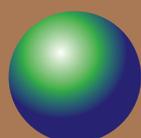


Livestock and Commons: Policy Perspectives for Rainfed Regions of India



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CONTENTS

Summary	5
Section 1: Introduction	9
Section 2: Grazing Based Livestock Production System: Production System In Ecological Succession	14
Section 3: Examining Livestock Production And Commons In The Policy Discourse	29
Section 4: Policy Recommendations	36
Bibliography	42

SUMMARY

Grazing-based livestock production is crucial to the livelihood security of a diverse range of people, extending from the landless and the socially marginalized to those with access to land and other resources, often including dominant members of local communities. This production system, located primarily in rainfed-dryland areas is dependent on the Commons, both land and water resources which include pastures, forests, barren and uncultivated land, river and tank beds, agricultural fallows, and in many areas harvested agricultural fields. This system has brought different users in contact with each other in ways that necessitate the institution of cooperative mechanisms. Institutional arrangements governing the Commons consequently have a crucial role to play in sustaining this system of production by contributing to the development of complementarities between diverse resource-users and resource systems.

This system of livestock production and associated institutions has evolved a complex social-ecological system that has enabled populations to survive and adapt to environmental, economic and institutional changes. Strategies such as livestock mobility (with different spatial and temporal patterns) and institutional arrangements for a dynamic resource use have been pro-active mechanisms to utilize the variability in environmental conditions, diversify livelihood options and uphold the resilience of livelihood systems.

Closely in sync with natural systems, grazing based livestock production systems demonstrate elements of self-regulation which are composed of a complex web of positive and negative feedback systems operating within the context of the carrying, regeneration and assimilation capacity of respective natural systems. In contrast to a linear framework of resource degradation and stock maximization, wherein it is assumed that a rational livestock keeper aims to maximize his herd size in situations of resource scarcity, this system has shown itself to be more dynamic and has been an important strategy to harness the ecological and economic dynamics of rainfed-dryland areas. In contemporary contexts of increasing climate variability, the integrity of this larger social-ecological system is crucial in maintaining the adaptive capacity and resilience of a diverse range of livelihoods that are associated with livestock and agriculture.

However, existing policy orientation has by and large failed to recognize the above. At local, national and international levels, policy makers have sought to link grazing based livestock production with deforestation and environmental degradation without taking into account the diverse strategies that enable communities to utilize local resources in a sustainable and scientific manner. Governed by ecological, social and economic dilemmas, sedentarisation, capital

and resource intensification have for the most part been standard policy recommendations as a means of addressing the above concerns, without taking into account capital and resource constraints in real world contexts.

Driven primarily by production considerations, policy makers have largely ignored the strengths of grazing-based livestock production systems in contributing to livelihood security, sustainable use of marginal resources and food security of a substantial section of the population. This system, while primarily based on a low input-low output framework, is geared towards commodity production by small holders (production by the masses) and is not only a subsistence form of production. Production based on this system provides the bulk of the milk and meat requirements of Indian consumers. The system has further adapted to the changing economic stimulus (for example, the increasing demand for milk and meat) and ecological conditions through changes in livestock composition, species kept and breeds evolved. In many contexts, livestock keepers have over time evolved, resilient grazing systems that manage to maintain high livestock and human populations in an uncertain environment using a combination of species kept (building on the complementarities between species), dynamic use of available resources (facilitating complementarities between resource systems) and

institutional arrangements for exchange, reciprocity and dynamic use regimes.

However, while there is substantial evidence to show the diverse ways through which this system of livestock production contributes to production requirements, landscape health and sustainability of agricultural production systems, the narrative of desertification, the animosity to livestock (especially sheep and goats), and the need to reduce herd size remains deep seated in policies and programmes aimed at livestock development and conservation of natural resources.

In order to gain a better understanding of the likely future of grazing based livestock production and common property institutions, there is a need to understand the broader context in which these are located. At a fundamental level, this context is constituted by the complex of transitions that can be characterised as the 'Green Revolution'-the focus on productivity and marketability (Kavoori 2010). Transforming the construct of rainfed agriculture through expansion of agricultural tracts on the Commons and development of crop production as a 'separate system' with increasing emphasis on intensification, the dominant development strategy has tended to create two separate worlds, which from being largely complementary, have started developing an antagonistic

character. Further, this paradigm of development based on individualistic decision making and privatization of resources has directly as well as indirectly, undermined the institutions that supported the commons. Basic changes in the production priorities of dominant agrarian groups and neglect by State institutions have played a key role in undermining the viability of the Commons, as a result of which common property institutions have weakened. Encroachment, expansion of agriculture and diversion of the Commons for alternate land use have rendered marginal populations as mute witnesses to the destruction of common resources critical to their livelihoods. In recent times, this random process has become more systematic as the State has sought to appropriate large tracts of commons in the interests of private industry. Indeed the recent euphoria over the cultivation of jatropha as a bio-fuel on Commons, usually termed as wastelands, probably, is the most direct attack on grazing based livestock production and associated production systems.

Notwithstanding this, Commons continue to play a critical role in the livelihoods of rural households; livestock keepers have shown considerable innovativeness in adapting to the changing environmental and institutional scenario; and there are numerous examples of robust common property institutions. While policy papers have remained peppered with

the construct of livestock pandemonium and the obvious ecological disaster, captured by the Hardin's Tragedy of Commons, there have been numerous examples of common property institutions and a vast body of scientific work which on the contrary have proved that communities can design robust institutional arrangements for governance and the sustained use of common pool resources.

In the emerging scenario of deteriorating environmental conditions and unfavorable agriculture production conditions, common property institutions and dependent livestock production systems provide an important avenue for enhancing the livelihood security of rural populations. The objective of this policy paper is to develop a narrative of these options considering the wide diversity of socio-economic groups engaged in this production system in different ecological, institutional and political contexts.

