cover was negligible or very low. This image would mean that large parts of total area (22 per cent) will be permanently lost to *Prosopis*. Most of these areas prior to *Prosopis* spread were good grasslands.

There is another process taking place at the revenue department's level under which it is being planned to freeze the livestock of Banni as per the data given to them in 2008 by Banni's Panchayats and accordingly allot the grazing ground to each village as per the standard of 40 acres for 100 animals. Although, in absence of any official information and statement, it is difficult to piece together all these inputs that we kept getting from various departments, officials, people and organizations working there; we have attempted to draw a likely picture for future of Banni here. Revenue Department may fix up the village *gamtal* land as per the current total human population along with future projections. It is likely to fix up the *gauchar* land as per the current standard of revenue villages of 40 acres for 100 livestock. Accordingly demarcate the village boundary and *gauchar* boundaries for each village and freeze it. Settle the community rights as per these calculations. Transfer the remaining land to the Forest Department to be managed under its new Working Plan. This means, in essence treat Banni's pastoral livelihood system like any other farm villages and do the land use plan accordingly.

There are also some talks about giving plots of 10 acres or so to each family to be used as private pasture land leaving remaining land for other uses. Freezing the boundaries of *gauchars* in villages or allocating some pasture land to each family can lead to severe negative impacts on Banni's pastoralism, grasslands and social harmony.

Most planners, policy makers and government officials view pastoralism as a 'backward' mode of production requiring lot of improvement in its grazing and breeding systems. It is also viewed as underutilization of land resource. It is this overall mindset that governs most of the decisions about managing Banni. It is important to reiterate that people of

Banni practice highly evolved and rational pastoralism and not animal husbandry as repeatedly stated in the Working Plan of the Forest Department.

Any agency wishing to intervene in Banni's land use must understand fundamentals of Banni's pastoralism. This pastoralism survives on free, easy and unobstructed access to pastures within Banni. As brought out in detail earlier that Banni grassland is treated as a large collective pasture by the pastoralists and free mobility within Banni allows them to access grasses from to grass rich zones within Banni depending upon micro variation in the seasons and the rainfall. Currently when there is less rain in one area, pastoralists take their livestock to the other. Also, depending upon seasonal rainfall, pastoralists use less or more of grazing grounds. When the rainfall and productivity of this land are not fixed, it will not be rational to fix the size of the grazing land as the animal depends upon the quantum of grass eventually and not the size of grazing ground. Fixing boundaries of grazing grounds would mean sacrificing the advantages of forage utilization which accrue due to mobility across the villages and zones. It is a well studied feature of pastoralism that the highest number of animals can be sustained when free mobility is allowed across diverse sub-systems within an ecosystem.

What is being proposed in this Working Plan goes much against the interest and future sustenance of pastoralism in Banni. Finally, as grazing ground boundaries get fixed, each settlement will strive to protect its turf for its exclusive use, much against the present culture and custom of common sharing. This may cause severe conflicts amongst the settlements as apprehended by many community leaders.

Chapter - 7

Let it be Banni

Conclusions and Framework to Sustain Pastoralism

Pastoralism is an ancient form of land use, well-adapted to the challenges for maintaining sustainable and productive livelihoods in drylands. Case study of Banni helps in understanding it closely. Low average rainfall of 300 mm, high temperature, inherent soil salinity and aridity have created conditions for emergence of pastoralism in Banni. Forest department, dairy officials and most other government agencies have often found it difficult to differentiate between mobile pastoralism and the settled animal husbandry. Thus, they always find the pastoral use of grassland as inefficient resource use and open grazing as cause of pasture degradation. Many of us often see pastoralism as backward mode of livelihood and production. Various aspects discussed here clearly bring out that neither of them holds true. Pastoralists make rather unimaginably creative use of their meager resource base. They are also quite innovative and alert in responding to changes in market and ecology. The conditions of Banni grasslands and its pastoralists have undergone a sea change in past five decades. Following points summarize the findings of this study.

7.1 Concluding Observations

Banni pastoralists are keen observers of nature and passionate breeders. For many of them purity of breed is critically important. Many have maintained pure breed characteristics across many generations of their animals. Through generations of experience, pastoralists have gained deep understanding of the complex relationships between grasses and their types; breeds and breeding; salinity, Prosopis and micro resource variations across villages of Banni.

Buffaloes and cattle are the main livestock of Banni and constitute more than 75 per cent of total livestock. There is also small proportion of sheep, goat and horses. Banni's cattle is of Vadhiara breed and buffalo originally from Sindh, has adapted and evolved well to Banni's context and is now known as Banni buffalo. Banni's buffalo is known for its high adaptability, immunity, resistance to water and fodder stress and high milk output. It is now formally recognised by the National Bureau of Animal Genetic Resources as a distinct breed, first indigenous breed to be recognized in India after the independence.

Diverse species of grasses grew in Banni, some of them extinct now. Various recent studies have found more than 30 varieties. Pastoralists of Banni have great acumen in using the pastures efficiently. Though there are mutually acknowledged village boundaries, pastures are seen as collective resource and there are interesting norms that govern the pasture use within and across the villages. Whole of Banni is like a large collective pasture. Besides daily livestock movements across the villages, there are livestock and pastoral movements from grass scarce areas to grass rich areas across the seasons and years. This free movement allows optimal utilisation of grasslands and sustains much higher number of animals as compared to a situation if such free movements were restricted. Free movement within Banni is crucial for the survival of pastoralism in Banni.

When livestock and pastoralists from grass scarce areas of Banni camp in a grass rich area; pastoralists of host areas (grass rich areas) extend their support in various ways to the camping groups often offering tea, food and water. From various discussions and our personal observations, it emerges that there is strong bond and feeling of cooperation, not competition, during the times of scarcity and emergency. Others are welcome to share the resources. And those 'others' also exercise lot of restraint and discipline in accessing resources during scarcity. We did not come across any cases of conflicts or disputes between different villages over boundaries or grazing though there are disputes over wadas.

Primary study of grazing pattern of 10 villages shows that each village accessed more than 3 villages' pastures. In Central Banni due to smaller pasture grounds; high *Prosopis* invasion in grassland and close proximity of neighbouring villages, pastoralists regularly access more than 5 to 7 villages' pastures.

Earlier pastoralists of Banni did not have to give any supplementary feed to their lactating and pregnant livestock. Now pastoralists have to give substantial supplementary feed to their livestock as quality of grasses have deteriorated. Also arrival of dairies has contributed to the rise of this practice. During summer there are increasing incidences of fodder purchase. Such purchases are the least in West Banni.

By the time summer arrives, both grasses and water become scarce every year. Depending upon the perceived severity of the scarcity, different families migrate for different durations both outside and inside Banni. Though largely due to fodder shortage, at times pastoralists have to migrate due to water shortage. Most pastoralists of East and West Banni migrate with their families.

Water sources in Banni have always been scarce. Traditional water systems of zheel and virdas continue to form an important water source for livestock. Talavs, open water

holes, wetlands and piped water supply are various other water sources used by the pastoralists to water their animals. Traditional systems are still vibrant but involve lot of drudgery for watering animals and younger generation finds it too tiring to use it.

Two major post independence ecological changes in Banni have been - large scale plantation and invasion of prosopis and increased soil salinity. Prosopis invasion has severely affected the growth of native grass species and has invaded more than 30 per cent of Banni grassland. As a result, many species have become extinct. Sweet water flow to Banni was stopped after all the rivers flowing towards Banni were damned. This further added to increase in salinity in Banni grasslands and loss of grass cover.

Due to severe Prosopis invasion, cattle population has substantially reduced. Thanks to buffalo's relative immunity to Prosopis; and growing milk and buffalo market; buffalo population has increased manifold in Banni. Due to Prosopis menace, pastoralists of village Misariyado, who have continued to keep cattle, go on long migration outside Banni living nomadic life in camps with their 7,000 strong cattle herd only to return during good monsoon. They have been practicing this cycle for about 30 years.

Before the independence in 1947, Banni had special status and rules governing its resource use that allowed pastoralists free access (to resource) and movements without restrictions within Banni. No outside animals, including that of Kutch state, were allowed to graze in Banni. As compared to the cultivators of that time, pastoralists were economically in better conditions. Though it is difficult to find documentary evidence, pastoralists claim that the rulers of earlier times had, in written, given grazing rights to them.

