



LIVING LIGHTLY

Pastoral futures in a Changing world

Conference Report

8 - 10 December, 2016 - New Delhi, India

LIVING LIGHTLY



About Sahjeevan

Sahjeevan works towards understanding traditional sustainable practices of communities, which when combined with modern knowledge; become the vehicles of growth and identity for them. Over the 25 years, in Kutch, Gujarat, Sahjeevan has implemented several community programs based on the understanding of complex geo-hydrology of the region. Some important programmes include solving drinking water problems in the villages; understanding of fascinating resilient rain-fed agriculture practices for food security to address climate change issues; understanding the sustainable practice of catching fish with rising and lowering tides in mangrove creeks; understanding of forests to save endangered biodiversity; understanding of pastoral science of breeding animals using ecology to infuse strength, productivity and resilience; waste management programmes etc

Sahjeevan regularly organises community events to demonstrate small models of socio-economic growth and advocates governments to scale up these sustainable practices

Foundation for Ecological Society

Spread across diverse ecological and social geographies, FES works towards conservation of nature and natural resources through collective action of local communities. The crux of FES' efforts lie in locating forests and other natural resources within the prevailing economic, social and ecological dynamics in rural landscapes. Globally, FES hopes to see an increasing influence on two fundamental issues in governing shared natural resources – a 'socio-ecological systems' approach and a 'Commons paradigm', which together could have far-reaching impact on world views on 'development'.

In India, FES has played a pioneering role in furthering the concept of Commons as an effective instrument of local governance, as economic assets for the poor and for the viability of adjoining farmlands. It has also highlighted that by strengthening the institutional dimension, the collective action spins off from effectively managing natural resources to other spheres of village life such as education, health and access to economic opportunities

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LIST OF ABBREVIATIONS

BRLF Bharat Rural Livelihood Foundation

FES Foundation for Ecological Security

GDP Gross Domestic Product

IIED International Institute for Environment and Development

MOEF Ministry of Environment, Forestry and Climate Change

SADC Swiss Agency for Development and Cooperation, Embassy of Switzerland

UK United Kingdom

USA United States of America

1. Introduction

India is home to a large number of pastoral groups, including those in the arid and semi-arid parts of Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, and Karnataka, as well as the mountain tracts in the Himalayas in the north and the Nilgiris in the south. However, very few studies of these systems have been conducted, and these have remained largely disconnected, with little attempt to bring either scholarly or policy coherence to the main body of work.

Recognizing the fact that relatively little research on pastoral systems has been undertaken in India, this three-day conference was aimed to provide opportunity for policy and scientific discourse among researchers working on pastoral systems in India and internationally and help develop an agenda for future research. The conference also aimed to facilitate consolidation of findings and insights from existing and ongoing research on pastoralism in India.

Under the banner *Living-Lightly: Journeys with Pastoralists*, hosted by Sahjeevan and Foundation for Ecological Security (FES) this three day academic conference was organized at Indira Gandhi National Centre for the Arts, New Delhi, India between 8 and 10 December 2016. The conference was convened by Ashwini Chhatre, Abi Vanak, and Vasant Saberwal. This report documents the proceedings and outcomes of the conference.

1.1 Conference Participants

About 40 participants working in the field of pastoralism both in India and abroad participated in the conference (see appendix E). The participants were practitioners, representatives of national and international organizations, scientific and research community, and masters/doctoral student researchers. The conference brought together experts from various fields related to pastoralism including education, economy, technology, climate change, livestock breeding and management, ecological resource management etc.

1.2 Programme of the conference

The programme of the conference on day 1 and 2 was organized through 7 keynote addresses and each keynote address was complimented by 3 panel presentations (see appendix A). The keynote sessions focused on the following topics

- Contribution of Pastoralism to the Economy
- Indigenous Knowledge and Breeding System
- Ecological Dynamics of Grasslands
- Technology and Pastoralism
- Engagements with Markets and Engagements with the State
- Pastoralism and Climate Change

The panelists spoke on the topic based on their experience and knowledge, bringing specific and diverse perspectives related to the topic, followed by a moderated discussion with participation from the conference participants (see appendix B and C for biographies of speakers). On day 3, keynote sessions and panel discussions culminated in the 'research synthesis' session that focused on discussing future research priorities for pastoralism in India.

2. Conference Proceedings – Day 1

2.1 Opening ceremony

The conference began with a welcome address by Sandeep Virmani, Founder Trustee, Sahjeevan. Sandeep briefed participants about *‘Living Lightly: Journeys with pastoralists’* event that was taking place for two weeks from 2nd to 18th December 2016. Further, he elaborated on the need for organizing a three day academic conference to integrate the scholarly work and initiate thoughtful dialogues in the field of pastoralism in India. He encouraged participants to involve in thorough discussions on following key topics

- Contribution and degradation associated with the pastoralism to ecosystem, and lack of research validating such claims
- Involvement and contribution of science to assess resilience of breeds developed by Pastoralist and their knowledge of the genetics of those breeds; management of invasive species
- Legislations and other legal efforts towards governing and managing pasture lands
- Research and funding needs for the management of pastures
- Contribution of pastoralists to the economy (e.g. seed bank and its effectiveness)
- Debate on next generations of pastoralists: next generation problem; determinants for continuation of pastoralism; future incentives; belief systems of the pastoralists; pastoralists views and understandings of the commons
- Involving young pastoralists as researchers

Introduction to the conference: Aswhini Chhatre

Following the opening address, Dr. Aswhini Chhatre (Chair, Convening committee) briefed participants about the preparation process, objectives and expected outcomes of the conference. Dr. Chhatre shared about reasons for setting up the conference programme. The conference primary objectives he noted were: to create of common platform for conversation; to identify relevant and interested stakeholder participation; to identify topics for dialogue on pastoralism; to identify possibilities for collaborative researches: to design a larger research programme etc. Finally, Ashwini introduced panelists and speakers to the audience.

2.2 Session 1: Contribution of Pastoralism to the economy

Keynote speaker: Roy Behnke, Oddessa Centre, UK

Session summary:

The focus of the keynote address was to highlight the importance of assessing pastoral contributions to the economy and to identify possible errors associated with proper estimates of actual numbers.

Roy Behnke emphasized the need for keeping record of actual contribution of pastoralism to national economies. The speaker presented his re-analysis of the official estimates of livestock

contribution to the GDP in four East African countries - Sudan, Kenya, Ethiopia, Uganda. In all cases, the speaker noted that the official estimates of livestock contribution to the economy were misinterpreted as far too low than the actual. In Kenya, for example, the actual livestock contribution to agricultural GDP was two and a half times larger than official estimates for 2009. The lower official estimates in this case are based on recorded sales of livestock and their products. Because only a small portion of Kenyan livestock production is exchanged through monitored channels, official figures misrepresented the size and economic significance of the livestock sector. Similar examples were noted by the speaker in Sudan, Uganda and Ethiopia. Because of these improper official estimates, the African pastorals were assumed to be inefficient, destructive in general, and hence there were calls for their transformation. The speaker noted that about 30 years ago, the Ethiopian government started large-scale plantation, pushing pastoral communities farther away. However, Ethiopian pastoralists contributed highest in terms of revenue when the revenue was calculated per hectare for pastoralism.

The discussion points highlighted by the speaker were

- Pastoral contributions to the economy can easily be ignored unless proper assessments and estimates of actual numbers is carried out. Underestimation of productivity numbers makes pastoralism inefficient.
- Although pastoral outputs are most likely to be the large contributor to national GDP outputs, due to lack of data, pastoral systems are labeled as inefficient.
- Demonstration of actual livestock numbers and understanding of inter-relation between crop economy and livestock economy is key to regard pastoral systems' contribution to the economy.

Panelist: Nitya Ghotge

Nitya Ghotge provided an overview on the situation of pastoral contribution to the national economy in India. She noted that India is probably one of the largest producers of milk and meat and the export of such products contributes 4% to the total GDP and 26% to the agricultural GDP. This is from what has been accounted for or is a part of the formal sector. However, when we look at the informal sector the numbers are far higher. A significant part of milk in India is produced by the pastoral community and is directly handed over to the consumers. Livestock also an important source of livelihood for small farmers and accounts for about 16% of their annual income.

Important discussion points highlighted by the panelist were

- What methods should be used to estimate the contribution? - Life cycle analysis, monetary and commodity based externalities, reciprocal arrangements etc.
- Given multiple disciplines and different stakeholders working in the field, should an interdisciplinary approach be adopted?

Panelist: Himanshu Upadhyay

Himanshu Upadhyay spoke about the status of grassland grazing in India. He emphasized on the facts related to quality of grazing pastures and cultivated fodder; people perceptions of the grazing versus cultivated fodder: fodder crops in western India; mobility of herds

Important discussion points highlighted by the panelist were

-
- The question of rights for grazing in reserve forests.
 - Requirement of research needs in grassland area
 - Provision of grazing land near settlements

Panelist: Ridhima Gupta

Ridhima Gupta shared information on the contribution of livestock products primarily milk and its importance in the Indian economy. In India, majority of milk is locally consumed and about 80% of milk in India is supplied by indigenous cows and buffaloes – remaining low level of total output comes from hybrids or cross breeds. This has significant impact in Indian economy- livestock as primary source of production

Two important discussion points highlighted by the panelist were

- Though yield of milk per animal is low in India when compared with US; it would be interesting in knowing more about yield of the animal. Interested in doing that.
- Male cattle-no proper treatment-economic unviability-sending cattle for slaughter-Gender imbalance among cattle population.