From a public policy perspective we argue on the need to evolve and nurture a plurality of institutional arrangements and address the institutional deficit at different levels, which can help promote 'innovativeness, learning, adaptation, trustworthiness, cooperation between participants, and achievement of more effective, equitable and sustainable outcomes at multiple scales' (Ostrom, 2010). Building on the empirical

evidence that livestock production systems in rainfed regions of India continue to remain primarily grazing based, we argue, that in absence of pro-poor policies which can address the specific constraints of livestock keepers such as access to land, feed and water, much of the livestock growth may be cornered by industrial livestock production systems with severe environmental and equity concerns. Understanding the dependence of livestock keepers on common lands as an important land use strategy and the interface of livestock-commons-agriculture in strengthening the resilience of rural production systems is crucial for devising suitable policies and programmes that can support socially and ecologically sustainable livestock development.

The evolution of such policies and programmes demands a paradigm shift in the approach to rainfed area development, whereby the focus is on strengthening the resilience and

diversity of local production systems. In order to operationalize this approach, it is imperative that communities have secure tenure over these common resources and therein an incentive to invest in these systems. This must be complemented by strengthening mechanisms for decentralised governance of natural resources, extending up to the level of the village.

At the same time, public investment must be channelled towards the development of the Commons with a suitable programme architecture which strengthens the agenda of natural resource management at various levels of local governance and is complemented by efforts towards capacity-building and institutional strengthening. Further, mechanisms need to be evolved for long-term planning at the landscape level and for interactions between multiple stakeholders to evolve a shared vision on issues related to natural resources and rural production systems.

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Section I

INTRODUCTION

The policy discourse on livestock and commons¹ has been shaped by what can be referred to as the “dilemma triangle”. These dilemmas have shaped the construct of a vast majority of development strategies, but the way in which they have relegated an entire system of production in an uncertain environment to being primitive and non-viable has been comprehensive and unparalleled. The three dilemmas can be classified as the ecological, social and economic ones, and while each is rooted in its own construct, they are at the same time deeply inter-connected. Any favourable discourse on policy for livestock production systems dependent on the commons would have to navigate through the construct of these dilemmas shaping mainstream development strategy.

First is the construct of ecological dilemma. Numerous literature and studies have been peppered with the narrative of a looming ecological disaster associated with an increase in livestock populations. This increase is linked to overgrazing and increasing stock density on a parcel of land, beyond the carrying capacity of the land, leading to decreasing phytomass and extraction beyond the regeneration capacity resulting in degradation and eventual desertification. The

outcome of such a paradigm has been juxtaposing production and conservation objectives wherein agro-pastoral and pastoral forms of livestock production are not seen as sustainable forms of production. This has promoted a range of intervention strategies and researches aimed at identifying scientific grazing practices, calculations of sustainable stocking density, reducing herd size, restrictions on grazing areas, replacing this form of production with scientific and intensive forms of livestock production (such as stall fed systems), and at a broader level alienating communities from their natural environment, based on the assumption that conservation objectives can be only met through reducing human-nature interaction and creating pristine natural habitats.

This brings us to the second inter-connected dilemma - the social or institutional dilemma. ‘The Tragedy of Commons’ (Hardin, 1968) has been widely cited and is an accepted portrayal of this dilemma wherein the users of a common-pool resource - a pasture open to all - are trapped in an inescapable tragedy of overuse and destruction. The underlying assumption has been that rational individuals are trapped in social dilemmas without the ability to change the structure

¹ Commons here refer to common pool resources of land and water.

or evolve institutional forms to collectively address the problem. The desire of livestock-rearers to increase livestock numbers on commons is taken as confirmation of the supposed irrationality of traditional production and land use systems. Hardin's solution to the problem is state control or privatization that is a widely accepted strategy and has shaped policies in many contexts leading to increased state control over natural resources.

The third dilemma is the economic or the production dilemma. Grazing-based livestock production has usually been characterized as primitive and with low productivity. With mainstream development strategies focusing on increasing productivity, surplus and marketability, the multiple production objectives of this production system have largely been ignored. Instead the focus has been on how higher productivity benchmarks, usually achieved under a more stable production environment, can be translated in these environments. The need to transform is considered essential to not only increase efficiency but also from a greater urgency to meet the growing demand for livestock products. Scientific livestock management strategies and technological improvement with a focus on cross breeding and improving productivity have been prescribed solutions. The underlying assumptions have been that 'more

productive' breeds would provide higher incomes and help reduce poverty, and the economic benefits from the high producing breeds can overcome the social-cultural-ecological-institutional constraints.

A vast body of scientific and empirical evidence has been generated which challenges the conception, assumptions and solutions to the dilemmas. First is the notion of carrying capacity. While relatively stable environments allow the adoption of the concept of carrying capacity, research has shown that standard concepts of carrying capacity are inappropriate in non-equilibrium environments such as semi-arid and arid regions and opportunistic grazing based livestock production systems, dependent on mobility and fluctuations in herd size, are more sustainable than constant stocking rates (Davies JNF. M., 2010). Further, studies have also shown the critical role of livestock in maintaining landscape health and its contribution in maintaining biodiversity. While highly grazed areas, around settlements or water sources, show levels of degradation, larger expanses demonstrate a lesser degree of such processes. Even areas which are perceived to be degraded have shown to recover with rains and seasonal restraints on grazing. Livestock keepers have also shown resilient grazing practices through a combination of approaches like maintaining diverse livestock

composition which promotes complementarity between resource uses, dynamic utilization of available resources through mobility and seasonal use of different resources, developing complementarities between different production systems and finding new niches, such as intensive irrigated tracts, orchards, increasing fallow lands.