Banni was declared protected forest in 1955. However, after more than 60 years, the process of settlement of people's rights and final notification are still pending. This has continued to create lot of confusion regarding the official status of Banni. Both Revenue and Forest Department situationally own and disown Banni as their land. Over the years, this has also created high insecurity among the people of Banni as they do not have any tenurial or legal rights on their homes, land, pastures and other resources.

Traditionally Banni was known for its bullocks and has had a large market among Saurashtra farmers for it. Despite arrival of tractors, there is still a large bullock market and pastoralists of Banni annually migrate with bullock herds to Saurashtra to sell them to farmers. There is a sharp increase in the demand for Banni buffalo as it is well adapted to dryland and resource scarce conditions and yields more milk. Milk, which was never sold earlier, has become an important source of income for the pastoralists and forms significant share of their total income. Pastoralism still forms more than 70 per cent of the total income of an average Banni pastoralist. Embroidery, charcoal making, casual

labour, pastoralism related business are some of the other sources of income for the pastoralists.

Due to good rainfall, setting up of dairies, and recognition of Banni's buffalo etc. past five years have proved to be critically useful for Banni's grasslands, economy and pastoralists' pride. Looking at the hardships of older generations, much of Banni's younger generation was not interested in the traditional occupation. These positive developments in the past five years have revived everyone's interest, including the younger generation, in Banni's pastoralism.

Though most people including the younger generation are keen to pursue pastoralism, there are some impending threats that make future of Banni's pastoralism uncertain and pastoralists are quite apprehensive and worried about it. Pastoralists of Banni feel that any effort to alter the current land use pattern from collective pasture to fragmented village grazing grounds or individual private land ownerships restricting current free mobility of their livestock will lead to end of pastoralism in Banni.

Unlike in other pastoral communities where grasses and water sources are accessed across the zones, districts and states and it becomes administratively difficult to intervene with a programme, Banni is physically a self-contained area with cultural and ecological contiguity where more than 90 per cent population is involved in the same livelihood activity. This contiguity makes it relatively easier to focus and intervene in Banni's pastoral system.

7.2 Important Features of Banni's Pastoralism

For those interested in sustainable and equitable development, there is significant learning from pastoral livelihood system of Banni. Today, Banni is an annual economy of about Rs 55 to 60 crores. For an economist, a land use planner or a regional policy maker, this may not be large, attractive economy. Its largeness lies in its important social and economic contribution. Annually Banni pastoralists contribute about 1.38 crore litres of milk; 13,000 bullocks; 2,500 buffaloes and other useful things like *ghee* and manure to the farming and other communities outside Banni; supporting many livelihoods. It also supports livelihoods of many small farmers, leather artisans and many others. Besides its economic viability, it is ecologically sustainable. Banni's livelihood system has three unique features - low resource use, higher multiplier effect and resilient livelihood system.

1. Low Resource Use: A closer look at this system reveals that it is a low resource consuming, low cost production system. It uses the raw material in its natural form, *in situ*, so there is no processing cost, no transportation and storing cost for the primary

inputs like grass and water. The system is pollution free. It is least energy intensive. Till now there has been almost no formal government support to this livelihood system. Thus it has no dependence on the public funds for its survival. Cost of pastoral skill reproduction is also very low or rather none as it is passed on from generation to generation. It has almost no dependence on outside skills or resources.

2. Higher Multiplier Effect: By conservative estimates, this Rs. 60 crore turnover system generates year round direct employment for more than 3500 families⁴⁶ and part time employment for additional about 1000 persons in other related works like working as *saathi*, milk transporter, milk trader, livestock selling agent etc. Rupees 60 crore enterprise generating employment for 6000 persons! It also has a much larger multiplier effect as it annually supports agriculture of about 10,000 farmers of Saurashtra, many of them small farmers, by providing them with one of their important means of production - bullocks for cultivation on easy, interest-free instalments spread over 3 year period. No public or private financial institution will provide such interest free credit periods to these small farmers. It also supports many farmers in generating additional income from farm based animal husbandry by providing high milk yielding buffaloes. Leather made from their animals' skin has in the past helped Marwada community sustain their livelihood by turning skin into diverse leather artefacts which have good market outside Banni. It is important to mention that the dead animals are still provided free to these leather artisans but now they do not make leather from it. Meghwals buy leather from Ahmedabad which is manufactured in Kanpur.

Though we have not carried out any formal study, from field observations of their overall living and housing condition, their asset holdings, it can be said that the degree of economic stratification is not very high among Banni pastoralists. It appears that the distribution of surplus generated from Banni's economy is relatively more equitable within the pastoral community.

3. Resilient Livelihood: Overall social - ecological resilience of Banni's pastoralism is very high. It has withstood several shocks and stresses and continues to survive against many odds. *Resilience* is the capacity of a social-ecological system "to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes" (Resilience Alliance 2008). This capacity can also be conceived "as the ability of the system to maintain its identity in the face of internal change and external

⁴⁶ From a single family at least one or two persons get productively engaged in pastoralism. This means on an average 1.5 persons per family. At that rate, for 3500 families, it generates direct employment for at least 5000 persons.

shocks and disturbances.” (Cumming et al. 2005:976).⁴⁷ Several droughts, increased soil salinity leading to low grass productivity of pastures, invasion of *Prosopis* in their grasslands, loss of many good palatable grass varieties, earthquake, no formal land tenure or recognition of their land use in Banni, increased communal harassment in past decade; they have survived it all without much external skill and support and have sustained pastoralism.

7.3 Framework for Sustaining Banni's Pastoralism

Banni is a unique grassland system and its pastoralism is an evolved, rational and sustainable livelihood system well suited for the arid and fragile ecology of Banni. The study brings out that while degradation of grassland is one of the major issues, likelihood of losing it to other uses and major land use changes in near future are serious threats to Banni's pastoralism.

Pastoralists have always experienced inherent anti pastoral attitude from outside people. They have also seen how most interventions in Banni, in the name of its protection, have eventually turned against its grasslands and proved disastrous for their livestock, its movements and pastoralism. So there is always a reservation against any new intervention. Our field work, interactions with many community leaders and the survey have clearly brought out that the people of Banni want to continue pastoralism and want Banni to be sustained as grassland.

In discussions when we used to ask people that what is their dream and imagination for Banni? What should be done for Banni's land, livestock and people? Invariably across villages there was the same answer: “*Banni ne Banni j raheva dyo* - Let Banni remain Banni.” Apparently simple sounding statement is a profound response and articulation of their dream. Banni to them means a land that nurtures pastoralism, a land-use that sustains their livestock, and a resource that is used collectively. Banni to them also signifies free mobility of their livestock.

Based on various current proposals for the land use of Banni formally stated or otherwise, in our survey schedule we gave three options to 300 pastoralists for the future of Banni's land use.

One, treat Banni's villages like revenue villages; fix the boundaries of the village and areas for various land uses like *gamtal*, *gauchar* etc; give individual land pattas to families and leave the remaining land for other uses by the government (Revenue proposal).

⁴⁷ As quoted in Davidson, 2009.

Two, fix *Prosopis* and grass zones, make grass plots and ban open grazing (Forest Working Plan proposal).

Three, make *gamtal* for settlement with tenurial security and keep the rest as collective grazing ground with free grazing movements.

Surprisingly or not so surprisingly, an overwhelming 96 per cent people responded in favour of the third option. As per this survey response and our own understanding based on several interactions with the pastoralists and other people in Banni, we can say that for Banni's pastoralism to survive it is utmost important to preserve and further enhance its character as grassland.

Not just the people but various committees and task forces formed to understand and address issues of Banni have also made several suggestions around the ecology with a concern to sustain and enhance grassland and pastoralism of Banni. Brief overview of key recommendations made by them in the past has been outlined in Appendix - 10.