2.3 Session 2: Indigenous Knowledge and Breeding System of Pastoralists

Keynote speaker: Ilse Kohler-Rollefson,

Session summary:

The focus of the keynote address was to discuss and appreciate the immense knowledge that the pastoral communities possess and to highlight the importance of conserving this traditional knowledge particularly indigenous pastoral breeding techniques.

Ilse spoke about the system of pastoral indigenous knowledge. She mentioned that the pastoral indigenous knowledge is actually beyond breeding, a complex system, culture/group specific, and involve refined breeding techniques. She further elaborated that pastoral indigenous knowledge is also about understanding animal behavior, and understanding animal behavior is key to conserve and sustain breeding techniques.

The discussion points highlighted by the speaker were

- Explore opportunities to understand the social contexts-long term approach to conservation
- Inform decision makers about the need to conserve indigenous knowledge

Panelist: Chanda Nimbkar

Chanda Nimbkar, based on her research and work experiences suggested that lack of information, misinformation and miscommunication forms a great barrier to conserving best breeds particularly pastoral breeds. She further noted that educating government about the need to protect is key to the conservation of indigenous knowledge.

Important discussion points highlighted by the panelist were

-
- Strategies to provide precise and appropriate information for government to design programs that protect and enhance pastoral breeds (e.g. Livestock pasture scheme-mobile gene banks etc)
 - Need to encourage researchers to understand the resilient genes among pastoral livestock

Panelist: D. K. Sadana

D. K. Sadana appreciated the skills and knowledge that pastoral communities possess. He emphasized that it is important to learn this knowledge.

Important discussion points highlighted by the panelist were

- Universities need to promote opportunities and programmes to learn about the indigenous knowledge and techniques of the pastoral groups.
- The way pastoral communities deal with things is relatively straightforward, but we think it is complicated. This system of pastoralism is going to be there but requires a little help in terms of valuing the elements of pastoralists' production systems.

Panelist: Karthikeya Sivasenapathy

Karthikeya Sivasenapathy shared a unique story of Kangeyam village in Tamil Nadu. In general, pastoral communities have high number of breeds in Tamil Nadu, however in Kangeyam village sedentary population owns few breeds that are very unique. He mentioned that the administrators are ignoring pastoral views, which are a threat to land management, and there are increasing cases of domesticated cattle getting feral.

The panelist mentioned that it is important to inform decision makers to involve pastoral views.

2.4 Session 3: Technology and Pastoralism

Keynote speaker: Ced Hesse, IIED, UK

Session summary:

The focus of the keynote address was to highlight how technological innovations could be used in enabling promising discourses for bridging gap between government planning processes, local institutions and pastoralists and encourage their interactions; and also enhancing pastoralists' skills to influence and participate in the formal planning processes

Ced Hesse shared a fascinating case story from his work in Kenya and Tanzania to demonstrate that the futures of pastoralists and their role in dryland resource management will be benefited by the adoption of technological tools. He elaborated on the steps used in digital resource mapping. Further, Ced emphasized that participatory digital resource mapping can be used as an excellent tool in recording pastoralists traditional knowledge and also equip pastoralists to effectively communicate the value of their needs to government officials and thus help design byelaws and finance investments in public goods.

The discussion points highlighted by the speaker were

- Undoubtedly, technology plays a key role in articulating community knowledge; provide platform for participatory planning; minimize resource conflicts; provide easy access and

handling of maps etc, however how to address the question of educating pastoralists on the usage of technology

- Need to explore technological options that help facilitate dialogue between communities and other stakeholders and policy making.

Panelist: Rahul Ghai

Rahul Ghai shared his experience working with the pastoralist communities of the Thar Desert - which spreads across India and Pakistan and thus involve two administrative jurisdictions. He highlighted the fact that pastoralism issues cannot be dealt in isolation and hence holistic approach is needed. Further, he emphasized that technological tools procured by pastoralists help them in extreme climate adaptability and hence enhance their resilience capacity.

Important discussion points highlighted by the panelist were

- How technological tools could be reached to pastoralists
- How technology could be used to minimize the impacts of developmental interventions in the natural ecosystems where pastoral communities live (e.g. Indira Gandhi canal yojna in the Thar Desert)

Panelist: Mattieu Salpateur

Mathieu Salpateur spoke about the usage of technology as a strategy by Rabari pastoralists (Kutch, India) to cope with the changes that affect their livelihood. He mentioned that the usage of technology particularly mobile phones and facebook is becoming an integral part of pastoralists. Also, technology usage is increasing among young and literate individuals of Rabari pastoralists.

Important discussion points highlighted by the panelist were

- Need to understand aspects that determine the technology usage among pastoralists
- Need to assess how technological changes influence/transform the adaptive methods/strategies of pastoralists
- Variation in access to technology among pastoralists is dependent on the level of education. This in turn suggest technology usage is completely associated with the development

Panelist: Monika Agarwal

Monika Agarwal spoke about the role of technology in providing access to education among pastoral children. She emphasized that the pastoral children should be provided with better quality of education and is important to empower them. Monika noted that there is still mindset among pastoral children that they are not part of present generation.

Discussion points highlighted by the panelist were

- Does technology provide effective solutions in access to education for pastoral communities? Can something be done about designing pro-pastoral policies through technology?
- How can youth be brought in the pastoral activities with the help of technology?

2.5 Session 4: Ecological Dynamics of Pastoralism

Keynote speaker: Jayashree Ratnam, National Centre for Biological Sciences, India

Session summary:

The focus of the keynote address was to highlight how variations in ecological dynamics in different ecosystems affect pastoralism.

Jayashree Ratnam spoke about historical legacies, uncertain futures and other ecological aspects (e.g. climate, soil nutrients, fire, herbivores etc) of savannas and grasslands in India. She mentioned that all these factors of ecosystems support pastoralists to different degrees; however increasing human interference/impact is becoming a threat to both ecosystem and to pastoral communities that depend on it. In addition uncertain climatic features are affecting pastoralism. The speaker also noted that there is a fundamental problem with classification as there are significant areas that are not being recognized as grasslands.

The discussion points highlighted by the speaker were

- Unrecognized savannas receiving less attention thus affecting pastoral communities
- Need research programmes to understand how changing ecological patterns-monsoon patterns- affect pastoralists groups

Panelist: Abi Vanak

Abi Vanak explained various threats and changes to landscapes which in turn affect the pastoralism. Some threats to landscape of wasteland include irrigation schemes, plantations, quarries, bunding/ trenching, alternative energy sources (e.g. solar panels, wind mills etc) invasive species (e.g. *Lantana camara*, *Prosopis juliflora* etc).

Important discussion points highlighted by the panelist were

- Need to understand the factors that change landscape ecology and policy maker's perception towards these issues?

Panelist: Ankila Hiremath

Ankila Hiremath presented the case examples of invasive species in Biligiri Rangana Hill (e.g. *Lantana camara*) and Kutch (e.g. *Prosopis juliflora*) and their socio-ecological impacts in these forests. She explained that *Lantana camara* spreads widely when the fire frequency is low and it spread rampantly in BR Hills when the area was declared as a protected area (as there was no fire) and thus it is now seen as degrading to the forest. Similarly in the case of *Prosopis juliflora* in Kutch (brought in 1960) which has a very unique ability to suck ground water gives higher drought seasons, increase salinity and now spread to more than 50% of the landscape. Hence when the new lifeform is introduced would have profound, often irreversible changes in ecosystem functioning, changes in services that people derive from these ecosystems and changes in herbivore and predator populations. Finally, she emphasized that it is important to study the causes for the spread of invasive species and their ecological impacts.

Panelist: Sumanta Bagchi

Sumanta Bagchi spoke about the need to change the misconceptions about wastelands as unproductive. He mentioned that the value of wastelands are diminished due to misconceptions. Wastelands could turn to be productive and it is important to explore options to change these misconceptions and make them productive (e.g. Green wall of China, Green wall of Africa).

Conference Proceedings – Day 2

2.6 Session 5: Research Presentations

Session summary:

In this session student researchers (masters and doctoral candidates) presented their research results (see appendix D). They spoke about research objectives, data collection methods, results and conclusions of their studies. A brief summary of these presentations are presented below.

Presenter: Ovee Thorat, Ashoka Trust for Research in Ecology and the Environment, Bangalore

Ovee's research looks at the role of pastoral practices (e.g. grazing) in shaping landscapes (grasslands) and how intervention by forest departments to prevent this would affect the landscape dynamics in Banni region of Kutch, Gujrat. The livelihood of *Maldharis* (pastoral community) in this region is dependent on animal movements and seasonality. However, forest department or the scientists believe in developing grasslands by putting restrictions on grazing or controlling mobility of the pastoral groups. This ignores the historical aspect of the landuse where the area used to be extensively grazed by these pastoral community for a long time and putting restrictions on them can have unexpected results on the landscape. The research suggests that the pastoral groups shouldn't be looked through one angle of grazing as there are other herding associated activities that are of prime significance in shaping the landscape and there is a possibility that these other activities are un-noticed or ignored over centuries. Thus the research results suggest that it is important to recheck the ground level identities of the present state of pastoral communities and the landscape.

Presenter: Chandrima Home, Ashoka Trust for Research in Ecology and the Environment, Bangalore

Chandrima's research aims at understanding linkages in transition in the changing face of agro-pastoralism in Upper Spiti landscape. The mountain ecosystems are vulnerable to changes as they are specifically dynamic, diversified and flexible in nature. Livestock herding is not only an integral part of these mountain ecosystem, but also a part of the culture. Changes like green pea cultivation in Spiti can be result in two possible extreme scenarios in future in Spiti. First, there can be increase in small livestock for manure if labor is available and if dog population is controlled in the area. Second, there can be diversified nature of livestock, which leads to increase in large animals in the herd population. These two scenarios fits into their agro-cultural model but the dog menace can put pressure to the livestock population.

