

Common Land & Poor Livestock Keepers

Experiences from Common Land Development in the States of Rajasthan & Madhya Pradesh in India

PREPARED BY

Foundation for Ecological Security

IN COLLABORATION WITH

BAIF Development Research Foundation

and

Gujarat Institute of Development Research

SOUTH ASIA

Pro Poor Livestock Policy Programme

A joint initiative of NDDB and FAO

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Small and marginal farmers constitute about 78% of the farming community in India and own close to 70% of the livestock. With very low land holdings, these farmers have traditionally relied on the Common lands for meeting a significant portion of the fodder requirements of their livestock. The degree of accessibility and the good condition of the Commons are thus important factors in deciding how to make livestock-based livelihoods effective.

The study *Common Land and Poor Livestock-keepers: Experiences from Common Land Development in Rajasthan and Madhya Pradesh* has emerged from the need to evaluate the role of the Commons in rural livelihoods and their diverse environmental functions; and more specifically, to understand the benefits of Common land development to poor livestock-keepers. The work of two organisations, namely Foundation for Ecological Security (FES) and BAIF Research Foundation, forms the background to this study. These organisations have been working for the restoration of Commons, by highlighting its diverse roles in sustaining the livelihoods of the Commons-dependent populace.

A representative sample of villages across the States of Rajasthan and Madhya Pradesh in India with different time-periods of engagement with governance of the Commons, different topography and agro-climatic features, diverse social-cultural contexts and institutional arrangements for governing Common Property Resources were selected for the study. These villages are inhabited by communities who depend primarily on agriculture and livestock for their livelihood.

The study provides facts and figures to help evaluate the dependence of livestock-keepers on the Commons for feed and fodder and estimate the monetary value. It also provides relevant facts and figures for understanding the qualitative and quantitative growth of foliage on the Commons and their potential in different agro-

eco regions. The study investigates changes in land use patterns in a watershed and their impact on improving the status of nutrients and water through analysing data collected over a period of time.

The study also examines the diverse institutional arrangements for the management of different categories of Common lands that are being established across project villages by the two facilitating organisations. It details the rules and regulations that have been developed at the village level for governance and equitable sharing of benefits arising from the work on Commons.

1.1 COMMONS IN INDIA

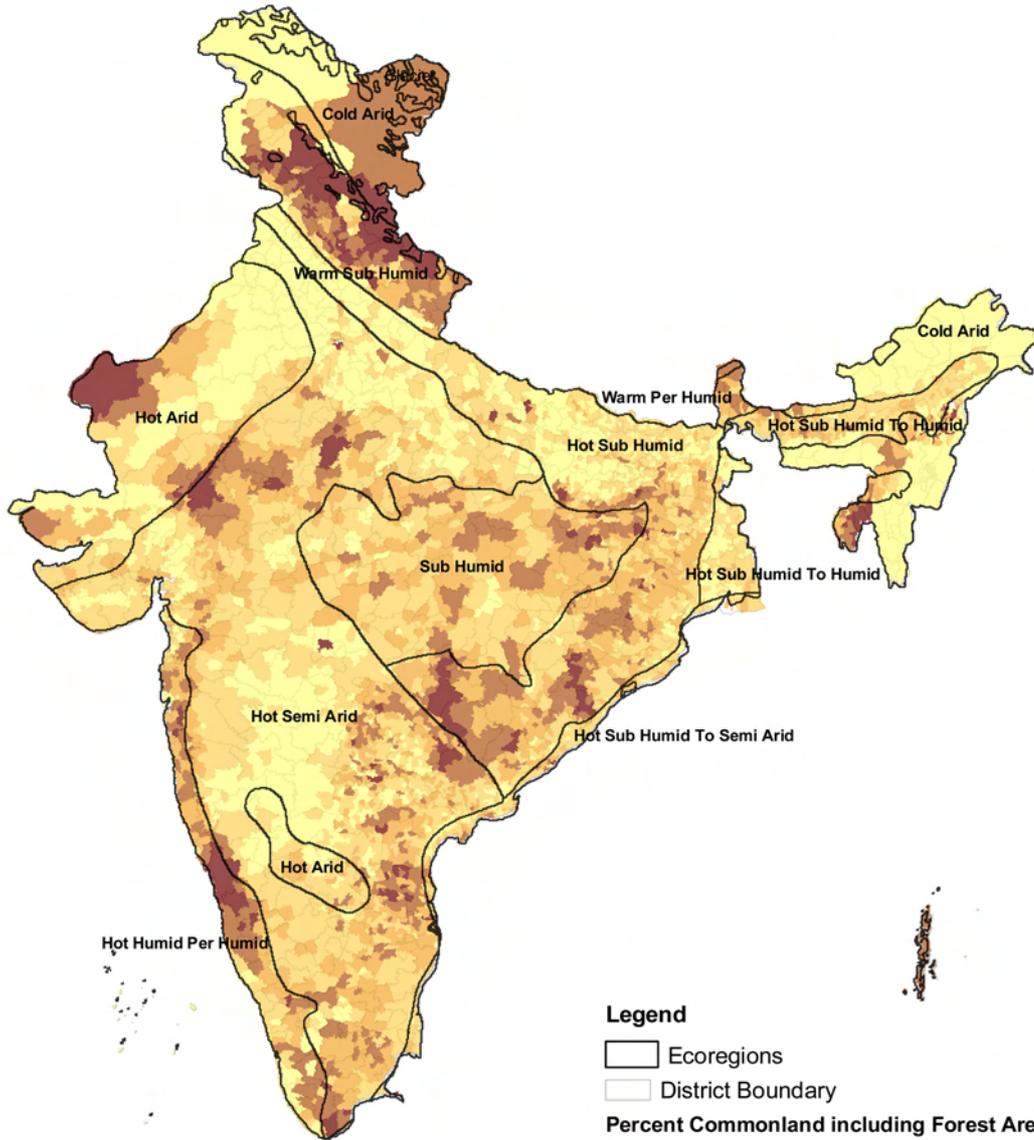
Common lands are an important land-based resource in India. They have multiple users and usages and make significant contributions to the rural economy in a myriad ways. Most natural resource systems of such kind, used by multiple individuals, comprise ‘Common Pool Resources’ (CPRs). A common pool resource typically consists of a core resource, which defines the stock variable, while providing a limited quantity of extractable fringe units, which defines the flow variable. While the core resource is to be protected or supported to allow for its continuous exploitation, the fringe units can be harvested or consumed. Examples of common pool resources include both natural and human-made systems such as groundwater basins, irrigation projects, forests, grazing lands, mainframe computers, government and corporate treasuries, and the Internet (*Bolomquist & Ostrom 1985*). Common pool land resources represent a larger set of non-exclusive resources with varying degrees of access and

Table 1.1: Grazing Resources in India (million ha)

Type of Resource	1980-81	1990-91	2002-03
Geographical area	328.7	328.7	328.7
Forests	67.5	67.8	69.1
Permanent pastures and grazing lands	12	11.4	10.6
Culturable wastelands	16.7	15	13.5
Fallow other than current fallows	9.9	9.7	11.7
Barren and unculturable wastelands	20	19.4	19.3
Total CPRs (excluding forests)	58.6	55.5	55.1
CPR as % of geographical area	17.8	16.9	16.8
Permanent pastures and grazing land as % of geographical area	3.6	3.5	3.2
Area under fodder crops (% of GCA)	4.6	4.6	5.2
Livestock units (million)	295	327	485
Livestock units/ha of CPR	5.0	5.9	8.8

Source: Ministry of Agriculture, Government of India

Percent Commonland including Forest Areas in different Eco-Regions



Legend

□ Ecoregions

□ District Boundary

Percent Commonland including Forest Areas

0% - 20%

20% - 40%

40% - 60%

60% - 80%

80% - 100%

often multiple patterns of Rights (*Chopra & Dasgupta, 2002*). A sub-set within this, having a specified property regime, is referred to as Common Property Land Resources (CPLRs).

Rough estimates suggest that about 70 million hectares (ha.), i.e. nearly 21% of the landmass in the country, can be categorized as Common Property Land Resources. Of this, 25 million ha area under the jurisdiction of the Forest Department and the remaining 45 million ha has been put under the purview of the Revenue Department, Village *Panchayats* and other local governing bodies (*Chopra & Dasgupta, 2002*). Among the States in India, Rajasthan has the highest proportion of area (32%) under this category, followed by Gujarat (27%) and Madhya Pradesh (22%), according to National Sample Survey Organisation (NSSO, 1999).

1.2 CONTRIBUTION FROM COMMONS

Various studies document the contributions from Commons to village economies. Besides flow of benefits to farming systems and animal husbandry in terms of food, fodder and timber availability, there are ecological benefits in terms of resource conservation, recharge of ground water and sustainability of agro-ecological systems¹. However, the range of direct and indirect contributions from Commons limits a complete quantification of benefits due to the inability to monitor and measure these indivisible flows emerging from them.

Jodha's study in 82 villages across 21 districts in the arid and semi-arid zones of India highlights the relevance of the Commons to the rural economy at large and their importance as a 'safety net' for the poor in particular. He estimated around 84-100% dependence of the rural poor on the Commons for fuel, fodder and food items, in comparison to 10-19% dependence of better-off households (even for the better-off the figure increases in dry land regions like Rajasthan). The study estimated that 14-23% of household incomes are derived from the Commons and they play an important role in reducing income inequalities, which would have been otherwise starker. The study also indicated that rearing livestock without the support from the Commons would mean a diversion of almost 48-55% of cropland from food and cash crops to fodder crops. Whereas the alternative, of reducing the number of animals in proportion

¹ Notable among them are the following: *Jodha, 1986; Jodha, 1992; Pasha, 1992; Beck and Nesmith, 2001; Adhikari, 2005; Dasgupta 2005; Ghate 2005; Menon and Vadivelu, Fuys et al, 2006*).

to the availability of one's own fodder resources, would entail a 68-76% loss of draught power and up to 43% loss of farmyard manure.

As per recent macro-estimates based on NSSO data, the collections from Common Pool Resources contribute about 3% of the total consumption expenditure in the surveyed households, with certain variations displayed at the State level (the highest being from Orissa, 5.59%). Households engaged in the collection from Commons varied across different agro-climatic zones, ranging from 73% in the Eastern plateau and hills to 13% in the Western dry region, forming a national average of 48%. About 30% of the households in the country use common water resources for rearing livestock. The livestock sector depends largely on Commons for a number of uses such as grazing, supply of green fodder and fulfilment of water requirements, particularly so in the case of the smallholders who together hold a major share of the livestock population.

1.3 DEPLETION OF COMMONS

Studies have estimated a decrease in the Commons between 31 to 55% (*Jodha, 1986*) with a simultaneous increase in pressure on each unit, which accelerates the depletion through decreased productivity and increased physical degradation. Trends in the decline of Commons have also been recorded by several other studies (*Iyengar 1988, Brara 1987, Chopra et al. 1990*). The NSSO data of 1999 estimated a decline of 0.38% per annum in Commons at the all-India level. The land-use data of different States also reveals these trends, along with showing an increase in the cropping area and continued re-allocation of land to different purposes. States like Rajasthan particularly, which lie predominantly in the dry region, have shown a continuous decrease in Commons. The total area under Commons in Rajasthan has reduced considerably, to the extent of almost 3.7 million ha or by about 24% in 2000 as compared to 1966 figures.

Decrease in Commons has intensified the conflict over resource use. Several studies indicate this phenomenon, with the poor families usually at the losing end, either by denial of access to these resources (mainly because of privatisation of Commons by a few) or by diversion of Commons to alternative uses. Privatisation of the Common resources and use of these resources for alternative purposes, under the pretext of their being degraded, have been major contributing factors for the depletion of commons. (*Iyengar 1989; McKean 1992; Beck, 1994; Iyengar, 1997; Beck 1998; Beck & Ghosh 2000; Cavendish 2000*). Further the use of the Common lands for afforestation (mainly mono-crop plantations for commercial use) and bio-fuel plantations to comply

with various environmental protocols such as Clean Development Mechanism, have enhanced the rate of depletion of commons. These measures tend to 'privatise' and 'commoditise' the natural resources that were otherwise accessible to the poor, dispossessing them further.

While much of the Common Pool/Property Land Resources consist of degraded lands within and outside the forest areas, it is difficult to measure the actual size as there exists no systematic database on the status, ownership and property rights governing these lands that are generally considered in the domain of common property (Iyengar 2003). The absence of an appropriate database may lead to the perpetuation of their 'residual' character and their being consigned to the official category of 'wastelands', the term used to indicate common lands in the Indian context. This, in turn, may result in continued degradation and/or misuse of the Commons.

1.4 COMMONS, LIVESTOCK AND LIVELIHOODS

Livestock rearing is directly related to the availability of private and common lands; thus, as the availability of land decreases due to increased land fragmentation and depletion of the Commons, the prospect of feed and fodder scarcity for poor households enlarges. Various studies (Jodha 1985, Brara 1987, Iyengar 1988) have shown a trend of decline in animal holdings, and a shift in livestock composition towards smaller ruminants.

With the exception of a strong growth rate of 4% in poultry, overall trends reflect a deceleration in growth rates of major livestock species and a decline in cattle population. This trend of decline, although exhibited by almost all States, is particularly high in the dryland regions of Rajasthan and Madhya Pradesh, milk bovine stock per 100 households coming down from 81 to 67 per 100 households in Rajasthan and from 63 to 42 in Madhya Pradesh in the period from 1991-92 to 2001-02. (NSSO 2006). The average bovine holdings since 1991-92 have fallen by 25% across all States, with the figure falling by 38% in States like Madhya Pradesh and Chhattisgarh (NSSO 2006). Decreasing livestock holdings, with low or almost nil improvements in productivity levels, portend serious consequences for the livelihoods of the poor.

Rapid growth in livestock production is desirable for sustaining agricultural growth and reducing rural poverty, especially in a context where the majority of the land holdings are small. Fifty-eight percent of the rural households in India have land holdings of less than 2 ha and another 32% have no access to land at all. (Brithal &

Taneja 2006). With increasing land fragmentation, the number of these households is likely to rise. In such a scenario, livestock is and can further be a more important source of income for smallholders and the landless and needs adequate attention in policies and programmes to address rural livelihoods.

In promoting pro-poor livestock development, two important issues emerge clearly. First and the foremost, is the feed and fodder crisis. The 11th Five Year Plan estimates a deficit in dry fodder, green fodder and concentrates to the extent of 11.20%, 27.66% and 34.45% respectively. This deficit may persist and even intensify in future unless adequate counter-measures are undertaken. These aggregate figures, however, do not reflect the plight of poor livestock-keepers in the dryland, rainfed and hilly regions of the country where the existing quantity of green fodder and crop residues falls short of the requirements during the drier months. Frequent droughts further exacerbate the shortage of fodder, forcing several households to migrate for the survival of their animals or resort to distress sales of their livestock assets.

Second is the fact that additional availability of fodder alone will not suffice to promote a livestock economy in a manner that is both ecologically sustainable and socially equitable. Three aspects deserve special attention in this context:

- i) In India, livestock is owned mainly by underprivileged households and this ownership is being increasingly influenced by access to land and irrigation (*Shah 2007*). Further, due to a greater focus on dairy products and large ruminants, policies and programmes for promoting livestock growth have tended to neglect livestock keepers with small ruminants and small landholdings.
- ii) Given ownership patterns, resource-poor farmers need additional support for overcoming technical, economic and social constraints in order to benefit from the growing demand for livestock products (*Thomas and Rangnekar 2004*).
- iii) With increasing economic compulsion for occupational diversification especially among the landless and poor, reinstating their financial stakes in the livestock sector calls for an urgent need to regenerate the Commons and other marginal lands.

An assessment of the status and benefits of resource management systems will be an important source of information in gauging outcomes of key interventions in the field of CPR-management. This will provide a broad idea of the potential benefits of an otherwise fairly degraded resource under an open-access regime and spell out these benefits in terms of sources, extent and distribution. Moreover, the aspects mentioned

above could play a significant role in boosting the nature and sustainability of collective action and community organisation, factors which become particularly important at a time when Common lands are looked upon as a low-productivity resource and given the lowest priority in land-use planning.

The allocation of Common lands across different sectors and uses makes for another matter of concern. Revenue wasteland is often the first to be offered up when land is diverted for industrial/infrastructural/mining projects. This has two grave drawbacks: firstly, it overlooks the ecological functions of Commons in each agro-ecological system; secondly, it ignores the critical dependence of poor households on Commons, howsoever degraded they may be. The dilemma is inherent: of balancing the objectives of conservation (including environmental protocols) or developmental initiatives (such as corporatisation) with the need to sustain the livelihood of local communities. It is a fairly complex dilemma since the aims or aspirations of the State, the corporate sector or the communities are neither singular, homogenous nor static. It is also likely that conservation and commercialisation might create alternative livelihood options that the local communities might aspire for, particularly in situations where the benefits from resource regeneration and management are not adequate or well distributed among different segments of the society.

The issue of adequate benefits and incentives assumes special significance since revival and strengthening of the livestock economy is vital for poor and small livestock-keepers. It highlights the importance of choosing the right kind of management strategy for use and users of Commons, a strategy that identifies an appropriate mix of technologies, institutional arrangements, as also priorities. While natural regeneration is undoubtedly the best approach for combining ecological and livelihood objectives, to operationalise this might not be so straightforward. It will call for substantial negotiations within the communities over critical choices to be made in the areas of the core (ecological) characteristics of the resources and the challenges posed by the region's changing economic-social-cultural environment.

Objectives and Methodology

The study was initiated in August 2007, with field-level data collection spread over the period from October 2007 to March 2008. The study aims to provide a broad picture of estimated benefits (mainly direct) from the work of Common land development, and looks into the impact of the improved biomass and water availability on livestock systems. The present study looks into the experience of interventions made by Foundation for Ecological Security and BAIF Research Foundation in the States of Rajasthan and Madhya Pradesh. Facilitated by these two organisations, work on Commons in the study areas started in the late 1980s. The villages included in the study have seen Common land governance for differing periods of time, with the oldest village governing its Commons for 17 years and the youngest for five. The facilitating agencies (FES and BAIF) intervened in most villages over a period of five years, with developmental efforts focused on achieving resource sustainability, improving productivity and developing equitable benefit sharing arrangements through the setting up and strengthening of institutional platforms at the village/ user group level for governance of Commons.

2.1 OBJECTIVES

The study tests the hypothesis that '*Common Land Development leads to pro-poor livestock development*'. The following broad objectives were accordingly outlined:

1. Assess the change in vegetation, livestock and crop productivity at the village/ community level due to development and management of Commons.
2. Estimate the direct as well as indirect benefits accruing from Common Land Development to different categories of households within the community, with specific efforts to understand the benefits for resource-poor households.
3. Understand the sustainability of benefits in light of the status of resource regeneration and institutional arrangements.

4. Document good practices linking development of Commons and pro-poor livestock development so as to inform and influence policy decisions.

2.2 METHODOLOGY

Selection of Villages

A representative sample of villages with different time-periods of work on the Commons, different topography and agro-climatic features, diverse social-cultural contexts and institutional arrangements for governing Common Property Resources, have been selected for the purpose of the study. This includes the following broad sets of villages/areas:

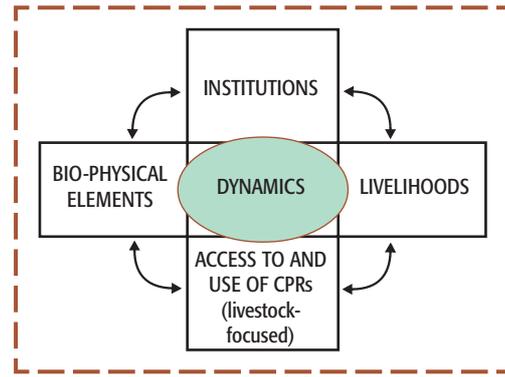
- Villages where measures for soil and moisture conservation and revegetation have been intensive but limited to areas over which the community has secure tenure in the form of land lease or permissions from the Revenue department or the *Panchayat*.
- Villages in contiguous patches (within a single hydrological boundary or watershed) where Common Land Development has been extended to areas of Common Pool Resources over which the community does not have secure tenure but nevertheless adopts certain governance systems.
- An adjacent, contiguous patch with similar socio-economic and ecological settings as the study areas, but with no history of governance and/or management of Commons, additionally studied as a control area. These have been included in the study in order to render more clearly, the quality and magnitude of changes resulting from the improvement in Common lands in comparison to situations where such (bio-physical and/or institutional) interventions are completely absent.

In the selection of the above-mentioned categories of villages, the relevance has been in understanding both the value of regeneration of Commons directly for poor livestock-keepers and mapping the extended set of benefits emanating from Common Land Development conducted on a relatively bigger scale.

2.3 STUDY DESIGN AND DATA COLLECTION METHODS

Livestock systems are influenced by a number of factors both internal and external to a context. Availability of resources (like fodder and water), the nature of institutional mechanisms governing the commons (deciding access and assurance to resources),

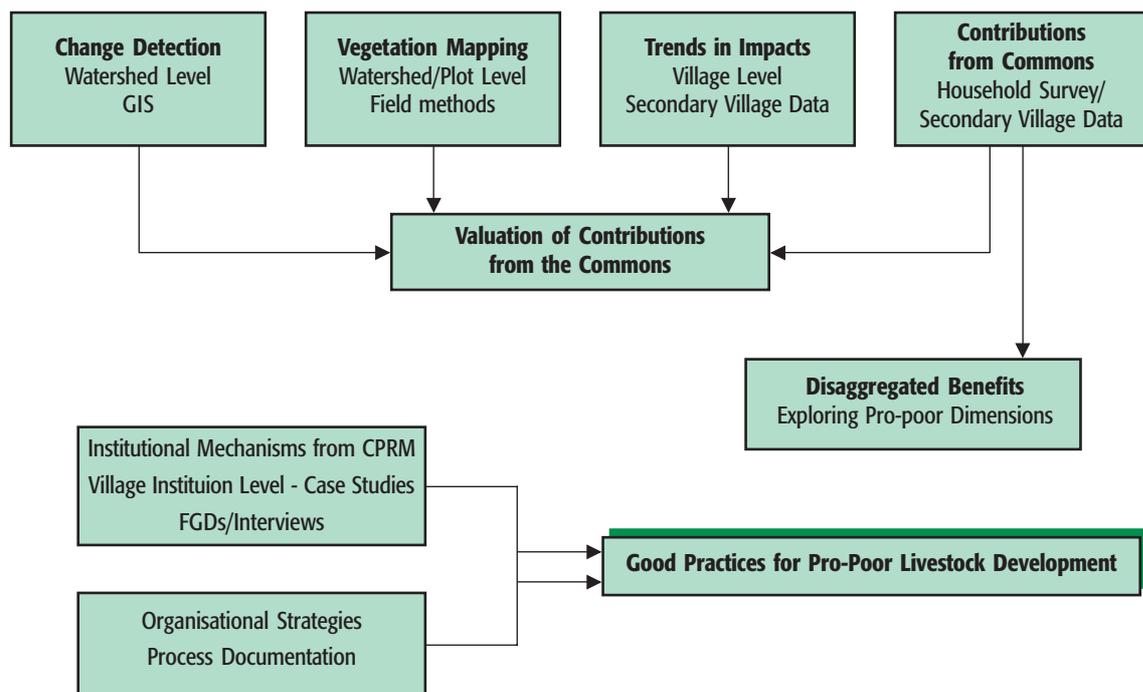
accessibility to other institutional linkages (like market and credit, services for livestock keepers), the location specific livelihood setting and choices etc., are some of the broad factors influencing livestock systems. Simultaneously in dryland situations the livestock systems have developed as a response to cyclical droughts, which further makes the system more dynamic and complex.