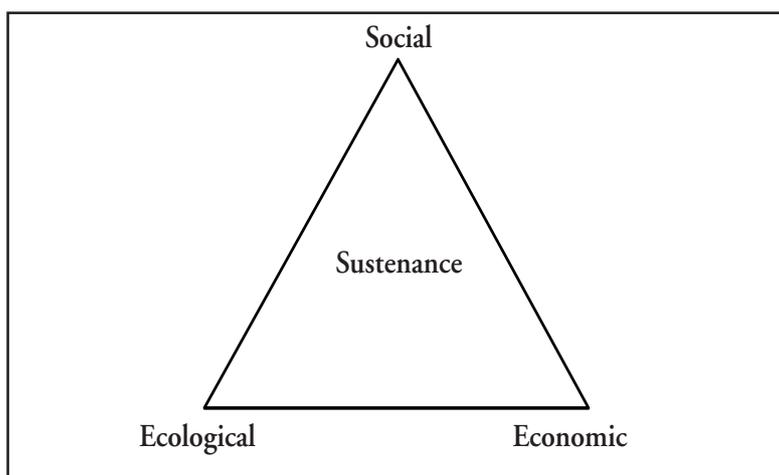


Figure 8: Sustaining Pastoralism in Banni

Pastoralism in Banni can be sustained by sensitively intervening in its three fundamental dimensions - Ecological, Economic and Social as indicated in Figure-8. While ecological and economic aspects form the basis for pastoralism, social aspects are equally important for its continuity in the present context. Table 42 depicts the possibilities for strengthening pastoralism along each of these dimensions. People of Banni must be involved in evolving every intervention for Banni.

1. Ecological Sustenance

Banni's grassland, water, buffalo and bullock breeds are lifeline for its pastoralism. A region like Banni which is very unique in terms of its livelihood system and ecology has a great potential to become a Special Pastoral Zone (SPZ), a zone where everything else is secondary to pastoralism or a Protected Pastoral Zone (PPZ) where no activity or development that adversely affects pastoralism should be allowed.

As discussed earlier, Banni's pastoralism can not survive without good pastures. Pasture lands should not be fragmented like in typical revenue village. When the land is ecologically grassland, why not plan and develop it as a model SPZ for sustainable pastoralism. While the protected forest status can continue, Banni can be treated as a special ecological zone, i.e. grassland and all its future development should focus around rejuvenation of grassland.

Table 42 : Framework and Ways for Sustaining Pastoralism in Banni

Pastoral Sustenance	Objective	Strategy	Intervention
Ecological	Rejuvenation of grassland and water resources Conserving Banni's livestock Breeds	No fragmentation of pasture lands Banni as special or protected pastoral zone (SPZ or PPZ) Demonstrating rational animal breeding and rearing practices	Limit and reduce Prosopis cover Restore degraded pastures Rejuvenate native vegetation species Improve water sources Improved animal health care Special livestock farms
Economic	Better economic returns on livestock sales and other pastoral products	Reduce production costs Other avenues for livestock and other pastoral products.	Improve fodder availability Collective fodder and feed purchase Banni brand Credit support to bullock trade
Social	Social security Recognising and utilising traditional knowledge base Dignity	Recognising pastoralism as meaningful occupation. Tenurial security Transfer of traditional knowledge Dealing with communalisation	Settlements of people's rights under Forest Act, 1927 and recognising and granting rights under Forest Rights Act, 2006. Pastoral School Arrangements for harassment free migrations

Prepared by authors in consultation with people, 2011

Dealing with *Prosopis* is one of the most fundamental aspects of ecological sustenance. There are conflicting viewpoints and competing land uses for different needs. We feel that planning of *Prosopis* at Banni level should meet three needs. One, the erstwhile pristine grasslands must be recovered from its invasion as much as possible to expand and rejuvenate grazing resource base. Two, shelter needs of the wild life should be assessed and met. The shelter needs can also be met by large scale plantations of native trees, as it used to be. There was abundant wild life in Banni even when there was no *Prosopis* at all. Three, fuel wood needs of the community should be assessed and planned for near the village settlements. The most critical process to arrive at practical and acceptable solutions is to discuss this issue widely with the people of Banni.

After planning for *Prosopis* areas and their distribution across Banni, rest of the grassland should be made free of *Prosopis* to allow for the natural vegetation and grass species of Banni to restore and rejuvenate themselves. Open grazing and free livestock movements must not be banned in these areas as it will fundamentally affect established grazing system of Banni. Village settlements or gamtal can be demarcated providing for future expansion but care must be exercised not to over burden one village respecting the traditional practice of creating newer settlements as soon as the original settlement reaches a threshold limit. Secondly, piped water supply needs to be so organised that the water requirements can be met satisfactorily during summers and scarcity situations.

For the water resources, the most important strategy should be to strengthen the traditional water system. Also, newer ways can be found with people to reduce the drudgery in the traditional water systems. Depending upon its feasibility, traditional systems can be improvised as people have done it in village Sadai by making pucca virdas and in Dhordo & Ghaar (near Bhitara) by making pucca talavs. After exploring its feasibility, this can be replicated in other villages of Banni.

For the conservation of Banni breeds, special livestock farms can be opened in few locations within Banni which can also supply quality bulls for servicing to people in and outside Banni and also demonstrate rational animal breeding and rearing practices. These can lay foundation for a pastoral school for the younger generation to learn the traditional knowledge from the *bhagias* of Banni and to promote interactions with people from the formal scientific community who respect and understand pastoralism of Banni.

2. Economic Sustenance

There is already an evolved market for the bullocks and buffaloes of Banni. Formal milk marketing through dairies is also developing well since past 2 - 3 years. If Banni becomes SPZ, its products can be branded and Banni brand can be a way to explore better

markets. There is already an informal branding of Banni animals, *mava* and *ghee*. This can be formalised by setting up networks of Banni pastoralists who can monitor the quality of various pastoral products of Banni. Additional support can be provided through various organisations working in Banni to make the Banni brand visible and viable.

Pastoralists find it expensive to buy fodder in summer months and feed year round. Improvement in grazing source will certainly help bring down the cost of production. However, for scarcity situations systems can be set up for collective purchase of fodder from fodder rich areas of South and Central Gujarat to make it more economical for them. This can be done through existing Banni Breeders' Association by setting up a cooperative within it. This cooperative can later on evolve ways to reduce feed costs by collective purchases and later on by exploring its production.

3. Social Sustenance

Currently Banni's pastoralism is viewed as a backward occupation that survives on an outdated production system. In the study, we have seen how it is not so. It is important to recognise pastoralism as a meaningful livelihood system. Its contribution to the social and economic gains of society must be acknowledged. There is an urgent need to settle the rights of the people of Banni under the Forest Rights Act for the tenurial security and conservation of grassland.

In order to prevent further indignities to the bullock traders and other pastoralists of Banni while they are on move, it is important to work out an arrangement in consultation with the people and the district administration. This may be in the form of improved identity systems during migration and better responses from the administration in case of confiscation and harassment to the pastoralists.

Pastoralists of Banni have rich traditional knowledge of breeding and rearing good livestock and their ecology. For the preservation of breed and for the new generation to learn from *bhagias* a pastoral school can be set up in Banni which can become a learning centre not only for Banni pastoralists but also for many other pastoralists outside Banni. This school can also provide hands on practical learning opportunities to students, scientists and professionals working on pastoralism, veterinary sciences, and bio diversity.

Epilogue

“You built dams, stopped our sweet water which reduced
our grass cover and water resources.
We did not say anything.

You planted this wild mad tree - gando baval
which killed our cows, swallowed our grasses and trees.
We did not say anything.

We showed you where our Chhari Dhandh is and you said,
we can not graze there as our animals have ruined it.
We did not say anything.

Those claiming to be protectors of cows
without ever breeding or rearing one
have been confiscating our cows and bullocks saying we are butchers.
We did not say anything.

Now we hear that you plan to bring big industries
to make salt, to make charcoal, to generate power for your cities.

You want us to give up our grazing grounds and rights to our land.

You want to give us small fragments of lands keeping the rest for you.

We want to say only this, This is our Banni. Let it be Banni.”