Presenter: Rashmi Singh, Ambedkar University, New Delhi

Rashmi's research looks at how socio-economic transformations have influenced the agricultural and livestock production in Upper Spiti landscape, Himachal Pradesh. Her research indicates that there is weakening of traditional institutions with end of barter system, seasonal herders (Bihari Bacche), replacement of black pea with green pea. The research results also suggest that the linkages are not linear because there is an increase in livestock due to animal husbandry practices on one hand and on the other hand there is influence of dogs on livestock population, modern education system and climatic changes which changes the daily practices. Eventually, these dynamics may result in unpredictable results which may put the pastoral communities at risk. Also, these risks may result in macro level changes in the landscape.

Presenter: Iravatee Majgaonkar, Centre for Wildlife Studies, Bangalore

Iravathy's research aims at understanding the implications of conservation policies on livelihood of agro pastoralists. There can be three agencies of interest in the study area (Maharashtra): shepherding community, forest department and predation. Officially, there is no legal access for grazing however, the pastoral groups regularly negotiate for access. The plantation actions and conservation policies by the forest department restricts the access. The conservation policies focus more on conservation of wildlife mainly *chinkara* (herbivore) in the area, but the area is one of the main habitat for Indian wolves. No compensation is paid to the pastoral groups for any loss due to wolf predation. The state policies also ignore the behavioral aspects of the wolf ecology, where it moves with the livestock. Thus, restricting entry of pastoral groups may not result in conservation of wildlife (*chinkara*).

Presenter: Mihir Matur and Kabir Sharma, The Energy and Resources Institute, New Delhi

Mihir and Kabir presented an MOEF sponsored project examining the economics of land degradation in Banni, Gujarat. They ran several models to project the nature of grassland degradation in Banni using system dynamics. The modelling results show that the grassland areas are going to deplete over time in the absence of conservation actions and if the *Prosopis juliflora* is removed from Banni the grasslands would start taking their course. The model variations are very high and sensitive towards *Prosopis* and buffaloes in the area. This research also suggest that the cost of policy delay can be much higher. The grasslands would rejuvenate but still there would be fodder deficit in the area. Though, *Prosopis* removal is favourable, its actual ecological impacts are not clear.

2.7 Session 6: Pastoralists and the State: Perspectives on Education Inclusions

Keynote speaker: Caroline Dyer, University of Leeds, UK

Session summary:

The focus of the keynote address was to discuss the relationships of pastoral communities and the states and different roles of states in uplifting pastoral groups and importance of introducing of education among pastoral communities.

Caroline Dyer presented several dynamics of pastoral education and how education could be integrated into pastoral livelihoods. She spoke about several points including formal education as a contested resource; linking Livelihoods with formal education; need for education to be a part of the integrated livelihoods approach; need for education to engage with pastoralists changing needs; state development ambitions, land and Pastoralist Livelihoods

Further, the speaker noted that although Indian constitution has a pledge for “Right for Education” the ground situation looks highly biased for sedentary mode of living. There is a need of basic infrastructure for running mobile schools which provides a systemic ‘alternative’ mainstream education system. This enrolls pastoral children in a system of schools for education rather than just admitting them in schools. Caroline suggested that there is a need to record/check drop-in and drop-out rates and further examine the factors behind drop-outs. The school learning must relate the education to livelihood, considering their traditional knowledge system.

Panelist: Anita Sharma

Anita Sharma shared her research experiences with the pastorals communities near international border areas where these communities are highly sensitive towards state policies against neighboring states. She mentioned that State considers that extended frontiers or claimed spaces used by the pastoral groups pose a threat to national security however historically these corridors were available for everyday livelihood. The shrinking geographies for the pastoral community limiting their land-use and thus their livelihood. In addition, sometimes, these pastoral groups face identity crisis due to underlying actions of military and militants in the area. The panelist concluded that talking about education and looking at educational institutes in these areas could be sometimes irrelevant.

Panelist: Farhana Ibrahim

Farhana Ibrahim spoke about how state is regulating / influencing pastoralists’ way of life, their activities, transregional issues etc. It is important to notice when and how pastoral communities become interested in the idea of state, where education and tourism plays important role in changing their perception. There is an interaction between different pastoral communities and sedentary communities which brings transregional tensions between them and state. The idea of access to education needs to be linked to livelihood. Also, a further examination is required on why the initiative of formal education have been taken by the state, not by the community

itself? How access to education will change or impact the relationships of pastoralists and the state

Panelist: Pirerre-Alexandre Paquet

Pirrie Alexandre Paquet shared his research experience working with Van Gujjars of Shivaliks where the land is highly contested for spaces and state acts as important player in controlling access, and pastoral community negotiates with the state on daily basis. Over time, to access the pasture the cost has increased in the form of bribery to the forest officials, so the prices of pastoral products have also been increased. Though, changes in livestock composition puts pressure on forests, but forest officials consider forests as their own property and continue to take benefits out of forest management practices.

2.8 Session 7: Pastoralists and the Markets: Engagements with markets

Keynote speaker: Carol Kerven, Odessa Centre, UK

Session summary:

The focus of the keynote was to understand different aspects of market engagements by the pastoral people and also to discuss how various market dynamics influence pastoral decisions.

Carol Kerven, provided an overview on how market conditions influenced pastoralists' perception in Africa. She noted that the pastoral communities are capable of taking rational decisions as per market dynamics and are opportunistic to market conditions. Still, it is interesting to look at how these communities engage with market and who would more often engage with the market. Within pastoral community there is no uniformity between the responses. There are several factors which influence the responses, like economic background of the household, gender, etc. This gives an indication about why more and more animals appeared in the market when there was drought. Especially during pragmatic weather conditions the poor pastoralists would sell their livestock and the rich pastoralists would buy. Thus, the engagement of poor with the markets is more than the rich. It can be looked at as more poor pastoralists engage in the market.

The important question is to understand how and when different kinds of markets (e.g. barter exchange, exchange of labor/service, etc.) need to be undertaken based on the engagement of pastorals with market

Panelist: Monisha Ahmed

Monisha Ahmed shared the history of worldwide popularity of Pashmina's fabrics (Kashmir Shawl) and its consequential impacts on the nomadic livelihoods, trade and craftsmanship in the Changthang region. Due to popularity and market boom of pashmina fabric, there has been compositional change in sheep and goat populations. Now people are rearing more goats than sheeps, which directly links the Changthang to the new cash economy. In the landscape, there has been an entry of tourism and army, which give economic benefits to the nomadic people however this can have a direct impact over the ecology of the landscape.

Panelist: Sabyasachi Das

Sabyasachi Das spoke about the market dynamics involved in selling pastoral livestock vs pastoral products (e.g. milk). He shared case examples from central and western India. In Gujrat, pastoralists made an opportunity to obtain huge income by selling resilient breeds of pastoral bullock in an animal trade market (about 400 kms away from rearing ground). He noted that government often fails to recognize the value for this kind of trade where pastoral livestock can supply to the demand created by agriculturists and where livestock economy is much more than that of milk economy. The bullock trade is not generally recognized as livestock economy which is different from milk economy.

Important discussion points highlighted by the panelist were

- Need to identify and promote value for different trades for the selling of pastoral livestock
- Strategies to create more value for pastoral livestock (e.g. bullock)

Panelist: Siddhartha Krishnan

Siddhartha Krishnan provided an overview about the struggles of Toda pastoral community in the Nilgiri biosphere Reserve. He elaborated on the constant pastoral negotiation that the Toda community needs to make with the neighboring farmers and foresters. In addition, shift in cultivation (e.g. banana plantation); increased trees and shrubs (e.g. eucalyptus and acacia); conversion of migratory routes into highways; cultural reasons (e.g. caste system) etc would pose risks on Toda pastoral groups by drastically decreasing pastoral lands.

Discussion points highlighted by the panelist were

- Do the market arguments and networking are enough for the pastoral community? Due to changes in the landscape and cultural politics, there is whole cultural vulnerability or a cultural crisis for these pastoral communities.

2.9 Session 8: Climate Change and Pastoralism

Keynote speaker: Arun Agrawal, University of Michigan, USA

Session summary:

The focus of the keynote address was to understand different strategies adopted by agro-pastoralist to cope with the changing climate

Arun Agrawal, presented in detail about the adaptation strategies of agro-pastoralist community. He elaborated on the adaptation strategies required to address different levels of risks namely mobility; livestock storage; mix of agriculture and pastoralism or mixed animal herds; joint actions and collective undertakings: market exchange etc. Arun also noted that migration forms an efficient solution to high-risk, low productivity environments

The migration and climate change make the pastoral mode of livelihood risky. It is important to consider that risks are contextually structured and there are limits of biophysical risk approach.

Due to remoteness of the pastoral economic production, diversity in adaptation techniques becomes function of lack of market access. This requires state's attention towards these pastoral groups who have been ignored over long period of time. For a market exchange, diversity of adaptation is a function of lack of access to the market where investment is required to better connections

Panelist: Pablo Manzano Baena

Pablo Baena spoke about the various adaptation strategies used by pastoralists to address climate change. He mentioned that there are old and new or traditional and contemporary views of looking at adaptation. There are specialized strategies like mobility, pooling etc.

Important discussion points highlighted by the panelist were

- What would happen if these pastorals are removed from the system, which is highly sensitive already? There is a possibility that there can be more wild herbivores in the niche, but still this is a possibility and any affirmation about that is contingent.
- Over the long period of time, these pastorals have worked as a part of system, their absence from the landscape can have drastic results.