In this context the study takes a four-window perspective of Common land development and aims to unveil the accruing benefits through understanding the dynamic interaction between the biophysical components, institutional components, livelihoods, and access to and use of resources.

The study has used different data-collection methods such as household surveys, vegetation surveys, secondary data collection, focused group discussions and remote sensing image classification in order to understand the changes in the livestock sector at both village and household levels, as also institutional changes and changes in land use/cover in the selected hydrological boundaries. The aim has been to not only understand the changes happening in livestock systems, in terms of livestock

Figure 2.2: Study Design: How Different Components Feed into Overall Study



composition, herd size kept by different households etc., but also map out the changes happening directly on resource availability, institutional factors, on other socio-economic indicators etc., which supports or constraints livestock growth. However, the study has not been able to capture the entire flow of second-round effects on households' incomes and employment on the one hand and the broader environmental services on the other.

Table 2.1 depicts the main features of the methods and tools used for data collection on different aspects.

Table 2.1: Data Collection Methods and Tools

Ascertaining Changes in	Analytical Frame	Data Source/s	Method/Tools	Variables Covered	Remarks
1. Vegetation	Comparison across plots under different management practices and with a control situation.	Vegetation survey, remotely sensed data and ground truthing.	Vegetation mapping.	Biomass estimation for tree, shrub, fodder and species diversity.	Estimations made by the FES team during 2007-08.
2. Livestock	Livestock population and composition at village level; livestock systems of different landholding classes; changes in livestock population, composition and distribution (only for Rajasthan).	Secondary data plus household survey; data collected through the sample survey; data collected in 2001-02 for some villages in Rajasthan.		Number by type (not on age and quality); ownership pattern across different categories of livestock; preference for livestock as future occupation; plan to buy more livestock, constraints and expected support.	The number of livestock is generally quite variable over the year/years due to a number of factors.
3. Land Use and Crop Production	Comparing before–after situations in the context of different rainfall conditions.	RS data; secondary data.	Digital and visual analysis, ground truthing.	Change in cropped area; area sown during <i>Rabi</i> ; irrigated area; number of wells, etc.	Official data lacks systematic, yearly recording of land use.
4. Water Availability	Changes in ground-water table. Supplementary survey of households owning wells and expected to have benefited from Water Harvesting Structures (WHS) created with assistance from FES and other agencies.	Primary data collected from households (87 in 8 villages in Madhya Pradesh and 33 in 3 villages in Rajasthan). The survey covered control villages in both States.	Survey of selected wells in the vicinity of WHS in project and control villages; selection of wells was done with help of informed persons.	Status of water table, crop-area, irrigated area, yield for the two periods i.e. before and after the project (for Rajasthan).	Data based on monitoring of wells in a sub-set of study villages (only in Rajasthan.)
5. Resources from CPLRs	Comparison between project and control village seen in the light of vegetation mapping.	Primary data.	Sample survey of households.	Season-wise use of CPLRs for grazing (no. of animals), fodder collection, fuel, and NTFP.	Quantification is difficult.

Table 2.1: Data Collection Methods and Tools

Ascertaining Changes in	Analytical Frame	Data Source/s	Method/Tools	Variables Covered	Remarks
6. Other Benefits	Direct & Indirect	As above, plus Focus Group Discussions (FGDs) in selected villages.		Impact on reduced indebtedness, migration, income from consumption of milk etc.	FGDs were conducted in a few villages as part of the Documentation of Good Practices by the FES team.
7. Institutional Arrangements	What institutional arrangements make Common land development pro-poor?	Primary, records at village level, FGDs.	Village discussions with different groups; resolutions and rules of the institution; discussion with field staff of the facilitating organisation.	Processes of institutional formation; rules, regulations and norms.	

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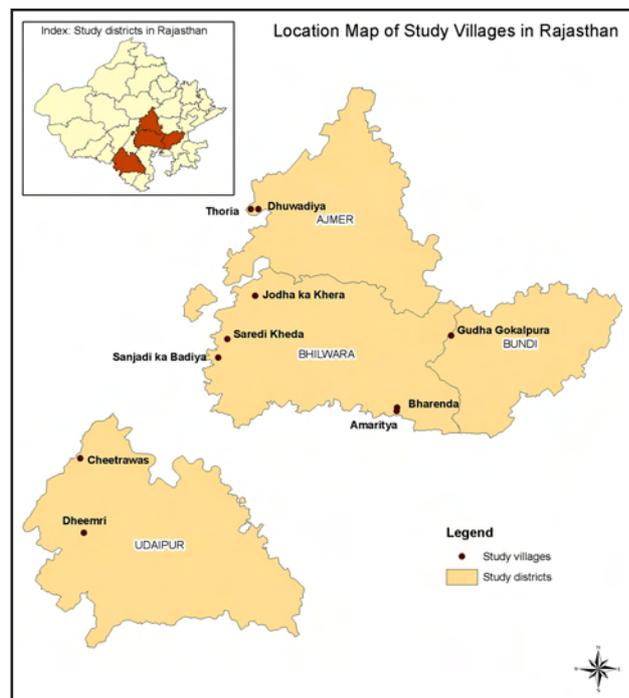
Study Locations

The study was carried out in 17 villages spread over 6 districts which fall under different agro-climatic zones in the States of Rajasthan and Madhya Pradesh. These villages have been involved in governance of their Commons over periods varying from 5 to 17 years.

3.1 STUDY LOCATIONS IN RAJASTHAN

In the State of Rajasthan, 11 villages in different locations were studied with the objective of understanding the varied approaches and arrangements adopted to bring the Commons under local governance. Of the 11 villages studied, 10 have undergone project interventions by facilitating agencies – 8 by FES and 2 by BAIF. One is a control village for depicting the baseline situation.

Figure 3.1: Study Villages in Rajasthan



The villages selected have taken up different institutional arrangements for bringing their Commons under governance. Some villages have multiple institutional arrangements for governing the Commons and have magnified the scale of regeneration work from individual patches to the whole village landscape or its watershed.

Land and People

Broadly speaking, the villages are located in semi-arid areas with an average rainfall between 400-650 mm, spread over four months from June to September. With high inter-year variation and an erratic dispersion of rainy days, drought is a common feature. Located at the confluence of the Aravalli and Vindhyan mountain ranges, the topography varies from uplands to an undulating landscape. Commons, including forestlands, constitute 30-80% of the village geography.

The local communities are mainly agro-pastoralists who belong to tribal and non-tribal groups. The tribal communities are mainly located in the southern district of Udaipur while a more heterogeneous caste community inhabits the other districts. Gujjars, Balais, Meenas, Bhils, Jats and Rajputs are some of the major caste categories found in these locations.

Livelihoods and Commons

The livelihoods of the local communities primarily depend on agriculture and livestock keeping. The production system can be broadly classified as a mixed farming system with agriculture and livestock playing complementary and synergetic roles. Landless, marginal and small farmers constitute more than 80% of the rural households. Households below the poverty line constitute 20-44% of the total households. These households possess a significant share of the livestock, which survive mainly on crop residues and fodder derived from the village Commons. They also set aside around 20-30% of their farmland as '*beeds*', i.e. private pasture, for grazing and meeting the fodder requirements of their livestock. With increasing land fragmentation, however the *beed* land is being increasingly converted to farmland, thereby further stepping up reliance on the Commons.

More than 90% of the households rear livestock, keeping cattle, buffalo, goat and sheep or a combination of these. Landless, marginal and small farmers rear around 80% of the bovine and 85% of the ovine population, indicating the importance and

equity component of livestock to the poor farmer. On an average, a marginal farmer keeps four large ruminants and seven to eight goats or sheep. Womenfolk are primarily engaged in livestock keeping, their responsibilities ranging from watering the animals, taking them out to graze to their daily maintenance and upkeep. With depletion of Common Property Resources, the women face increasing hardship in grazing their livestock and fulfilling the energy needs of their households.

Degradation and decline of Common Property Resources has major consequences on the livelihoods of many communities. One being the vicious cycle of resource degradation that is initiated – increased livestock density on the land, decrease in pasture and water available per animal, and an inevitable decline in both the condition of the livestock and the Commons. Degradation and decline of Common Property Resources also aggravates soil erosion, soil nutrient depletion, moisture stress, deforestation, biodiversity loss, reduction in grazing areas, and forage scarcity, thereby negatively influencing agriculture and animal husbandry in a multitude of ways.

Table 3.1: Details of Villages Studied in Rajasthan

Villages Studied	Number of Households	Geographical Area in ha	Commons Land in ha (% Commons)	Institutions	District	Duration of governance on Commons (in years)
FES Supported Villages²						
1. Thoria	136	628	261 (42%)	TGCS, WDC	Ajmer	17
2. Dhuwadiya	92	993	493 (50%)	TGCS, WDC	Ajmer	17
3. Sanjadi Ka Badiya	65	310	175 (56%)	CVS	Bhilwara	10
4. Saredi Kheda	90	319	155 (49%)	TGCS, CVS	Bhilwara	10
5. Amaritiya	90	295	145 (49%)	WDC	Bhilwara	9
6. Bharenda	60	331	245 (74%)	TGCS	Bhilwara	10
7. Cheetrawas	155	856	751 (88%)	VFPMC	Udaipur	8
8. Dheemri	167	252	102 (44%)	VFPMC	Udaipur	7
BAIF Supported Villages						
9. Gudha Gokalpura	257	947	610 (64%)	VMC	Bundli	11
10. Jodha Ka Kheda	163	720	320 (44%)	VMC	Bhilwara	17

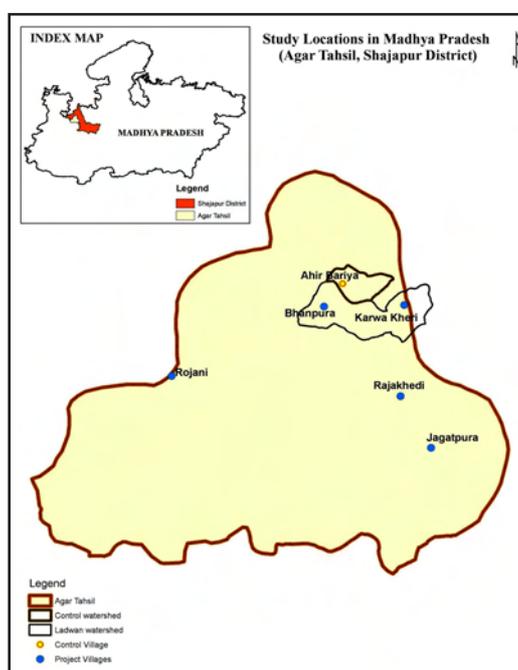
TGCS: Tree Growers Cooperative Society; CVS: Charagah (Pasture land) Vikas Samiti; VFPMC: Village Forest Protection and Management Committee; WDC: Watershed Development Committee.; VMC: Village Management Committee

² The approach of FES and BAIF in facilitating the process of common property resource management is detailed in Section 4.

3.2 STUDY LOCATIONS IN MADHYA PRADESH

The area taken up for study in Madhya Pradesh comprises the project area of the FES team in Shajapur district. The FES has worked in these villages through the Tree Growers Cooperative Societies (TGCSs). Set up as a people's institution in all the villages, the TGCSs were assisted by FES to obtain land lease over the revenue wastelands in the village. Project interventions helped to successfully regenerate the wastelands and satisfy the feed and fodder requirements of dependent communities. Through social fencing mechanisms, the leased plots were brought under protection and locally-suited, drought-resistant plant species were introduced as part of the re-vegetation measures. During this stage, village level institutions were assisted to evolve norms that would not only enable the protected resources to recover but also ensure the equitable sharing of benefits in the long run. Apart from intensive soil and moisture conservation measures, efforts to harvest the surface run-off and assist groundwater recharge were also undertaken. The overall effort was to ensure better fodder and feed availability for livestock and augment availability of crop residues for poor livestock-holdings by increasing double cropping along marginalised lands adjoining the revenue wastelands.

Fig 3.2: Study Villages in Madhya Pradesh



Land and People

The project area lies in the Agar *tehsil* in the uplands of the Lakhunder, a tributary of the Choti Kali Sindh – the main perennial stream in the region. The area falls in a semi-arid zone within the Malwa Plateau, characterised by deep medium-black soil and an average annual rainfall in the range of 800-1200 mm. Geo-hydrologically speaking, the terrain is poor in terms of surface and sub-surface water. Groundwater availability is poor due to the low depth of unconfined aquifers and absence of sufficient confined aquifers. Due to the undulating terrain, hard rock type, sparse vegetation cover, low recharging capacity and high evaporation rate, the surface run-

off is high and surface availability of water, poor. Dry deciduous scrub and grass forests are the typical vegetation here.

The communities reached through the project interventions are agro-pastoralists by occupation. Just under a half of this population belongs to the socio-economically marginalised category of the ‘Scheduled Castes’, while the rest is made up of the Gujjars, Sondiya Rajputs and a few households of the Jain, Kumavat, Bairagi, Dholi and Rathore communities. As mentioned above, the project area lies in the uplands of the Lakhunder river catchment. The poorest villages in the region are located at the ridges and these were prioritised for inclusion in the project. Village institutions were facilitated at the level of user groups with special emphasis on participation of resource-poor households whose dependence on the Commons tends to be higher than that of the rest of the population.

Table 3.2: Details of Villages Studied in Shajapur (Madhya Pradesh)

Villages Studied	Number of Households	Geographical Area in ha.	Commons Land in ha (figures in parentheses indicate % Commons)	Duration of CPLR Governance (in years)
1. Bhanpura	77	396	156.44 (40%)	10
2. Jagatpura	108	243	143.43 (59%)	8
3. Karwakhedi	92	582	286.43 (49%)	8
4. Rajakhedi	53	526	112.56 (21%)	5
5. Rojani	130	451	104.305 (23%)	11

Livelihoods and Commons

Agriculture and animal husbandry are the predominant source of livelihood in the region. The region falls in the *cotton-jowar* crop zone and used to be a seat of the textile industry, producing cotton and yarn. However, in the past few years, the area under cotton cultivation has been on the decline and soyabean is now the main *Kharif* crop. Other important crops include *jowar*, *gram*, maize and wheat. The majority of land holdings are small, about 65% of them being less than two ha in size.

Animal husbandry is an important means of livelihood although livestock holdings are small. The *malvi* breed of cattle is an indigenous breed of the region, known for its suitability for draught in black-soil conditions. However, with the spread of mechanisation, the number of cattle kept for draught is decreasing. Buffaloes are now the preferred livestock variety with the spread of irrigation and the opportunity to encash milk surpluses. Buffalo rearing is prevalent across all land-owning classes,

with big farmers maintaining a herd of four buffaloes, and small and marginal farmers just one or two. However, weak market linkages and high input costs pose serious constraints for the spread of buffalo keeping.

The overall livestock population in the district has been declining with a 5% decline reported from 1997 to 2003. In the project district, the largest decline is in that of indigenous cattle (9%) followed by goats and then buffaloes. Animal husbandry, initially part of extension activity, has become part of the mixed farming system, owing to good crop-livestock linkages in the irrigated areas. Small ruminants are largely dependent on the Common lands.

The extent of Common lands varies in the project villages. Comprising mainly revenue wastelands, it ranges between 21% in the irrigated tracts to 60% in the drier areas. Largely under open-access regimes, these lands have been severely degraded over the years and in many parts, are subject to widespread encroachments for agricultural purposes.

About 41% of the households own less than ha of land and almost 70% own land less than 2 ha. The irrigated area is limited and ranges between 25-40% of the land owned in each of the land-owning classes. Between 82%-100% of the households of the land-owning classes rear livestock to complement their agricultural incomes while about 64% of the landless (estimated at 11% of population) rear livestock. A majority of the livestock-keeping households keep cows for their sacred value as well as for meeting the household needs for milk. Cow dung is collected for application to farmlands or sun baked and used as fuel for cooking. While the landless and small and marginal farmers keep one or two cows per household, larger herds can be seen with the bigger cultivators. Some Gujjar households continue their livestock-keeping tradition with herds of up to 30-35 cattle.

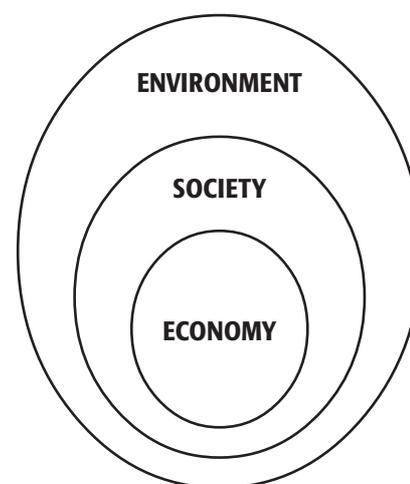
The importance of the bullock is declining due to the spread of farm mechanisation and the competing feed needs of the buffalo. Among the small ruminants, goats are preferred with 40-50% of the poorer households keeping a typical herd of seven to a dozen goats. About a third of the big farmers also rear goats with three to four goats per herd. Goat rearing is a taboo in some communities like the Bundelkhandi Gujjars, the Jains and the Brahmins, although some Gujjars are observed to have taken up goat rearing so as to capitalize on the availability of feed from the Commons.

Approach for Common Land Development

This section briefly details the approaches of the two facilitating organisations – The Foundation for Ecological Security (FES) and BAIF – and their work on the Commons across rural landscapes.

4.1 THE FOUNDATION FOR ECOLOGICAL SECURITY

The Foundation for Ecological Security was set up in 2001 to reinforce the massive and critical task of ecological restoration in India. The Foundation strives for a future that is based on holistic understanding of the principles that govern the interrelationship of various life forms and natural systems. The central character of the efforts lie in intertwining principles of nature conservation with local self governance in order to accelerate efforts on ecological restoration and improve the living conditions of the poor. The origin of the FES and its work go back to 1986 when, at a request from the National Wastelands Development Board, a pilot project on Tree Growers' Cooperatives (TGCP) was initiated in five states by the National Dairy Development Board (NDDB). Over the years the work has spread to 26 districts of India and around 97,000 ha of land has been brought under collective management by the community institutions. In a worldview that is dominated by economic thinking, the role of FES lies in centre staging an ecological agenda and re-orienting development with conservation and social justice perspective. This approach visualises social organisation and economic activity as embedded within the ecological sphere, thereby denoting that they are in fact bounded by the natural environment and do not operate in isolation.



The work of FES in restoring degraded forests and other Common lands is spread over five of the ten bio-geographic regions of the country. In most cases, these Common lands are unproductive and require years of care to rejuvenate and revive with efforts largely centred on assisting natural regeneration where, depending on the stages of ecological succession, appropriate pioneer plant species are introduced to aid natural recovery. Geo-hydrological studies guide the way to designing appropriate measures to retain soil and water which, besides helping to recharge groundwater or harvest surface water, assist in generating a microclimate conducive for vegetative growth. Nature heals by itself and even small measures against over-exploitation of resources, pay immediate dividends in terms of improved biodiversity, biomass and moisture regime, resulting in double crops, increased crop productivity, milk production and availability of water for lengthier periods.

Interventions in degraded landscapes follow the watershed approach of moving from ridge to valley. Watersheds make for integrated natural resource units for purposes of analysis and treatment. While the focus of initiatives is the Commons, collective action, which is strengthened by interventions, is also encouraged to facilitate individual treatment plans. Since natural resource boundaries cut across administrative boundaries and necessitate management initiatives at appropriate levels, the landscape approach (*described below*) helps develop appropriate perspectives on resource governance and management strategies.

The working approach of FES for restoration of Commons Pool Resources and strengthening community institutions for governance of the same are briefly detailed below.

Common Pool Resources (CPR)

CPR serves as a vital safety net in times of hardship for agro-pastoral communities. Therefore, FES believes that the intervention, in its very design, should be centred around the improvement of natural resources, more particularly CPR (where the whole community and especially the poor have a stake), and two, should facilitate collective action among communities so they may analyse, resolve and take proactive steps in gaining control of their lives and surroundings.

Work on Commons has been guided by the following broad principles:

- To work towards the stability of the entire ecosystem by working on the physical and institutional aspects of various categories of Common lands such as *gaucher* (Common pasture lands) and revenue wastelands, as well as on water regimes for regeneration and restoration of watersheds.
- To treat the Commons as well as private lands as a single organic unit, so that work on the Commons can help stabilize nutrient and water cycles and also improve the productivity of the private lands for agriculture and livestock.
- To initiate processes that take into consideration the social inequalities present in the village context and provide the disadvantaged sections, a space in decision-making and governance.

Commons and Community Institutions

FES works in areas that have a significant human presence and works towards conservation of natural surroundings which is critical for the survival of the poor and the viability of farming systems. FES works on systemic drivers that can bring about a multiplier change. In fostering collective action for the safeguard of natural surroundings, Common lands, and water in particular, the approach is to build on existing practices and revive institutions of collective action at the habitation level. Issues concerning conservation of natural resources are thrown open to discussion between all residents (taking particularly the poor and women as equal partners), so as to spell out rights and responsibilities, mechanisms for consensus building and rules for appropriation and provision. It is hoped that the community-based associations will mature into powerful alliances ready to face challenges on complex issues (such as devising measures for equal access across villages and preventing over-exploitation of natural resources).

4.2 BAIF DEVELOPMENT RESEARCH FOUNDATION

BAIF Development Research Foundation is a national-level NGO, working in over 12 States in India for the development of rural and tribal areas. It undertakes multiple interventions like livestock development, watershed development and agriculture-horticulture-forestry development. Promoting the development of Common lands for the benefit of the poor and marginalised families in rural Rajasthan has been one of important initiatives taken up by the BAIF Development Research Foundation. The community members of the village collectively own the Common lands, the legalities of which are entirely handled by the governing body of the village, usually

the *Gram Panchayat*. The primary beneficiaries of the community pasturelands are the resource-poor families of the village.

The long-term objectives for working on Common lands:

- To develop rain-fed pasture and create nutritive feed resources for livestock as well as fuel, especially for resource-poor families
- To diligently work on degraded lands so as to improve the environment as also the incomes and nutrition of village communities
- To develop programmes for women and landless labourers through Self Help Groups (SHG).
- To build up the local institution – the Village Management Committee (VMC) – so as to ensure sustainability of activities and strengthen the Panchayati Raj Institutions (PRIs)
- To revive old cultures for the protection of village Commons for beneficial purposes

Rationale for Common Land Development

The argument for the protection and conservation of Common lands can be explained from two perspectives: that of the resource-rich and the other, of the resource-poor farmers.

- The focus of the relatively Resource Rich (RR) farmers is primarily agriculture while livestock in general, is of secondary importance (to obtain milk for home consumption or manure for agriculture). These households may sell surplus milk and may invest in cultivated fodder (Berseem, Lucerne, etc.) in order to have easy access to quality fodder for their animals and have less/no dependency on Common land.
- The focus of relatively Resource Poor (RP) farmers is primarily livestock keeping. These households own little or no land and, by and large, depend completely on incomes derived from livestock rearing, while the few agricultural activities (if any at all) contribute to feeding the family.
- The RP farmers usually own little or no land and therefore their keeping of livestock implies a high dependence on Common lands for fulfilling fodder/biomass needs. In addition, they may have some agri by-products and/or access to these, through sale, barter or exchange.