*- Compiled from an extended interview with an elderly pastoralist
who has witnessed gradual degradation of Banni.*

Appendix - 1

Physical Area of Banni : Different Estimates

No	Year	Area (Sq. km.)	Source
1	Undated	Approx 3000	Undated short note on Banni Vikas Yojana, Forest Department (undated)
2	1959	Approx 1664-2662	Rathod, Ramsinhji (1959): Kutch Nu Sanskruti Darshan, Navbharat Sahitya Mandir, Ahmedabad
3	1961	Approx 2000	Census of India (1961): Reference of Bhirandiarra monograph to be completed
4	1977	2500	Report of the Expert Committee set up by the Indian Council of Agricultural Research in 1977.
5	1981	1868	Taluka Development Officer, Bhuj,
6	1984	2144	District Development Officer, Kachchh,
7	1985	2500	Centre for Environment Planning and Technology, Ahmedabad,
8	1988	3040	Draft report of the sub committee on Salinity Ingress in Banni area of Kachchh district (Gujarat). 1988.
9	1989	3840	Water Resources Department / Central Design Organisation,
10	1990	3844	Banni Development Officer, Animal Husbandry Department,
11	1991	3847	S.O.I., topographic and WRD / CDO map,
12	2004	2597	Gujarat Institute of Desert Ecology (2004): Grassland Action Plan for Kachchh District: Vol 1
13	2009	2497	Working Plan of Banni Protected Forests, Forest Department, Gujarat State, October 2009
14	2009	About 2400	Collective Journey Towards Conservation of Chhari Dhandh (Souvenir)

Appendix - 2
Zone-wise Panchayats and Villages

West Banni		Central Banni		East Banni	
Panchayat	Villages	Panchayat	Villages	Panchayat	Villages
1. Bhagadiya	1. Bhagadiya 2. Chhachhala	1. Dhordo	1. Dhordo	1. Berdo	1. Berdo
		2. Dumado	1. Dumado	2. Bhirandiara	1. Bhirandiara
2. Bhitara	1. Bhitara Nana 2. Bhitara Mota 3. Udhma	3. Gorevali	1. Gorevali 2. Andhiyang 3. Panavaari 4. Patgar 5. Shiniyado	3. Bhojrado	1. Bhojrado 2. Chhachhi
3. Luna	1. Luna Nana 2. Luna Mota 3. Hajipir 4. Burkal	4. Hodko	1. Hodko 2. Ghadiyalo 3. Thikariyado 4. Jararwali 5. Karanwali 6. Erandawali 7. Udai	4. Dadhdhar	1. Dadhdhar Moti 2. Dadhdhar Nani 3. Vagura 4. Dedhiya Mota 5. Dedhiya Nana
4. Shervo	1. Shervo	5. Mithadi	1. Mithadi Moti 2. Mithadi Nani	5. Misariyado	1. Misariyado 2. Neri 3. Madan
		6. Sadai	1. Sadai 2. Vad 3. Vadli	6. Raiyada	1. Raiyado 2. Nothniyado 3. Kharod 4. Lakhara Wandh
				7. Sarada	1. Sarada Nana 2. Sarada Mota
				8. Sargu	1. Sargu
				9. Udai	1. Udai
4 Panchayats	10 Villages	6 Panchayats	19 Villages	9 Panchayats	22 Villages

Source: Revenue Department, 2008

Appendix - 3

Zone wise Human Population in Banni

No	Zone	No of families	Total Population	Men	Women	M:W Ratio
	West Banni	874	3730	1904	1826	959.0
	Central Banni	1415	6604	3438	3166	920.9
	East Banni	1468	6868	3468	3400	980.4
	Total	3757	17202	8810	8392	952.6
Village wise Human Population in Banni						
West Banni						
1	Bhagadia	191	718	382	336	879.6
2	Mota Bhitara	257	1,061	541	520	961.2
3	Luna	341	1,517	748	769	1028.1
4	Shervo	85	434	233	201	862.7
	Total	874	3730	1904	1826	959.0
Central Banni						
1	Gorewali	391	1720	896	824	919.6
2	Hodko	597	2954	1509	1445	957.6
3	Mithadi	400	1831	983	848	862.7
4	Udhamo	27	99	50	49	980.0
	Total	1415	6604	3438	3166	920.9
East Banni						
1	Berdo	95	692	326	366	1122.7
2	Bhirandiyara	453	2240	1131	1109	980.5
3	Bhojardo	106	459	242	217	896.7
4	Moti Dhadhhar	71	267	142	125	880.3
5	Nani Dhadhhar	140	540	266	274	1030.1
6	Nana Dedhiya	234	976	509	467	917.5
7	Moti Reladi	40	155	71	84	1183.1
8	Nani Reladi	24	125	66	59	893.9
9	Misariyado	185	918	457	461	1008.8
10	Raiyada	120	496	258	238	922.5
	Total	1468	6868	3468	3400	980.4

Source: Census, 2001 [from Bhatti, 2008]

Appendix - 4
Banni Buffaloes in Different districts of Gujarat [2007]

No.	District	Population	Per cent share
1	Porbandar	606	0.12
2	Narmada	1214	0.23
3	Navsari	1523	0.29
4	Bhavnagar	1896	0.36
5	Dahod	2507	0.48
6	Valsad	3696	0.70
7	Ahmedabad	4168	0.79
8	Bharuch	4311	0.82
9	Tapi	6386	1.22
10	Junagadh	7890	1.50
11	Panchmahal	8436	1.61
12	Mehsana	8449	1.61
13	Surat	11234	2.14
14	Patan	12261	2.34
15	Vadodara	14281	2.72
16	Rajkot	17585	3.35
17	Gandhinagar	18661	3.55
18	Anand	21911	4.17
19	Banaskantha	35142	6.69
20	Kheda	39710	7.56
21	Surendranagar	55588	10.59
22	Sabarkantha	78622	14.98
23	Kachchh	168938	32.18
	Gujarat State [Total]	525015	100.00

Source: Singh K P et al, Status and Potentials of Banni Buffalo Germplasm of Kachchh, Gujarat

Appendix - 5
Livestock Population in Banni, 2008

Panchayat	Village	Buffalo	Cow	Sheep	Goat	Horse	Camel	Total
West Banni								
1. Bhitara	Mota Bhitara	500	0	0	60	0	0	560
	Nana Bhitara	2500	0	50	200	0	0	2750
	Udhmo	300	0	0	30	0	0	330
2 Chhchhala	Bhagadiya	2500	0	70	50	0	1	2621
	Chhachhala	200	0	0	0	0	1	201
3. Luna	Burkal	400	0	80	50	0	1	531
	Hajjpir	25	0	150	150	5	0	330
	Mota Luna	650	0	1000	500	4	5	2159
	Nana Luna	1500	0	50	100	0	1	1651
4. Servo	Shervo	1100	0	50	50	0	0	1200
5. Sarada	Mota Sarada	3700	200	200	70	0	0	4170
	Nana Sarada	1200	0	600	60	0	0	1860
	Total	14575	200	2250	1320	9	9	18363
Central Banni								
6. Dhordo	Dhordo	160	25	0	100	10	0	295
	Patgaar	100	10	50	100	4	0	264
	Siniyado	500	10	0	200	15	0	725
	Udo	400	0	200	50	8	0	658
7. Dumado	Dumado	579	42	10	184	13	0	828
8. Gorewali	Adhiyang	110	10	800	200	20	0	1140
	Gorewali	600	60	160	117	28	0	965
	Panaawari	125	4	30	70	4	0	233
9. Hodko	Erandawali	600	70	10	80	15	0	775
	Ghadiyado	350	0	200	150	10	0	710
	Hodko	830	307	10	140	43	0	1330
	Jararwali	0	12	40	60	4	0	116
	Karanwali	250	25	0	40	6	0	321
	Thikariyado	90	40	150	15	0	0	295
10. Mithdi	Mithdi	800	35	200	100	12	0	1147
11. Sadai	Sadai	550	200	100	50	20	0	920
	Vad	200	30	0	5	10	0	245
	Vadali	20	6	30	35	0	0	91
	Total	6264	886	1990	1696	222	0	11058

Appendix - 5 (continued)
Livestock Population in Banni, 2008

Panchayat	Village	Buffalo	Cow	Sheep	Goat	Horse	Camel	Total
East Banni								
12. Berdo	Berdo	4000	50	50	50	100	3	4253
13. Bhirandiyara	Bhirandiyara	1123	82	170	90	8	0	1473
	Reldi	35	230	125	80	4	0	474
14. Bhojrado	Bhojardo	740	410	3	430	68	0	1651
	Chhachhi	400	15	0	5	12	0	432
15. Dadhhar	Dedhiya	1200	50	20	15	3	0	1288
	Nani Dhadhhar	450	0	0	100	20	0	570
	Vagura	400	150	500	500	0	0	1550
16. Misariyada	Madan	260	20	250	100	25	0	655
	Misariyado	38	7000	20	10	2	0	7070
	Neri	250	350	50	20	20	0	690
17. Sargu	Old Sargu	1908	150	20	30	13	0	2121
	New Sargu	171	37	170	70	13	0	461
18. Udai	Lakhabo	1200	4	0	100	50	0	1354
	Udai	1150	50	200	100	50	0	1550
	Jhimariwandh	225	0	0	4	35	0	264
19. Raiyada	Kharod	1500	25	300	120	3	0	1948
	Lakhara	1100	1000	50	100	425	50	2725
	Total	16150	2623	1928	1924	851	53	30529
Total of all zones		36989	3709	6168	4940	1082	62	52950