Second has been the uni-level policy proposal for governance of common pool resources and the notion that communities or private individuals are unable to produce institutional arrangements to address issues of resource governance. The seminal work of Elinor Ostrom has shown that communities in many contexts have developed institutional rules suited to their local social-ecological context and invest in building trust, mechanisms for decision making, benefit sharing and monitoring to address issues of resource use. Commons, contrary to dominant perception, are not open access regimes and usually communities have over time evolved mechanisms for clarifying resource and institutional boundaries. While the emergence of robust institutional arrangements remains specific to local socio-political-economic-ecological contexts, these studies have provided a more nuanced perspective of decision making in uncertain environments. These studies have also highlighted the

need to go beyond the panaceas for governance of human-nature interaction beyond a single type of governance system (government ownership, privatisation, common property). The positive outcome of recent research and evidences of community based natural resource management institutions in different parts of the country can be observed in the renewed attention of policy makers to 'local solutions' as an alternative to centralized governance or market led solutions. With greater impetus to joint forest management arrangements from the 1990s to the 73rd Amendment of the Constitution of India enabling a greater role to Panchayati Raj Institutions (PRIs) to recent legislation such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and the Forest Rights Act, community based natural resource management has been considered an important strategy to address issues of environmental degradation, livelihood security and community development. These trends towards local governance point to a shift in thought from the centralized and overarching solutions of the past decades that have failed to reverse and may indeed have contributed to environmental problems and attendant social tensions. However, while these changes in the policy environment have provided an enabling set of rules and institutional environment

for communities to determine outcomes which are more beneficial to them, in the absence of a deeper understanding of the dynamics of how communities address issues of degradation of natural resources in different bio-physical, economic and social environments, and the resultant outcomes, policies and programmes have usually remained tailored to a blueprint, neglecting location specificities.

The critique for the conceptions, assumptions and solutions to the third dilemma has partially derived its logic from the ecological soundness of grazing based livestock systems and the ability of these systems to adapt to diverse environments; the visible evidence of failures of the dominant livestock development strategy and its inability to make inroads in these variable environments; and the need to have a different development paradigm for rainfed regions rooted in strengthening the resilience of rural livelihoods. While policies and programmes continue to be misinformed by inappropriate economic and productivity valuation between intensified and grazing-based production systems, it is slowly being realized that this form of production provides favourable returns in conditions where exotics and crossbreeds would fail to survive. Evidence further suggests that livestock keepers through careful breeding practices have evolved local

breeds whose productivity levels match and surpass the scientist's selection of productive breeds. Further, in many contexts there have existed complementarities between intensive and extensive forms of livestock production, with the extensive forms of production subsidizing intensive livestock production through maintenance and replacement of stock.

The rainfed regions, even after continued neglect in policies and programmes, continue to support a substantial livestock population. Estimates suggest that 70% of agricultural GDP in arid areas and 40% in semi-arid areas come from the rearing of livestock. The numbers of livestock in these regions constitute around 55% of the total livestock population of the country, estimated to be 350 million in 2003 and around 3/4th of this livestock is owned by landless, marginal and small farmers. This system of production by landless, small and marginal farmers meets a substantial proportion of the milk and meat requirement of the Indian consumer and depends to a varying extent on inputs derived from the commons.

While it is clear that grazing based livestock production systems are based on complementarities between resource users, resource systems and species dependent on them, the policy debate at the

state, national and global levels has remained constrained by panaceas. Central to this neglect has been the failure to recognize the value of the multi-functional nature of livestock, local breeds and the interface of commons-livestock-agriculture in strengthening the resilience of rural livelihoods. In this paper we argue the need to move beyond panaceas to complex problems of resource conservation and use, governance and production objectives. We build this argument by exploring the trends in livestock population and land use in rainfed regions showing the self-regulating mechanism of the system and its interconnectedness to the natural environment (Section 2). Highlighting the critical dependence of the livestock production systems on the commons, this section also looks at the stakeholders, the different socio-economic groups and the different species being raised on the commons. Section 3 explores the key policies and programmes impacting livestock and the commons in rain-fed regions, transitions in the policy perspectives, institutional forms emerging and the resultant outcomes. Section 4 puts forth policy proposals for consideration.



Section 2

Grazing Based Livestock Production System: A Production System in Ecological Succession

Historically, livestock production systems have had strong links with commons. This is true not just on account of the nomadic pastoral system but also for a variety of conditions under which animal husbandry has been practiced. Transhumance, oscillating between agrarian and pastoral domains, is the most obvious instance. But even the more sedentary forms of livestock production associated with agrarian contexts, more often than not, have exploited resources governed by common property institutions. In its own important way, agriculture has also contributed to the maintenance of common property institutions, with fallow lands and post-harvest grazing providing valuable pasturage in interstitial spaces.

It is, however, unquestionable that these conditions have changed rapidly over the last many decades. Common Pool Resources (CPRs) and institutions for their governance have seen a decline both in extent and quality. As noted in the introductory chapter, livestock production dependent on commons has witnessed perhaps a greater circumscription, and agriculture, far from

building accommodative relationships, has become an increasingly exclusive domain geared towards the maximization of production.

It is under these conditions that we need to look at CPRs, grazing based livestock production systems and their relationship with the larger rural production systems. We explore this through examining livestock population and land use trends over the last two decades in rainfed-dryland² regions to understand the transition in livestock and agricultural production systems. We then explore some basic questions, what kind of resource systems are supporting this livestock population and the contribution of commons in supporting changing livestock composition including changes across different socio-economic groups. A large part of this discussion is based on a recent study undertaken by the foundation for ecological security in 100 villages across the rain-fed regions of the country spanning 7 states and 22 districts, and covering a sample of 3000 households (Foundation for Ecological Security, 2010).³

² This analysis is limited to the arid, semi-arid and sub-humid ecological regions of Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha and Rajasthan.

³ The objective of the study was to assess the criticality of the Commons for rural production systems and livelihoods across different socio-ecological categories and ecological regions, as well as the institutional environment shaping the governance of the Commons.

Transition in Livestock Production Systems and Land Use

Increasing livestock population against a backdrop of resource scarcity and consequent environmental degradation has been a conventional portrayal of livestock production in the rainfed-dryland regions. While livestock populations have increased (Table 2.1), the character of this change needs a better diagnosis to understand how the system is responding to the changing ecological and economic dynamics.