While dealing with Common lands, specific rules and regulations for the management and sharing of the produce of the land must be laid out clearly in order to avoid conflict. As a general rule, 50% of the total harvested grass under the 'cut and carry' arrangement is deposited with the VMC. Subsequently this is auctioned, and the proceeds deposited in a Common fund. In the controlled-grazing method, a fixed fee (per animal/for 15 days) is paid for grazing on Common lands, and the proceeds deposited in the same Common fund. The Common fund is used for the upkeep of the Common lands, purchase of seeds and wages for workers.

The VMC, comprising community members from different sections of the village society, controls the ownership and management of the land. It ensures the involvement of all members of the village community, who have to pay a nominal amount for the development of the Common land every year. This ensures the ownership of all villagers over the Common land. The VMC is a self-sustained village level institution whose responsibilities include creating land-based assets for fodder production.

Sustaining the ecological balance is a challenging task – particularly in semi-arid environments where degradation is often very severe and widespread. BAIF's interventions seek one, to explore new institutional arrangements by mobilising people's continued participation in the management of the Commons and two, to strike a harmonious balance between the community and their physical environment.

These descriptions of the policies of FES and BAIF suggest considerable commonality between the two, though some important differences in approach may be noted in terms of the relative importance of soil water conservation measures and livestock promotion.

5.1 COMMONS AND POOR LIVESTOCK-KEEPERS

The objective behind studying the role of Common Land Development in supporting poor livestock-keepers was to understand three distinct but interrelated processes of a) Nature of Common Land Development b) Livestock production systems c) Institutional arrangements. The key elements within each aspect are highlighted in the table below:

Nature of Common Land Development	Livestock Production Systems	Institutional Arrangements
1. Extent of Commons under governance	1. Nature of livestock production systems, especially of poor livestock-keepers	1. Process of forming robust institutions at village level
2. Quantity and quality of vegetative growth	2. Dependence on Commons	2. Secure tenure to communities
3. Flow of fodder and feed from Commons	3. Changes in livestock population, composition and distribution with Common Land Development.	3. Rules, regulations and norms: understanding pro-poor dimensions
4. Contributions of Commons in total fodder availability	4. Other factors influencing livestock production systems	
5. Value of Biomass	5. Socio-economic impact of improved livestock production systems on poor livestock-keepers	
6. Qualitative and quantitative impact of Common Land Development on water availability, cropping area and land use/cover; role of Commons in building healthy watersheds.		

Extent of the Commons under Governance

In the study locations, the Commons constitute an average of 56% of the total geographical area in Rajasthan and 38% in Madhya Pradesh. The initiation of Common Land Development across these villages involved two distinct processes: One relating to the intensive protection and management of a patch on the Commons and the other, to the extension of governance on the adjoining Commons through certain rules and regulations. In the first case, a stretch of common land is demarcated and tenurial rights given to the village institution. The facilitating organisation provides

monetary support to the institution to regenerate the plot through fencing, seeding, plantation and soil and moisture conservation. The second case builds on the evolving institutional arrangements and traditional practices so as to frame rules and regulations which restrict encroachments, tree felling and harmful lopping as also provide support to natural regeneration and protection of trees on other Common lands in the village. Together, these define the total area under governance in the villages. Table 5.1 shows the extent of Common Land Development and area under governance across the study villages in Rajasthan and M.P.

Protected patches – with tenurial security of different kinds – as a component of the Commons area show wide variation across study villages. These patches constitute about 7% to 86% of the total Commons in the study villages in Rajasthan, and 64% to 97% in Madhya Pradesh. Distinct approaches can be observed in the nature of governance promoted by the facilitating organisations as well among the villages in the two States. In contrast to the intensive focus on protected patches observed in case of villages supported by BAIF, FES supported villages have aimed to extend

Table 5.1: Detail of Commons under Protection

Villages Studied	Number of Households	Total Area	Total Commons	Protected Patches (Area under Tenurial Security)	Commons under Governance (excluding protected patches)
RAJASTHAN					
FES supported villages					
1 Thoria	136	628	261	62	115
2 Dhuwadiya	92	993	493	83	209
3 Sanjadi ka Badiya	65	310	175	150	25
4 Saredi Kheda	90	319	155	70	32
5 Amritiya	90	295	145	50	95
6 Bharenda	60	331	245	75	100
7 Cheetrawas	155	856	751	267	364
8 Dheemri	167	232	102	68	25
BAIF supported Villages					
9 Jodha Ka Kheda	163	720	320	60	0
10 Gudha Gokalpura	257	947	610	45	0
MADHYA PRADESH					
FES supported Villages					
1 Bhanpura	77	396	156	122	34
2 Jagatpura	108	243.46	143	114	29
3 Karwakhedi	92	582	286	278	8
4 Rajakhedi	53	526	113	93	20
5 Rojani	130	451	104	67	37

governance functions over the adjoining Commons as well. While comparing governance systems in the two States, there is a visible distinction in the understanding of protected patches and security of tenure between the study villages. In Rajasthan, the protected patches are enclosed areas, which have received bio-physical support in terms of regeneration and certain institutional arrangements have been made for legal custody of these resources. In case of Madhya Pradesh, the approach has tended towards the gaining of rights over these lands through lease. With rights procured, the lands are supported through soil and moisture conservation work. However, only certain portions of these lands are vigorously protected by restricting grazing after the monsoons.

Table 5.2: Common Land Categories under Protection and Associated Villages

	Land category and Institutional Arrangement	Total Area	Number of Villages
Rajasthan	Forest Land (Village Forest Protection and Management Committee)	335	2
	Grazing Land (<i>Charagah Vikas Samiti</i> : Pasture land development committees, VMC: Village Management Committee)	447	8
	Revenue Wasteland (Tree Growers Cooperative Society: TGCS)	148.3	4
Madhya Pradesh	Revenue Wasteland (TGCS)	675	5

The study villages have made different arrangements for different land categories. In Rajasthan, three different land categories, viz. forestland, grazing land and revenue wasteland, have been brought under institutional arrangements for Common Land Development. Some of the study villages have also set up multiple institutional arrangements to develop their Commons. In case of Madhya Pradesh, the experience of Common Land Development largely relates to revenue wastelands.

Quantity and Quality of Vegetative Growth on Commons

Table 5.3 indicates the healthier vegetative composition on the regenerated Commons as compared to the unprotected areas. The increase is visible across tree, shrub and grass coverage as also in the high plant density in the regenerating phase, indicating a sustained growth on these patches.

Vegetative growth is determined by complex interactions and is shaped by biophysical conditions in a process mediated by human action, particularly in Common Land Development. Variations in the quantum of vegetative growth can be attributed largely to the state of degradation of a particular patch. Location-specific topography and climate are also important factors influencing vegetation growth on the Commons.

Table 5.3: Category-wise Plant Density and Grass Cover across Study Villages

Village	Trees with Diameter above 10 cm	Trees with Diameter less than 10 cm	Shrub	Grass Cover (%)
RAJASTHAN				
Unprotected Commons	29	286	571	79
FES supported Villages				
Thoria	350	250	1000	91
Dhuwadiya	163	250	950	88
Bharenda	114	5600	0	28
Amritiya	175	2400	50	40
Sanjadi ka Badiya	154	831	1046	74
Saredi kheda	289	533	311	81
Dheemri	150	2050	1350	98
Cheetrawas	205	1720	1640	92
BAIF supported Villages				
Jodha Ka Kheda	100	360	400	43
Gudha Gokalpura	170	320	440	69
MADHYA PRADESH				
Unprotected Commons	19	1143	1171	79
FES supported Villages				
Bhanpura	86	698	1900	98
Jagatpura	120	960	2000	89
Karwakhedi	86	698	1900	98
Rajakhedi	180	1360	560	77
Rojani	100	880	1760	92

The figures show that the increase in the number of trees per ha on protected patches ranges from 100 to 350 trees per ha in Rajasthan as against 28 to 80 trees per ha where there has been no similar work. On an average, across the study villages in Rajasthan, the number of trees per ha has increased from 41 to 187 trees.

In case of Madhya Pradesh, the increase in number of trees per ha has ranged between 100 and 120 trees in comparison to around 19 trees per ha on the ungoverned/unprotected Commons. The governed areas provide protection to natural rootstocks for regeneration, as also support to the natural process of seed germination – the success of these measures showing in the growing numbers of regenerating trees (trees with diameter less than 10 cm). The increase in trees per ha on the Commons has important implications with regard to feed and fodder availability for livestock, especially that of small ruminants which feed mainly on tree leaves and pods. The composition of vegetative growth on the Commons is of significant relevance for livestock systems.

The Spread of Tree Species and Shrubs

Acacia nilotica, *Acacia leucophloea*, *Butea monosperma*, *Anogeissus pendula*, *Azadirachta indica*, and *Prosopis cineraria* are some of the important species of trees found across the study villages. *Acacia nilotica* is widespread across the regenerated Commons and is highly valued for its use as an animal feed as well as for timber and medicinal purposes. It serves as a major feed for animals, especially sheep and goats, in arid and semi-arid regions where there is a scarcity of feed and fodder. Besides, it is traditionally appreciated for its high nutritive value and for its beneficial impact on reproductive processes. The improved water availability through soil and water conservation measures has also helped *Butea Monosperma* gain dominantly in the vegetative growth across most of the villages. Leaves of *Butea* are used to feed cattle and buffaloes and are traditionally accepted as boosters of milk production and fat content.

Shrubs are another important component of the vegetation vis-à-vis livestock systems because:

- Shrubs with their low height, relatively tender stems and high foliage are an important feed and fodder resource for livestock-grazing
- Shrubs help arrest soil erosion and indirectly support biomass growth on the Commons
- Shrubs indicate a more complex and healthy stratified vegetation structure

With the focus on natural regeneration, the shrub species too boasts a high density, complementing the growth of trees per ha.

Healthy Improvement of Grass Cover

Estimation of grass cover and its yield has been one of the most difficult components of vegetation analysis in the course of this study. Since grass cover and its standing biomass show temporal variations with season and with degree of use, a single-period estimation is insufficient to perceive its total value. In most study locations, the vegetation survey coincided with the grazing period on the Commons or, in certain locations, was carried out towards the beginning of summer, resulting in an underestimation of the total value. However, keeping these data constraints in mind, the study villages have displayed a healthy improvement in grass cover and production per ha in the Commons, although this growth has not been uniform across the villages. It has been influenced by location-specific, topographic-biophysical

conditions not to forget the state of degradation in which the Commons was originally. For e.g., high slopes and extreme degradation in Amritiya and Bharenda villages in Rajasthan have limited the grass cover on the Commons there. These areas however show a high growth in tree and shrub categories – which also limits the spread of grass.

Apart from grass cover, the species of grass has an important bearing on fodder availability. Grass on regenerated patches shows a greater diversity and higher palatability in comparison to that on the unprotected Commons. The study reveals that the ratio between non-palatable and palatable grass species is improving. More palatable species like *Apluda mutica*, *Heteropogon contortus*, *Cenchrus setigerus*, *Stylosanthes hamata*, *Iseilema laxum*, *Chloris barbata*, and *Cynodon dactylon* are replacing the earlier not-or-partially palatable species like *Aristida Spp.*, *Tephrosia purpurea*. Thus a process of positive ecological succession can be seen in the watersheds/study villages, with an increasing number of plant species dressing the denuded areas.

Flow of Fodder and Feed from Commons

This section offers an estimation of availability of the total fodder and feed resources from vegetation growth on the Commons. Table 5.4 shows the availability of the palatable biomass from the regenerated Commons and the other Commons across the study villages. In Rajasthan, an increase of almost 450% in the total availability of palatable fodder is seen in the regeneration patches. Villages in Madhya Pradesh also show similar trends, with an average increase of around 300% on regenerated patches.

However, results across study villages display wide variations. Apart from data constraints (underestimated grass biomass figures in some villages) and location-specific factors, one of the most important reasons for this variation is the change in agro-climatic conditions. Villages with relatively better rainfall like Cheetrawas and Dheemri in Rajasthan, and the villages in Madhya Pradesh have shown, on an average, a higher increase in the availability of fodder per ha on Commons.

Another important finding is the higher contribution of leaf and pods to the fodder availability in the villages in Rajasthan in comparison to those in Madhya Pradesh. While the contribution of leaves and grass in fodder composition is relatively equal in both States, the study villages in Madhya Pradesh show higher grass fodder in the total biomass composition. In the context of livestock systems, this becomes an important factor in influencing households for investing in a particular type of

Table 5.4: Palatable Fodder from Regenerated and Other Commons

Villages	Palatable Biomass from Regenerated Commons				Total Palatable Biomass from Other Common Lands (tonne/ha)	% Increase in Availability of Palatable Biomass per ha from Regenerated Patches (in comparison to adjoining/unprotected patches)
	Tree Leaves** (tonne/ha)	Shrub Leaves (tonne/ha)	Grass/Herb* (tonne/ha)	Total Palatable Biomass (tonne/ha)		
FES supported Villages (Rajasthan)						
Thoria	0.59	0.23	0.92	1.74	0.62	180.6
Dhuwadiya	0.45	0.27	0.85	1.57	0.62	153.2
Sanjadi ka Badiya	0.68	0.14	1.32	2.14	1.026	108.6
Saredi Kheda	0.97	0.14	0.98	2.09	0.54	287.0
Amritiya	0.63	0.44	0.58	1.65	0.814	102.7
Bharenda	0.56	1.03	0.22	1.81	1.274	42.1
Cheetrawas	9.88	0.03	3.94	13.85	4.222	228.0
Dheemri	0.54	0.11	5.95	6.6	0.223	2,859.6
BAIF supported Villages (Rajasthan)						
Jodha Ka Kheda	0.67	0.1	0.57	1.34	0.191	601.6
Gudha Gokalpura	0.28	0.03	0.42	0.73	0.433	68.6
Average Rajasthan	1.5	0.3	1.6	3.4	1.0	463.2
Madhya Pradesh (FES supported Villages)						
Bhanpura	0.26	0.16	4.95	5.37	0.95	465.3
Jagatpura	0.26	0.16	4.95	5.37	0.95	465.3
Karwakhedi	0.05	0.22	2.64	2.91	0.95	206.3
Rajakhedi	1.42	0.12	2.46	4.00	0.95	320.7
Rojani	0.43	0.18	1.51	2.12	0.95	123.4
Average M.P.	0.48	0.17	3.30	3.95	0.95	316.2

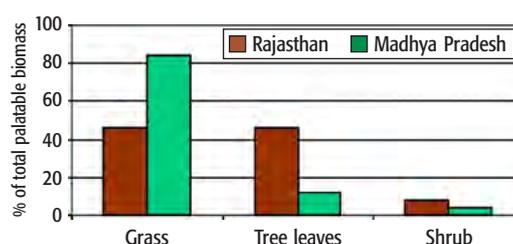
** Tree leaves have been calculated at 5% of the total standing biomass.

* The calculation for grass biomass is an underestimate as the time of the study coincided with the lean period of grass production in the area/village.

livestock. For e.g., in the villages of Rajasthan, where the availability of leaf and pods has significantly increased over time, there has been an enlargement in the herd size of small ruminants, whereas in the villages of Madhya Pradesh where it is the grass cover that has improved more substantially, the households show a preference towards rearing of large ruminants such as the buffalo.

The contribution of the protected patches in the total fodder availability from the Commons is another significant finding. This

Graph 5.1: Composition of fodder availability from commons (in %)



issue is more clearly visible in the study villages of Rajasthan where the protected patches constitute a smaller portion of the total Commons (average 25%) but contribute 60% of the total fodder availability. This high contribution from protected patches not only marks them out as critical resources, it emphasises the need to make institutional arrangements for use of these resources, an aspect explored in more detail in the Section 5.3. In Madhya Pradesh too, where protected patches constitute around 80% of the total Commons, their contribution has been significantly higher.

Contribution of Commons in Fodder Availability

Dry matter available from the Commons and crop residues were calculated to estimate the contribution of the Commons to the feed and fodder availability in a village. The estimation of crop residue³ availability is based on the average cropping pattern in the village, the average gross cropped area and the average yield per hectare of

Table 5.5: Dry Matter (DM) Available from Commons and Crop Residue

Villages	Total Common (in ha)	Average Gross Sown Area (in ha)	DM from Commons (in tonne)	DM from Crop Residue (in tonne)
FES Supported Villages (Rajasthan)				
Thoria	261	331	616	500
Dhuwadiya	493	249.2	1079	376
Sanjadi Ka Badiya	175	176	728	199
Saredi Kheda	155	112	359	313
Amritiya	145	269	251	810
Bharenda	245	100.5	493	303
Cheetrawas	751	112.5	9,756	332
Dheemri	102	93	1,322	274
BAIF Supported Villages (Rajasthan)				
Jodha Ka Kheda	320	306	220	545
Gudha Gokalpura	610	336	316	1,011
Average Rajasthan	326	209	1514	466
Madhya Pradesh (FES Supported Villages)				
Bhanpura	156	135	840	352
Jagatpura	143	114	642	296
Karwakhedi	286	198	1,538	515
Rajakhedi	113	103	389	268
Rojani	104	370	178	962
Average M.P.	161	184	717	479

³ The average cropping intensity of the district and the agricultural landholdings of households, collected through household surveys, have been used to estimate the average gross cropped area in those villages where data was not available for 3-4 successive years.

different crops, while taking into account the variations in these factors across the years (mainly because of the erratic and fluctuating rainfall in these locations).

The fodder availability from crop residues and the Common lands constitutes a major share of the total fodder availability in a village. Fodder availability is additionally derived from *beed* land, trees on private farms, grasses from farm bunds etc., all of which have not been covered in this particular study since the primary focus has been on understanding the fodder availability from the two main sources, namely, the total dry matter available from the Commons and from crop residues across villages. Both of these are directly influenced by the area under the Commons and the cultivated area for crop and fodder production in the village.

In the villages of Rajasthan, the dry matter availability from the Commons constituted around 60% of the total fodder availability. Excluding Cheetrawas village, where dry matter available on Commons is significantly high, the average contribution of the Commons in fodder availability comes to around 37%. In case of Madhya Pradesh, the dry matter availability from the Commons constitutes around 50% of the total fodder availability. The data clearly underlines the high contribution of the Commons to total dry matter availability.

Valuation of Biomass

The stock value and the flow value of biomass from the Commons have been calculated by multiplying the biomass figures with 2007-08 market prices. These ranged from Rs.155 only to almost Rs.1100 thousand per tonne for the standing biomass of trees. Biomass from shrubs have been valued @ Rs.1.5 thousand per tonne. Grass biomass derived from commons has been valued at Rs.900 per tonne in terms of the dry weight. Values of leaf-material have been estimated by drawing upon existing studies in the region.

Standing Biomass and Its Value: An Aggregate Picture⁴

Table 5.6 summarises the minimum, maximum and average biomass available on the protected and non-protected patches on the common lands across the villages studied in the two States. Standing tree biomass range between 6 tonne per ha to 283 tonne

⁴ The details of village and State wise biomass values and their monetary estimates have been provided in Document 21A (Protection and Regeneration of Common Pool Resources: Estimating Economic Value) and Document 21B (Vegetation Analysis of Protected Common lands).

per ha with an average of 52.59 tonne per ha on the protected patches of the Common lands. The tree biomass values are relatively higher in villages of Rajasthan than in Madhya Pradesh. The standing tree biomass on non-regenerated Commons comes to an average of around 20 tonne per ha. The shrub biomass values are also higher in the regenerated Commons. On an average, the total biomass on the regenerated Commons comes to around 62 tonne per ha in comparison to an average of 23 tonne per hectare on the non-regenerated Commons.

Table 5.6: Biomass of Trees, Shrubs and Grasses: Maximum, Minimum and Average Values

		Tree BM (tonne/ha)	Shrub BM (tonne/ha)	Grass (tonne/ha)	Total BM (tonne/ha)
Protected Patches	Maximum	282.82	20.74	8.50	301.62
	Minimum	5.80	1.09	0.31	11.19
	Average	52.29	6.36	2.98	61.63
Other Commons	Maximum	140.43	12.84	1.18	143.68
	Minimum	0.00	0.41	0.03	2.59
	Average	19.54	3.38	0.54	23.45

Based on these biomass estimates, which were done after a detailed vegetation analysis across villages, the total monetary value of biomass was calculated. In Rajasthan the monetary value of the total standing biomass on the Commons range between Rs.3000 thousand to as high as Rs.157800 thousand across the study villages. The highest value of biomass is observed in Cheetrawas village, due to higher biomass availability per ha as also a relatively higher area under Commons. In the total stock value, the tree biomass values constitute the dominant category and are more than 80% of the total value. This is followed by the values of shrub and grass. The monetary values of biomass on regenerated Commons range from Rs.18.6 thousand per ha to Rs.460 thousand per ha across villages. In comparison, the monetary values of biomass per hectare on non regenerated/unprotected Commons have ranged from Rs.3.9 thousand to Rs.216 thousand per ha. The average monetary value of the total biomass on the protected Commons in Rajasthan (excluding Cheetrawas village which has a significantly higher values) comes to around Rs.55 thousand per ha in comparison to Rs.11 thousand on non-regenerated commons. In Madhya Pradesh, the estimated monetary value of biomass comes to an average of Rs.59 thousand per ha on the protected commons while in comparison the values on non-regenerated commons came to around Rs.12 thousand per ha. .

Value of Fodder and Feed from the Commons

Table 5.7 shows the total value of biomass available to livestock-keepers across the study villages as well as the share per household. In Rajasthan, on an average, a household derives fodder worth around Rs.10.7 thousand per annum from the Commons. Keeping in view the different levels of dependence of the different landholding classes on the Commons, it will be safe to assume that poor livestock-keepers derive a higher value of fodder from the Commons. In the study villages of Madhya Pradesh, the average value comes to around Rs.7.6 thousand per household per annum. These are significant contributions, keeping in view the conservative estimate of dry matter value per tonne that has been taken into account. These imply even greater values in drought periods when, on an average, the prices of dry matter almost double.

Table 5.7: Monetary Value of Feed and Fodder Derived from Commons

Villages	No. of households	Total Common (in ha)	DM from Commons (in tonne)	Total value of fodder from Commons (Rs thousand)	Value per household (Rs thousand)
FES supported Villages (Rajasthan)					
Thoria	136	261	616	554	4.1
Dhuwadiya	92	493	1,079	971	10.5
Sanjadi Ka Badiya	65	175	728	655	10.1
Saredi Kheda	90	155	359	323	3.6
Amritiya	90	145	251	226	2.5
Bharenda	60	245	493	443	7.4
Cheetrawas	155	751	9,756	8780	56.6
Dheemri	167	102	1,322	1190	7.1
BAIF supported Villages (Rajasthan)					
Jodha Ka Kheda	163	320	220	198	1.2
Gudha Gokalpura	257	610	316	284	1.1
Average Rajasthan Study Villages	127.5	325.7	1514	1362	10.9
Madhya Pradesh (FES supported Villages)					
Bhanpura	77	156.44	840	756	9.8
Jagatpura	108	143.43	642	578	5.3
Karwakhedi	92	286.43	1538	1384	15
Rajakhedi	53	112.56	389	350	6.6
Rojani	130	104.305	178	160	1.2
Average Madhya Pradesh Study Villages	92	161	717	646	7.6

Role of Common Land Development in Building Healthy Watersheds

Located on slopes and constituting a major portion of the village landscape, Common lands provide varied ecological services. (Ecological services constitute the ecological processes and functions that sustain and improve human life.) These can be divided into four categories:

- 1) Provisioning services, or species that provide us with food, fodder, timber, medicines and other useful products.
- 2) Regulating services such as flood control, erosion control and climate stabilisation.
- 3) Supporting services such as pollination, soil formation, water recharge and water purification.
- 4) Cultural services, the aesthetic or recreational assets, which provide both tangible and intangible benefits (*Kremen and Ostfeld 2005*).