Panelist: Ashwini Chhatre

Ashwini Chhatre provided a case example of how agro-pastoral communities in the upper Himalayas adopt strategies to address the impacts climate variability. The pastoral system in these regions generally depends on agricultural system and vice versa (e.g. the pastoral livestock graze the farm lands and in turn give tons of manure that supports agricultural crops). The wheat for example is extremely important for pastoral food of these alpine landscapes. However, due to changing climate less and less pasture is becoming available for pastoral livestock. To address this new situation, some of the pastoralists are moving to cash crop cultivation; some are keeping lesser animals or some have completely left the pastoral activities; some have taken abandoned agricultural lands; some pastorals changed their migratory routes etc.

Important discussion points highlighted by the panelist were

- The pastoralists have seen lot of changes over time and have always adapted to the given situation but how they adapt to climate change can be interesting to understand

Panelist: Ajay Dandekar

Ajay Dandekar provided insights into the struggles of agro-pastoral communities in the Deccan Plateau due to shrinking water resources, urbanization and market factors. Agriculture is turning to be an unviable option in these areas primarily due to water stress which is also leading to increased cases of farmer suicides.

Discussion points highlighted by the panelist were

- To what extent the pastoralists have to rely on global externalities?
- The issue of urbanization which continuously shrinking the pastoral spaces and routes which further complicate their livelihood in present times.

Conference Proceedings – Day 3

On day 3, three sessions were held to synthesize – participants' reflections; participants' suggestions of future research agenda and immediate actions. An overview of these sessions is provided below.

2.10 Session 9: Synthesis

Abi Vanak and Ashwini Chhatre

Session summary:

The 'Synthesis' session is basically the reflections of participants based on the discussions over the last two days. These views are presented below as expressed by participants:

- While there is a need to engage pastoralists with the markets through creating demand for the pastoral products, the risks associated with this market exposure need to be understood as pastoralist may get sedentary and their products become the focus of their system. Then, there will be consequences of these changes on the habitat or on the ecosystem?
- Pastoralism is a marginal system and is based on mobility and is highly dynamic. Mobility allows pastoralists to use resources as per the dynamics. But now there is change in the numbers and types of livestock composition. In context [of Kutch], there has been a shift from cows to buffaloes which has an impact on the grasslands. There has been more focus on the milk products. Hence, this influences the market economy and also the ecosystem.
- Denominators are always about per hectare land or per millimeter rainfall. Denominators should also include soil nutrients and other factor as well.
- How to broaden our thinking about the entire system as a whole and not just about a component.
- There is a need to identify what do young pastoralists do after schooling? Need to examine how young pastoralists imagine the future of pastoralism. Their aspirations can be very different from our imaginations of them in future.
- There is a need to look at the present situation using an interdisciplinary approach.
- The labor coming in the pastoral mode of production and traditional pastoralists leaving this mode can also be looked positively because it is giving a scope of employment to the outsiders. For Example: In China, herders are hired from other ethnic groups. But, when people come from other groups, they do not really know much about the animal or the ecology. This could be problematic in the long run.
- The pastoralists have knowledge about their animals and animals also have knowledge about the pastures. For example, in Spiti, livestock is capable of finding grass under snow.
- There has been rising inequality within pastoral families. Earlier women used to have an important role in a pastoral household where they had control over dairy products. But now, there is a lack of women participation and is largely men-driven. Women often

complaint about shortage of dairy products for themselves because of huge market demand. This can be looked as losing assets in the larger society.

- There has been a shift to ranching. This is a spontaneous move. We must keep an open mind towards it. This could be due to cohesions or market demand.
- How do we preserve the traditional mode of production because the pastoral products come out of the cultural processes? There is a need to preserve those processes. What if they lose access to those processes? Then, the whole values or the principles changes and the outcomes are very different. We need to better understand their present state and look at the potential areas when interventions can be done. It is important to know how to build passages for the pastoral communities. There are different kinds of pastures and there is a need to identify those pastures. But how to do that? These initiatives must be supported by NGOs, not driven by NGOs.
- Pastoralism still operates and adapts to the given situations. The problem there is more focus on pastoralism than nomadism, through which the whole livelihood emerged. There are pastoral communities like Bakharwals, Changpas, etc. who rear their livestock in remote areas, which is based on nomadic activities. They sell their products to the sedentary population on their way. The mobile schools doesn't work for them because these schools do not have any surveillance and lacks basic infrastructure. The pastoralism would hardly remain in future because money and dignity are attached to it. But this requires an active intervention which could support it for further self-sustenance.
- In India, no active support exists for pastoralism (specially in Ladakh region). There has been a conflict of situation between Ladakhis and Tibetan refugees over access to the pasture. The Tibetan Changpas are getting support from the Tibetan government where the government provide education to the young pastoralists and have a provision to send them back to the pastoral economy. Whereas, the Ladakhi Changpas are considered to still have a primitive lifestyles. There are challenges like dividing families and staying differently. Better provisions are required so that they can maximize their livelihood methods. There is a lack of representation of the Changpa community in policy making, which also needs to be considered for better decision making.
- There is a need to look at land tenure or property regimes. There has been changes in access to pastures. There has been large scale fragmentations of the pastures which has an impact over ecology of the landscape. The pasture rights under Forest Rights Act are not yet recognized. There has been a huge gap in recognition of these rights. Can we use FRA to secure the land rights?
- In Banni, the breeding economy is highly ignored. There is a need to focus on breeding economy while doing any evaluation of the pastoral economy.
- The rapid industrialization continuously disturbs the traditional routes and shrinks the access. There is a need to suggest industrial groups better planning, considering the pasture use by the pastoral communities.
- There is a gap between interdisciplinary studies which includes social sciences and ecology. There is lack of funding for such research projects.

2.11 Session 10: Future research agenda

In the 'Research Horizons' sessions participants' suggestions were recorded to arrive on the priorities for future research agenda. A summary of areas/topics and their respective research questions that need to be addressed are provided in table 1

Table 1: Summary of research questions that need to be addressed.

Areas /themes	Research questions
Environmental aspect	<p>Need to study / examine</p> <ul style="list-style-type: none"> ○ the consequences to ecosystem ○ the functionality of pastoral landscape and certain corridors (which required detailed understanding), need of surveys over existing corridor models, their success and failures. ○ the issue of land degradation in context of land governance.
Economical aspect	<ul style="list-style-type: none"> ○ Research for proper economic assessments to understand pastoral contributions to the economy ○ Research to study the breeding economy. ○ Research to know more about the challenges of pastoralists' spaces and formalization of pastoral economy. ○ Need to understand the potential of endangered pastoral systems ○ Information is needed about livestock matrices.
Social aspect/welfare	<ul style="list-style-type: none"> ○ Research is needed to understand the social change among pastoralists. Social change is unavoidable among pastoralists as they are constantly exposed to development, access to education etc. ○ Researchers need to be working with pastoralists to demand from state with regard to education; social recognition etc ○ Research is needed to determine at what stage education could be introduced to young pastoralists and what comes of them etc. ○ Need to understand reasons to shift to ranching ○ Determine how various factors influence young pastoralists to discontinue pastoralism (e.g. tourism, army, and market) ○ Study on pastoral subsidies
Skill development	<ul style="list-style-type: none"> ○ How to equip pastoralists to fight for their resources and services ○ How and what type of technological interventions are appropriate for pastoral communities? ○ Does technology can provide effective solutions in providing access to education for pastoral communities? Can something be done about designing pro-pastoral policies through technology? ○ How can youth be brought in the pastoral activities with the help of technology?
Market	<ul style="list-style-type: none"> ○ Need to understand how pastoralists are engaging with markets ○ Need to understand how changing times (exposure to development) and changing practices impact pastoralists way of life ○ How to create appropriate value for pastoral products?

Mobility	<ul style="list-style-type: none"> ○ While mapping movements there are huge gaps on land access, mobility etc ○ Research to understand the traditional governance patterns ○ Need to understand how mobility allowing them to use resources ○ Detailed study is needed to understand the factors that determine Pastoralists mobility? For example pastoralists may avoid extreme cold and extreme heat. Thus pastoralists may not always be tracking greenness hence these factors should be understood
Agriculture/livelihood	<ul style="list-style-type: none"> ○ Need to assess how pastoralists contribute to the agricultural system and how it helps in reducing costs of agricultural production, retaining soil health, etc.? ○ There is also need to examine alternative livelihood options available to these pastoral communities like tourism, government jobs, etc. and needs to look at who is going out and who is coming in, how value addition takes place in the pastoral system. What are the factors for which a pastoralist goes out and for what a person comes in?
Health and Anthropological aspects	<ul style="list-style-type: none"> ○ Need to understand political tensions and boundaries among different pastoral groups. ○ Need to document ethno- medical studies/ practices; lifestyle and behavior as pastoral people are generally healthy. (The ethno- documentation of the modern pastorals can be compared with the old pastoral individuals) ○ Need to understand about diminishing health among young pastoralists (In Changthang, the old pastoral people often used to complain about the health of their children, not good as theirs)
Human rights	<ul style="list-style-type: none"> ○ The ethics of research needs to extrapolate. There is a need to clear thoughts about what, when, why and how we are researching. ○ Need to understand the application of human rights to the pastoral system
Indigenous knowledge and breeding	<ul style="list-style-type: none"> ○ Need to understand the social contexts-long term approach to conservation ○ Need to understand how traditional knowledge could be updated/integrated into mainstream knowledge system. ○ Need to preserve unique pastoral breeds and further work on genetic improvement. There is a need to record list of pashmina goats in the Ladakhi area.
Pastoral resilience capacity	<ul style="list-style-type: none"> ○ How to assess the constant change among pastoral communities and their adaptive capacities? ○ How to build adaptation capacities among pastoral groups. ○ The politics behind climate change needs to be addressed sensitively and there is a need for capacity building.