Source: Primary Data Collection from all Villages, Sahjeevan, 2008

Appendix - 6
Diversity of Vegetations found in Banni

No	Plant Name	Local Name	Family
	Climbers		
1	<i>Citrullus colocynthis (L.) Soland.</i>	Truja Val, Tru Val, Tru Deda	Cucurbitaceae
2	<i>Coccinia grandis (L.) Voigt</i>	Tindora, Ghiloda	Cucurbitaceae
3	<i>Corallocarpus epigaeus (Rottl. & Willd.) Cl.</i>	Navi Val, Naigi Val, Ajapad	Cucurbitaceae
4	<i>Ctenolepis cerasiformis (Stocks) Hk. f.</i>	Dod Val, Aankh Futamna	Cucurbitaceae
5	<i>Cucumis callosus (Rottl.) Cogn.</i>	Kotimbda vel, Nindhattru,	Cucurbitaceae
6	<i>Cucumis prophetarum L.</i>	Indriyal, Kandhari Indriyan	Cucurbitaceae
7	<i>Momordica balsamina L.</i>	Adbau Karela	Cucurbitaceae
8	<i>Mukia maderespatensis (L.) M. Roem.</i>	Ankhfutmani	Cucurbitaceae
9	<i>Oxyslelma esculenta (L.f) R.Br</i>	Jal Dudhi	Asclepiadaceae
	Grasses		
1	<i>Aeluropus lagopoides (L.) Trin. ex Thw.</i>	Khario Ga, Kharo Ga	Poaceae
2	<i>Apluda mutica L.</i>	Bhungario Ga, Fulari Ga	Poaceae
3	<i>Aristida adscensionis L. subsp. Adscensionis</i>	Jandhar Lambha Ga, Lampdo	Poaceae
4	<i>Aristida funiculata Trin. & Rupr.</i>	Laso Lambh	Poaceae
5	<i>Cenchrus biflorus auct.</i>	Dhaman Gha, Anajaniyo	Poaceae
6	<i>Cenchrus ciliaris L.</i>	Dhaman Gha, Anajaniyo	Poaceae
7	<i>Cenchrus setigerus Vahi</i>	Dhaman Gha, Anajaniyo	Poaceae
8	<i>Chloris barbata Sw.</i>	Rusad Gha, Punjaniu Ga	Poaceae
9	<i>Cynodon dactylon (L.) Pers.</i>	Chhabbar Gha	Poaceae
10	<i>Dactyloctenium aegypticum (L.) P. Beauv.</i>	Kagatango Gha, Vado, Mandhanu	Poaceae
11	<i>Dactyloctenium indicum Boiss.</i>	Chund Gha, Nindho Mandhanu	Poaceae
12	<i>Desmostachya bipinnata (L.) Stapf</i>	Dhrab Gha, Dhab	Poaceae
13	<i>Dichanthium annulatum (Forak.) Stapf</i>	Dunnuhi gha, Jinjavo	Poaceae
14	<i>Digitaria adscendens (H.B. & K.) Henr.</i>		Poaceae
15	<i>Dinebra retroflexa (Vahl) Panz</i>		Poaceae

contd...

16	<i>Echinochloa colonum</i> (L.) Link	Sanvadha Sau, Samu	Poaceae
17	<i>Eleusine compressa</i> (Forst.) <i>Aschers. & Schweinf.</i>	Gandhiro Gha, Mandanu Gha,	Poaceae
18	<i>Eleusine indica</i> (L.) Gaertn.	Adbau Mandanu	Poaceae
19	<i>Eragrostis ciliaris</i> (L.) R. Br. <i>Var. ciliaris</i>	Fuliyu Gah	Poaceae
20	<i>Eragrostis tenella</i> (L.) P. Beauv. <i>ex R. & S.</i>	Limor, Kalavo	Poaceae
21	<i>Eragrostis tremula</i> Hochst.		Poaceae
22	<i>Eragrostis unioloides</i> (Retz.) <i>Nees ex Steud</i>		Poaceae
23	<i>Panicum miliaceum</i> L.	Moraiyo	Poaceae
24	<i>Saccharum</i> Sp.		Poaceae
25	<i>Setaria glauca</i> (L.) P. Beauv.	Sani Bhichdi, Sani Zipti	Poaceae
26	<i>Sorghum bicolor</i> (L.) Moench.	Juwar, Jwar	Poaceae
27	<i>Sporobolus coromandelianus</i> (Retz.) Kunth	Khariyu Ga	Poaceae
28	<i>Sporobolus fertilis</i> (Steud.) Clayton	Ganthiar, Khari Ga, Palangi	Poaceae
29	<i>Sporobolus helvolus</i> (Trin.) <i>Th. Dur. et Sch</i>	Khevai	Poaceae
30	<i>Sporobolus marginatus</i> Hochst. <i>ex A. Rich</i>	Khevai Ga	Poaceae
31	<i>Themeda triandra</i> Forsk.	Fulio Gah	Poaceae
32	<i>Tragus biflorus</i> (Roxb.) Schult.	Gah	Poaceae
33	<i>Urochondra setulosus</i> (Trin.) Hubb	Kkariyu Gah	Poaceae
	Herbs		
1	<i>Acalypha indica</i> L.	Dadar Jo Zad	Euphorbiaceae
2	<i>Achyranthes aspera</i> L. var. <i>argentea</i> Hook. f.	Agado, Kandhero, Aandhado	Amaranthaceae
3	<i>Aerva lanata</i> (L.) Juss.	Sani Buu, Gorkhadi	Amaranthaceae
4	<i>Aerva persica</i> (Burm.f.) Merrill	Bou, Bour	Amaranthaceae
5	<i>Altemanthera sessilis</i> (L.) DC.	Jar Bhaji, Jar Bhangaro	Amaranthaceae
6	<i>Alysicarpus monilifer</i> (L.) DC. <i>var. monilifer</i>	-	Fabaceae
7	<i>Alysicarpus</i> Sp.	-	Fabaceae
8	<i>Amaranthus viridis</i> L.	Adbau Rajgaro, Rajgaro	Amaranthaceae
9	<i>Ammannia baccifera</i> L.	Rato Jal Agio	Lythraceae
10	<i>Argemone mexicana</i> L.	Darudi, Uzar Kanbho, Piri Aakandho	Papaverceae

contd...