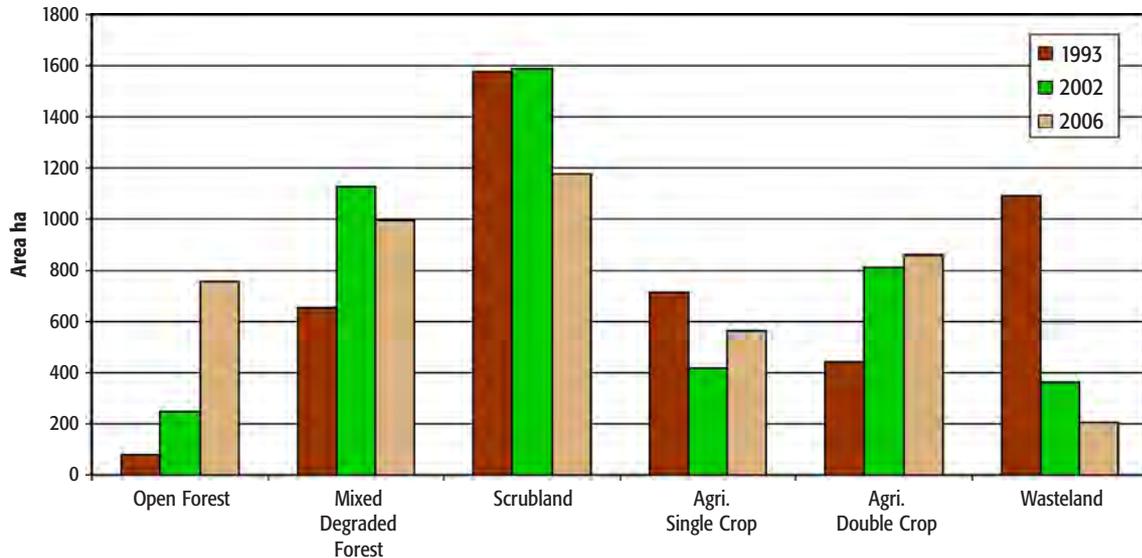
Understanding the role of Commons in influencing ecological services gives us a more holistic picture of the functions it plays and emphasises the need to carry out activities to restore and maintain these resources. The study has broadly analysed some of the ecological services being strengthened with Common land development work, especially related to its influence in determining the land use, the land cover, nutrient transfers through soil etc., and water recharge. The analysis is based on the assessment of changes within watersheds that have seen extensive work on Common lands over a time period and comparison of the same with an adjacent watershed, which has similar socio-economic and ecological characteristics, but has not witnessed any programmatic action for development of the Commons.

The above analysis was carried out in the Thoria watershed in Rajasthan and the Ladwan watershed in Madhya Pradesh and the adjacent control watershed in these two locations. Images from Remote Sensing (RS) satellites were used to assess the changes in land use and land cover that took place due to community interventions for the protection and conservation of natural resources. Use of both the digital and visual analysis techniques (Hybrid) has been done. Further, Geographic Information System (GIS) techniques have been used in the integration of RS data with other spatial and non-spatial information.

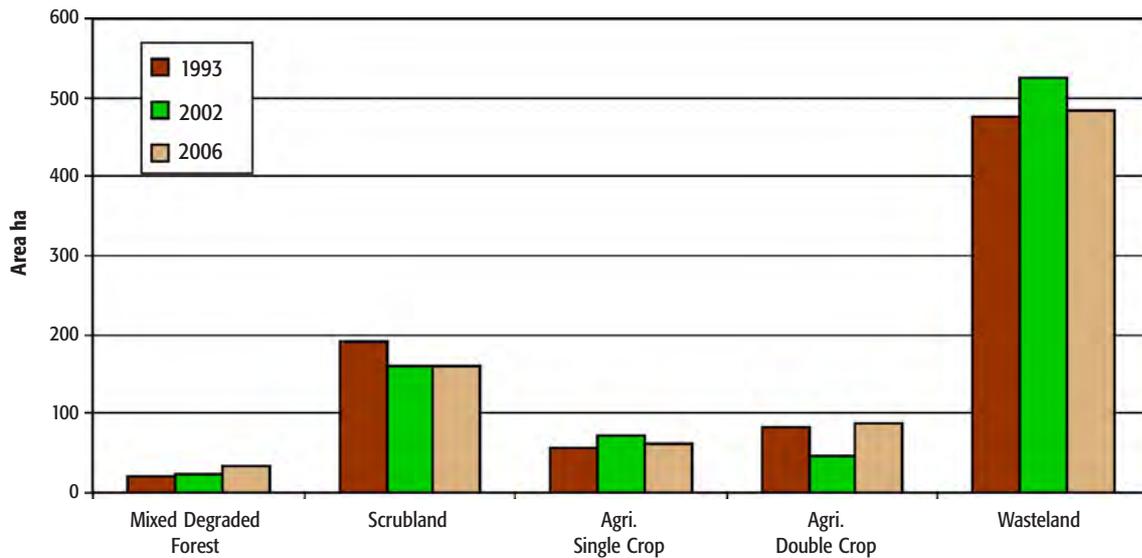
The findings show that work on Commons in contiguous patches, for e.g. within the defined hydrological boundaries of a watershed, can play a key role in positively influencing land use/cover. In contrast to the adjoining control watershed, the changes here reflect the progression towards a healthy watershed and marked improvement in its various features.

Graph 5.2 & 5.3: Change in Land Use/Cover in Thoria Watershed and Control Watershed in Rajasthan (1993-2006)

Change in Landuse/cover of Thoria Watershed from 1993 to 2006



Land Use/Cover changes in control watershed in Rajasthan



Changes in Land Use/Cover⁵

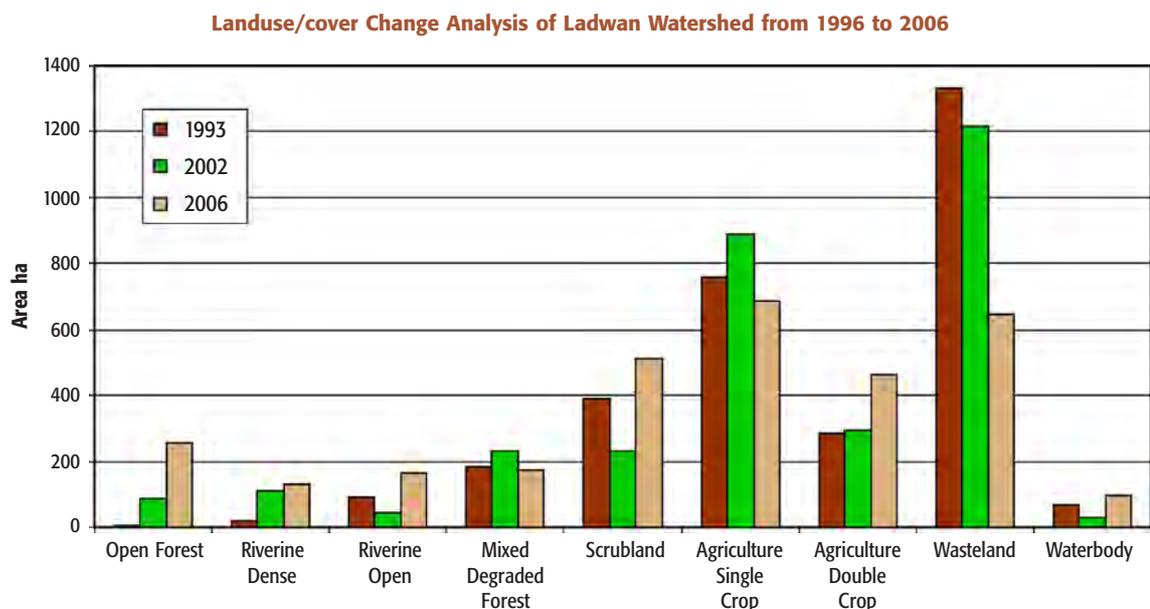
In case of the Thoria watershed, the open forest category – which has canopy cover in the range of 10% to 40% – has significantly increased since 1993 with the start of community management of the Commons. The open forest area, which was 80 ha in 1993, increased to 756 ha by 2006. The mixed degraded forest also improved by 52%.

⁵ The details of land use and land cover changes with work carried out on the Commons are provided in Document 21C: “Assessment of land use and land cover changes: Impact of Common land development”

This increase was reckoned at 73% in 2002, but with more areas coming under the open-forest category, there was a reduction in the mixed degraded forest area. Similarly, scrubland was promoted to mixed degraded and open-forest category by 2006, causing a decrease of about 25% in this category. The assured availability of water (as against the pre-intervention period) boosted the agricultural area under double crop by almost 94%, while the wasteland category showed a reduction of 81% in 2006 compared to 1993.

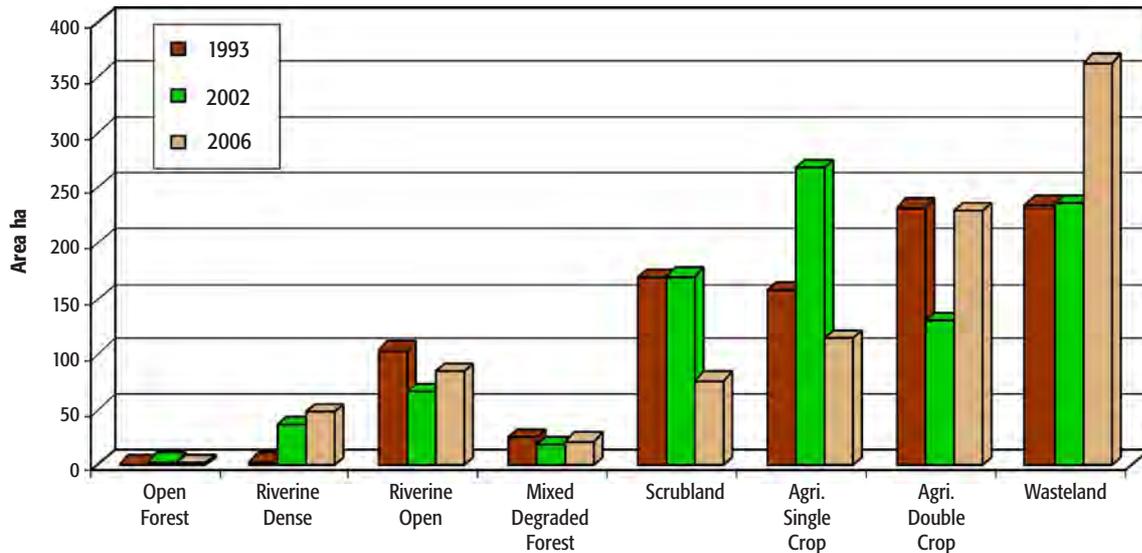
A similar analysis of change carried out in an adjacent watershed shows a static picture of land use, with negligible changes in vegetative cover and agriculture from 1993 to 2006, except in the category of mixed degraded forest. Since there is no protection by the community, the wasteland area has not reduced since 1993.

Graph 5.4: Change in Land Use/Cover in Ladwan Watershed (Madhya Pradesh.)



Similar trends are seen in Madhya Pradesh. In Ladwan watershed, where extensive regeneration work was carried out on the Commons by the community, a sharp decline in land classified as wasteland, and marked improvements in the qualitatively-higher land cover of open forest, riverine dense and scrubland. Simultaneously, the agricultural area under double crop (*Rabi*) increased significantly (by 65%) in the decade from 1996 to 2006. While generally the area under double crop decreased in 2002 owing to consecutive years of drought, in the same period, in the lands lying downstream of the water-harvesting structures constructed by the community, the double-cropping area actually went up.

Graph 5.5: Change in Land Use/Cover in the Control Watershed in Madhya Pradesh.



Change analysis in the control watershed shows a drastic increase in the area under wastelands but improvement in the Riverine Dense Forest category. Overall, the analysis depicts increased degradation with increasing pressures on the land, lack of governance mechanisms on the Commons and increasing vulnerability of communities to droughts.

Improvement in Soil Nutrients

In Thoria watershed, the organic content of the soil increased by 45% as compared to soil of the control micro-watershed. Other soil nutrients of the area too show like results. There was a 9% increase in nitrogen, 7.5% increase in phosphorus and 22% increase in available potassium over the adjoining micro-watershed. All these indicators point towards enrichment in the soil condition of the watershed over the years.

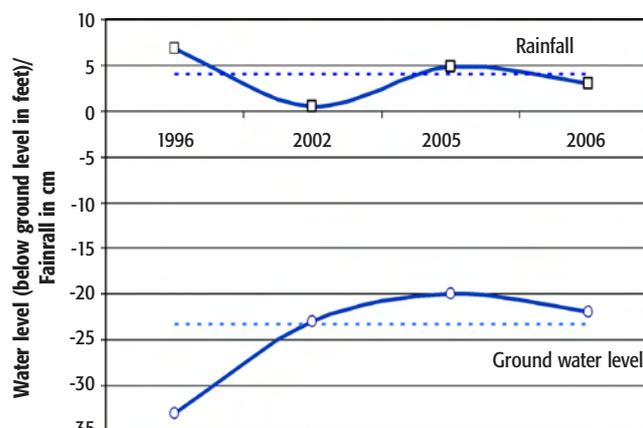
In Madhya Pradesh, there is an overall increase of 14% in the organic carbon content of the area as compared to the adjoining micro-watershed. There is a 39% increase in the available nitrogen content, 24% increase in available phosphorus and 23% increase in the available potassium content in the soil. Moreover soil pH has also shown a trend from near-alkaline to neutral values.

Improvement in Water Availability

Intensive soil moisture conservation, accompanied by the construction of water harvesting structures on the Commons, has led to improvements in the availability of

both surface and groundwater. Water level observations of wells in the Thoria watershed confirm improvement in groundwater levels. In comparison to water levels in 1996 which were 33 ft. after the monsoons (October), average water levels between 2002 and 2006 were around 23.25 ft. This indicates a gain of around 10 ft. in the water column, offering higher

Graph 5.6: Trends in Groundwater Level (Post Monsoon) in Thoria Watershed



irrigation potential and reducing shortage of water in dry months. The interventions on the Commons have also shown similar trends in the Ladwan watershed. The study in the Ladwan watershed recorded an increase in water levels in 63 out of 83 wells surveyed, with a concurrent increase in *Rabi* cropped area by about 85 hectares.

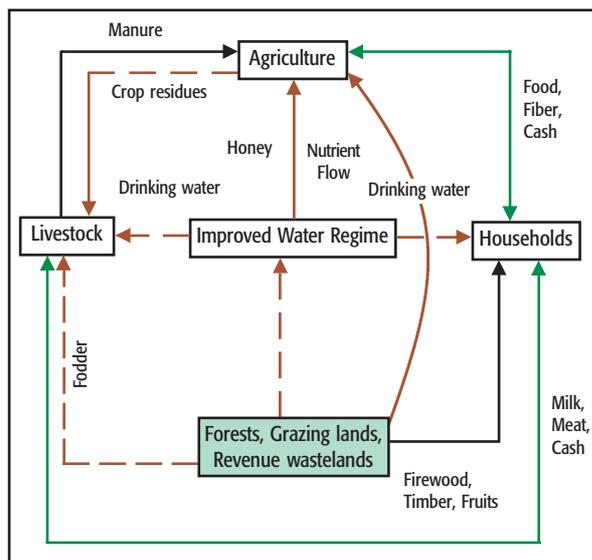
Table 5.8: Estimates of Impact of Common Land Development on Agriculture (Thoria and Ladwan Watersheds)

Details	Rajasthan	Madhya Pradesh
1. Average Estimated Increase in Irrigated Area with Common Land Development	14 ha. in <i>Rabi</i>	22 ha. in <i>Rabi</i>
2. Main Crops	Maize and Wheat	Soybeans, Wheat and Gram
3. Net Returns for Major Crops (Rs./ha)	Maize – 15,600 Wheat – 25,500	Soybeans – 10,000 Wheat – 23,500 Gram – 20,300
4. Net Returns per Village (Rs.)	3,57,000 from Wheat	5,17,00 from Wheat
5. Additional Fodder from Crop Residues	21 tonne	57 tonne

With temporal variations in rainfall, the increase in water availability has not been uniform. Spatial variations in groundwater conditions may be associated with location-specific changes in topography as also the sites of Common land development. These broad trends, coupled with the above-mentioned changes in land use/cover and soil nutrients clearly indicate the improvement in the ecological health of the watersheds with the work carried out for ecological restoration of the Commons.

Reinforcing Inter-linkages between the Production Systems

Improvement in the ecological health of the Commons subsequently contributes to the strengthening of the other production systems. This in turn enhances the services and flows to the farming and livestock systems, such as flow of fodder and feed from the Commons to the livestock. Also, the improvement in water regime and nutrient flows, in turn, help increase the flow of crop residues to livestock and the expansion of cultivated areas.



5.2 LIVESTOCK PRODUCTION SYSTEMS

Agriculture and animal husbandry have traditionally been the two pillars sustaining rural livelihoods in the dryland. They are synergistic and complementary, thus reducing livelihood vulnerability to natural calamities such as drought and disease. Some of the key features of livestock production systems in the study locations are

- Livestock rearing is practised as part of mixed farming systems with most households owning some large ruminants and a few small ones
- The role of the Commons in the system is critical for livestock rearing, especially for landless, marginal and small farmers. The commons by providing fodder and water make direct contributions to livestock rearing.
- There are also indirect benefits for livestock rearing arising from collective action on the Commons.

Assessment of livestock systems and changes therein has been based on data from baseline surveys of certain villages, livestock census data, focussed group discussions and household surveys. The collected information has been collated and analysed in order to understand in detail the nature of livestock systems in the study regions and the role of biophysical improvements in influencing livestock systems.

Nature of Livestock Systems

Across the study locations, livestock rearing has been an important component of the livelihood system. Communities living in arid and semi-arid lands have historically incorporated animal husbandry into their livelihood strategies. This is reflected not only in livestock rearing among diverse groups like pastoralists, sedentary farmers, agro-pastoralists, tribal farmers, etc., but also in the large livestock holdings found in these regions.

The livestock systems in these locations are predominantly based on the rearing of cattle, buffalo, goat and sheep. Poultry is another growing livestock category especially in tribal villages, however it still constitutes a very small portion of the total livestock asset base. It has hence not been considered while understanding the relations between Common Land Development and Livestock.

Table 5.9: Purpose of rearing and feeding system for major livestock

Animal	Purpose of rearing	Feeding systems and sources of fodder
Indigenous Cattle	Socio-cultural value, draught power, milk for home consumption, sale of milk (where good indigenous breeds are present as in villages in Ajmer), ghee ⁶ and butter milk (sale of <i>ghee</i> is important in villages in Bhilwara), <i>mawa</i> (villages in Madhya Pradesh), manure, sale of young calves.	Grazing (average eight hours per day) supplemented with crop residues; bullocks are usually raised on crop residues and grazing in private <i>beeds</i> ; milch cattle are provided with some concentrates.
Buffaloes	Perceived to be of high economic value, milk for home consumption, sale of milk (high fat content), <i>ghee</i> and butter milk (sale of <i>ghee</i> is more dominant in villages in Bhilwara), <i>mawa</i> (villages in Madhya Pradesh.), manure, sale of male calves.	Grazing (average four hours) plus crop residues and cultivated green fodder; mineral mixtures and concentrates are also provided to buffalo in milk.
Sheep	Milk for consumption, sale of wool, sale of lambs and ewes, manure.	Grazing (average eight hours) on the Commons, farm fields after harvesting, lopped tree leaves and pods.
Goat	Sale, milk for consumption, manure	Grazing (average eight hours) on the Commons, farm fields after harvesting, lopped tree leaves and pods.

Table 5.9 highlights the main purposes behind rearing a particular type of livestock and the feeding system of each. Livestock in these locations are reared for multiple reasons. Most fodder and feed requirements of different livestock categories are met through:

⁶ Ghee is a class of clarified butter and is an important ingredient of local food system. Mawa is basically dried milk used for making most sweet dishes.

- Grazing on the Commons
- Grazing on farm fields after harvest (which are also *de facto* used as commons after harvest)
- Lopped leaves and pods of different trees
- Supplemented by crop residues to meet any deficit.

The proportion of crop residues in the total fodder intake increases as the fodder availability from the Commons decreases (from monsoon to winter to summer). This also increases with the increase in economic value of livestock- bullocks and bovines in milk being given a relatively higher share of the crop residues to meet the fodder requirement. Dependence on crop residues to meet the fodder requirement of livestock decreases or increases in proportion to the availability or shortage respectively of fodder from the Commons. When total fodder resources available in the village fall short of total requirements, fodder is purchased from outside sources. In desperate situations, the livestock-keepers are forced to migrate to far off places to maintain their herds. Deficits in fodder availability make livestock systems vulnerable, especially for poor households, with increased costs of feeding making livestock-keeping economically unviable.

Table 5.10 shows the population of different livestock varieties across villages in Rajasthan and Madhya Pradesh. Indigenous cattle constitute around 10% to 35% of the total livestock in Rajasthan. In villages like Thoria and Dhuwadiya, Gir is the most dominant breed in the indigenous cattle population. Across the other study villages, different mixed breeds of cattle can be found, which are generally classified as 'nondescript'. Crossbred cattle are present mainly in three villages – Jodha Ka Kheda, Gudha Gokalpura and Dheemri – while a very small population is found in the village of Amritiya. The other three villages showing a higher population of crossbred cattle have benefited from the continued presence of BAIF and its livestock breeding programmes.

Buffaloes are the other important livestock variety and constitute around 7% to 15% of the total livestock in the study villages of Rajasthan. Both the lowest and the highest percentage of buffaloes in the total livestock population is seen in villages with an average rainfall below 500 mm – indicating that other factors also influence the buffalo population.

Sheep population constitutes around 5% to 50% of the total livestock population across villages in Rajasthan. Sheep constitute a relatively higher proportion of the total

livestock population in villages which receive less than 500 mm rainfall, and are inhabited by caste groups like the Gujjars and the Meghvanshi. In contrast, in tribal-dominated villages like Gudha Gokalpura, Cheetrawas and Dheemri, sheep constitute a relatively lower share of the total livestock. Goats constitute 26% to 66% of total livestock population. Except Sanjadi ka Badiya and Saredi Kheda, which have a higher sheep population, goats, on an average, constitute more than 40% of the total livestock population.