	<ul style="list-style-type: none"> ○ We should rethink about making any political changes or decisions over wastelands or rangelands. There is a need to develop strategies coherent to the social and ecological resilience of the pastoral system. ○ Need to understand the reason why a pastoralist would like to remain as a pastoralists despite the hardships pastoralism facing.
Data needs	<ul style="list-style-type: none"> ○ Need to establish right information to inform policy makers and the government? ○ Need of authentic and clear data to inform policy making?
Policy and institutions	<ul style="list-style-type: none"> ○ Need to assess the political economy
Funding	<ul style="list-style-type: none"> ○ Explore mechanisms to procure constant research funding

3.0 Future Action Plans

Following actions plans were decided during the concluding session of the conference.

- To design an action plan for the extension of already existing work
- To form a working group (work force) to carry forward and keep the momentum
- To establish of a center that is responsible for pastoral eco systems research on issues such as land use, education and value change. Also the Center could broadcast the information to the larger audience.
- To establish data base for anthropological, political, economic, legal, institutional etc issues and provide access to researchers and lobbies who could rightfully use it.
- To establish a common network for Indian pastoralism (similar to LIFE Network)
- To develop a proposal for funding
- To create new funding agencies which can be both bilateral and multilateral.
- To Plan on how to approach funding agencies
- To develop a digital atlas/field guide
- To initiate a system for constant review and follow up
- To establish a process to involve young scholars
- Sahjeevan needs to extend its programs to reach out pastoralists outside Gujrat and initiate talks with government.
- To establish a system of accountability where relative lenses can be used to look at history, taxonomy and utility.
- To identify corridors for pastoral communities and wildlife.
- Need to address three questions about new set of resources- 1. Large scale transportation, 2. Strengthening resilience and capacity, 3. Existing conditions of pastures and how to prevent their degradation.

APPENDICES

APPENDIX A: Programme Schedule

DAY 1 : 8 DECEMBER 2016, THURSDAY		
TIME	PROGRAMME	PANELISTS
8:00 – 9:00	REGISTRATION	
9:00 – 9:10	WELCOME ADDRESS	SANDEEP VIRMANI, FOUNDER TRUSTEE, SAHJEEVAN
9:10 – 9:20	INTRODUCTION TO THE CONFERENCE	ASHWINI CHHATRE
9:20 – 9:30	INAUGURAL ADDRESS	REHMAN, DEPUTY DIRECTOR GENERAL-ICAR
9:30 – 11:00	Session 1: CONTRIBUTIONS OF PASTORALISM TO THE ECONOMY KEYNOTE SPEAKER: ROY BEHNKE	1) HIMANSHU UPADHYAY 2) NITYA GHOTGE 3) RIDHIMA GUPTA
11:00-11:30	COFFEE BREAK	
11:30 -13:00	Session 2: INDIGENOUS KNOWLEDGE AND BREEDING SYSTEM KEYNOTE SPEAKER: ILSE KOHLER-ROLLEFSON	1) CHANDA NIMBKAR 2) D. K. SADANA 3) KARTHIKEYA SIVSENPATY
13:00 – 14:00	LUNCH TIME	
14:00 –15:30	Session 3: TECHNOLOGY AND PASTORALISM KEYNOTE SPEAKER: CED HESSE	1) RAHUL GHAI 2) MATTHIEU SALPETEUR 3) MONIKA AGARWAL
15:30-16:00	COFFEE BREAK	
16:00 – 17:30	Session 4: ECOLOGICAL DYNAMICS OF GRASSLANDS KEYNOTE SPEAKER: JAYASHREE RATNAM	1) ABI VANAK 2) SUMANTA BAGCHI 3) ANKILA HIREMATH
19:30-22:00	CONFERENCE DINNER	

DAY 2 : 9 DECEMBER 2016, FRIDAY		
TIME	PROGRAMME	PANELISTS
9:00 – 11:00	Session 5: PAPER PRESENTATIONS CHAIR: AJAY DANDEKAR	1) OVEE THORAT 2) CHANDRIMA HOME 3) RASHMI SINGH 4) IRAVATHY MAJGAONKAR 5) MIHIR MATHUR & KABIR SHARMA
11:00 – 11:30	COFFEE BREAK	
11:30 – 13:00	Session 6: ENGAGEMENTS WITH THE STATE KEYNOTE SPEAKER: CAROLINE DYER	1) ANITA SHARMA 2) FARHANA IBRAHIM 3) PIERRE-ALEXANDRE PAQUET
13:00 – 14:00	LUNCH TIME	
14:00 - 15:30	Session 7: ENGAGEMENTS WITH MARKETS KEYNOTE SPEAKER: CAROL KERVEN	1) MONISHA AHMED 2) SABYASACHI DAS 3) SIDDHARTHA KRISHNAN
15:30 – 16:00	COFFEE BREAK	
16:00 -18:00	Session 8: PASTORALISM AND CLIMATE CHANGE KEYNOTE SPEAKER: ARUN AGRAWAL	1) PABLO MANZANO BAENA 2) ASHWINI CHHATRE 3) AJAY DANDEKAR

DAY 3 : 10 DECEMBER 2016, SATURDAY

TIME	PROGRAMME	PANELIST
9:30 – 11:00	Session 9: SYNTHESIS	ABI VANAK & ASHWINI CHHATRE
11:00 – 11:30	COFFEE BREAK	
11:30 – 13:00	Session 10: RESEARCH HORIZONS CHAIR: ARUN AGRAWAL	1) PABLO MANZANO 2) SUMANTA BAGCHI 3) CHANDA NIMBKAR 4) PIERRE-ALEXANDRE PAQUET 5) TANUJA KOTHIYAL
13:00 – 14:00	LUNCH TIME	
14:00 - 14:30	SUMMARY OF RESEARCH DIRECTIONS AND CONCLUDING REMARKS	

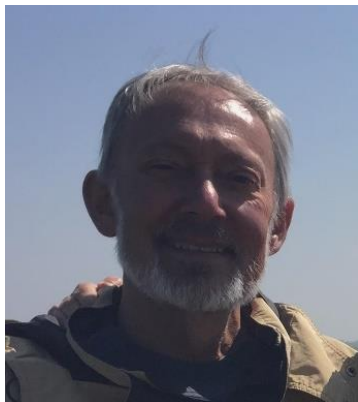
APENDIX B: Keynote Speakers

Arun Agrawal, Associate Professor, University of Michigan, USA



Arun Agrawal is a Professor at the School of Natural Resources & Environment at the University of Michigan. His research and teaching emphasize the politics of international development, institutional change, and environmental conservation. He has written critically on indigenous knowledge, community-based conservation, common property, population and resources, and environmental identities. His recent interests include adaptation to climate change, urban adaptation, REDD+, and the decentralization of environmental governance. He coordinates the International Forestry Resources and Institutions network, and is currently carrying out research in central and east Africa and South Asia. He is the author of *Greener Pastures* and *Environmentality*, and his recent work has appeared in *Science*, *PNAS*, *Conservation Biology*, *World Development*, and *Development and Change* among other journals.

Roy Behnke, Odessa Centre, UK



Roy Behnke was trained in Arabic studies and social anthropology at the Universities of Chicago and California, and has worked on problems of extensive livestock production and rangeland management and tenure for over 30 years. He has served as a civil servant in three African governments, as a free-lance consultant to international donor agencies, and as a research scientist. In addition to short-term assignments, he has lived and worked for extended periods in Turkmenistan, Kazakhstan, Libya, Iraq, Sudan, Somalia, Zambia, Namibia and Botswana. He is currently co-editor of the journal *Pastoralism – research policy and practice*, co-director of a consulting firm specializing in pastoral development and natural resource management, and a Research Fellow of Imperial College London.

Caroline Dyer, university of Leeds, UK



Caroline Dyer is Professor of Education and International Development at the University of Leeds, UK. Caroline works on education inclusion and social justice, and much of her research focuses on mobile groups' experiences of Education For All. Caroline has migrated with pastoralists in western India and examined the dynamics of their education inclusion there, as well as in Afghanistan, Kenya and Ethiopia.

At present, Caroline co-leads the British Academy-funded Reading to Learn network which has partners in the UK, South Africa, Kenya and Uganda. She is Co-Director of the Leeds University Centre for Global Development and past Chair of the British Association for International and Comparative Education.

Ced Hesse, International Institute for Environment and Development, UK



Formerly the director of IIED's Drylands programme, Ced is now the principal researcher on Drylands within the Climate Change Group of the International Institute for Environment and Development work. In this capacity I'm currently responsible for a portfolio of research and capacity-building work on climate resilience, productivity and equity in the drylands of Kenya, Mali, Senegal and Tanzania. Working with local and national government institutions, universities and civil society, the work focuses on mainstreaming climate in development planning, conducting research on the total economic value of dryland livelihoods and trainings on the dynamics of dryland ecosystems, economies and institutions. For more information see: <http://www.iied.org/drylands-buildingclimate-resilience-productivity-equity>

Carol Kerven, Odessa Centre, UK



Trained as a social anthropologist at Sussex University UK and University of Toronto (Ph.D. 1977). Carol has worked for thirty five years as an applied research anthropologist in agricultural and livestock development, first in Africa and the past twenty years in the rangelands of former Soviet Central Asia. She has concentrated on market development of pastoral products of milk, meat and animal fibres.