Table 2.1 gives the composition of livestock and change in population between the years 1987 and 2007, based on data from livestock censuses for the respective years. The data given here pertains to seven states

that have been considered for the study. Apart from the increase in the number of livestock from 242 million to 271 million—an increase of 11.67%—over a 20 year period, what is immediately visible is the decrease in the number of indigenous cattle by 18.19%. While it is usually argued that indigenous cattle are gradually giving way to more productive species and breeds, namely buffaloes and crossbred cattle, indicating a change in the hitherto deeply embedded relationship between cattle and agrarian production and in the role that livestock have assumed in rural livelihoods, a closer look at the increase in small ruminant numbers (sheep and goat which has increased by nearly 40% and 20% respectively) and a more or less stable livestock composition over the two time periods (Figure 2.1 and Figure 2.2) shows a more complex pattern of transition.

Table 2.1: Trends in livestock population 1987 and 2007 (in millions)#

Livestock	1987	2007 (P)	% Change
Indigenous cattle	98.4	80.5	-18.19
Crossbred cattle	3.1	11.65	264.11
Buffaloes	41.1	53.6	30.24
Sheep	38.5	53.7	39.63
Goats	57.3	68.8	19.95
Others	4.3	2.99	-30.63
Total	242.97	271.31	11.66

Livestock Census-1987 and 2007(P), P: Provisional

Others includes horses and ponies, donkeys and pigs

Data for 7 states included Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha and Rajasthan. All the districts are classified in three ecological regions – arid, semi-arid and sub-humid.

Figure 2.1: Livestock Composition 1987

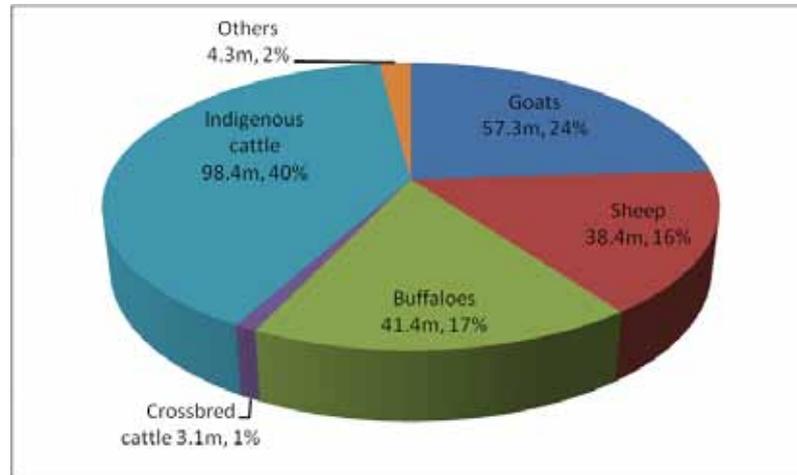
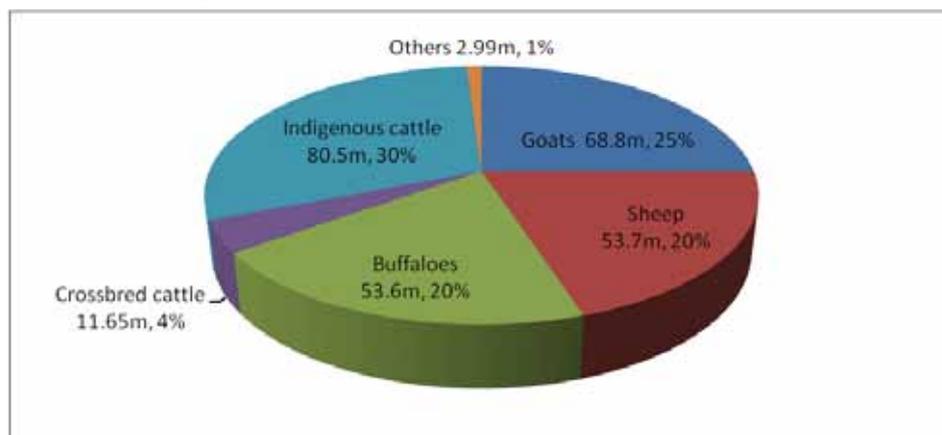


Figure 2.2: Livestock composition 2007



These trends reveal that the space vacated by native cattle seems to have been occupied not by buffaloes alone but by other species as well, quite possibly by small ruminants, since the base figure for crossbred cattle is too small to make an appreciable difference. This pattern while showing that the decline of native cattle may not necessarily reflect a shift towards more intensive forms of husbandry, has important implications for the continuing role of grazing based production systems, in particular

common property regimes. Secondly, considering that a large proportion of the increase in livestock population is constituted by small ruminants, the actual increase in population in terms of livestock units⁴ is far less (in comparison to an increase of around 12% in actual livestock population, in terms of livestock units the increase is around 7%).

A closer look at these considerations may be had in Table 2.2 where the same data as in Table 2.1 is given

⁴ Livestock Unit is calculated based on co efficient for different livestock (established on basis of feed or nutritional requirement of each livestock) and is used to aggregate livestock from various species/age to common denominator.

according to different ecological regions comprising the rain-fed regions. There are considerable differences in the environmental and production conditions in these three regions, which play an important role in shaping the differences discernible in the trajectory of livestock composition and growth. In the arid region, we therefore see a modest overall decrease in the livestock population, with not only cattle but the sheep population declining as well. Although the declining figure for sheep should be viewed with caution since sheep population can fall and climb quite rapidly in the course of a few years, it does seem that in the arid regions, there has been an overall decline in numbers, perhaps as a result of environmental deterioration or perhaps due to change in forms of land use or an increasing preference for goats due to their sturdiness and acceptance as a better source of meat and milk. In semi-arid regions, trends show a decline in cattle population, increase in buffalo population and a more pronounced increase in sheep population. If we were to measure these increases in terms of comparable animal units, then both species (buffalo and sheep) probably show an equal increase in terms of the total livestock units the ecosystem is supporting. While it is clear that a larger number of animals have been added to the system than that which can be accounted for by the decrease in native cattle, it would be fair to say that both buffalo and sheep (and largely the small ruminant population) have replaced the native cattle populations. This again confirms the larger picture that the system is not linearly moving

Table 2.2: Trends in livestock population across eco-regions (in millions)