11	<i>Aristolochia bracteolata</i> Lamk.	Kida Mari	Aristolochiaceae
12	<i>Asteraceae</i> Sp. (N. G. R)		Asteraceae
13	<i>Bergia capensis</i> L.	Rapatri	Elatinaceae
14	<i>Blumea</i> Sp.		Asteraceae
15	<i>Boerhavia diffusa</i> L.	Rafadi, Rati Satodi,	Nyctaginaceae
16	<i>Borreria articularis</i> (L.f) F. N. Will.	Bikan, Baakan Jo Zad	Rubiaceae
17	<i>Cardiospermum halicacabum</i> L.	Bkan Fofti, Tridhari Val, Popti	Sapindaceae
18	<i>Cassia italica</i> subsp. <i>Micrantha</i> Brenan	Mindhiavar, Pat Mindhiavar	Caesalpiniaceae
19	<i>Aassia pumilla</i> Lam.	Rato Chon, Choniyo, Nidhechor, Khad	Caesalpiniaceae
20	<i>Catharanthus roseus</i> (L.)G. Don	Asi sada	Apocynaceae
21	<i>Celosia argentea</i> L.	Lampadi	Amaranthaceae
22	<i>Chenopodium album</i> L.	Chir, Chir Ji Bhaji	Chenopodiaceae
23	<i>Chrozophora rottleri</i> (Geis.) Juss.	Karo Okharad	Euphorbiaceae
24	<i>Cleome gynandra</i> L. var. <i>gynandra</i>	Bidhro, Asso Bidharo, Vado bidharo	Capparaceae
25	<i>Cleome viscosa</i> L.	Beddhro, Prlobidhro, Badhod	Capparaceae
26	<i>Commicarpus verticillatus</i> (Poir.) Standl.	Dhokariyar	Nyctaginaceae
27	<i>Convolvulus arvensis</i> L.	Neri Val, Neri	Convolvulaceae
28	<i>Convolvulus microphyllus</i> (Roth) Sieb. ex Spr.	Mankhani, Makhan Val, Bethi Sankh Val	Convolvulaceae
29	<i>Corchorus aestuans</i> L.	Kag Gisodi, Kag Kela	Tiliaceae
30	<i>Corchorus depressus</i> (L.) Stocks	Mundheri, Munderi	Tiliaceae
31	<i>Corchorus olitorius</i> L.	Kag Gisoda, Gunpat	Tiliaceae
32	<i>Corchorus</i> Sp.		Tiliaceae
33	<i>Cressa Cretica</i> L.	Oin, Bukan, Gun, Lun, Un Bakano	Convolvulaceae
34	<i>Croton bonplandianum</i> Baill.		Euphorbiaceae
35	<i>Datura metal</i> L.	Dhaturo	Solaneceae
36	<i>Digera muricata</i> (L.) Mart.	Lodar	Amaranthaceae
37	<i>Dipteracanthus prostratus</i> Hassk.		Acanthaceae
38	<i>Echinops echinatus</i> Roxb.	Utkanto, utkandheri, Boriyo	Asteraceae
39	<i>Eclipta prostrata</i> (L.) L. Mant.	Bhangaro, Kakrodha, Karo Bhangaro	Asteraceae
40	<i>Enicostema axillare</i> (Lamk.) Roynal	MameCho, Mamej, Kadvi Bhaji	Gentianaceae
41	<i>Euphorbia hirta</i> L.	Vadi Dudheli	Euphorbiaceae

contd...

42	<i>Euphorbia thymifolia</i> L.	Pat Dudhi, Sir Val, Sani Dudheli	Euphorbiaceae
43	<i>Evolvulus alsinoides</i> (L.) <i>L. var. alsinoides</i>	Kari Sankhval, Sani Buti, Kari Buti	Convolvulaceae
44	<i>Fagonia bruguieri</i> DC. Var. <i>bruguieri</i>	Dhrumau, Dhamaso, Kandhera	Zygophyllaceae
45	<i>Goniogyna hirta</i> (Willd.) Ali	Undarkani	Fabaceae
46	<i>Heliotropium indicum</i> L.	Agio Kharsan, Morandhi, Muradhi	Boraginaceae
47	<i>Heliotropium marifolium</i> Koen. ex Retz. var. <i>marifolium</i>	Dungario Agio, Zinko Okharad	Boraginaceae
48	<i>Heliotropium</i> Sp.		Boraginaceae
49	<i>Hibiscus</i> Sp		Malvaceae
50	<i>Indigofera cordifolia</i> Heyne ex. Willd.	Gadar Gari, Ridha Gari	Fabaceae
51	<i>Indigofera linnaei</i> Ali.	Pat Gari, Bhoyan Gari	Fabaceae
52	<i>Ipomoea eriocarpa</i> R. Br.	Adbau Unerigi Val	Convolvulaceae
53	<i>Ipomoea pes-tigridis</i> L.	Fotiyal, Fotiyar	Convolvulaceae
54	<i>Launaea procumbens</i> Roxb.	Moti Bhonpatri	Asteraceae
55	<i>Lepidium sativum</i> L.	Khaserio, Asario	Brassicaceae
56	<i>Leucas aspera</i> (Willd.) Spr.	Gumu	Lamiaceae
57	<i>Lindenbergia muraria</i> (Roxb. Ex D. Don) P. Bruehl	Piri Sadedi, Zamar Val	Scrophulariaceae
58	<i>Mimosa hamata</i> Willd.	Kai Bavari, Kai, Zanjani, Zinjani	Mimosaceae
59	<i>Mollugo pentaphylla</i> L.		Molluginaceae
60	<i>Ocimum gratissimum</i> L.	Vadi Tulsi, Mara Tulsi	Lamiaceae
61	<i>Oligochaeta ramosa</i> (Roxb.) Wagenitz	Kandhari, Nandhi Uth Kandhari,	Asteraceae
62	<i>Opuntia elatior</i> Mill.	Nag Phan	Cactaceae
63	<i>Pavonia arabica</i> Steud. Var. <i>arabica</i>	Rato Balbuwaro	Malvaceae
64	<i>Peristrophe bicalyculata</i> (Retz.) Nees	Lasi Adhedi, Kari Adhedi	Acanthaceae
65	<i>Phyla nodiflora</i> (L.) Greene	Rato Ukharar, Ratval	Verbenaceae]
66	<i>Phyllanthus fraternus</i> Webst.	Pat Amari, Amari	Euphorbiaceae
67	<i>Physalis longifolia</i> Nutt.	Fofati, Fad, Fotaji Val	Solanaceae
68	<i>Physalis minima</i> L.	Fofati, Fad, Fotaji Val	Solanaceae
69	<i>Polygala erioptera</i> DC. Var. <i>erioptera</i>	Patsan	Polygalaceae

contd...

70	<i>Polygonum plebeium</i> R. Br. Var. <i>indica</i>	Ratanjyot	Polygalaceae
71	<i>Pulicaria wightiana</i> (DC.) Cl.	Son Fuladi	Asteraceae
72	<i>Sesamum indicum</i> L.	Tal	Pedaliaceae
73	<i>Sida</i> Sp.		Malvaceae
74	<i>Solanum nigrum</i> L.	Kamperu	Solanaceae
75	<i>Solanum surattense</i> Burm. f.	Jangali Ringani, Pat Ringani	Solanaceae
76	<i>Tephrosia uniflora</i> Pers. Subsp. <i>Petrosa</i>	Sarpankhi	Fabaceae
77	<i>Tribulus terrestris</i> L.	Akanthi, Mitha Gokharu	Zygophyllaceae
78	<i>Trichodesma amplexicaule</i> Roth	Undh Fuli	Boraginaceae
79	<i>Tridax procumbens</i> L.	Vilayati Bhangro	Asteraceae
80	<i>Vernonia cinerea</i> Less.		Asteraceae
81	<i>Xanthium strumarium</i> L.	Kantaru Zadvu, Gokhru	Asteraceae
82	<i>Zygophyllum simplex</i> L.	Pat Lani	Zygophyllaceae
	Sedge		
1	<i>Cyperus alopecuroides</i> Rottb.		Cyperaceae
2	<i>Cyperus difformis</i> L.	Chiyo	Cyperaceae
3	<i>Cyperus haspan</i> L.	Chiyo, Nidan Moth	Cyperaceae
4	<i>Cyperus rotundus</i> L. subsp. <i>rotundus</i>	Kaluro, Mutha, Moth	Cyperaceae
5	<i>Cyperus</i> Sp.		Cyperaceae
6	<i>Fimbristylis</i> Sp.		Cyperaceae
	Shrub		
1	<i>Asparagus racemosus</i> Willd.	Akal Kandha Ni Val, Chini Ji val	Liliaceae
2	<i>Atriplex stocksii</i> (Wt.) Boiss.	Khati Palakh, Kharo Tanko	Chenopodiaceae
3	<i>Cadaba fruticosa</i> (L.) Flem.	Karo Pijaro, Kari Katakial, Jangali Mirchi	Capparaceae
4	<i>Calotropis gigantea</i> (L.) R.Br.	Vado Akad, Dholo Akad	Asclepiadaceae
5	<i>Calotropis procera</i> (Ait.) R. Br.	Akado, Aak	Asclepiadaceae
6	<i>Cassia angustifolia</i> Vahl	Son Makai, Khoti Mindhiavar	Caesalpiniaceae
7	<i>Citrus limon</i> (L.) Burm. f.	Limbu	Rutaceae
8	<i>Indigofera oblongifolia</i> Forsk.	Zeel, Zeel Jo Zad	Fabaceae
9	<i>Indigofera tinctoria</i> L.	Nili Gari, Gudi, Gari Jo Zad	Fabaceae
10	<i>Ipomoea carnea</i> Jacq. Subsp. <i>Fistulosa</i>		Convolvulaceae
11	<i>Lycium barbarum</i> L.	Garothi, Gerati, Gerothi, Khareti	Solanaceae
12	<i>Prosopis juliflora</i> (Swartz) DC.	Gando Baval	Mimosaceae

contd...