Carol has worked as a short-term consultant and on long-term assignments with governments, international donor agencies, NGOs, private consulting firms and research institutes. Editor of "Nomadic Peoples Journal" 2004-2009, she is the co-founder and Editor-in-Chief of the SpringerOpen peer-reviewed journal "*Pastoralism: Research, Policy and Practice*".

Ilse Kohler Rollefson, League for Pastoral Peoples, India



Ilse Köhler-Rollefson is currently Coordinator of the League for Pastoral Peoples and Endogenous Livestock Development (LPP) and the global LIFE Network. The LPP supports socially and ecologically sustainable livestock development and believes in participatory, bottom-up processes in which livestock keepers have a voice.

With a background in veterinary medicine and anthropology, Ilse has done extensive fieldwork among pastoralists in many countries and is a co-founder of LPP. She coordinated the inputs of livestock keepers to the "Interlaken Process" that resulted in the Declaration on Livestock Keepers' Rights and currently backstops communities in India to develop Biocultural Community Protocols (BCPs).

Dr. Köhler-Rollefson has authored more than 100 scientific publications around sustainable livestock development, especially on animal genetic resource management. She is the recipient of various awards, including an associate Rolex Award for Enterprise in 2002, and the Marwar Rattan Award by the Maharajah of Jodhpur in 2014 for her efforts in saving Rajasthan's biocultural heritage. She blogs about issues in the livestock sector at www.ilse-koehler-rollefson.com and her book "Camel Karma. Twenty years among India's Camel Nomads", addressed to a popular audience was recently published in India. For more information see www.ilse-koehler-rollefson.com/?page_id=640

Jayashree Ratnam, National Centre for Biological Sciences, India



Jayashree Ratnam is community and ecosystems ecologist. Her past research has focused on drivers of vegetation and nutrient dynamics in African savannas, and cross-continental comparisons of savanna structure and function. She is now working on the under-recognized savanna ecosystems of South Asia with a focus on understanding their history and management, the dynamics of savanna- forest transitions, the roles of fire, drought and herbivores in driving plant traits in these ecosystems, and on their potential responses to ongoing and future climate change. Her work has appeared in well-regarded journals including Philosophical Transactions of the Royal Society, Global Ecology & Biogeography, Nature, Science, Ecology Letters etc.

After she earned her PhD in Biology from Syracuse University USA in 2002, she worked as a Research scientist at the Natural Resources Ecology Laboratory in Colorado, USA and a Research Fellow at the Earth and Biosphere Institute, University of Leeds, UK. She joined the National Center for Biological Sciences, Bangalore, India as a Research Fellow in 2009 and has served as Associate Director of its Wildlife Biology and Conservation Program since 2014.

APPENDIX C: Biographies of Panelists

MONIKA AGARWAL, Independent Researcher, New Delhi

Monika Agarwal is a researcher, an activist and an adventurer who is motivated by her fascination of, and respect for, pastoralism. Since 2002, Monika has been engaging in various national, regional and global alliances on pastoralism and land. Currently, she has taken a break from work to travel across India to live with different pastoralist communities.

MONISHA AHMED, Ladakh Arts and Media Organisation, Ladakh

Monisha Ahmed is an independent researcher whose work focuses on art practices and material culture in Ladakh. She first went to the nomads of Ladakh in 1990 as part of her doctoral degree from Oxford University, and developed this into the book *Living fabric – Weaving among the Nomads of Ladakh Himalaya* (2002). She has published several articles on textile arts of the Himalayan World as well as other areas, more recently a chapter on textiles for *The Arts and Interiors of Rashtrapati Bhavan – Lutyens and Beyond* (2016). She co-edited *Ladakh – Culture at the Crossroads* (2005) and collaborated on *Pashmina – The Kashmir Shawl and Beyond* (2009). Formerly Associate Editor of *Marg*, she is co-founder and Executive Director of the Ladakh Arts and Media Organisation, Leh.

PABLO MANZANO BAENA, IUCN Commission for Ecosystem Management, Kenya

Pablo Manzano is a PhD in Rangeland Ecology with 15 years' experience in pastoralism. Starting with ecological research in Spain, he expanded his interests into social, legal and economic issues on the matter, first by collaborating with NGOs and the government locally, and later working on rural sustainable development issues among pastoralist communities in Bosnia and Herzegovina. For the last six years he has gathered global experience, first as Global Coordinator of the World Initiative for Sustainable Pastoralism at IUCN in Kenya, and later as Coordinator of the Pastoralist Knowledge Hub at FAO in Italy. He currently works from Nairobi as an international consultant on livestock development and conservation issues, and also supports pastoralist networks in developing effective advocacy strategies.

SUMANTA BAGCHI, Indian Institute of Science, Bangalore,

Sumanta Bagchi is an assistant professor at the centre for Ecological Sciences of the Indian Institute of Science, Bangalore, India. His research interests include Ecosystem function and services, Biodiversity and Global change, Coupled human-natural ecosystems, Plant-herbivore interactions, Wildlife conservation. Sumanta has a Doctoral degree from the Syracuse University, USA

ASHWINI CHHATRE, Indian School of Business, Hyderabad

Ashwini Chhatre is a faculty at the Indian School of Business, Hyderabad, India. His research investigates the intersections of democracy with environment and development, with a more recent focus on rural livelihood dynamics in rainfed systems across different agro-ecological and socio-political contexts. He has published articles in prestigious journals including *Science*, *PNAS*, *Annual Review of Environment and Resources*, *Conservation Biology*, *World Development* etc. His previous works focused on local communities and social movements on democratic governance of natural resources in India. He was the Post-doctoral Fellow (Sustainability Science) at Harvard University (2007), and has been serving as a faculty at the University of Illinois at Urbana-Champaign since 2007. Ashwini has a Ph.D. in Political Science from Duke University, USA.

AJAY DANDEKAR, Shiv Nadar University, Tehsil Dadri

Ajay Dandekar is the Director of the School of Humanities and Social Sciences (SHSS) and Center for Public Affairs and Critical Theory (C-PACT), Shiv Nadar University, India. His research interests are in the areas of Pastoral Nomadism Tribes, Regions Governance, Central India Agrarian Crisis Denotified Tribe. He has authored several books and journal articles related to pastoralism.

He has previously worked as professor at Central University of Gujarat, Gandhinagar|Institute of Rural Management Anand; ICT Agriculture and Rural Development Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinaga; Tata Institute of Social Sciences, Rural Campus, Tuljapur. He holds a PhD in Pastoralism from the Centre for Historical Studies, Jawaharlal Nehru University, New Delhi

SABYASACHI DAS, Revitalizing Rainfed Agriculture Network (RRAN), Secanderabad

Sabyasachi Das, after completing his PhD on Van Gujjar, a Pastoral community in Himalayan region, has been working with various pastoral communities in the country. He has been instrumental in organizing Cattle and Buffalo Pastoralists in Banni, camel pastoralist in Kachchh and contributed in registration of indigenous livestock breeds, namely, Banni Buffalo and Kharai Camel. Currently he is leading Livestock programme with Revitalizing Rainfed Agriculture(RRA) Network which works in 7 states in 8 locations in the country. He is based in Hyderabad with WASSAN and engaged in designing programmes on Extensive Livestock System including Pastoral Production system and associated with policy dialogues on this agenda.

NITYA GHOTGE, Anthra, Pune

Nitya Ghotge is founder Director of Antra – an organisation that works on livestock development. Trained as a veterinarian, Nitya has been working on issues related to development and the environment since 1986 Her work includes research, training and policy advocacy on different aspects of livestock development especially on systems of health care as well as planning for gender sensitive and sustainable ways of farming and livestock rearing . A special focus for her now is pastoral and nomadic communities and the animals they rear. She has significant publications on the themes of livestock development, bio diversity and systems of veterinary medicine. She is the author of the book "Livestock and Livelihoods: The Indian Context.

RAHUL GHAI, Independent researcher and consultant, Ahmadabad.

Rahul Ghai is an independent consultant working in the fields of rural development and pastoralism. Rahul has dedicated more than two decades of his life to work with rural communities particularly pastoralists, small farmers and craftspeople in western Rajasthan addressing the issues of food, fodder, water security and improved quality of life. Over the past decade, he has also been working with hereditary sufi musicians of pastoralists for contributing to reinvigorate sufi music traditions in Thar (The Great Indian Desert), India. His current research interests focus on understanding culture and development from the perspective of marginal communities and multiple dimensions of human condition in the rapidly expanding rural urban continuum. Rahul Ghai has previously worked as an associate professor at Indian Institute of Health Management University, Jaipur.

RIDHIMA GUPTA, Indian School of Business, Hyderabad

Ridhima is a post-doctoral fellow in Economics at the Indian School of Business, Hyderabad with primary research interests including environmental economics and agricultural economics. Her current work involves analyzing emissions from the agriculture sector in India with possibilities of its mitigation. She received a PhD. in Economics from the Indian Statistical Institute, Delhi.

ANKILA HIREMATH, Ashoka Trust for Research in Ecology and Environment, New Delhi

Ankila Hiremath is a fellow at the Ashoka Trust for Research in Ecology and Environment, Bangalore, India. She is interested in invasive species, fire, and restoration, in the context of social-ecological systems, and currently works in the Prosopis-invaded Banni grasslands of Kutch, Gujarat. She has a Masters degree in environmental science from Jawaharlal Nehru University, New Delhi, and a Doctoral degree in botany (ecology) from the University of Florida, Gainesville, USA.