Livestock	Arid			Semi- Arid			Sub-Humid		
	1987	2007	% Change	1987	2007	% Change	1987	2007	% Change
Indigenous cattle	8.9	7.38	-17.47	54.85	40.94	-25.37	34.63	32.20	-7.02
Crossbred cattle	0.063	0.624	888.74	2.08	7.03	236.91	1.03	3.95	280.79
Buffaloes	4.66	6.17	32.41	29.08	36.42	25.23	7.42	11.02	48.49
Sheep	14.59	11.81	-19.00	20.43	36.25	77.41	3.46	5.66	63.74
Goats	12.72	14.46	13.67	33.86	38.16	12.72	10.76	16.15	50.12
Others	1.42	0.603	-57.63	1.92	1.34	-29.94	0.96	1.04	7.71
Total	42.42	41.07	-3.17	142.25	160.17	12.60	58.29	70.06	20.18

Animal Census-1987 and 2007(P)

Others includes horses and ponies, donkeys and pigs

Data pertains to 7 states – Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Odisha and Rajasthan.

from an extensive or a grazing based system to an intensive or stall fed production system revolving around buffaloes and crossbreds.

The sub-humid region, even though it harbours the smallest livestock population, shows some interesting features. This region shows the greatest increase in livestock population and most interestingly, registers the lowest rate of decline in the population of indigenous cattle and overall increase in all categories of livestock population. This pattern of growth of livestock species does not by itself indicate that this region has been witness to a transformation of the production system from an extensive type to an intensive one. Barring perhaps buffaloes, none of the species, whether cattle or small ruminants, need to be kept under intensive stall feeding systems generally, conforming to the generalization that increase in population has come about within a grazing system, within which CPRs might have had an important part to play.

These trends point to some very crucial characteristics of the transition in livestock production systems in rainfed regions. While there has been considerable increase in the overall livestock population, it is in the interpretation of the growth rate of different species and the overall species composition that we can make better sense of the

rationality of the livestock production system in rainfed-dryland regions. In contrast to the spectre of an exploding livestock population, these trends show that there have been incremental additions of livestock pressure on the ecosystem.

Further, the decline of native cattle and increase in buffalo numbers may not necessarily reflect a shift towards more intensive forms of husbandry. This has important implications for the continuing role of grazing based livestock production systems, in particular common property regimes. It is also evident that the system is catering to increasing commoditization with a shift to animals producing greater quantities of milk (buffalo) and meat (small ruminants). The transition in the system also reflects that livestock keepers are varying livestock composition to match the changing ecological conditions - reflected in increasing small ruminant populations. In the light of the widespread resource degradation, including the degradation of CPRs, it makes more sense to keep species which can survive in poorer conditions than those with greater resource needs. This, however, also highlights the growing constraint of the systems. While the shift to small ruminants reflects a response to deterioration in ecological conditions supporting the system, the slowing down of the growth rate in the

buffalo population (across some states in the rainfed regions) or that of stagnating milk production growth rates overall, also points out that the system may be stagnating and reaching threshold limits, owing to a general deterioration of pastures and growing antagonism between crop-livestock systems.

they are based on a simplified construct of resource use patterns based on different combinations of species mix in a herding system. A further insight into these possibilities may be obtained if we look at the change in land use across different land categories for the states during the period between 1981 and 2001 (Table 2.3).

While these trends broadly challenge the general view that there is a move towards an intensive system of livestock production and that the commons and grazing systems in general seem to be in historical decline,

It is evident that common lands have seen an overall reduction in area. Along with permanent pastures and other grazing lands, other land categories that are de facto used as grazing lands, like barren and uncultivable lands,

**Table 2.3: Land use pattern in selected States, 1981 and 2001
(area in million hectares)**

	Land use pattern	1981	2001	% Change
1	Forests	27.61	27.0	-2.23
2	Permanent pastures and other grazing lands	7.39	6.46	-12.61
3	Other CPRs (a+b+c+d)	30.76	29.98	-2.55
a	Land used for non-agricultural purposes	7.95	9.10	14.34
b	Barren and uncultivable lands	10.49	9.87	-5.88
c	Miscellaneous tree crops and groves	1.12	1.38	22.91
d	Cultivable wastelands	11.18	9.62	-13.99
4	Total CPRs (1+2+3)	65.77	63.44	-3.54
5	Fallows other than current fallows	5.21	5.62	-2.96
6	Current fallows	6.31	7.79	23.46
7	Net area sown	67.04	66.31	-1.10
8	Total geographical area	144.35	142.61	

Source: Land use data of six states – Andhra Pradesh, Gujarat, Madhya Pradesh, Karnataka, Odisha and Rajasthan, Ministry of Agriculture.

and cultivable wastelands have all seen a decline by a sizeable margin. Insofar as livestock kept on common pool resource is concerned, there is clearly a decline in the resource base available. However one compensatory source of grazing-agricultural fallows, show a considerable increase. Grazing on stubble is an important source of forage for small ruminants, especially sheep, and perhaps here it seems that some amount of compensation has become available. The marginal reduction that we see in the net sown area complements this process, adding somewhat to the potential grazing available.

However, it is unlikely that either of these two niches can quite offset the overall reduction of commons in various forms, not to mention the probable deterioration in the condition of forage available. How then are we to explain the overall increase in livestock? A possible explanation in our view is that at a systemic level, the larger livestock population continues to be supported within the framework of a grazing regime, which lies at the core of the adaptive potential of the system, but given the attrition of the resource base, the species composition has shifted to smaller animals which can adapt easily to poorer conditions. The increasing availability of fallow lands probably has an important role here, as these provide for grazing in interstitial spaces. In an overall sense,

what the system has developed is a mechanism for maintaining the overall biomass under production, by increasing the number of smaller animals under the given ecological conditions. Livestock continue to be produced under a grazing system, but both the niche and the species composition have been modified, enabling the livestock system as a whole to retain its viability under adverse resource conditions.