Table 5.10: Livestock Population across the Study Villages (2007-08)

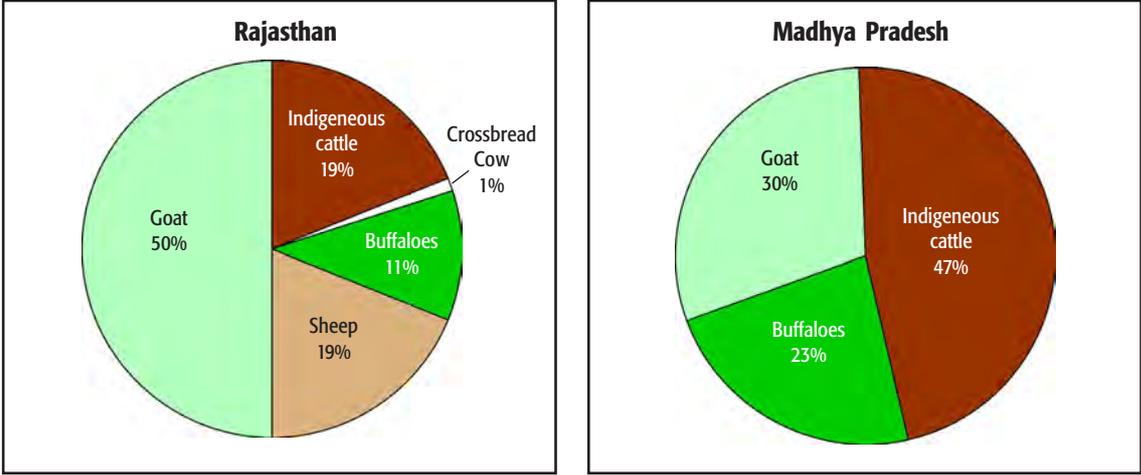
Villages	Indigenous cattle	Crossbred cow	Buffaloes	Sheep	Goat	Total livestock	Adult Cattle Unit (ACU)
FES supported Villages (Rajasthan)							
Thoria	330	0	212	328	543	1,413	543
Dhuwadiya	244	0	183	372	538	1,337	456
Sanjadi ka Badiya	65	0	58	391	238	752	170
Saredi Kheda	246	0	114	797	402	1,559	413
Amritiya	411	8	154	187	397	1,157	504
Bharenda	160	0	110	150	725	1,145	319
Cheetrawas	901	0	484	567	2042	3,994	1320
Dheemri	486	77	350	148	1869	2,930	915
BAIF supported Villages (Rajasthan)							
Jodha Ka Kheda	92	51	96	151	592	982	277
Gudha Gokalpura	261	22	177	140	1170	1,770	521
Average Rajasthan	320	16	194	323	852	1,704	544
Madhya Pradesh (FES supported Villages)							
Bhanpura	254	0	179	0	155	588	371
Jagatpura	258	0	157	0	157	572	345
Karwakhedi	435	0	177	0	339	951	491
Rajakhedi	209	0	128	0	143	480	286
Rojani	331	0	89	0	175	595	326
Average Madhya Pradesh	297	0	146	0	194	637364	

Note: 1 Adult Cattle Unit (ACU) = 320 kg; Keeping in mind the demographic composition of livestock (district averages) and the average body weight of different livestock, the following conversions were used: Indigenous cattle = 0.7-0.62, Crossbred cattle = 0.72-0.76, Buffalo = 1.2-.94, Sheep/Goat = 0.1.

On an average in the study villages of Rajasthan, bovines constitute 30% of the total livestock and small ruminants form the other 70%. The livestock composition in Madhya Pradesh study villages shows a different structural composition, one of the most significant differences being the relatively higher percentage of indigenous cattle and buffalo. Across the study villages, none of the households were observed to possess sheep that, in contrast, constituted a very dominant livestock category in some of the

Rajasthan villages. The population of buffalo in these villages is relatively higher in comparison to the villages of Rajasthan, indicating a shift in livestock composition.

Graph 5.7 and 5.8: Average Livestock Composition in Villages of Rajasthan and Madhya Pradesh



Livestock systems across different household categories

To understand livestock systems across the different households, households were classified according to the size of their landholdings. The households were classified as landless, marginal (less than one ha), small (1-2 ha), medium (2-4 ha) and large (above 4 ha). For the purpose of the study, the categories of landless, marginal and small farmers have been broadly categorised as poor households. Table 5.11 shows the distribution of households across different land-holding classes across both States. Landless, marginal and small households constitute around 85% of the total households in the study villages in Rajasthan with the highest number of households falling in the marginal household category. Landless families constitute a relatively smaller proportion, of around 2% of the total households.

Table 5.11 Distribution of Households Across Landholding Classes

Land Holding Classes	% of Households (Rajasthan)	% of Households (Madhya Pradesh)
Landless	1.82	11.88
Marginal	48.41	29.82
Small	33.3	27.13
Medium	12.61	17.71
Large	3.86	13.45

In Madhya Pradesh, around 70% of the households are landless, marginal and small farmers. Landless households constitute around 12% of the total households, while marginal and small farmers constitute around 47% of the total households. In Rajasthan, landless households are present in the four villages of Thoria, Amritiya,

Cheetrawas and Jodha Ka Kheda. Marginal families constitute 17% to 95% of the total households with the highest concentration of marginal families found in the village of Dheemri and the lowest in Dhuwadiya. Data shows a dominance of households in the marginal and small farmer categories. Small farmers comprise about 5% to 58% of the total households, while medium and large farmers comprise around 3% to 30% and 1% to 20% respectively. In Rajasthan the landholding data also shows an increase in landholding as we move from relatively better rainfall (greater than 500 mm) areas to low rainfall areas (less than 500 mm). Marginal farmers constitute 42% of the total households in lower rainfall zones and a substantially higher 61% in areas with relatively better rainfall. This trend is seen in other landholding categories too, indicating relatively higher land availability per household in villages with lower rainfall areas.

Comparison of current landholding categories with data of 2001-2002 reveals another important change across study villages. The analysis shows an increase in households in marginal and small farmer categories and a decrease in households in the medium and large farmers category. This issue, highlighted in focussed group discussions, was seen as an indication of the growing preference for nuclear families in response to socio-cultural changes occurring across these villages, besides increasing migration in recent years. The increasing fragmentation of landholdings further emphasises the importance of Common lands in these locations for reducing the risks and vulnerability of livestock-keeping.

Table 5.12: Changes in Distribution of Households in Rajasthan

Category	% no of Households in 2001-2002	% no of Households in 2007-2008
Landless	1	2
Marginal	40	48
Small	26	33
Medium	20	13
Large	12	4

The landless constitute about 12% of the households in the villages studied in Madhya Pradesh. Another third of the households own landholdings sized less than a hectare. A large majority of these land-poor families belong to the Scheduled Castes – the Bhalai, Banchada, Bagri, Dholi, Malviya, Suryawanshi, Sutar and Lohar. Historically, these castes settled in their respective villages to function as service communities for the Gujjar and Sondiya Rajput families. Over time, these households acquired agricultural land, many through government allocation of Common lands, much of which are in the upper reaches of the village. With inadequate capacity to invest in land development, these households resort to livestock-keeping and other wage-

earning opportunities. In addition, land is getting increasingly fragmented, leading to an increasing number of households unable to eke out their livelihoods from their small patches of land. Some of the non-farm based livelihoods in the region include blanket selling, making mats from palm leaves, small trade in cattle, and sale of seasonal produce from the Commons such as berries, mangoes and seeds of *Cassia tora*.

Distribution of land across the study villages shows a common trend of inequality. To understand the inequality in landholdings, a Lorenz curve was drawn for all the households. In comparison to Rajasthan, the inequality in landholdings is found to be higher in the study villages of Madhya Pradesh. For e.g. around 70% households in Rajasthan own 40% of the land whereas in Madhya Pradesh, they own less than 30% of the total land.

Livestock rearing forms an important livelihood activity across these different landholding classes. Table 5.13 shows details of households rearing livestock in both States. In Rajasthan, around 90% of the households rear livestock, with a slight variation among the different landholding classes. However, significant variations can be seen between households in the composition of the livestock population. Households rearing cattle and bullocks decrease as landholding size increases. However, the number of households keeping buffaloes increased with the increase in landholdings. In the study villages in Madhya Pradesh, households keeping livestock – cattle, bullock and buffalo – all show an increasing trend to own larger landholdings. Households keeping small ruminants are significantly higher in Rajasthan as compared to Madhya Pradesh.

Table 5.13: % Households across Different Landholding classes Keeping Livestock

	Any Livestock	Cattle	Bullock	Buffalo	Sheep	Goat
RAJASTHAN						
Landless	87.5	87.5	31.3	25.0	6.3	68.8
Marginal	96.5	80.3	57.3	53.5	16.2	79.3
Small	97.6	81.2	51.5	64.5	19.1	79.9
Medium	91.9	70.3	29.7	59.5	18.0	69.4
Large	85.3	61.8	23.5	67.6	5.9	70.6
MADHYA PRADESH						
Landless	63.5	35.8	3.8	15.1	0	34.6
Marginal	83.2	71.5	8.3	19.4	0	34.3
Small	91.8	82.7	37.3	47.3	0	32.7
Medium	97.4	88.6	60.8	70.5	0	35.4
Large	100.0	98.3	96.7	85.0	0	26.7

Table 5.14 gives the mean livestock holding across different landholding classes.

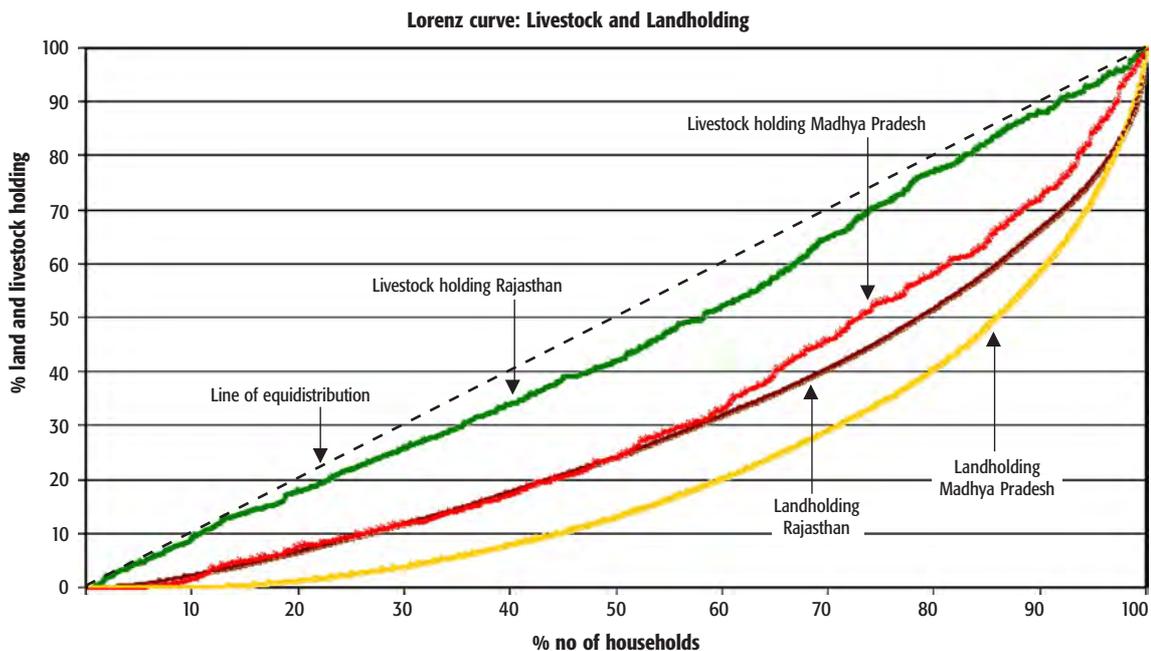
Overall data analysis of livestock systems at household level coupled with village level discussions helped reveal that in comparison to landholdings, livestock holdings show relatively less inequality (Graph 5.9). Simultaneously livestock per unit of farmland (livestock intensity) is relatively higher across small and marginal farmers, and decreases as we move towards large farmers (Graph 5.10 and 5.11). Both the figures indicate the relatively higher dependence of small-marginal farmers on livestock at one level and also their higher dependence on the village Commons to meet their feed, fodder and water requirement.

Table 5.14: Mean livestock holding across different landholding classes in Rajasthan and Madhya Pradesh

	Cattle	Buffalo	Sheep	Goat
RAJASTHAN				
Landless	4.31	0.56	0.06	7.06
Marginal	2.91	0.97	2.82	4.52
Small	3.45	1.68	3.72	6.28
Medium	3.23	1.88	2.8	5.86
Large	3.03	3.18	1.29	6.91
MADHYA PRADESH				
Landless	1.08	0.28	NA	1.27
Marginal	2.01	0.47	NA	2.1
Small	3.58	1.5	NA	2.01
Medium	4.11	2.4	NA	2.43
Large	7.03	4.93	NA	3.15

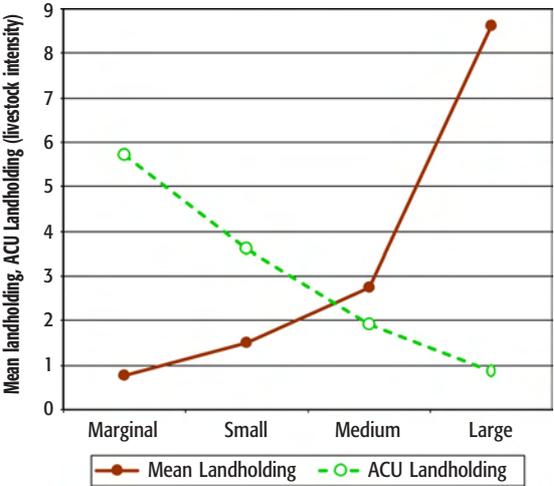
Across the States the degree of inequality is comparatively higher in both livestock and landholding in Madhya Pradesh as compared to Rajasthan. One of the most significant reasons for this higher inequality in the livestock holdings in Madhya Pradesh, can be traced to the relatively smaller small-ruminant holdings in the study

Graph 5.9: Inequality in Land and Livestock Holding in Study Villages in Rajasthan and Madhya Pradesh

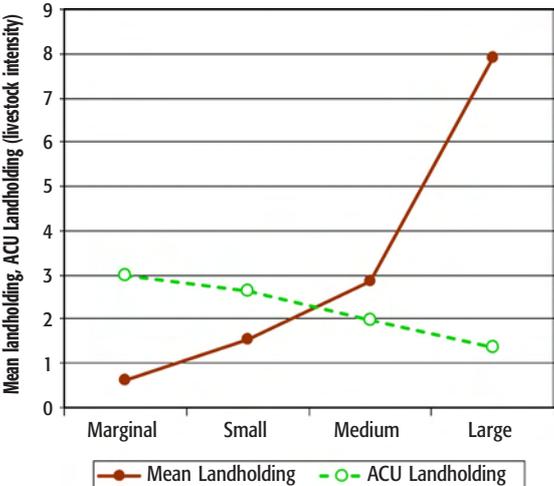


villages here. The composition of fodder (with higher tree biomass in Rajasthan in comparison to Madhya Pradesh.) from the Commons seems to be an important influencing factor. Simultaneously, there are other factors at work – like a higher inequality in landholdings, social taboo towards keeping of small ruminants and perceived vulnerability (based on a recent disease outbreak in some of the study villages leading to drastic reduction in the small ruminant population) influencing what we may call the smaller holdings of small ruminants.

Graph 5.10 Livestock Intensity in Rajasthan



Graph 5.11 Livestock intensity in Madhya Pradesh



Dependence on Commons

In order to understand the dependence of livestock on the Commons, the fodder requirements of different livestock varieties were calculated. For estimating their dry matter (DM) requirements, 2.5% of the body weight was taken for bovines and 3.5% of the body weight for small ruminants. Based on the estimates of fodder availability from the Commons and crop residues, the dependence on the Commons has been calculated. Table 5.15 shows the total DM requirement, the DM available from the Commons and crop residues and the contribution of different sources towards total fodder availability. The study did not calculate other sources for feed and fodder; such as farm bunds, trees on farmlands, grazing areas along roadsides, etc. which also form important fodder resources and also fall in the category of Common Property Resources.

On an average, the Commons contribute around 65% of the total DM requirement of the livestock in Rajasthan and around 60% in Madhya Pradesh. The proportion of fodder requirement met from the Commons varies across the study villages in Rajasthan, with a low of around 16% to a high and a surplus situation of 235% in

village like Cheetrawas. The surplus situation is seen in two study villages (Sanjadi ka Badiya and Cheetrawas) where the fodder available from the Commons is higher than the total requirement within the village. Both these villages, however, have traditionally shared their fodder resources with the adjoining villages and have allowed livestock to graze on their commons. This highlights an important issue in understanding the contribution of the Commons – viewing Commons and Common Land Development only in terms of village-specific phenomena can restrict actual understanding of this contribution. With each village being endowed differently with Common Property Land Resources, the availability of fodder from an adjoining village that has relatively higher Common lands, and the sharing of that fodder with a resource-deficit village are important considerations and practices which have been usually devised in location specific situations. Though the study has not covered this aspect in detail, the study villages of Sanjadi ka Badiya and Cheetrawas highlight this aspect significantly.

Table 5.15: Dry Matter (DM) Available from Commons, Crop Residue and Total DM Requirement: Contribution of Commons

Villages	Total Commons (in ha)	Average Gross Sown Area (in ha)	DM from Commons (in tonne)	DM from Crop Residue (in tonne)	DM Req. per Annum (in tonne)	% DM Available from Commons	%DM Available from Crop Residue
FES supported Villages (Rajasthan)							
Thoria	261	331	616	500	1,687	36	30
Dhuwadiya	493	249.2	1,079	376	1,437	75	26
Sanjadi Ka Badiya	175	176	728	199	570	128	35
Saredi Kheda	155	112	359	313	1,346	27	23
Amritiya	145	269	251	810	1,541	16	53
Bharenda	245	100.5	493	303	1,033	48	29
Cheetrawas	751	112.5	9,756	332	4,158	235	8
Dheemri	102	93	1,322	274	2,927	45	9
BAIF supported Villages (Rajasthan)							
Jodha Ka Kheda	320	306	220	545	909	24	60
Gudha Gokalpura	610	336	316	1,011	1,680	19	60
Average: Rajasthan	326	209	1,514	466	1,729	65	33
Madhya Pradesh (FES supported Villages)							
Bhanpura	156	135	840	352	1,139	74	31
Jagatpura	143	114	642	296	1,069	60	28
Karwakhedi	286	198	1,538	515	1,543	100	33
Rajakhedi	113	103	389	268	888	44	30
Rojani	104	370	178	962	1,019	17	94
Average: Madhya Pradesh	161	184	717	479	1,132	59	43

Further, estimates at village levels can sometimes distort the contribution of the Commons where some portions could be used exclusively by certain groups/hamlets within the village with others depending on other sources for fodder. This was reflected in Dheemri village where the available Commons are used largely by four hamlets within the village, while the main village depends on an adjoining patch of Commons within the *Panchayat*. Considering this, the percentage of fodder available from the Commons significantly increases from 45% to around 120%.

Dependence on commons across different household categories

Based on the livestock units held by different landholding groups, the DM requirement at household level has been calculated. It is understood that most households would face fodder deficit if they were to rely only on their agricultural lands. The deficit in fodder availability indicates the dependence of households on the Commons and other sources of fodder for meeting the feed requirement of their livestock. The deficit in fodder availability is higher among the households with no land or very small holdings and decreases as the size of landholding increases. The estimates show that in Rajasthan on average small and marginal farmers rely on other sources for feed

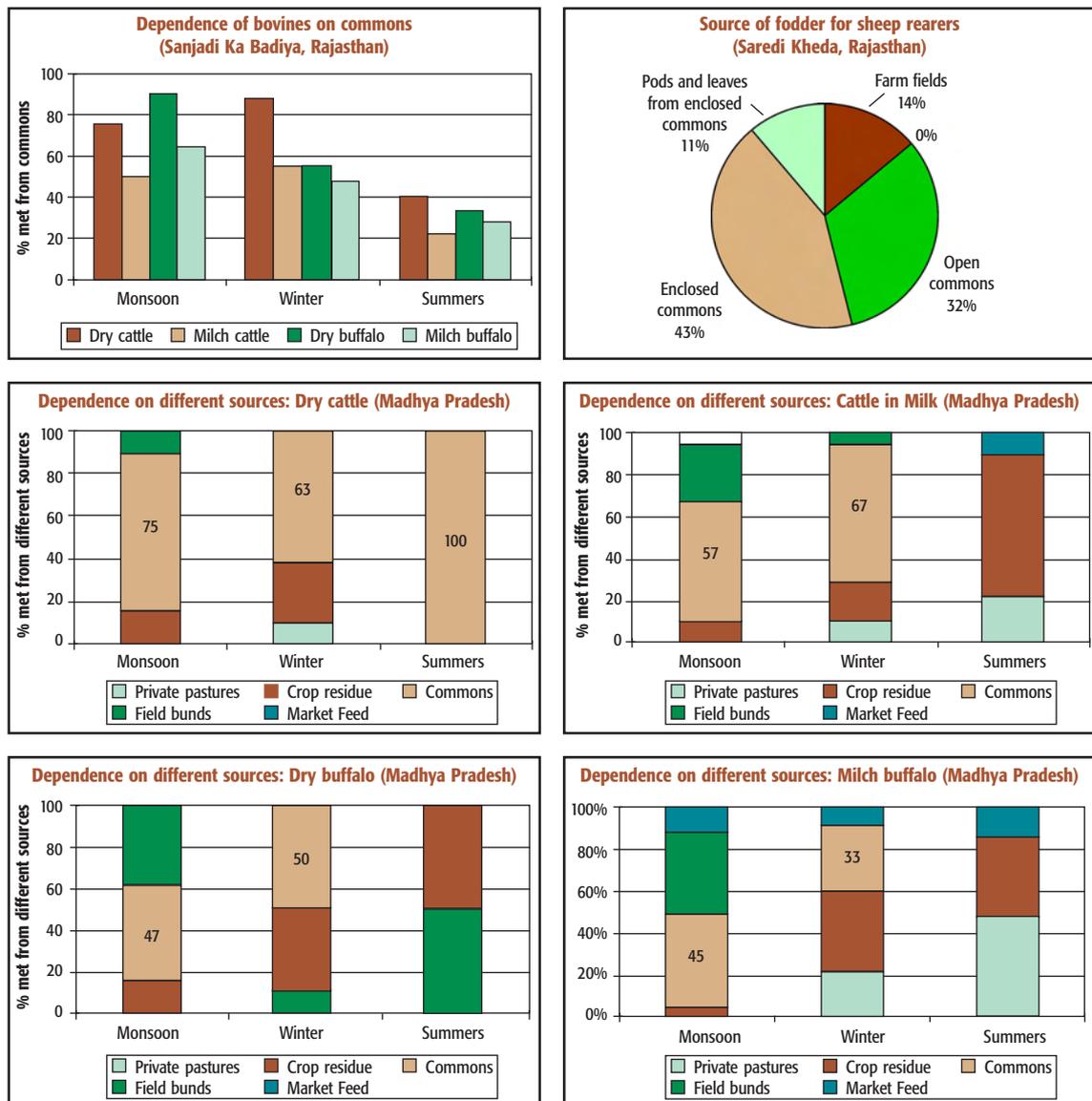
Table 5.16: % Dry Matter Available from Crop Residue

	Landless	Marginal	Small	Medium	Large
FES Supported Villages (Rajasthan)					
Thoria	0	16	34	47	70
Dhuwadiya	NA	19	18	37	69
Sanjadi ka Badiya	NA	18	36	100	NA
Saredi Kheda	NA	8	18	26	77
Amritiya	0	26	44	37	NA
Bharenda	NA	27	30	28	57
Cheetarawas	0	25	26	32	NA
Dheemri	NA	37	70	NA	NA
BAIF Supported Villages (Rajasthan)					
Jodha Ka Kheda	0	11	28	81	288
Average Rajasthan	0	20	28	53	134
Madhya Pradesh (FES Supported Villages)					
Bhanpura	0	36	30	35	44
Jagatpura	0	33	24	68	36
Karwakhedi	0	23	31	37	48
Rajakhedi	0	24	45	27	37
Rojani	0	49	70	129	111
Average Madhya Pradesh	0	33	40	59	55

and fodder by around 70-80%. Similarly in Madhya Pradesh the livestock keepers in small and marginal farmer category rely on other sources of fodder by 60-70%. Both the cases highlight the importance and the need for healthy Commons to meet the feed and fodder requirements of the livestock.