CHANDRIMA HOME, Ashoka Trust for Research in Ecology and the Environment, Bangalore

Chandrima Home is a Doctoral candidate at the Ashoka Trust for Research in Ecology and the Environment. After her Masters in Wildlife Science at Wildlife Institute of India, Dehradun, she briefly worked as research trainee at the National Centre for Biological Sciences (NCBS), Bangalore. Chandrima's doctoral research aims at understanding the ecological and social dimensions of threat by free-ranging dogs merging into the overarching theme of how humans impact the trophic relationships through anthropogenic subsidies and the subsequent repercussions on socio-ecological linkages within the environment

FARHANA IBRAHIM, Indian Institute of Technology, New Delhi

Farhana Ibrahim is an Associate Professor at the Dept. of Humanities and Social Sciences, Indian Institute of Technology, New Delhi. Her research interests include the study of borders, migration and ethnographic perspectives on the state. Her book, 'Settlers, Saints, and Sovereigns: An Ethnography of State Formation in Western India' is based on ethnographic research among Muslim pastoral communities along the Kutch - Sindh border, Gujrat. She is currently co-editing a special issue of the Economic and Political Weekly on borderlands, and is working on a book manuscript on history of cross border marriage migration in Kutch. Farhana has previously worked at National University of Singapore and Tata Institute of Social Sciences (TISS), Mumbai, India. Farhana has a doctoral degree from Cornell University, USA

TANUJA KOTHIYAL, Ambedkar University, New Delhi

Tanuja Kothiyal is a faculty at the School of Liberal Studies, Ambedkar University and Fellow at the Nehru Memorial Museum and Library, New Delhi. Her current research aims at exploring seventeenth and eighteenth century textual traditions in Rajasthan, and their subsequent lives in writings of colonial historians, as well as Indian historians of 'Rajputana'. Tanuja has a Doctoral degree from the Jawaharlal Nehru University, New Delhi. Her first monograph *Nomadic Narratives: A History of Mobility and Identity in the Great Indian Desert*, has been published by Cambridge University Press (2016), India. Her work explores the Thar Desert in India and Pakistan as historical, political, social and cultural frontier. Her recent publications explore networks of circulation through studies of markets, military labour flow and marriage alliances in the Thar desert.

SIDDHARTHA KRISHNAN, Ashoka Trust for Research in Ecology and Environment, Bangalore

Siddhartha Krishnan is a Fellow at the Ashoka Trust for Research in Ecology and Environment, Bangalore. A sociologist by training, Siddhartha (Sidd) Krishnan's disciplinary and conceptual interests are in historicizing environmental sociology and sociologizing environmental history. Methodologically, Sidd combines field and archival work. He collects field and archival data to address questions pertaining to pastoral landscape and lifestyle transformations; human capabilities and ecosystems services; environmental justice; and modernity and development questions as they pertain to food, pesticide use and human health. He was Carson Fellow (2012-2013) at the Ludwig-Maximilians University, Munich. Since April 2015, he is member of the Executive Committee of the Carson Society of Fellows. Sidd is a Board member of the International Consortium of Environmental History Organizations.

IRAVATEE MAJGAONKAR, Centre for Wildlife Studies, Bangalore

Iravatee Majgaonkar is a conservation biologist at the Centre for Wildlife Studies Bangalore. She has an undergrad degree in biological sciences from St. Xaviers, Bombay (2012) and Masters degree in Wildlife biology and Conservation (2012-2014) from the National Centre for Biological Sciences, Bangalore (under the Wildlife Conservation Society (WCS)-INDIA program). After her graduation, She joined WCS-India on a collaborative project with Pune Wildlife Division (Maharashtra Forest Department) to work on large carnivore distribution and to study the relations between pastoral communities, carnivores and the Forest department in Indapur, Pune district. Iravatee's research focuses on people-wildlife relations in dry grasslands in Maharashtra. Her current research aims to understand how wolves use the landscape and how they interact with people primarily in terms of quantifying livestock loss in Koppal district of northern Karnataka, India

MIHIR MATHUR, The Energy and Resources Institute, New Delhi

Mihir Mathur is an interdisciplinary researcher who has more than seven years of experience working on climate change and development projects. He currently works at The Energy and Resources Institute (TERI) in New Delhi. He has and continues to teach systems thinking and system dynamics to Masters students as a visiting faculty. Some of his recent work includes system dynamics modeling for urbanization, grassland degradation and resource economics, evaluating climate services in India and climate risk assessment of Oil & Gas sector. Prior to TERI, Mihir did action research on local economics, climate impact assessment, livelihood resilience, and alternative energy with village communities in Maharashtra at Watershed Organisation Trust. He has previously worked in stock markets, commodity markets and retail banking.

CHANDA NIMBKAR, Nimbkar Agricultural Research Institute, Phaltan

Chanda Nimbkar is the Director of Animal Husbandry Division, Nimbkar Agricultural Research Institute (NARI), Phaltan, India. Her areas of expertise include Animal breeding, applied research in quantitative genetics; Research planning and management and assessment of utility of research to farmers. Her special interest is in devising village-based genetic improvement schemes for goats and sheep". Dr. Nimbkar serves as a member of the Board of Trustees of the International Livestock Research Institute, Kenya since 2015. Dr. Nimbkar has a Doctoral degree from the University of New England, NSW, Australia and a Master s degree in Animal Breeding from the University of Edinburgh, U.K.

PIERRE-ALEXANDRE PAQUET, McGill University, Montreal

Pierre-Alexandre Paquet is a doctoral candidate at McGill University, Canada. Based on one year of intensive ethnographic fieldwork among both forest-dwelling and settled Van Gujjars communities in Uttar Pradesh and Uttarakhand states of India, his doctoral research provides a detailed genealogical account of the construction of rehabilitation at the intersection of community mobilization and state-making. Pierre-Alexandre has previously worked as research assistant at Université Laval, Canada. He has a Master s degree in Anthropology from Université Laval, Ca

D. K. SADANA, Indigenous Livestock Society – India, Karnal

Dr D. K. Sadana worked in Animal Genetics & Breeding and specialized in Animal Genetic Resources of India. He served as ICAR Scientist at the National Dairy Research Institute and then at the ICAR-National Bureau of Animal Genetic Resources, Karnal. His research areas centered around India's indigenous breeds of livestock, especially cattle. He worked on Characterization and Conservation of local breeds and engaged himself with NGOs working on local livelihoods and also formed Breed Societies. He

retired from ICAR in December, 2014. Presently he is working as Secretary of the Indigenous Livestock Society-India and is engaged in raising awareness about importance and utilization of local cattle breeds

MATTHIEU SALPETEUR, Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier

Matthieu Salpeteur (PhD in anthropology) is currently a Marie Skłodowska-Curie fellow at the Centre d'Écologie Fonctionnelle et Évolutive (Montpellier, France). His research aims at understanding how social and ecological dynamics go intertwined at different spatial and temporal scales to create the world we observe around us. Since 2012 he is working with the Rabari pastoralists from Kutch (Gujarat, India) to study the ways they cope with the wide array of changes that affect their livelihood. He has specifically been working on the dynamics of Traditional ecological knowledge (TEK) related to pastoral occupation, the adaptive strategies implemented to maintain access to pastures, and the evolution of mobility patterns during migration.

ANITA SHARMA, Delhi University, New Delhi

Anita Sharma submitted a PhD thesis on the nomad and the state in Kashmir at the Department of Sociology, Delhi university. She was a visiting Commonwealth scholar at the University of Sussex, Centre of International Education, and has an MSc in Social Anthropology, Oxford University. She has published *South Asian Nomads - A Literature Review*, for the Consortium for Research on Educational Access, Transitions and Equity, University of Sussex. She is the author of *The Bakkarwals of Jammu and Kashmir — Navigating Through Nomadism*, shortlisted for the Crossword Non-Fiction Award 2009. She was guest lecturer at her department in Delhi university, and is working on converting her thesis into a book. Her research interests are social theory, nomadism, education, Bakkarwals of Jammu and Kashmir, tribes, minor, margin, frontier, borders, state, militarisation and development, and the anthropology of everyday life and the normal.

KABIR SHARMA, The Energy and Resources Institute, New Delhi

Kabir Sharma is a researcher interested in social-ecological systems, energy and climate change adaptation, currently employed in the modeling area in TERI. His recent work includes system dynamics modeling for grassland degradation in Banni (Kutch), urbanization, and resource economics, a study on climate change mitigation and adaptation in Andhra Pradesh, energy modeling studies on low carbon pathways and analyzing the energy-water nexus. Prior to TERI, Kabirhas worked at the French Atomic Energy Commission, and on grassroots projects relating to education and accountability of governance. He has a background in physics.

RASHMI SINGH, Ambedkar University, New Delhi

Rashmi Singh is a PhD scholar at School of Human Ecology, Ambedkar University Delhi. Her doctoral research examines the socio-ecological dynamics of a grazing ban policy in West Sikkim, India. She has a Master's degree in Environment and Development (2013). For her Master's dissertation she worked with the high altitude program of Nature Conservation Foundation to examine the traditional management of rangelands by the local communities in the backdrop of a changing socio-economic scenario in Spiti Valley, Himachal Pradesh. Thereafter she worked as a consultant to examine the relationship between people and elephants in the Valparai Plateau. Rashmi's research interest lies in understanding the issues of resource management and nature conservation in the mountain societies using ethnographic, historical and political-ecology approaches

KARTHIKEYA SIVASENAPATHY, Senaapathy Kangayam Cattle Research Foundation, Coimbatore

Karthikeya Sivasenapathy is a conservation biologist, an agriculturist and the managing trustee of Senaapathy Kangayam Cattle Research Foundation, Kuttapalayam, Tamilnadu - an organization working

to conserve Cattle breed of Tamilnadu. He is also member of several institutions including Core group of National Biodiversity Authority, Government of India, Board of Management of Tamilnadu Agricultural University etc. He represented India in several United Nations conferences namely UN Convention on Biological diversity, Japan (2010); UN Food and Agriculture Organization, Kenya (2013); UNEP–Kenya (2013). Karthikeya has organized extensive awareness programmes across Tamil Nadu and in neighboring states including several state level workshops, exhibitions, stakeholder consultations, farmers training programmes, seminars etc - all aimed at creating awareness on cattle breeding and conservation and livestock management.