Dependence on Commons

What role do commons play in supporting the increasing livestock population and changing composition? While the transitions in livestock production systems and land use indicate the continuity of grazing based livestock production through changes in livestock composition and availability of new niches vacated by agriculture, the extent of dependence of such grazing regimes on the commons need to be understood to highlight whether CPRs are only an ecological refugium or are they an ecological foundation on which a larger production system is founded. We explore this using data from the recent study undertaken by the Foundation for Ecological Security to understand the dependence on commons of livestock keepers in rainfed regions and its criticality for grazing based livestock production systems.

Households accessing Commons for Livestock

Grazing and Other Usages

Table 2.4 shows the proportion of households accessing commons for livestock grazing, fodder collection and livestock water requirements. A dominant proportion of households,

eco-regions depending on the same in varying degrees.

While these figures reflect the nature of resource use regimes, it does not provide the actual measure of dependency and contribution of CPR systems to livestock production. This is further explored below across different eco-regions, species and socio-

Table 2.4: Households accessing Commons for Livestock

Eco-regions	Livestock grazing	Fodder collection	Water for domestic and livestock purposes
Arid	75%	4%	78%
Semi-Arid	70%	26%	56%
Sub-Humid	59%	26%	86%
Total	69%	23%	62%

70% across all regions, graze their livestock on common pool land resources. The pattern across all eco-regions also shows consistency in this resource use pattern. Further, households also derive fodder through collection of fodder from commons and while the proportion of households collecting fodder from commons (through cut and carry) is very low in arid areas, around 25% of households in semi-arid and sub-humid areas collect fodder from common lands. Households accessing commons for water requirements, an important feature of resilient grazing based systems also shows greater proportion of households across all

economic groups to understand the actual contribution of commons and its criticality to the production system.

Contribution of Commons to Livestock in Rainfed Regions

The three pie charts given below (Figures 2.3, 2.4 and 2.5) indicate the relative proportion of feed obtained through commons, through grazing on post-harvest stubble and crop residues, and that obtained from fodder that has been purchased or specifically cultivated for the three ecological regions that comprise the

rained regions. Households in arid, semi-arid and sub-humid regions on an average meet around 45% of the fodder requirement from commons. The dependence on common lands for fodder is highest in arid and sub-humid regions with around 66% of the total annual fodder requirement being met through grazing and fodder collection for common pool land resources. In semi-arid areas around 35% of fodder requirement is met from the commons.

It is also evident from these charts that agriculture provides an extremely important feedback into the livestock production system in the form of post-harvest stubble grazing and crop residues. While this is true for all the three regions, its contribution is most substantial in the semi-arid region, where it provides the bulk of fodder requirements. Whereas in the arid and sub-humid regions, crop residues play an important role in supplementing pasture grazing on the commons, in the semi-arid region it is the main source of fodder. In contrast, the role of purchased fodder in all the three regions remains modest. Fodder from crop residues and post-harvest stubble form a part of both individual resource use pattern as well as a common property entitlement system. This highlights the complementarities between agriculture and livestock rearing, and elastic resource use regimes. The other critical point which comes

out is that while the contribution of commons to overall fodder requirement, as in the case of semi-arid regions, may be low as compared to inputs derived from agriculture, this link forms the critical base for livestock populations to sustain. Therefore while commons may be construed as the weakest link in the chain, taking into consideration the variability of agriculture production, the commons act as the foundation for the system and help sustain a stable livestock population. The inputs derived from agriculture act as the driver for variations in livestock populations, with the system expanding and contracting as per the agricultural production.

The domain of common property regime extends, therefore, well beyond its formally instituted boundaries to include conventions, practices and accommodative cultures that enable or maximize synergies between different types of production systems. Common property oriented cultures and relationships are, in a way, mechanisms that maintain the feedback cycles and complementarities between common pool resources and rural production systems (agriculture and livestock keeping). Common pool resources thus contribute not just directly to production, but form part of a complementary system of resource utilization. In the context