To further understand the dependence on Commons, focussed group-discussions with livestock keepers were conducted in the study villages. These findings provide a general perspective of poor livestock-keeping households across Rajasthan and Madhya Pradesh and help in further understanding the dependence on Commons and other sources of fodder. Fig 5.1 shows some of the results.

Fig 5.1: Dependence of Poor Livestock-keepers on the Commons: Findings from Focused Group-discussions



The first slide shows the dependence of poor households on the Common lands for fodder resources if they rear a large ruminant. The dependence of different bovine categories on the Commons is highest in the monsoon period, which is when most Commons are bestowed with green cover. Significant dependence on the Commons can be seen in the cases of milch cattle and buffalo, which are usually taken to the greenest pastures (embankments of village ponds, anicuts, small water harvesting structures, etc.).

With the end of the monsoons and the onset of October (in some villages slightly earlier), the regenerated and protected Common plots across the villages are opened for grazing or fodder collection. The higher dependence on the Commons in these periods reflects the contribution of protected plots and also the other Commons within the village.

Village discussions helped reveal that the post-monsoon period is the one most impacted by the Common land development work. The standing biomass on the Commons which are opened to grazing (in some villages, the fodder is cut and stored by the households) provides adequate fodder resources for 2-4 months. During this period, there is very low or absolutely no additional crop residues or fodder provided to the livestock. This helps in saving and storing crop residues for later, scarcer times. In the process, households gain not only by saving the crop residues for future use, but also by saving costs of purchasing fodder for the summer months. The households hailed this seasonal self-sufficiency due to Common land development as the most valuable.

The dependence on Commons continues even during the summer for almost all livestock breeds, though the average grazing hours are reduced and the feed is supplemented by a higher proportion of crop residues, other stored fodder and sometimes purchased fodder. During this period, most of the households also resort to selective feeding of livestock with more supplementary fodder given to productive/important livestock (milch cattle or buffalo and bullocks which are used immediately at the end of summer) and the other large ruminants within the herd being left largely to fend for themselves. These livestock usually depend on the Commons and farmlands for their grazing needs. They usually lose body weight during this period and regain it with the onset of the monsoons. However, many households reported a reduction in this phenomenon with some increase in the quantum of fodder availability. Focused group-discussions in Madhya Pradesh too showed a similar trend of dependence on the Commons.

The second slide shows the dependence of sheep keepers. The data describes the case of one village where sheep-keeping has traditionally remained a very important occupation. Grazing by sheep and goats has generally been considered as one of the main factors in accentuating degradation of the Commons. However, this has often led to conflicts within villages among different livestock-holding groups and in many locations, has resulted in a breakdown of the institutional system set up to govern the Commons. In this context, the focussed group-discussion aimed to understand the perspective of sheep-keepers, their dependence on Commons, and the effectiveness of the Common land development process in benefiting the small ruminant keepers.

The study showed that the sheep-keepers' dependence on the Commons exceeded 80% of the total fodder and feed requirement. Focussed group-discussions revealed that with adequate focus on regeneration of trees and adequate open grazing spaces, sheep owners have become important beneficiaries of Common land development. The sheep holders hailed the increased availability of leaves and pods on the Commons as the most important benefit derived from Common Land Development. This has resulted in saving costs incurred on leasing trees and purchasing fodder at significantly higher prices from the markets, and has proved catalytic in increasing their herd size and productivity.

Changes in Livestock Systems with Common Land Development

How does increased biomass and enhanced contributions from the Commons influence livestock systems, especially of the poor livestock-keepers? Though the inter-relationship between improved resource regimes and livestock systems seems obvious and direct, the complexity of livestock systems in drylands which have developed as response to cyclical droughts and shortages of feed, fodder and water shortages, on one hand and the interplay of other socio-economic-institutional-technical factors, clearly made the task very difficult. Before some of the study finding on these aspects are shared it would be important to reiterate the broad nature of livestock systems in the study locations, which inherently guide the trajectory of livestock system development:

- Livestock systems have developed as a response to seasonal and yearly fluctuations, which make the livestock systems very dynamic (in terms of population, composition and practices).
- Livestock systems are influenced by multiple factors apart from the availability of sufficient fodder and feed. These factors also vary across households and villages.

- Livestock systems in the study locations cater to multiple needs of a household and are mostly practised as low input-multiple output systems, with the women of the household primarily engaged in maintaining the livestock.

Livestock Changes at the Village Level

The data required to understand the changing trends occurring in livestock populations and composition has been available only for the study villages in Rajasthan. Focussed group-discussions and analysis of household surveys were also carried out so as to gain some understanding of the changes in livestock systems in Madhya Pradesh. Livestock data for two time-periods was analyzed to understand the changes in livestock systems. The table below shows the changes in total livestock population across different categories in the study villages in Rajasthan:

Table 5.17: Change in Livestock across Study Villages in Rajasthan

Villages	Year	Indigenous Cattle	Crossbred Cattle	Buffalo	Sheep	Goat
FES supported Villages						
Thoria	2001	149	0	250	239	336
	2007	330	0	212	328	543
Dhuwadiya	2002	210	0	128	285	449
	2007	244	0	183	372	538
Sanjadi Ka Badiya	2001	95	0	66	266	211
	2007	65	0	58	391	238
Saredi Kheda	2001	189	0	101	396	297
	2007	246	0	114	797	402
Amaritiya	1997	443	0	157	235	404
	2007	411	8	154	187	397
Bharenda	2001	209	0	143	93	470
	2007	160	0	110	150	725
Cheetrawas	2001	970	0	313	703	1,845
	2007	901		484	567	2,042
Dheemri	2001	511	11	277	196	1,756
	2007	486	77	350	148	1869
BAIF supported Villages						
Jodha Ka Kheda	1993	224	0	106	360	728
	2008	92	51	96	151	592
Gudha Gokalpura	1997	492	6	137	250	850
	2003	261	22	177	140	1,170

The livestock development over the two time-periods show mixed trends, which have been summarised in Table 5.18. Some common trends observed at the village level are:

- Overall, there has been a reduction in cattle population, with a preference for buffalo keeping.
- Preference towards quality cattle breeds reflected in the increased population of good indigenous breeds (*Gir*) of cattle in villages and a trend towards crossbred cattle in villages where BAIF is active.
- Increase in goat population across most villages.
- Increased sheep population in villages with relatively lower rainfall and inhabited by communities like Gujjars and Meghwals who are traditionally sheep-keepers.

Table 5.18: Livestock Changes at Village Level in Rajasthan and Some Observations

Livestock Category	Increase	Decrease	Remarks
1. Indigenous Cattle	Increase in three villages and stable population in one village.	Decrease in six villages.	Increased cattle population in villages like Thoria, Dhuwadiya and Saredi Kheda that have better cattle breeds (<i>Gir/Rindi</i>) Thoria and Dhuwadiya, with assured increase in fodder and water availability, complemented by market linkage through the village dairy cooperative society, have seen an increase in cattle population. The community in Saredi Kheda has taken steps to improve their nondescript cattle breeds with the <i>Gir</i> , with a view that investments in improved breeds will pay off. Across other villages there has been a decrease in cattle population with trends towards reduction in nondescript and unproductive livestock and a shift towards other livestock.
2. Crossbred Cattle	Increase in four villages.		Villages supported by BAIF have witnessed a rapid increase in population of crossbred cattle with a sharp reduction in population of nondescript cattle. Crossbred cattle have been introduced in villages close to markets.
3. Buffalo	Increase in five villages; Stable population in one village.	Decrease in four villages.	Buffalo population has been increasingly replacing cattle at an average yearly growth rate between 5 and 8%. Except Thoria, decrease in buffalo population across other villages has been marginal.
4. Goat	Increase in eight villages; Stable population in one village.	Decrease in one village.	With increased palatable tree and shrub biomass, goat population has uniformly increased between 1.3 and 12.3% per annum across all villages.
5. Sheep	Increase in five villages.	Decrease in five villages.	Growth in sheep population in five villages has ranged between 6 and 12% per annum. Increased sheep population is observed in villages where traditional sheep-rearers like the Gujjars dominate and who still maintain a semi-pastoralist lifestyle. Simultaneously however, with increasing migration and preferences for other livestock, there has been a decreasing preference for sheep-keeping across other villages.

Livestock Changes at the Household Level

One of the most direct and most visible benefits of Common Land Development is the increased availability of fodder and feed that such development facilitates. Coupled with appropriate institutional arrangements to access these benefits, there has been a direct impact on reducing the risk and vulnerability of poor livestock-keepers to fodder scarcity. For households with very small landholdings or no landholdings, this helps in maintaining their livestock with low inputs and costs, making the livestock-economy viable for them. Simultaneously, increased fodder availability helps bring about changes in the holding, composition and distribution of livestock across different landholding classes.

Household-level livestock data of two time-periods was analyzed in order to understand the changes occurring in livestock holding, composition and distribution across different landholding classes. Table 5.19 shows that, but for a decrease in mean holdings of buffalo among the landless, the holdings of cattle and buffalo have increased across all groups. The changes in small-ruminant holdings show an increase across the landless, marginal and small landholding categories and a decrease in medium and large landholding classes. The decrease in small-ruminant holdings has been largely due to the decrease in sheep-holding in these classes.

Table 5.19: Changes in livestock holding across different landholding classes (Rajasthan)

	Landless		Marginal		Small		Medium		Large	
	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08
Cattle	0.3	4.3	2.8	2.9	3.0	3.5	2.3	3.2	2.5	3.0
Buffalo	1.0	0.6	0.8	1.0	1.6	1.7	1.6	1.9	2.7	3.2
Total Bovine	1.3	4.9	3.6	3.9	4.5	5.1	3.9	5.1	5.2	6.2
Sheep	0.0	0.1	1.7	2.8	2.9	3.7	5.7	2.8	3.5	1.3
Goat	5.6	7.1	4.0	4.5	5.1	6.3	5.9	5.9	5.7	6.9
Total Ovine	5.6	7.1	5.7	7.3	8.0	10.0	11.5	8.7	9.2	8.2
ACU	1.8	4.3	3.4	3.8	4.6	5.2	4.5	5.1	5.6	6.3

The average changes in livestock holdings in different landholding classes across the study villages broadly follow the livestock changes displayed at the village level. However some variations can be seen. For example, the data shows that for most of the landholding classes and villages, the decrease in holdings in one category of livestock has usually been compensated by an increase in holdings in other categories. These changes reflect the fluid and variable nature of livestock systems and the

influence of the availability of different resources on livestock systems at the household level.

Changes in composition in average holdings of different livestock can indicate a relative preference for certain livestock in different households, besides highlighting the influence of Common Land Development. The changes in average holdings of different livestock reflect an increased proportion of cattle in the total livestock in the landless group, increased sheep in marginal households, and increased goat and sheep in small landholding classes. In medium and large landholding classes, with a reduction in average holdings of sheep and an increase in other livestock categories, the percentage of cattle, buffaloes and goats in the total livestock has increased.

Table 5.20: Change in Distribution of Livestock across Different Landholding Classes (Rajasthan)

(in percentage)

	Cattle		Buffalo		Sheep		Goat	
	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08	2001-02	2007-08
Landless	0.10	2.50	0.70	0.70	0.00	0.00	1.20	2.40
Marginal	42.20	44.60	24.30	33.60	22.20	45.20	33.20	40.30
Small	29.60	36.30	29.70	39.90	25.70	41.10	27.50	38.60
Medium	17.10	12.90	23.20	17.00	38.50	11.70	24.70	13.60
Large	11.00	3.70	22.10	8.80	13.50	1.70	13.40	4.90

On the whole, change in livestock holdings show a strengthening of the livestock base across different landholding classes. The holding of different livestock is higher as the size of landholding increases, at the same time however, the gap in livestock holdings among different classes seems to have reduced. To understand which group as a whole has gained from changes in livestock, the distribution of different livestock across different landholding groups was looked into. The changes show that, on an average, landless, marginal and small farmers have gained in the total holdings of livestock with medium and large landholding classes showing a uniform decrease. One of the significant reasons for this is the decrease in members in the households of medium and large landholders. The trend of increasing concentration of livestock holdings with poor households further emphasises the importance of restoration of the Commons to make livestock growth more inclusive and more equitable.

In order to understand whether a more strengthened livestock base is visible across the different landholding classes, the livestock database of 2007-08 was compared

with the household survey done by NSSO (*Livestock Ownership across Operational Landholding Classes in India*, 59th Round, Report no. 493, 2006). The NSSO data available for both Rajasthan and Madhya Pradesh across different landholding classes was compared with data from the study villages.

Table 5.21 shows the distribution of livestock and the size of livestock-holdings among different landholding classes in Rajasthan and the study villages in Rajasthan. Compared to the State average, the study villages show a higher livestock population across different landholding categories and a more equitable distribution of livestock. This could reflect the importance of the regenerated Commons and enhanced fodder

Table 5.21: Livestock Distribution and Holding per Household: Comparison of State Averages and Study Villages (Rajasthan)

Category	Landless	Marginal	Small	Medium	Large
RAJASTHAN					
% households	15.4	41	15.9	13.7	14
Distribution of livestock (%)					
Cattle	0.7	39.9	14.7	16.6	28
Buffalo	0.4	36	18.9	22.8	21.9
Total bovine	0.6	38.1	16.6	19.5	25.2
Total ovine	1.2	46	11.2	12.8	28.9
Size of livestock holdings (no/household)					
Cattle	0.06	1.31	1.25	1.63	2.68
Buffalo	0.03	1.01	1.36	1.91	1.79
Total bovine	0.09	2.31	2.61	3.54	4.47
Total ovine	0.23	3.36	2.11	2.79	6.15
RAJASTHAN (STUDY VILLAGES)					
% households	1.8	48.4	33.3	12.6	3.9
Distribution of livestock (%)					
Cattle	2.48	44.57	56.34	12.9	3.7
Buffalo	0.73	33.6	39.94	16.96	8.77
Total bovine	1.94	41.21	37.44	14.15	5.26
Goat	2.37	40.33	38.69	13.66	4.94
Sheep	0.04	45.33	41.22	11.75	1.66
Total ovine	1.54	42.04	39.65	13	3.77
Size of livestock holdings (avg/household)					
Cattle	4.31	2.91	3.45	3.23	3.03
Buffalo	0.56	0.97	1.68	1.88	3.18
Total bovine	4.88	3.88	5.13	5.12	6.21
Goat	7.06	4.52	6.28	5.86	6.91
Sheep	0.06	2.82	3.72	2.8	1.29
Total ovine	7.13	7.32	10.01	8.66	8.21

and feed availability from those to support more livestock. The study villages reveal that, in comparison to State average figures, improvement in the natural resource base increases the potential for larger herds of large and small ruminants.

Table 5.22: Livestock Distribution and Holding per Household: Comparison of State Averages and Study Villages (Madhya Pradesh.)

Category	Landless	Marginal	Small	Medium	Large
MADHYA PRADESH					
% households	24	37.5	17.8	13	7.7
Distribution of livestock (%)					
Cattle	1.1	36.2	23	23.6	16.1
Buffalo	0.5	23.2	25.3	24.1	26.8
Total bovine	1	33.4	23.5	23.7	18.4
Total ovine	4.4	50	24.8	10.7	10.1
Size of livestock holdings (no./household)					
Cattle	0.1	2.01	2.7	3.78	4.36
Buffalo	0.01	0.36	0.83	1.08	2.02
Total bovine	0.11	2.37	3.52	4.85	6.39
Total ovine	0.09	0.63	0.66	0.39	0.63
MADHYA PRADESH (STUDY VILLAGES)					
% households	11.9	29.8	27.1	17.7	13.5
Distribution of livestock (%)					
Cattle	3.37	15.12	27.47	24.04	30.01
Buffalo	2.9	10.5	26.5	20	40.1
Total bovine	3.2	14	27.2	23.1	32.4
Total ovine (goats)	6.8	26.1	27.8	19.8	19.5
Size of livestock holdings (no./household)					
Cattle	1.1	1.9	3.8	5.2	8.5
Buffalo	0.28	0.41	1.15	1.33	3.5
Total bovine	1.36	2.34	4.99	6.48	11.97
Total ovine (goats)	1.25	1.9	2.22	2.43	3.15

Table 5.22 shows a comparison of the State level data for livestock distribution and holdings figures and that of the study villages in Madhya Pradesh. In comparison to Rajasthan as a whole, the study data shows a mixed pattern. All livestock categories show a higher average holding across different landholding classes in the study villages in comparison to State averages, however the distribution of livestock holdings looks more inequitable in the study villages in comparison to the State figures. An important reason for this could be the larger proportion of households with bigger landholdings in the study villages. However, this still leaves open the question as to why poor livestock-keepers have not gained substantially with improved Common land development in Madhya Pradesh.

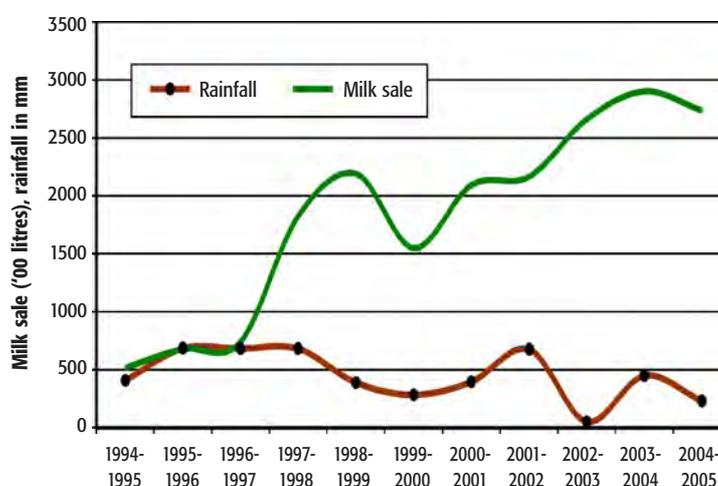
An analysis of household perception about the main constraining factors for keeping livestock was undertaken through a survey of sample households in the study villages across both the States. The responses from different landholding classes were mixed, with different landholding groups identifying different constraints restricting their livestock systems. To some extent, these responses could perhaps be influenced by the implicit expectation of getting financial support from the government and development agencies. Half the respondents indicated the lack of adequate financial resources as the main constraint in pursuing livestock options or further scaling. Similarly nearly one-fourth of the households reported lack of water and/or fodder as a key constraint, which though at one level highlights the need and expectations for programmatic support to improve resources regimes, it also clearly highlights the inherent limitations of the ecological and economic setting in the study locations to pursue a linear path of quantitative growth in livestock holdings at household level.

Socio-economic Impact of Livestock Changes

The livestock changes have shown an improved livestock base in varying degrees, attributed to the multiple facilitating factors and removal of constraints at the household and village level. In this section, we further attempt to understand the contribution of the improved livestock base in economic terms, improvements which help not only to broaden the asset base of the livestock but provide increased milk, manure and other by-products, thus boosting the livelihoods of poor livestock-keepers.

The findings of the household survey show that around 50% of the households in Rajasthan and around 36% of the households in Madhya Pradesh have benefitted from an increase in milk production – attributed by all households to the increase in fodder availability from the Commons. Discussions with different groups highlighted other important factors in influencing growth in milch animals, productivity and average milk production – such as the presence of village Dairy Cooperative

Graph 5.12: Trends in milk sale in Thoria



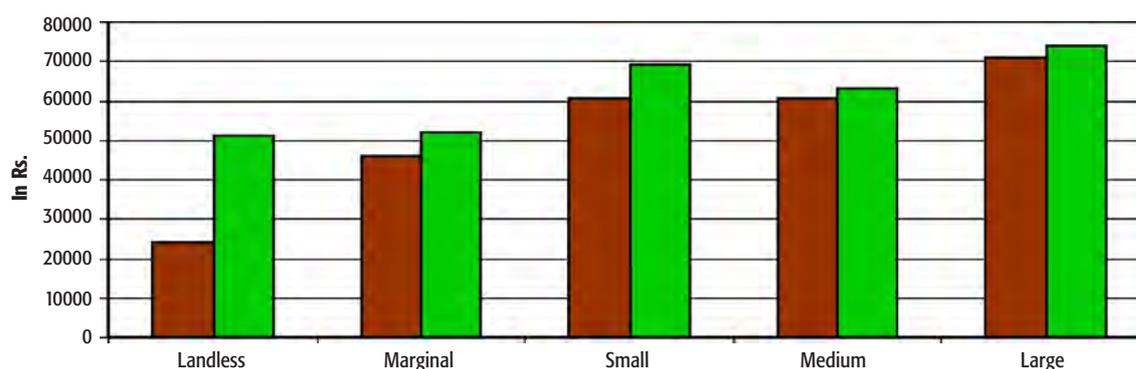
Societies in providing livestock services and market linkages, improved water availability through watershed development, improvement in cattle breeds and, in some villages, access to credit facilities through linkages with agencies providing micro-finance.

In order to understand the trends in milk production with Common land and watershed development, data was collected for the village Thoria in Rajasthan where a village Dairy Cooperative Society has been present right from the initiation of the study project. Graph 5.12 shows the total milk procured from the village across the years by the Village Dairy Cooperative Society and a private dairy functioning in the village. The trend shows a consistent and significant increase in milk procurement despite erratic and extremely low rainfall years. It is clear that with improved fodder availability and institutional support of the Dairy, the poor can improve the viability of their livestock based livelihoods even during low rainfall years

Simultaneously, in villages where work has been facilitated by BAIF, marginal and small farmers have also invested resources in improving the breed of their cattle. This was visible in Jodha Ka Kheda and Gudha Gokalpura villages where landless and marginal families kept more than 50% of crossbreed cattle. Breed improvement is an important factor in improving livestock productivity and incomes and, with reduced vulnerability with regard to fodder and water, poor livestock-keepers are able to invest resources for asset improvement.