OVEE THORAT, Ashoka Trust for Research in Ecology and the Environment, Bangalore

Ovee Thorat is a PhD candidate at Ashoka Trust for Research in Ecology and the Environment, Bangalore. Her doctoral research is aimed at identifying the drivers and outcomes of landscape change under development interventions in the arid grasslands of Banni, Kachchh, Gujarat. Ovee's research interests include understanding the process of change in human-nature relationships by utilizing interdisciplinary approach and the framework of Political Ecology. She holds Master's degree in Zoology from the University of Mumbai.

HIMANSHU UPADHYAY, Azim Premji University, Bangalore

Himanshu works as asst professor at School of Development, Azim Premji University, Bengaluru. Himanshu's doctoral research in Science Policy from JNU, looks at the relationship between crop cultivation and cattle rearing in late colonial and post-colonial India. He has previously worked as an environmental activist and researcher. Since 2002, when he shifted from academic research to environmental activism and advocacy, he has studied social and ecological issues around large irrigation dams, hydropower and mining projects, ecological impacts and governance, public finance and accountability. He did his M.A. in Linguistics from JNU and M. Phil. in Linguistics from University of Hyderabad.

ABI TAMIM VANAK, Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore

Abi Vanak is a Fellow at the Centre for Biodiversity and Conservation, The Ashoka Trust for Research in Ecology and the Environment (ATREE) Bangalore. His research interest focuses on the conservation of species, landscapes and biodiversity in arid and semi-arid savanna grasslands and also in human-modified and human-dominated landscapes. Much of his work involves studying the movement responses of animals to changing environments.

APPENDIX D: Conference Abstracts

Chandrima Home, Ashoka Trust for Research in Ecology and the Environment, India

Linkages in Transition: Changing face of agro-pastoralism in the Upper Spiti Landscape, Himachal Pradesh, India

The cold deserts of the Trans-Himalayas have supported traditional agro-pastoral systems for millennia. In the last two decades however, rapid socio-economic changes have resulted in an unexpected threat to this lifestyle. Increased subsidy from tourism derived human sources have facilitated an increase in the domestic dog population over a decade, emerging as an important threat to the livestock of the region. We conducted 257 semistructured interviews across 27 villages in the Upper Spiti landscape of Himachal Pradesh. We found that 72% of the respondents reported a decrease in livestock abundance in the last 10 years, with half the number currently having no small-bodied livestock. However, for 40% of these respondents, this change occurred only in the last five years. Most of this decrease in small livestock holding has been attributed to dog depredation, challenges in herding and problem of fodder availability. Dogs, were responsible for as many livestock losses as wild predators. Traditionally, manure from small livestock was an important source of organic fertilizer for the agro-pastoralists, but 42% of the respondents did not want to maintain small bodied livestock in the near future. Instead, 44% of the respondents admitted to procuring manure for agriculture from multiple sources. These changing practices in the landscape are a manifestation of economic, social as well as ecological shifts. Though cash crop drives agro-economy, livestock manure forms a substantial source of agricultural inputs. With domestic dogs being responsible for most of the livestock losses, there are chances of disruption in these linkages, early signs of which are already visible.

Iravatee Majgaonkar, Centre for Wildlife Studies, India

Will compensation for damage from wildlife always work? : The case of the pastoral communities in western Maharashtra

Dry grasslands in western Maharashtra have historically supported nomadic and semi-nomadic livestock rearing livelihoods. Conflicting interests between the State Forest department and the pastoral communities over access to grazing lands has its roots in the functioning of imperial administration, where pasture lands which could not generate revenue were associated with wasteful activities like grazing. In western Maharashtra, pasture land under the State Forest Department has been appropriated by conversion to mono-culture plantations since the 1970s and still continues to be so. Pastoral communities which have traditionally been using these lands have since then been pushed to find their way around this inaccessible resource. We explored links between the Forest department's policies and the interests of shepherds in the landscape to assess its relevance for our primary research interest which is that of carnivore conservation outside protected areas. For this purpose, we conducted open ended interviews with semi-nomadic agro-pastoralists in the Indapur taluka of Pune district from the period December 2015 to March 2016, under a snow-ball sampling scheme. Our work shows that interactions between the two parties over access to grazing lands is connected to a seemingly irrelevant aspect viz., state sponsored compensation schemes offered for damage due to wildlife. The response of pastoral communities to availing monetary compensation for livestock loss by wolves was influenced by their interactions with the Forest department with respect to access to fodder and water. The study sheds light on the unapparent links between wildlife conservation and underlying socio-political setups in the pastoral system.

Mihir Mathur, Kabir Sharma, The Energy and Resources Institute, India

Modeling Economics of Grassland Degradation of Banni using System Dynamics

This study is on the interactions between the grassland, livestock, *Prosopis juliflora* and the economy of the Banni grasslands located in the district of Kachchh, Gujarat. The study focuses on modeling grassland degradation of Banni from 1992-2014 and simulates future scenarios up to 2030 using system dynamics modeling. An economic valuation of Banni's economy is done by discounting the future earnings of the pastoral economy (milk, livestock sale, dung manure) and the charcoal economy under two scenarios 1) Base case (Business as Usual), i.e. keeping things as they stand today and 2) *Prosopis* Removal Policy (PRP) scenario i.e. where a decision is implemented to remove *Prosopis* from Banni. The modeling results indicate that Banni grassland is headed for severe fodder scarcity due to shrinking area under grassland under BAU scenario. If PRP is implemented then Banni would be able to revive its grasslands and the Present Value of future earnings (pastoral and charcoal), upto 2030, goes up by 2 times. If the policy decision to remove *Prosopis* is delayed by 5 years then it results into a 50% reduction in earnings indicating the policy's time sensitivity. The model serves as a test bed to evaluate management policies of Banni grasslands.

Rashmi Singh, Ambedkar University Delhi, India

Transformation of an agro-pastoral system: A case study from Upper Spiti landscape, Himachal Pradesh

Recent discourses on pastoralism focus on adaptations made by pastoral communities in response to climate change in the entire Trans-Himalaya. In last three decades, developmental interventions and market connectivity have drastically altered livelihoods and thus human-environment relationships. On the contrary, climate change has also been economically beneficial in parts of Indian Himalayas where increase in temperatures has made some regions suitable for cash cropping. Our study based on ethnographic research in five villages of the Spiti region in North-West Indian Himalayas investigates the quick transition in agro-pastoral community largely driven by success of experimental cropping of green pea and apples. This one major change i) shifted self-sufficient barter based economy to market driven economy, ii) altered agricultural practices and food habits, iii) resulted in decline of livestock numbers where reduced holdings are compositionally different, iv) ensued entry of seasonal laborers from plains who have become the new actors in pasture management and, v) caused loss of cultural practices like weaving, monastery tax in form of traditional crop barley etc. We argue that the present day discourses in ecological studies of pastoral systems should also engage with these socio-ecological dynamics that have implications on agricultural productivity, rangeland vegetation and wildlife conservation.

Ovee Thorat, Ashoka Trust for Research in Ecology and the Environment, India

Reshaping of the landscape and identities in Banni Grasslands, Kachchh

Grasslands used by pastoral communities for open range grazing contain dynamic ecological and land use patterns. However, development interventions often focus on specific aspects of the larger system. This leads to reshaping of the landscape in which the most powerful actors control the access to resources and determine the kind of management to be followed. This study examined landscape change under development interventions in Banni grasslands of Kachchh, Gujarat. Under interventions that focused on increasing productivity and market integration, the people-grassland relationship in Banni transformed to give rise to a new space that depends on external inputs. In the process, boundaries and fences denoting specific land use practices have been created continuously. We identify the drivers and consequences of the compartmentalisation of Banni. Using ethnography, vegetation surveys and mapping, we show that pastoral identity and the landscape get reshaped at each major development intervention, whether State or NGO led. We also show that certain practices and communities are excluded from the landscape during new management articulations and regimes. The current political economic context encourages people to seek land ownership and market access. With the State focusing on tourism and industrial growth, resulting employment and revenue generation obscures issues such as inequality and environmental problems. Although the initial interventions were State-led, NGOs now play a significant role in determining landscape change in Banni. NGOs and conservation groups should take into account the heterogeneity and inequality of access and power within the Banni while arguing for a landscape level approach

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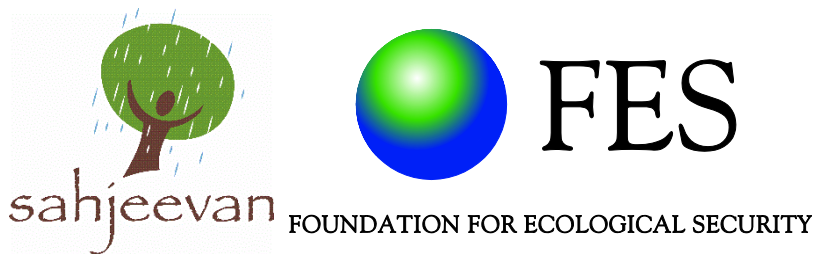
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APPENDIX G: Organisers and Funding Partners

Organisers



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