Figure 2.3: Sources of fodder in arid areas

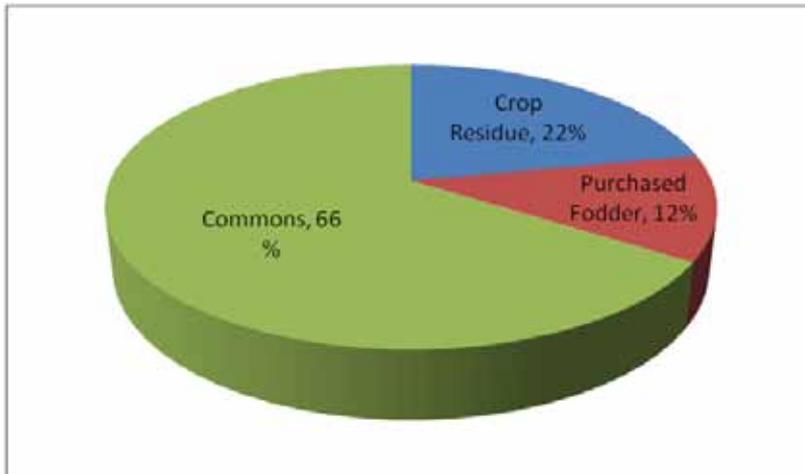


Figure 2.4: Sources of fodder in semi-arid areas

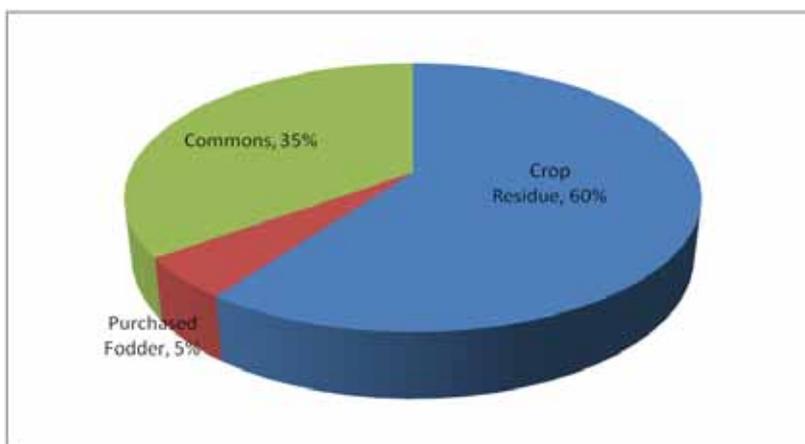
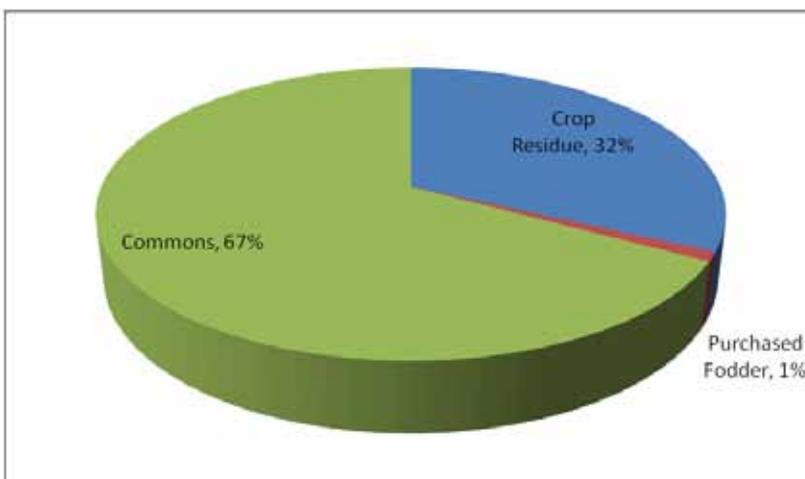


Figure 2.5: Sources of fodder in sub-humid areas



of rainfed regions with variable environment this also shows the limited applicability of the concept of carrying capacity. Livestock is raised on multiple resources with composition of species and institutional arrangements among different resource users geared towards dynamic resource use and enabling complementarities between resource systems. We further explore this through dependence of different livestock species on the commons.

Contribution of Commons to Different Livestock Species

Table 2.5 records the contribution of the commons to total fodder requirements of different livestock species across the eco-regions. The data clearly indicates that even in their present condition, the CPRs continue to provide a large chunk of fodder requirement for livestock. The commons provide for well over 50% of the requirements of fodder for small

ruminants. In the arid and sub-humid regions, they provided three-quarters of the total fodder requirements. In the semi-arid regions, well over 50% of the fodder needs are met from the commons. Keeping in mind that small ruminants are almost always maintained on a grazing system, we can with some assurance say that these species would be practically impossible to maintain in the absence of common pool resources (CPR) for while both, large and small ruminants, are provided with occasional top feed, the only other source of grazing for small ruminants are agricultural lands, where they graze on post-harvest stubble.

Native cattle breeds are also reared primarily on fodder obtained from CPRs. Livestock which show relatively low levels of dependence on CPR are crossbred cattle and bullocks. In the sub-humid region however, both draught animals and buffaloes show a substantial dependence on commons. While the dominant assumptions are that crossbred and buffaloes are the

Table 2.5: Percentage of annual fodder requirement met from Commons across regions and different livestock

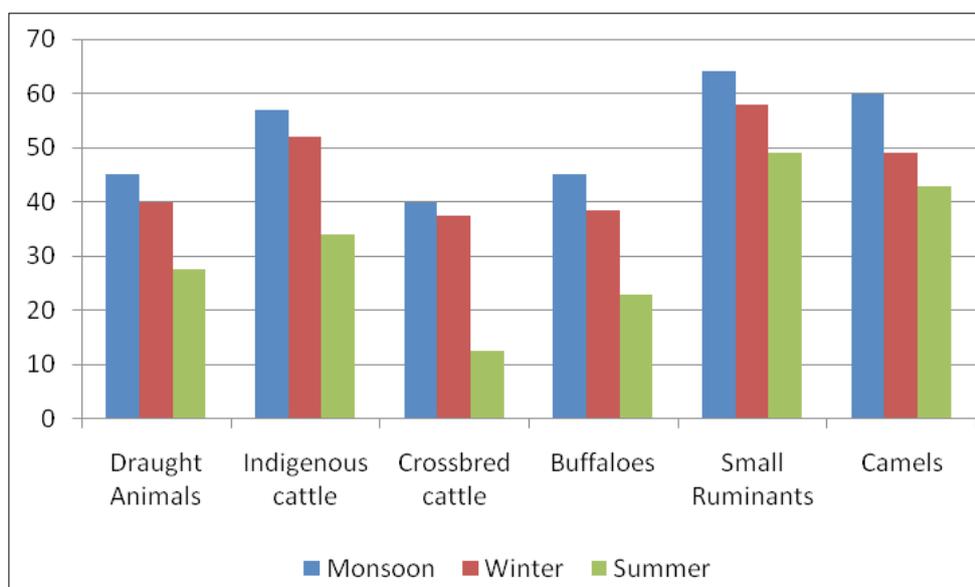
	Draught animals	Indigenous cattle	Crossbred cattle	Buffalo	Sheep and goats	Camel
Arid	33	63	45	65	84	68
Semi-Arid	31	41	30	30	52	29
Sub-Humid	68	74	11	58	79	0

archetypal stall fed animals, these figures across different eco-regions shows the variations in production strategy and critical role of commons for these livestock as well. The other crucial element is that this system is geared towards utilization of available biomass in the ecosystem through a diverse livestock composition. The different livestock have different

entrant to any pasture, sheep follow the large ruminants in the grazed pasture with their preference for low vegetation.

This dependence of livestock on CPRs continues through much of the year, as may be seen from the bar charts given here (Figure 2.6). CPRs form the key niche in the monsoon (July-October) periods,

Figure 2.6: Dependence of different livestock on Commons in different seasons



biomass preference and rather than a competition between species for pasturage, there are complementarities between the different species. Sheep and goat access different feed resources, and while cattle and sheep are relatively dependent on the same ecological niche, livestock keepers have usually developed grazing systems which allows for both species to co-exist. While cattle with its preference for taller grasses are usually the first

with all the livestock deriving more than 40% of their fodder requirements from the commons. Even during winter (November-February), the dependence does not decrease much. In summer, which is the lean grazing period, CPRs provide for half of the grazing needs of small ruminants. Far from being a weak link in the chain of production, even under the present circumstances, CPRs continue to provide for all the major livestock groups throughout the year.