13	<i>Ricinus communis</i> L.	Arenda, Divela	Euphorbiaceae
14	<i>Salvadora oleoides</i> Decne.	Mithi Zar, Mithi Pilujo Zad	Salvadoraceae
15	<i>Salvadora persica</i> L.	Khari Zar, Pailu	Salvadoraceae
16	<i>Sesbania sesban</i> (L.)	Ekad	Fabaceae
17	<i>Tamarix ericoides</i> Rottl.	Lai Jo Zad	Tamaricaceae
	Trees		
1	<i>Acacia leucophloea</i> (Roxb.) Willd.	Hirmo, Haramu	Mimosaceae
2	<i>Acacia nilotica</i> (L.) Del.	Deshi Baval, Bavar	Mimosaceae
3	<i>Azadirachta indica</i> A. Juss.	Limbdo, Neem	Meliaceae
4	<i>Balanites aegyptiaca</i> (L.) Del.	Hingor, Hingod	Balanitaceae
5	<i>Cordia dichotoma</i> Forst.	Gunda	Ehretiaceae
6	<i>Cordia gharaf</i> (Forst.) E. & A.	Liyar, Desi Gunda	Ehretiaceae
7	<i>Eucalyptus globulus</i> Labill.	Nilgiri	Myrtaceae
8	<i>Ficus benghalensis</i> L.	Vad Jo Zad	Moraceae
9	<i>Ficus microcarpa</i> L. f.	Nandhi Pipar	Moraceae
10	<i>Ficus racemosa</i> L.	Umarejo Zad, Gularjo Zad	Moraceae
11	<i>Mangifera indica</i> L.	Ambo, keru Jo Zad	Anacardiaceae
12	<i>Melia azedarach</i> L.	Irani Nim, Rato Nim, Bakani Nim	Meliaceae
13	<i>Pithecellobium dulce</i> (Roxb.) Bth.	Goras Amali	Mimosaceae
14	<i>Prosopis cineraria</i> (L.) Druce	Kandhi, Khajdo, Kando	Mimosaceae
15	<i>Tamarindus indica</i> L.	Ambali Jo Zad, Ambali, Emali	Caesalpiniaceae
16	<i>Zizyphus mauritiana</i> Lam.	Boedi Jo Zad	Rhamnaceae
	Twiner		
1	<i>Pentstemon spiralis</i> (Forsk.) Decne	Dhodhiyal, Dhodheji Val, Dhodh Val	Asclepiadaceae
2	<i>Pergularia daemia</i> (Forsk.) Chiov.	Dudhariyal, Dudhar Val, Tari Val	Asclepiadaceae
3	<i>Rhynchosia minima</i> (L.) DC. Var. <i>minima</i>	Mogariyal, Sanari, Mungarial	Fabaceae
	Under Shrub		
1	<i>Abutilon indicum</i> (L.) Sw. Subsp. <i>Indicum</i>	Khapato, Dabaliar	Malvaceae
2	<i>Abutilon ramosum</i> Guill.		Malvaceae
3	<i>Alhagi maurorum</i> Medikus	Javaso, Javas	Fabaceae
4	<i>Aloe barbandensis</i> Mill.	Kunvar, Kunvar Pathu	Liliaceae
5	<i>Capparis decidua</i> (Forsk.) Edgew.	Kerado, Dora Kera, Kar Jo Zad	Capparaceae

contd...

6	<i>Leptadenia pyrotechnica</i> (Forsk.) Decne.	Khip	Asclepiadaceae
7	<i>Pupalia lappacea</i> (L.) Juss.	Gadar Bhurat, Ridha Bhurat	Amaranthaceae
8	<i>Suaeda fruticosa</i> (L.) Forsk. ex Gmel.	Khario Luno, Lano, Luno	Chenopodiaceae
9	<i>Suaeda nudiflora</i> (Willd.) Moq.	Morus	Chenopodiaceae
10	<i>Withania somnifera</i> (L.) Kurz	Asun, Asundh	Solanaceae
11	<i>Zizyphus nummularia</i> (Burm. F.) W. & A.	Bordi, Boedi, Chania Bor	Rhamnaceae

Appendix - 7

Mutual Dependence for accessing Grazing Resource among the Surveyed Villages

	1	2	3
	Bhagadia	Bhitara Nana	Sherva
Mutual movements across which villages	Bhitara	Luna	Bhagadia
	Mithadi Moti	Bhagadia	Chhachhala
	Sarada	Sarada	Sarada
	Chhachhala	Mithadi Moti	Mithadi
	Chhari Dhandh	Udhama	Dumado Hodko Gorewali
Mutual movements across which villages	There is less movement in this region across neighbouring villages as they have larger pasture lands.	In 2005, its livestock had gone to Mundra wadis.	In scarcity, Sadai, Nirona and Chhari Dhandh
	In 1996, Bhagadia livestock migrated to Dhrangadhra cattle camp and wadis of Mankuva and Sukhpar	During monsoon they go to Gorevali and Nara in Lakhpat.	If scarcity in their cluster, then Luna and Bhitara. Since past one month, Sherva's livestock has gone to Bhagadia, Chhachhala and Sarada
Places from livestock comes	Post monsoon for a month or so Buffaloes from Laiyari [Abdasa]	Buffaloes from Ahmedabad on charamani [currently 200 buffaloes]	50-60 buffaloes on charamani
	Cattle from Jalu, Nakhtrana every year		
	Buffaloes from Ahmedabad on charamani [currently 500 buffaloes]		
	Half livestock of Nana Sarada is in Bhagadia and half I Chhachhala since last 15 days. [22-03-2011]		
Grass Cutting	2500 gov. camels every yr.		
	About 20 families cut and store some fodder for last 4-5 years. To take care of 15-20 days of fodder stress towards the end of summer.	Rarely cut and store grass Only for kid buffaloes.	-

Source: Primary Survey, 2011

[Continued on next page]

Appendix - 7

Mutual Dependence for accessing Grazing Resource among the Surveyed Villages

	4	5	6
	Dumado	Mithadi Moti	Sadai
Mutual movements across which villages	Adhiyaang Siniyado Sargu Karanwali Hodko Erandawali	Sarada Udhama Bhitara Bhagadia Gorewali	Nani Sadai, Ghedudhi Wandh Hodko Erandawali Ghadiyado Zararwadi Vad Vadali Bhirandiyara
Mutual movements across which villages	Around a decade ago, their livestock migrated to Luna, Sarada and Bhagadia. 5 - 6 years ago to Naranpur, Kukama, Dhori Sumrasar and Nirona.	Decade ago, their livestock went to Bhirandiara and Luna	In-frequent movements to - Madan, Misariyado, Sarada, Sherva, Bhagadia, Reladi Neri 3 years ago, livestock from Sadai, Western Banni, and Lakhpat - Abdasa went to Misariyado, Madan, Neri etc. as the rainfall there was very good. 4 years ago, Sadai and Jat livestock migrated to Lakhabo, Kharoda and Lakhara 12-13 years ago, Sadai livestock went to Luna side
Places from livestock comes	Nearly every year Rabaris from Bhachau and Lodai come with their buffaloes and bharwads with cows during 2 to 3 months of mosoon. They do not take external livestock on charamani as they have more livestock.	Dhebar Rabaris from Bhachau 4-5 years ago, livestock from Sarada, Gorewali and Udhama had camped. No livestock on charamani for past 6 years.	
Grass Cutting	Long standing tradition of cutting and storing fodder by all families.	-	Cutting and storing when rains are good by few families.