To further quantify their economic significance, the value of changes in livestock assets was calculated. The average price of a livestock was fixed on the basis of focussed group-discussions in villages. Livestock values, especially those of cattle, are highly variable and significantly depend on rainfall conditions, with prices falling in low rainfall years and climbing back in the good ones. Taking a broad average figure, the estimates help to understand the importance of livestock as an asset base in poor households. Livestock for poor livestock-keepers are like safe deposits which can be easily traded in emergency situations and hence, their importance. Graph 5.13 shows livestock assets of different landholding classes in 2001 and 2008 in the villages of Rajasthan (based on current market prices). The livestock asset base has shown an improvement across poor livestock-keepers, with increases in the average livestock-holding. The highest increase is seen in landless households where the asset value has almost doubled by 2008, with an increase of 12-14% across small and marginal farmers.

Graph 5.13: Value of Livestock Asset across Different Landholding Classes (Rajasthan)



5.3 INSTITUTIONAL ARRANGEMENTS

One of the most important reasons for degradation of Common Property Resources has been the decline of traditional institutional arrangements for governing these resources. Many studies have noted the importance of proper institutional arrangements for sustaining the improvements in Common Land Development. Common Land Development is relatively a less ‘technical problem’ than an ‘institutional problem’.

In this section, we present our findings about institutional arrangements across the study villages, which have helped in Common Land Development and brought about improvements in livestock systems. Institutions and organisations are terms that are often used interchangeably but are, in fact, distinct. If institutions are thought of as ‘the rules of the game in society,’ then organisations may be thought of as the players, or ‘groups of individuals bound together by some common purpose to achieve objectives’ (North 1990). However, for purposes of the study, we have used the terms interchangeably, with the understanding that the key focus in Common land development has been not to establish a village level organisation but to strengthen institutional arrangements and coordinate human action for the management of Common Property Resources.

Common lands are not pure ‘open access regimes’ but are ‘Common Property Regimes’ with some definition of property rights, with defined (*de jure or de facto*) user groups and presence of internal arrangements which guide the use of resources. The efforts to strengthen institutional arrangements involve an understanding of Common Property Regimes; different institutional settings at macro, meso or micro levels; devising of new mechanisms to help solve the problem of excessive exploitation of resources and strengthening traditional mechanisms where they survive. The

institution assists village communities to set in place rules and regulations that are based not only on their micro-reality, but also take into consideration the larger principles that govern successful Common property governance. The process of each village taking the initiative to create a formal body of terms and conditions to govern itself with regard to a Common Property Resource is a critical step towards the act of self-governance and forms the foundation for the sustainability of local institutions. The crafting of institutions is an iterative process of continued discussion, negotiation and mutual agreement as also a dynamic one, which needs to continually respond to emerging internal and external environment.

In context of the study, the key question aimed to be answered: *How to ensure that institutional development on the Commons is pro-poor?* In seeking answers, the study explored three aspects:

- Understand the process of institutional formation that was followed?
- Understand the changes in the relationships between different actors, and how did the devised rules, regulations and norms provide for an inclusive decision-making system and equal benefit-sharing arrangement?
- Document the lessons to be learnt from the study of village institutions (Tree Growers Cooperative Society, Watershed development committee, Charagah Vikas Samiti, gram sabhas, Gram Panchayats etc.,) for governance of the Commons and the role of facilitating agencies (FES and BAIF)?

Process of Institution Formation

Multiple processes spread over different levels and over different time periods were initiated in the study villages to ensure robust institutional arrangements for the development of the Commons. As all the villages studied have seen project interventions by facilitating organisations, a key aspect was external mediation for Common Property Resource Management. This called for the building of trust and rapport with the local communities and the understanding of location-specific contexts, needs, previous institutional arrangements, awareness building, resolving conflicts, facilitating planning, supporting institutional development, generating financial resources for physical interventions, developing benefit-sharing systems etc. While certain differences can be seen in the emphasis and working approach of the different facilitating organisations, principally, the process of institutional formation across the study villages involved two key aspects:

- Securing rights on the Commons.
- Crafting and strengthening village institutions.

Securing Rights on Commons

Common Property Land Resources cover different land categories (village pastures, revenue wastelands and also forests). These resources are considered the property of the State with custodian rights wrested with different government departments, and in case of village pastures, with *Gram Panchayats*. There has been a gradual recognition of customary rights of local communities over these resources, according them varying degrees of access to the resources, and including them in the management of resources. Clarity of rights and an assurance of benefits for efforts invested on the Commons are crucial factors in the formation of relevant institutions. Outside interventions which focus only on the benefit-component of the resources, ignore the basic right of the community to participate in the process of governance and decision-making at all levels – from policy making and planning to execution and the disposal of gains. Such interventions have led rather to short-term gains and processes unable to adapt to external or internal changes. The net result then has been one of disempowerment, by making communities dependent on external agents for the solution to their problems.

In Rajasthan and Madhya Pradesh, in the work facilitated by FES and BAIF, there has been the much-needed focus on strengthening the rights of the community over the Commons. Across all the study villages, the processes of institutional development started with efforts to understand the legal and policy context of a particular Common Property Land Resource. Guided by the development of some policy changes (73rd Amendment providing Panchayati Raj Institutions an important role in local governance, Joint Forest Management Guidelines facilitating community institutions on forestlands and Watershed Development Guidelines) that recognise the importance of community-based institutions in the proper management of natural resources and community rights on natural resources, interventions were suitably designed for the different Commons across the study villages. FES has also been proactive outside the broad policy setting for bringing some Common Property Resources under secure tenure. This mainly relates to revenue wastelands where, under a Memorandum of Understanding between the specific State governments and FES, the lease of these revenue wastelands in parcels of 40 hectares has been handed to village communities.

To cater to the requirement of policy guidelines and direction, different institutional templates have been set up for different categories of Common Property Land Resources across the study villages (Table 5.23):

Table 5.23: Institutional Arrangements for Different Categories of Commons

Common Lands	Enabling Policy	Institutional Template	Rights to Community	Villages
Village Pastures	73rd Amendment, Panchayati Raj Act (<i>Panchayats</i> as custodians of village pastures/grazing lands) and Watershed Development Guidelines.	Pasture land Development Committees with approval from the concerned <i>Gram Panchayat</i> (informal institution).	Management and protection rights, Usufructory rights to fodder and trees, decision-making rights.	Thoria, Dhuwadiya, Sanjadi ka Badiya, Saredi Kheda, Jodha Ka Kheda, Amaritiya, Bharenda, Gudha Gokalpura and Cheetrawas.
Forest Land	National Policy on Forests, Joint Forest Management Guidelines.	Village Forest Protection and Management Committee.	Management and protection, rights to harvest Non-Timber forest Produce (NTFP), share in final harvest and decision-making rights.	Cheetrawas and Dheemri.
Revenue Wasteland	MoU between the State Government, NDDB and FES (based on the success of the cooperative model).	Tree Growers Cooperative Society.	Lease of land for 25 years to the TGCS, management and protection rights, rights to benefits and produce from leased land, decision-making rights.	Thoria, Dhuwadiya, Bhanpura, Jagatpura, Karwakhedi, Rajakhedi and Rojani.

Across all the study villages, three broad institutional templates specific to Common Land Development could be identified: Pastureland Development Committees (*Charagah Vikas Samiti*, CVS), Village Forest Protection and Management Committee (VFPMC) and Tree Growers Cooperative Society (TGCS). In some of the villages, Watershed Development Committees are also present and have played an overarching role in Common Land Development. Villages having different Common land categories have also adopted multiple institutional templates so that communities gain legitimate access to Common Property Land Resources.

Secure rights on the Commons play a significant role in shaping institutional development and also directly contribute to the clarification and resolution of disputes. In discussions involving village leaders, different groups within the village and the project teams of the facilitating organisations, some of the important issues highlighted were:

- Securing rights on the Commons makes Common Land Development an empowering process, in which there is devolution of power as against devolution of just management functions. Local governance and decision-making becomes an important agenda in contrast to site-specific development activity. This has great significance in the context of strengthening village-level institutions.
- Where there are pre-existing tensions between communities from different villages, the sharing of a Common resource is often the grounds for expression of the pre-existing rivalry. In these cases, securing tenure is perceived by the tenure-owning community as a crucial gain so as to counteract the threats posed to the resource by rival villages.
- The perception by the communities that their right to manage the resource has received recognition by legal authorities leads to an increased participation of all sections of the community in the evolution of, and compliance with, institutional rules. Secure tenure is both a pre-requisite and an outcome of collective action. Thus it is seen that in all the study villages the right of management has resulted in communities devising their own strategies to counter threats, both internal and external. What's more, the right of management is an assurance of a sustained flow of benefits that motivates communities to engage in collective action to protect their tenurial rights.

Though there are policies and directives which help provide these institutions/ organisations with rights to manage and gain benefits, the actual process of gaining rights might take considerable time and energy depending on the response of different officials in the government. This is confirmed in most study villages where work on revenue wastelands and forestland has been taken up. The process of finally reaching agreements took more than a year in some cases and, though this was not covered as part of the study, the securing of rights took almost three to four years in some of the project villages. In case of village pastures, where it is the local *Gram Panchayat* that approves the work process, less time was required. This also points out to the process in villages being a political one, with the course of action often rendered easier in the presence of a sympathetic *Sarpanch*. The role of the facilitating agency gains importance in this context as it coordinates between the various actors within the government and the local institutions to hand over rights to the village institution. The process involves negotiation and meetings at different levels and departments of government; also, with different people's representatives to make them aware of policy provisions and measures that can help the community gain rights to CPR resources – and persuade them that investing their efforts will be worthwhile.

Notwithstanding the importance of community tenure, the apprehension regarding devolution of management rights to community organisations largely pertains to the likely capture of collective rights by the elites. In a society stratified on the multiple axes of caste, class and gender, it is very likely that collective initiatives on the Commons would have to deal with the hierarchies otherwise prevalent in the community. The process of decentralisation and devolution of rights has failed mainly in contexts where it has been partial or restrictive, where the local community has been entrusted with the responsibility, while authority and majority of benefits has remained in the hands of agencies, local officials or local power centres. Village discussions on this issue focussed on the importance of effective devolution of rights at all levels and the considerable efforts required to formulate an appropriate institutional design for a pro-poor, transparent and accountable institutional platform. This leads to the second and most important step of institutional formation: crafting and strengthening of village institutions.

Crafting and Strengthening of CPR Institutions

One of the main apprehensions in devolution of rights at community level has been related to the usurpation of the process by local elites leading to a further alienation of poor households in the new institutional arrangements. The institutional design propagated or evolved and its potential of including or excluding people relating to a particular CPR institution, needs to be assessed in this context.

Design of the institution involves three important components:

1. Structure of an institution. 2. Function of an institution 3. Normative principles of an institution.

The study tried to understand the different institutional designs across the study villages from three aspects:

- Understand how the institution changed with different institutional templates and on different Common land categories.
- Understand how the policy setting and guidelines influenced institutional design.
- Document good practices in crafting of institutions on the Commons.

Across the study villages it was noted that, though institutional designs have been influenced by policy guidelines and relevant government orders, in most villages they were transformed/adapted to their own context. The know-how and experience

of the facilitating organisations have also shaped institutional design. Before delving into further details of this design across the study villages, it is important to understand the key design elements (based on policy guidelines and relevant orders) of the various institutional templates on the Commons. Table 5.24 briefly notes the key institutional design elements (based on the government policies) for forming an institution for a specific category of the Commons. It is important to note that though many aspects of the policy guidelines provide a facilitating environment for development of the Commons and forestland, there still exist many grey areas and loopholes.

Table 5.24: Crafting Institutions: Policy Guidelines

Institutional Template	Institution Design Elements (from policy guidelines and relevant orders)
Tree Growers Cooperative Society (TGCS) on Revenue Wasteland.	Every family residing within the boundary of village have the right to be a member of the TGCS, the family being represented by one adult member from each household. Members have to pay membership fee and share money. A minimum nine-member Management Committee is mandatory. The general body elects a President and Secretary. Elections for the post of President are held after five years (previously three). There is provision for an honorarium for the Secretary. The Secretary shall be responsible for convening meetings of the General Body; S/he shall record the proceedings of meetings and get these proceedings approved in subsequent meetings. S/he is also responsible for handling records, taking resolutions and maintaining financial records. TGCS functions through defined bye-laws: Two mandatory General Body meetings are held per year; Proper books of records (Resolution book, Cash book, Membership book, Share register, Stock, Ledger, Receipt book, Vouchers) are maintained and income from the TGCS can be distributed to its members.; The Audit is carried out by the Co-operative Department which has powers to dissolve the cooperative if it so decides.
Village Forest Protection & Management Committees under Joint Forest Management	As far as possible there should be a separate VFPMC for each village. However a joint VFPMC or a VFPMC for a specific hamlet of a village can be formed under special circumstances. In addition, each village shall have a Women’s Advisory Sub-committee (WAS) with at least seven members. All adult persons residing within the revenue boundaries of the village concerned will be entitled to membership of the General Body of the VFPMC. The list of members should include at least 33% women members. An Executive Committee (or the Executive) comprising not more than 11 members is constituted to manage the affairs of the VFPMC The Executive will be elected from among the VFPMC members by the <i>Gram Sabha</i> and shall have at least three women members, one member from the landless and one member each from the Scheduled Castes (SC) and Scheduled Tribes (ST) where the percentage of population of each of these groups is 10% or more. Where the percentage of SC and ST populations combined is 15% or less, at least one member each from the SC and ST shall be elected to the Executive. The members of the Executive shall elect, from among themselves, a Chairman, a Vice-Chairman and a Treasurer, of whom at least one should be a woman. In addition to the elected members of the Executive, the <i>Sarpanch/Ward-panch</i> of the village shall also be a non-voting ex-officio member of the Executive. The Forester/Assistant Forester working in the area shall be the ex-officio Secretary of the Executive (for the initial two years) but he shall not have the voting powers. The VFPMC must hold at least two General Body meetings in a year. The Secretary shall be responsible for convening these meetings; s/he shall record the proceedings of meetings and get them approved in subsequent ones. S/He will also be responsible for handling paperwork and general correspondence of the VFPMC with the Forest Department, NGOs, and other agencies. The Chairman or the Secretary may call a special meeting of the General Body if so requested by at least one-third of its members. The Executive shall meet at least four times in a year, though more meetings can be held if so decided by the Chairman or the Secretary. The

Table 5.24: Crafting Institutions: Policy Guidelines

Institutional Template	Institution Design Elements (from policy guidelines and relevant orders)
	<p>Treasurer will maintain the accounts of the VFPMC and present these at meetings of the General Body and the Executive. VFPMC funds shall be kept in an account in the nearest bank or post office. The VFPMC shall work to protect forest and pasture lands, which have been made available to it and raise plantations on such lands. The VFPMC shall evolve/prescribe/lay down rules for harvesting and sharing of forest produce, such as grass, leaves, fruits, lops, tops etc. harvested from lands managed by it, and decide the amount of fee/levy to be charged, if any. The VFPMC shall be entitled to free non-timber forest produce harvested from the areas managed/protected by it. Produce from cultural operations and lopping of trees shall be available to the members of the VFPMC, only if the VFPMC has protected/managed the area in pursuance of its agreement with the Forest Department for not less than five years running. Different sharing mechanisms are spelt out for the final felling and the use of timber. The Forest Department has rights to revoke the agreement with VFPMC if the VFPMC repeatedly contravenes any of the provisions laid down, disregarding the advice of the Forest Department.</p>
<p><i>Charagah Vikas Samiti</i> (Village Pasture Development Committees)</p>	<p>Section 104 of Rajasthan Panchayati Raj Act provides powers to the <i>Panchayats</i> to frame by-laws... to regulate 'the manner in which tanks, ponds, cesspools, pasture lands, play grounds, manure pits, land for disposal of dead bodies and bathing places shall be maintained and used.'</p> <p>Section 170 on Development of Grazing Ground states – (1) It shall be the duty of the <i>Panchayats</i> to take all required steps for development of suitable type of grasses, shrubs and plants in grazing grounds and prevent encroachments. For this purpose, the <i>Panchayat</i> shall give control of <i>Charagah</i> land of each village to a five-member committee headed by a <i>Ward Panch</i> of the village concerned and with four members to be elected by the <i>Gram Sabha</i>.</p> <p>Section 171 notes that the <i>Panchayat</i> can levy Grazing Charges with the fees not exceeding Rs. 10 per cattle-head, per annum for buffaloes, cows, camels, and horses, and Rs. 5 per head, per annum for goats, sheep and other animals.</p>

Three key and interrelated aspects of institutional formation can be synthesised from the above policy guidelines and the understanding gained from exploration of institutional arrangements across the study villages:

- Structure of an institution:** What is broadly referred to here are the structural aspects of the institution, its physical and institutional boundaries, who its members are, which are the decision-making bodies and how they are constituted. Three key structures of an institution can be noted at the village level: the Members, the General Body and the Management/Executive Committee. Though the membership process under different institutional templates has been defined variably, in all the institutions studied there is an overarching concept of universal membership. The objective here being to include all user groups, provide scope for latecomers and recognise the rights of all in the decision-making process as well as in the benefits from Common Land Development. A key structure is the General Body, a collective platform where every member has equal rights. The General Body is constituted as an apex body having legislative, executive and

judiciary powers within the institutional boundary. It has the responsibility of delegating power through decentralised functional groups, usually referred to as the Management or Executive Committee. The General Body chooses the members of this Committee from among different actors such as farmers, livestock keepers, women, different caste groups, poor families, deprived sections, etc.

- **Functional aspects of an institution:** What functions does the institution perform and how are the responsibilities of carrying out these functions shared within the defined institutional boundary? What are the operational mechanisms that support the structural layout of the resource-managing institution, that help pursue a continuous process of resource development and conservation? A key function of the institution is towards efficient management and development of the institution and the resources. It implies planning, implementation, monitoring and review mechanisms for the creation, development and maintenance of the resource as well as the institution (Strengthening the capacities of the institution has been a key function of facilitating agencies). It institutes mechanisms for efficient use of resources by the community, for ensuring that it addresses the interest of all groups, and for avoiding conflicts. This means screening procedures and decisions to assess whether they are beneficial to the poor or detrimental to them.

Another key function of the institution is the handling of financial and administrative functions, sometimes initially supported by the facilitating agencies. Transparency and accountability must be ensured, risks minimised and apprehensions of the members dispelled. Maintenance of proper books of records (financial as well as records of decisions and resolutions) is an important function and a tool for setting up transparent and accountable systems. Execution of these key functions as a process developed over time helps to support functional autonomy of the institution. Most institutions have scaled up from their primary selection of activities to address more holistically the issue of resource management at different levels, and become an influential factor in bringing about socio-cultural change.

- **Normative aspect of the institution:** The normative aspects define the principles, rules and norms that guide the structure and functions of the community institution. In essence, they constitute the value system of the institution. Norms and rules are essential instruments which help institutionalise various systems for development and management of resources. Once institutionalised, they

facilitate evolution of mechanisms for assigning responsibilities to members and ensuring their accountability. Norms help establish linkages between the resource and the members by regulating their behaviour *vis-a-vis* the resource: every member of the institution has the right to participate in framing rules to govern oneself, fellow members, outsiders and the resource. Members are also responsible for modification and enforcement of the rules.

Institutional arrangements and the process of institutional formation have shown some common trends and steps, though the template may be different and relative focus on certain aspects differ. Most of the institutions studied have implicitly or explicitly addressed the different requirements of structure, function and norms as a requirement of the policy guidelines, as a process facilitated by the implementing organisation or as a process of self-evolving mechanisms. The guidelines may vary but at the ground level there is not much distinction to see.

Rules, regulations and norms: understanding pro-poor dimensions

The formation of rules and regulations basically takes place for the following purposes:

- Membership to the village organisation.
- Meetings and decision-making.
- Protection and conservation of resource.
- Work (physical work supported by organisations and later on the maintenance).
- Benefit sharing.
- Financial transactions.

The robustness of the institutional system is determined by the way rules and regulations operate. The system is characterised as robust 'if it is long-living and the operational rules has been devised and modified over time according to a set of collective choice rules (which themselves might be modified more slowly over time within a set of constitutional-choice rules, which were modified, if at all, very infrequently)'.

Rules and regulations have a direct bearing upon who it is that the institution will benefit. Framing of these is a crucial process in which the facilitating agency plays a major role. Though broadly the collective choice rule across villages remains the same, the operational rules/systems to put the rules in place differ across villages. The role of the facilitating agency is mainly to promote discussions against the broader set of

rules and facilitate operational systems, which are mutually agreed and are sensitive to all actors. Another important aspect is to provide alternative options, examples from neighbouring villages and other contexts, which provide the actors more options. Table 5.25 summarises the different operation rules/systems across villages for membership, meeting, decision-making, work (work on the Commons) and protection. These rules together guide the shape of the structural and functional aspects of the institution.

Table 5.25: Rules and regulations guiding structure, functions and decision making

Rules for	Operational systems at village level	Guiding principles
Membership	De-facto membership, Membership enrolment processes (membership register), token money from each household (Rs. 1 to Rs. 5, determined also by the amount required for opening account of the VI), scope for latecomers (revisions after a time period)	Universal membership, traditional user group.
Meeting rules	<i>Place of meeting: Hatahai (common platform traditionally used for village meetings), village temple complex, schools, Panchayat bhawan, alternative meetings in different habitations if the institution covers more than one habitation</i>	Common place which is accessible to all.
	<i>Time of meeting: Night meetings, day meetings in areas where use alcohol is more prevalent, scope for flexibility (if required)</i>	Timings which are suitable to all (consensus based).
	<i>Day of meeting: No-moon day when farmers do not use their equipment, Full moon day when all households gather at a temple, Fixed day (as mutually agreed), On religious festivals (local festivals like Holi and Deepawali)</i>	Monthly, As and when called in case of any special circumstance, Before festivals
Decision making	<i>Check mechanisms: Rules for violation, fines for members not attending meetings (in some villages), fines for members attending meeting after taking alcoholic products.</i>	Graduated sanction mechanisms
	Representation from all households, presence of management committee members, presence of credible village leaders/old persons, representation of women, presence of group leaders from different groups/caste (patels), scope for revision and rectification by members, presence of staff from facilitating agency (initial years), scope for clarification by facilitating agency.	General body meeting (Supremacy of the general body), Scope for revision (flexibility)
	Facilitating agency meetings with women/women groups, separate women committee/members meetings before village meetings, previous resolutions discussed and approved in women meetings, on-site meetings (meetings at work places), meetings in different hamlets with different groups	Separate women meetings, Information flow
Physical work	Management committee as guiding and executive committee, implements decision taken by general body, accountable for financial transactions, record keeping, monitors and enforces decisions, enforces fines for violations of decisions according to resolutions, facilitate village meeting	Executive role of management committee
	Labour opportunities to all families (rotation of households as per the employment opportunities), continuous wage opportunities for poor households (identified by the village and the facilitating agency).	Employment opportunities to all, Pro-poor sensibilities

Table 5.25: Rules and regulations guiding structure, functions and decision making

Rules for	Operational systems at village level	Guiding principles
	Monitoring of work by the management committee, periodic checking by the facilitating agency,	Work against norms, transparent systems
	<i>Shramdan-dharmata</i> (voluntary labour contribution) for some common purpose (village roads, village temple, plantation on some day etc.,)	Collective action and building sense of ownership
	Payments at a common place in a village meeting, presence of all management committee members, payments by management committee members.	Minimum wages to both men and women
Protection	<i>Ora</i> system (each household taking responsibility to protect the common land in rotation), <i>Chowkidar</i> (one or two village persons appointed by the village to guard the Commons in peak agricultural season, in some villages this extends throughout the year), Management committee members (or a separate protection committee is formed) which periodically monitors the work carried out on Commons against rule violation or damage, <i>Gwals</i> (livestock rearers who routinely go the common lands) taking the responsibility to inform violation of rules from within and outside village.	Functional responsibility of institution
	Payments to <i>chowkidar</i> /guard: each household gives a fixed amount in kind or cash, or, the guard is paid once a year when the fees is collected from households for grazing or fodder collection is received.	Self-sustaining mechanisms
	Rules for violation: Fines on cutting of tree, fines for grazing without the approval from the VI.	