Source: Primary Survey, 2011

Appendix - 7

Mutual Dependence for accessing Grazing Resource among the Surveyed Villages

	7	8	9	10
	Berdo	Bhojarado	Nani Dhadhhar	Sargu Moti
Mutual movements across which villages	Chhachhi Lakhabo	Chhachhi Udai Bhirandiar Sumarasar Misariyado	Moti Dhadhhar Vagura Dediya Udai [sometimes]	Nani Sargu Dhediya Erandawali Vad Dumado During scarcity Luna and Lakhara [1985-87, 1990-91]
	Till 4 - 5 years ago, every year they used to migrate to Dudhai due to water and fodder shortage. They have 1200 - 1500 virdas. And have also made pucca awadas 4-5 km. away from the village.		10 years ago, livestock migrated to Luna side. During severe scarcity they go to Lakhpat, Abdasa.	
Places from livestock comes	Huge buffalo herds. Total buffaloes 6000. Every year they buy fodder from farmers of Dhrang, Lodai, Umedpur. Khedoi, Navagam, Dudhai, Dhaneti	Dhori, Sumarasar Chhachhi Lakhapar Dhebar Rabaris from Bhuj and Anjar taluka	Dhebar Rabaris from Anjar and Vagad.	Gorewali, Hodko, Panawari Khavda & Pachham villages like Soyela, Mindhiyara, Godpur, Akli, Ludiya, Kakkar 5 years ago when there were good early rains, 4000 animals from villages of Western Banni, Gorewali, Pachham, Abdasa and Lakhpat came for 2 months. Sometimes livestock from Saurashtra
Grass Cutting	No grass cutting			

Source: Primary Survey, 2011

Appendix - 8
Economics of Buffalo Herds - Before and After Dairy

A. [After Dairy in Banni]			
Details	Herd-size		
Total Buffaloes in the Herd	10	20	30
Average number of lactating female in the herd	4	8	12
Sources of Income from Buffaloes			
A From animal sales			
1 Lump sum from buffaloes, male and female calves	30000	65000	100000
B From Milk			
1 Average milk production per herd @ 8 liters per buffalo	32	64	96
2 Milk kept for self consumption per family	2	3	5
3 Saleable milk per day	30	61	91
4 Annual saleable milk @ 275 days per annum	8100	16470	24570
5 Annual revenue from milk @ Rs. 25 per liter	202500	411750	614250
C From Manure			
1 Annual manure production per herd [no of trucks]	3	6	10
2 Manure selling @ Rs. 1500 per truck	4500	9000	15000
Total Annual Income	237000	485750	729250
Total Expenses			
A For Labour			
1 Lumpsum for hired labour for various works	0	15000	25000
B Expenses for Feed			
1 for lactating buffaloes daily Rs. 96 [8 kg. @ Rs. 12 / kg] for 300 days	115200	230400	345600
2 for others @ Rs. 36 daily [3 kg @ Rs. 12/kg.] for 300 days	64800	129600	194400
3 Expenses for kala [cotton ball coverings] for 2 summer months - 4 kg daily for 2 months @ Rs. 3.5 / kg.	8400	16800	25200
C Other expenses			
1 Annual medical expenses @ Rs. 100 per animal	1000	2000	3000
2 Transport @ Rs. 500 per animal	3000	6000	10000
3 Other miscellaneous expenses	500	1000	1500
Total Annual Expenses	192900	400800	604700
Net Annual Income [Income - Expenses]	44100	84950	124550
Average Monthly Income	3675	7079	10379
Income per buffalo	4410	4248	4152

Economics of Buffalo Herds - Before and After Dairy

B. [Before Dairy in Banni] (at current rates)

Details	Herd-size		
Total Buffaloes in the Herd	10	20	30
Average number of lactating female in the herd	4	8	12
Sources of Income			
A From animal sales			
1 Lump sum for buffaloes, male and female calves	30000	65000	100000
B From Milk			
1 Average milk production per herd @ 8 liters per lactating female	32	64	96
2 Milk kept for self consumption per family	2	3	5
3 Saleable milk per day	30	61	91
4 Annual saleable milk @ 275 days availability per annum	8100	16470	24570
5 Annual revenue from milk @ Rs. 25 per liter	121500	247050	368550
C From Manure			
1 Annual manure production per herd [no of trucks]	3	6	10
2 Manure selling @ Rs. 1500 per truck	4500	9000	15000
Total Annual Income	156000	321050	483550
Total Expenses			
A For Labour			
1 Lumpsum for hired labour for various works	0	15000	25000
B Expenses for Feed			
1 for lactating buffaloes daily Rs. 96 [8 kg. @ Rs. 12 / kg] for 300 days	115200	230400	345600
2 for others @ Rs. 36 daily [3 kg @ Rs. 12/kg.] for 300 days	64800	129600	194400
3 Expenses for kala [cotton ball coverings] for 2 summer months - 4 kg daily for 2 months @ Rs. 3.5 / kg.	8400	16800	25200
C Other expenses			
1 Annual medical expenses @ Rs. 100 per animal	1000	2000	3000
2 Transport @ Rs. 500 per animal	3000	6000	10000
3 Other miscellaneous expenses	500	1000	1500
Total Annual Expenses	192900	400800	604700
Net Annual Income [income - expenses]	-36900	-79750	-121150
Average Monthly Income	-3075	-6646	-10096
Income per Buffalo	-3690	-3988	-4038

Appendix - 9
Rainfall Data Analysis for 30 years 1981 - 2010

Sl.	Year	Rainfall [mm]	% of normal rainfall	No of years below normal
1	1981	363	121.0	
2	1982	172	57.3	
3	1983	236	78.7	
4	1984	366	122.0	
5	1985	123	41.0	3
6	1986	105.9	35.3	
7	1987	2.2	0.7	
8	1988	657.7	219.2	
9	1989	563	187.7	
10	1990	281	93.7	3
11	1991	31	10.3	
12	1992	507	169.0	
13	1993	106	35.3	
14	1994	729	243.0	
15	1995	326	108.7	2
16	1996	174	58.0	
17	1997	259	86.3	
18	1998	464	154.7	
19	1999	450	150.0	
20	2000	195	65.0	3
21	2001	540	180.0	
22	2002	110	36.7	
23	2003	700	233.3	
24	2004	147	49.0	
25	2005	139	46.3	3
26	2006	485	161.7	
27	2007	641	213.7	
28	2008	177	59.0	
29	2009	370	123.3	
30	2010	655	218.3	1

Source: Gujarat Institute for Desert Ecology, [upto 1994]
Irrigation Department and Rudramata Dam site 1994 onwards]

Appendix Table 10 . Various Committees formed to study Banni and their Recommendations to Improve

Year	Committee / Institute	Objective	Main Recommendations
1966	Government of India Team, Ministry of Agriculture.		Reconnaissance and topographic surveys; pilot projects to determine reclamation procedures - Based on survey, delineation of areas for agriculture and pasture development.
1974	Ground Water Institute, Pune	Find remedies for drinking water problems of Banni.	Protect the system of Virdas by increasing their catchments by connecting with many footer channels.
1977	Indian Council of Agricultural Research, New Delhi	Assess Banni's problems & suggest measures R & D programmes in Banni	Fencing & controlling grazing - Banni - Khavda to be the priority area for reclamation and management - Operational research project for demonstration in Banni
1979	High Level Committee, by Government of Gujarat and an experts committee formed in 1983.	Finding ways to prevent salinity - protection of livestock - dairy industries.	Reconnaissance soil survey to assess the drainability characteristics and reclamation - Constructing a road from Khavda to Lakhpur to prevent the ingress of sea water in to the northern fringe of Banni caused by the construction of Punjabi Road.
1985	Project Planning Cell, CEPT	Assist the Planning Board in undertaking exercise for comprehensive development	Dismantle Punjabi road or increase height of Khavda - Hajipur road. Construction of road cum reclamation bund along the northern and north eastern Banni, between Kunaria (Khavda) and Kharoda (Khadir)- Construction of bunds across Kori Creek and minor creeks like Adiyang and Sungandhi
1988	Water Resources Department, Gujarat	Study the salinity ingress in Banni and suggest remedial measures)	Construction of Gaduli - Santalpur road cum reclamation bridge Surface water harvesting by gully plugs, check dams and veil tanks Diverting the course of saline water from Pakistan, providing drainage channel for tidal water across Punjabi road and construction of tidal regulators.
1993	Gujarat Ecology Commission (GEC)	Restoration of grasslands through several pilot projects	Restrict spread of Prosopis J. and encourage indigenous species - Stop free grazing around maldharis settlements - Grassland monitoring to check overuse. Fixing up stocking rates based on the assessment of carrying capacity of different zones - Encourage stall feeding and stop immigration of livestock

Source: Compiled from the information in *Sindh & Kumar, 1998*.

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