Rules for distribution of benefits have the most important consequence for the members involved. The benefit sharing arrangements depend on many factors:

- Resource distribution.
- Condition and objective of resource growth.
- Number of households and their different demands.
- Monitoring and enforcement costs of sustainable resource harvesting.
- Alternative options available to complement or supplement the resource distribution.

Two main mechanisms can be seen in terms of fodder collection: Regulated and rotational grazing and cut and carry method. Different mechanisms for lopping tree leaves and pods are also observed across villages.

In most villages, while crafting the rules and regulations, there has been a very holistic perspective of the overall resources and usage patterns. Such an understanding of the overall resource base helps the village community in making choices, which may sound complex but are location specific and take a dynamic perspective of the socio-economic and ecological interrelationships.

FES, in its initial work with TGCS learnt the lesson that motives like maximisation of revenue generation and income makes the distribution mechanism highly inequitable. These processes involve mechanisms like auction, which let the highest bidder privatise a common property resource. Institutions which aim to do so can earn good amount of money, and there are examples where institutions have been offered Rs.100 thousand to Rs. 200 thousand for an area of 50 hectares, if they allow a resource rich to only graze their livestock on regenerated patches. With clear membership boundaries and primacy accorded to the needs of the villagers, these motives are usually checked, but within the village also regular efforts need to be put in the form of a rule, which makes the resource available to all.

It is also observed that for the first two to five years, the common land developed is controlled for grazing by small ruminants. It is important that ample grazing space remains open for the small ruminants so that they are not the ones who lose out. Simultaneously, it has been a learning that communities would like to invest in creating different kind of plots. For example in some plots they would like to have intensive work done but on another plot, apart from securing the rights over the Commons, they would like a different kind of intervention (seeding of grass with some soil and moisture conservation work with minimal or no plantation). Since there is a high gestation period in resource growth, especially that of trees, project interventions of three to five years is quite small in improving the biomass availability on all the village Commons. The village community understand this important constraint and thus desires regeneration of the Commons to be phased out in different patches over different periods of time. This clearly brings out the need to have a broader understanding of space and time frameworks within which Common Property Resources Management should be placed.

Table 5.26: Rules for appropriation and distribution: Study Villages in Rajasthan

Subject/ Village	Mechanism for		Time of collection/use	Price
	Grass	Tree (Leaves and pods)		
FES SUPPORTED VILLAGES				
Thoria	Regulated and rotational grazing (cattle, buffalo, goat and sheep)	Trees on the plot are allotted to one or two households who distribute to all members annually.	After one month of monsoon; Tree lopping in Nov-Dec and Apr-May.	For cattle and buffalo price per animal range from Rs. 35-50 in a good year; in drought period it is Rs. 10 per large animal. Small ruminant holders pay Rs.5-10 per animal for grazing. For the last three years they have allowed lopping of tree on a 50 ha patch.

Table 5.26: Rules for appropriation and distribution: Study Villages in Rajasthan

Subject/ Village	Mechanism for		Time of collection/use	Price
	Grass	Tree (Leaves and pods)		
				The institution gives it to a livestock keeper who deposits Rs.2500 for 50 ha. S/he in turns collects it from small ruminant holders who want leaves and pods.
Dhuwadiya	Regulated and rotational grazing. (Cattle, Buffalo, Goat and Sheep) (cattle, buffalo, goat and sheep)	Trees on the plot are allotted to one or two households who distribute to all members annually.	After one month of monsoon in one plot; After two-three months in other plot; Tree lopping in Nov-Dec and Apr-May.	For cattle and buffalo, price per animal range from Rs. 35–50 in a good year, in drought period it is Rs. 10 per large animal. Small ruminant holders pay Rs. 5 per animal for grazing. For the past three years they have allowed lopping on a 50 ha patch. The institution gives it to a livestock keeper who deposits Rs.2500 for 50 ha. S/he in turns collects it from small ruminant holders who want leaves and pods.
Sanjadi ka Badiya	Regulated and rotational grazing. (cattle, buffalo, goat and sheep)	Trees on the plot are allotted annually to one or two household who distributes to all members.	After one month of monsoons in one plot; After seed fall during Oct-Nov in two other plots, Tree lopping in Nov-Dec and April-May.	Total expenses incurred on <i>chowkidar</i> / guard guides the price per livestock. Currently price of cattle and buffalo is Rs. 6 per animal for an year.
Saredi Kheda	Regulated and rotational grazing. (cattle, buffalo, goat and sheep)	Trees on all the Commons are divided into patches, each patch allotted to different households having bigger herd size of sheeps/goats, yearly and also some patches are allotted for two–three years.	After one month of monsoon in one plot; After 2–3 months in other plot after seed fall of grasses. In case of very low rainfall, one plot is open for grazing and the second plot is open 15 days after the last rainfall; Tree lopping in Nov-Dec and Apr-May.	Rs. 10 per large ruminant, Rs. 5 per sheep and goat. Lopping of tree from the Commons fetches Rs. 4.1 thousand for the VI (price per tree averages between Rs. 5-20)
Amaritya	Regulated grazing. (cattle, buffalo,)	Thinning and pruning after two-three years.	After Diwali (Oct-Nov)and sometimes after Feb–Mar (after fall of leaves of <i>Dhokra</i> –	Rs. 5 per cattle and buffalo and Rs. 2 per sheep and goat.

Table 5.26: Rules for appropriation and distribution: Study Villages in Rajasthan

Subject/ Village	Mechanism for		Time of collection/use	Price
	Grass	Tree (Leaves and pods)		
			Anogessis pendula)	
Bharenda	Regulated and rotational grazing. (cattle, buffalo, goat and sheep)	Thinning and pruning after two-three years.	After Diwali (Oct-Nov)	R. 5 per cattle and buffalo and Rs. 2 per sheep and goat.
Cheetrawas	Cut and carry.	No lopping of trees. (Currently)	After three to four months of rainfall (Oct-Nov).	Rs. 25–30 per household who contributes for protection, Rs. 50 for household who are quite far from the plot and are not directly involved in regular protection, Rs. 50 for households from outside villages. (in summer period if grass is still there)
Dheemri	Cut and carry	No lopping of trees. (Currently)	After 3–4 months of rainfall	Rs.10 per household for cutting grass.
BAIF SUPPORTED VILLAGES				
Jodha Ka Kheda	Regulated and rotational grazing, cut and carry. (cattle, buffalo, goat)	On one plot trees are allotted to one or two individuals who distribute it to those who require.	Grass cutting after one month of monsoon, Grazing after grass cutting; Tree lopping on one plot in Apr–May.	Rs.5 for a goat, Rs.10 for a cow and Rs.15 for a buffalo.
Gudha Gokulpaura	Cut and carry. (cattle, buffalo)	No lopping of trees. (Currently)	After 3–4 months of rainfall.	After the produce is cut and gathered, it is tied into bundles. Half the produce goes to the household that cuts the grass and half goes to the VI, which in turn sells it within and outside village.

Table 5.27: Rules for appropriation and protection (Madhya Pradesh)

Subject/Village	Karwakhedi	Bhanpura	Jagatpura
Protection	Social fencing and through village cowherds.	Social fencing and through village cowherds	Social fencing and through village cowherds.
Access to outsiders	Adjoining villages may access water in the Common land	Adjoining villages have rights to grazing as well as water for cattle.	Adjoining villages have access to peripheral areas of the Common lands and water for cattle.
Conservation of Trees	Felling of standing trees on Commons prohibited. Cart load of thorny shrubs may be taken on payment of Rs. 51 to the VI.	Felling of standing trees on Commons prohibited.	Felling of standing trees on Common property resource prohibited.

Table 5.27: Rules for appropriation and protection (Madhya Pradesh)

Subject/Village	Karwakhedi	Bhanpura	Jagatpura
Grazing– Period of grazing	All year round except in the grass plot that is closed for four months of the monsoon.	All year round except in the grass plot which is closed for four months of the monsoon.	All year round except in the grass plot which is closed for four months of the monsoon.
Grass Plot	Grazing is not permitted in an area of 100 ha during the monsoons to allow grasses to grow and seed. In the month of Oct–Nov this plot is opened for grazing and remains open for the rest of the year.	Grazing is not permitted in an area of 50 ha during the monsoons to allow grasses to grow and seed. In the month of Oct–Nov this plot is opened for grazing and remains open for the rest of the year.	Grazing is not permitted in an area of 60 ha during the monsoons to allow grasses to grow and seed. In the month of Oct–Nov this plot is opened for grazing and remains open for the rest of the year.
Grazing fees	Nil	Nil	Nil
Rules for lopping	Practice does not exist.	Practice does not exist.	Practice does not exist.
Rules regarding water access from Common harvesting structures	No lifting of water from water harvesting structures on the Commons for individual agriculture.	No lifting of water from water harvesting structures on the Commons for individual agriculture.	No lifting of water from water harvesting structures on the Commons for individual agriculture.
Voluntary Contributions/ Maintenance of assets	Village has the responsibility of maintenance of collective assets.	Village has the responsibility of maintenance of collective assets.	Village has the responsibility of maintenance of collective assets.
General Sanction norms	Village general body decides fines based on violation.	Village general body decides fines based on violation.	Village general body decides fines based on violation.

The primary aim of the study was to gather pervasive empirical evidence to support the hypothesis that Common Land Development leads to pro-poor livestock development. However, the more the study tried to find the ‘all economic logic’ for the need to support Common Land Development in the context of poor livestock-keepers, the more it seemed to get entangled in the complex nature of interaction between the Commons and the poor households. While seeking answers as to what exactly were the economic gains that could be derived from the Commons, a more revealing question emerged instead: *‘What would one lose from the loss of the Commons and who would be the biggest loser?’*

Loss of the Commons has multiple connotations – ranging from the physical to the subtler, but equally important, socio-cultural-institutional losses. What poor households would lose with the loss of the Commons has emerged quite clearly. Almost all the poor households in the study villages are engaged in livestock rearing and the dry matter available to feed their livestock from their own resources constitutes not more than 40% of the total requirement. With no/little dependency on market sources of feed and fodder, livestock systems in these locations are viable only if a significant proportion of fodder and feed availability comes from the Commons.

Protecting Commons for their biodiversity, biomass and hydrological functions is critical for farming and livestock systems. Efforts to protect the Commons pay immediate returns in terms of increased biomass and an improved soil and moisture regime. Additionally, where geo-hydrology supports recharge, there is an increase in the water table and accordingly in the area under cropping. With strong institutional arrangements, investments in Common Property Resources can contribute significantly to the improvement of rural livelihoods, especially those of poor livestock-keepers. Whether the benefit is direct in the form of increased availability and access to fodder and firewood, or indirect, in the form of a sense of confidence and empowerment, *the*

restoration of the Commons is akin to land redistribution for the poor. This helps reduce the vulnerability of poor livestock-keepers to environmental and economic uncertainties, and to stabilise the livestock sector. Improved Commons also provide a strong ecological foundation that can spur poor livestock-keepers to becoming drivers of livestock growth.

Biomass estimates suggest that the value of incremental biomass on the regenerated Commons as compared to those of a control village works out to between Rs.47 thousand and Rs.85 thousand per ha. Taking into account the time frame of protection, management practices and agro-climatic conditions, improvements in vegetative cover of the Commons can provide fodder and feed worth Rs.657 only to Rs.12 thousand per ha per annum. Estimates at household level suggest that, on an average, a household accesses fodder worth Rs.7-10 thousand from the Commons. There is also evidence that *appropriate measures for soil-water conservation, undertaken as part of CPLR-management, provide significant indirect benefits* in terms of increased irrigated area and hence increase in crop-production. A tentative estimate based on the analysis of irrigation wells suggests that, on an average, restoration of the Commons lead to an additional income ranging between Rs. 360-520 thousand from increased agricultural production in a year at a village level. These are fairly substantial benefits – more than justifying public investment on such resources.

Emphasis on pro-poor institutional arrangements and pro-active efforts by the facilitating agencies in the study villages has helped improve assurance of, and access to, fodder resources from the Commons. It is quite clear from the study of institutional arrangements that if the management objectives of the regenerated Commons and forests are primarily for the benefit of the entire village community and especially for the poor among them, for them to actually gain in the process, it would be important to ensure that such institutions promoting local subsistence are not displaced by market forces. In the context of benefits from the Commons, the determination locally, of *'what', 'how much'* and *'who'* become extremely significant; and considerations such as ecosystem benefits, the needs of other species and even future generations (those yet to find their voice) need to be given due consideration in these institutional structures.

In broad conformity to the above, some of the specific elements that need to be further emphasised in relation to the Commons being pro-poor are:

- Work on Common Property Resources must adopt a realistic perspective of the differentiation and discrimination within village communities, since village

communities are essentially *not* single entities and are differentiated by caste, class, gender, livelihood systems, etc.

- Formalized organisations of village communities which do not pay adequate attention to the needs of disadvantaged sections will result in greater incidence of poor households being left out of the benefit-sharing and decision-making processes, and will be co-opted by the influential, resource-rich groups in the village.
- Strong and dynamic institutions, which are based on traditional institutional arrangements and location-specific settings and which adhere to the broad principles of Common Property Resource Management institutions, are more likely to survive and be sensitive to the needs of poor households and livestock-keepers.
- Working under a project mode facilitating agencies often assume a very short-term and linear perspective of institutional and resource growth. Facilitating arrangements that evolve according to location-specific settings and keep in mind both short-term and long-term needs of the different actors, can help institutions in planning and crafting rules that are beneficial for all. By vesting increasing control in the hands of the community in all aspects of resource governance, such institutions gain from a more holistic perspective of time and space. In such an approach, for instance, different patches/stretches of the Commons are treated differently – no plantation on a particular patch, silvi-pasture systems on another, dense plantation on one and perhaps open regimes on another. Different rules and regulations are crafted for these different areas in line with a tangible recognition of the time and Nature's requirement. In contrast, organisations with formalised systems of resource generation and with contrary views on 'sustainable resources harvesting' either lose out in providing benefits to all, or initiate actions which will eventually lead to a breakdown of institutional arrangements, since the resources themselves do not last indefinitely.
- The resource growth on the Commons is neither linear nor homogeneous. It is influenced by a range of factors, which also change in different location specific setting. There are instances where, within a particular village, two different regenerated patches of Commons have shown different resource growth. Though it might be important to ensure optimum productivity for the Commons as a whole, an important lesson of the study was that in areas where poor livestock-keepers have high dependence on the Commons, resource growth across all patches

couldn't be uniform. Thus, while a silvi-pasture plot might not get marks from a conservationist for its growth and diversity, it usually plays an important role in promoting diversity on plots in its proximity by freeing them of anthropogenic pressure.

- Secure tenure and assured benefits from the Commons are important for mobilising communities for Common Property Resources Management. Tenure and usufructory rights help in clarifying and demarcating boundaries of Common Property Resources which are often ambiguous or information about which is confined to just a few in a village.
- Strong focus on endemic species of plants provides livestock-keepers a share in the growth by way of increased biomass availability. Livestock systems in these regions have emerged as a response to resources available from the Commons. Of significant importance to both small and large ruminants are the tree leaves and pods; thus an appropriate seeding of these species and protection of their root-stock while planning resource growth will render that patch of Common Property Resource more valuable for livestock-keepers.
- Water and land are critical constraining factors in livelihood systems of households in semi-arid areas and so work on Common Property Resources in both these categories has a great impact on livelihoods. With institutions that concentrate only on one component of CPRs, the significant interlinked aspect of the resource regime is often overlooked. Since the Commons usually form the uplands and are situated on slopes, an improvement in water retention capacity in these areas has an indirect effect on farming systems through an increase in ground water availability. Village institutions in certain locations have also formed rules to regulate the usage of groundwater understanding the 'Common Property' nature of such resources.

The study clearly shows that improvements in Common Property Resources have paid off substantially with increase in the livestock base of poor livestock-keepers and reduced vulnerability of theirs to water and fodder scarcity. The study emphasises the need to further enhance programmatic actions to support restoration of the Common lands, develop policies to govern and conserve the Commons, to only ensure a pro-poor livestock growth but also address the growing ecological concerns.

REFERENCES

- Baskerville, G.L., 1965. *Estimation of Dry Weight of Tree Components and Total Standing Crop in Conifer Stands*, Ecology, 46: 867–869.
- Beck, T. (1998) *Excluding the Poor from their Rights: The Case of Natural Resources in West Bengal* Paper Presented at the International Association for the Study of Common Property, Vancouver.
- Beck, T. and M. Ghosh (2000) *Common Property Resources and the Poor: Findings from West Bengal* Economic and Political Weekly, Vol. 35 (3) pp: 147-153.
- Birthal PS and Taneja VK. 2006. *Livestock sector in India: Opportunities and challenges for smallholders*. Paper presented at the ICAR-ILRI International Workshop on Smallholder livestock production in India: Opportunities and challenges, 31 Jan –1 Feb 2006, New Delhi, India.
- BLOMQUIST, W. & OSTROM,E. *Institutional Capacity and the Resolution of a Commons Dilemma*. Policy Studies Review 5(2), 1985: 383-393.
- Brara, Rita 2006 *Shifting Landscapes: The Making and Remaking of Village Commons in India* , Oxford University Press, New Delhi
- Chopra, K. and Dasgupta, P. 2002. *Common Pool Resources in India: Evidence, Significance and New Management Initiatives*, Institute of Economic Growth, Delhi.
- Conroy, C. and Lobo, V. 2002. *Silvi-Pasture Development and Management on Common Lands in Semi-Arid Rajasthan*, Technical Bulletin No. 3, BAIF-DFID Publication.
- FAO – Food and Agriculture Organisation of the United Nations, 1993. 'Forest Resource Assessment 1990. Tropical Countries', FAO Forestry Paper 112. Rom: FAO.
- FES – Foundation for Ecological Security, 2004. 'Biomass Assessment in Sadhukonda Reserve Forest and Adjoining Areas, Madanapalle, Andhra Pradesh' ,Working Paper.
- FES – Foundation for Ecological Security, 2006. *A Study on Biomass and Biodiversity in Satkosia Gorge Wildlife Sanctuary, Orissa, India*, Internal Paper.
- Ghate, R., Jodha, N., and Mukhopadhyay, P. 2008. *Promise, Trust and Evolution: Managing the Commons of South Asia*, Oxford University Press, Oxford.
- Grimmett, R., Inskipp, C., Inskipp, T., 1999. *Pocket Guide to the Birds of Indian Subcontinent*, Oxford University Press.
- Gundimeda, H. 2005. *Can CPRs Generate Carbon Credits without Hurting the Poor?* Economic and Political Weekly, Vol. 40, No. 10, 973 - 980.
- Hector, A., 1998. 'The Effect of Diversity on Productivity: Detecting the Role of Species Complimentarity', Oikos 83: 597 - 599.
- Iyengar, S. (1989) *Common Property Resources in Gujarat: Some Findings about their Size, Status and Use* Economic and Political Weekly, June 24, pp. A67-A77.
- Iyengar, S. (1997) *Common Property Land Resources in Gujarat: Some Issues in Size, Status and Use* In J. Parikh, and S. Reddy (eds.) Sustainable Regeneration of Degraded Lands, Tata McGraw Hill, Delhi, pp: 57-76.
- Iyengar, S. and N. Shukla (1999) "Common Property Land Resources in India: Some Issues in Regeneration
- Iyengar, S. 2003, *Environmental Damage to Land Resource: Need to Improve Land Use Data Base*, Economic and Political Weekly, Vol. 38, No. 34, 3596–3601.
- Jodha, N.S. 1985. *Population Growth and the Decline of Common Property Resources in Rajasthan*, Population and Development, Vol.11, No.2, Population Council, New York.

- Jodha, N.S. (1986) *Common Property Resources and the Rural Poor in Dry Regions of India* Economic and Political Weekly. Vol .21 (27), pp: 169-181.
- Jodha, N.S. 2000. *Waste Lands Management in India: Myths, Motives and Mechanisms*, Economic and Political Weekly, Vol. 35, No.6; 466 - 473.
- Kadekodi, G. 2004. *Revenue Land as Commons: The Case of National Tree Growers Cooperative Federation*, Chapter 8, *Common Property Resource Management: Reflections on Theory and the Indian Experiences*, Oxford University Press, New Delhi.
- Ketterings, Q.M., Noordwijk, C.M.Y., Ambagau, R., Palm, C.A., 2001. 'Reducing Uncertainty in the Use of Allometric Biomass Equations for Predicting Above-ground Tree Biomass in Mixed Secondary Forests' ,*Forest Ecology and Management*, 146: 199 - 209.
- Mondal, D., Singh, S., and Dhameliya, J.V. 2007Kumar, P. and Reddy, S. eds. *Ecology and Well-Being*, Sage Publications, New Delhi.
- Naeem, S., Thompson, L.J., Lawlor, S.P., Lawtonne, J.H., and Woodfin, R.M., 1994. 'Declining Biodiversity can Alter the Performance of Ecosystems', *Nature* 386: 734 - 737.
- Ostrom, E. (1990) *Governing the Commons: The Evolution of Institutions for Collective Action* Cambridge University Press.
- Rangnekar, D.V. 2006. *Livestock in the Livelihoods of the Underprivileged Communities in India: A Review*, International Livestock Research Institute, Nairobi.
- Rathore, M.S. 2007, *Livestock and Livelihood in Rajasthan*, unpublished paper, Institute of Development studies, Jaipur.
- Ravindranath, S., Premnath, S., 1997. 'Biomass Studies: Field Methods for Monitoring Biomass', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- Ricotta, C., Avena G., et al., 1999. 'Mapping and Monitoring Net Primary Productivity with AVHRR NDVI Time-series: Statistical Equivalence of Cumulative Vegetation Indices', *ISPRS Journal of Photogrammetry and Remote Sensing*, 54(5): 325 - 33.
- Rishmawi K., Eagletonne N., Hrimat N., Isaac J., 2005. 'Using Medium-high Spatial Resolution Satellite Data to Monitor Biomass Changes in the Dead Sea Basin', Paper presented at International Conference on: Promoting Community-driven Conservation and Sustainable Use of Dry Land Agro Biodiversity, Syria 18 - 21 April, 2005.
- Shah, A. 2001. *Who Benefits from Participatory Watershed Development? Lessons from Gujarat, India*, Gate Keeper series No. 97, International Institute for Environment and Development, London.
- Shah, A., Joshi, H. and Desai, J. 2008. *Revisiting Watershed Development in Madhya Pradesh: Evidence from a Large Survey*, unpublished Report, Gujarat Institute of Development Research, Ahmedabad.
- Stirling, G., Wilsey, B.J., 2001. 'Empirical Relationships between Species Richness, Evenness and Proportional Diversity', *American Naturalist* 158: 286 - 300.
- Tilman, D., 1997. *Distinguishing between the Effects of Species Diversity and Species composition*, *Oikos* 80: 185.

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