Contribution of Commons to Livestock Keepers Across Different Landholding Groups

Table 2.6 provides the contribution of the commons to livestock-keeping households in different ecological regions across different landholding groups.⁵ In contrast to the regional differences (as discussed above), the variation in contribution does not seem to change much across landholding classes. While the landless do seem to depend more on the commons than the landed for the fodder requirements of their livestock, including those in semi-arid regions, it is clear that for landowning groups, owning large tracts of land does not significantly affect their dependence on the commons. The

contribution that commons make to varying landed groups does not change with increasing land holding. While the general assumption is that poor households depend more on commons, this provides evidence to the contrary and shows that relatively large landowners may have a greater stake in the commons.

Contribution to Water Requirement of Livestock

The influence of CPRs as part of seasonally modulated regimes of extraction can also be seen if we look at the most vital of resources—water. Table 2.7 shows the relative dependence of households on different sources of water, community resources (tanks, ponds, rivers), public utilities (hand pumps and community wells) and private sources (taps, tube

Table 2.6: Contribution to livestock from Commons across different landholding category (% annual fodder requirements met from Commons)

Landholding category	Arid	Semi-Arid	Sub-Humid
Landless	67	41	54
Marginal farmers	46	35	70
Small farmers	43	41	69
Others	72	35	68
Total	64	37	68

⁵ Annual fodder requirement of households were calculated based on the average biomass requirement of different livestock and their body weights. To calculate the proportion met through the Commons, an average of fodder requirement met from the Commons in the different seasons based on household grazing and feeding systems was taken.

wells and private wells), for meeting the needs of livestock.

Common water sources are made use of by almost all households in different eco-regions. Households with access to other sources make greater use of CPR in the monsoon and winter season. Across different eco-regions, community dependence on common water sources for livestock is greater than dependence on other sources.

Here again, the complementary nature of the relationship between different types of water sources

is remarkable. As in the case of fodder resources, the dependence on multiple water sources not only reduces the possibilities of over-exploitation by dependence on any single source. Like a grazing system, the water utilization regime of livestock also works on similar principles of open access of which common property regimes are a part. As in the case of post-harvest grazing on stubble, in the case of water also, private wells can and often do provide water to animals not necessarily belonging to the owner at certain times of the year.

Table 2.7: Livestock drinking source in different seasons across different eco-regions

Season	Source	% Households depending on different sources		
		Arid	Semi-Arid	Sub-Humid
Monsoon	Community sources	62	61	74
	Public sources	38	22	20
	Private sources	25	28	15
Winter	Community sources	47	52	74
	Public sources	37	28	21
	Private sources	40	31	16
Summer	Community sources	51	33	51
	Public sources	35	37	27
	Private sources	39	40	29

SUMMARY

This evidence while establishing the continuity of grazing based livestock production in dryland environments and the critical contribution of commons, challenges the conventional assumption of a secular decline in common property institutions and production systems based on them. While commons have declined both in extent and quality, and common property institutions have been undermined through continued policy neglect and mainstream development strategy, livestock keepers have adapted livestock production which rather than being an intensive form of production continues to be a dominantly extensive form of livestock production. This transition also highlights that livestock keepers have shown considerable innovativeness in adapting to the changing environmental and institutional scenario. The transition in the system also addresses the increasing commoditization requirements of meat and milk. Further, in contrast to the assumption of enormous livestock population growth, the analysis shows that the system continues to have a low ecological footprint. In contrast to a linear framework of resource degradation and stock maximization, wherein it is assumed that a rational livestock keeper aims to maximize his herd size in situations of resource scarcity, the system has shown itself to be more dynamic and has been an important strategy to harness the ecological and economic dynamics of rainfed-dryland areas. In contemporary contexts of increasing climate variability, the integrity of this larger social-ecological system is crucial in maintaining the adaptive capacity and resilience of a diverse range of livelihoods associated with livestock and agriculture.



Section 3

Examining Livestock Production and Commons in the Policy Discourse

A brief survey of policies and programmes on livestock in the country reflects a clear disregard for extensive production systems and of commons, a disproportionate focus on private and state intervention, and a serious institutional deficit in favour of technological solutions.

Livestock-Specific Policies

While there is no over-arching national livestock policy at present, a clear position on livestock development can be discerned from the policy and plans for the development of 'agriculture and allied activities'. In the eleventh five year plan (2007-12), for instance, chief objectives of the livestock sector were listed as: '(i) to achieve an overall growth between 6% and 7% per annum for the sector as a whole with milk group achieving a growth of 5.0% per annum and meat and poultry group achieving a growth of 10% per annum; (ii) the benefit of growth should be equitable, benefiting mainly the small and marginal farmers and landless labourers and should benefit poorly endowed areas like drought

prone, arid, and semi-arid areas; (iii) to provide adequate animal health services for effective disease control; (iv) the sector should generate additional employment opportunity to people in the rural areas especially to the female population; (v) livestock should provide major source of income in the selected areas having potential for mixed crop-livestock farming system; and (vi) the growth in the sector should result in the improvement of environment, especially in the rural areas.'

While the objectives are rather non-controversial in terms of considerations of productivity, equity and environment, the means of achieving this reflect the standard mainstream focus on intensification, improved breeding/breeding of high-yielding species and private sector investment. The role of communities and their institutions in livestock production as well as local ecological contexts in which these systems operate find no space in the articulation of the major issues in animal husbandry and dairying, usually identified as feeding,

breeding, health, management and market linkages. Accordingly, the recommendations for action are aimed at promoting appropriate technologies for increasing productivity and improving extension and input services. Development of common pool resources, when acknowledged as a requirement, is also perceived as a way of increasing fodder availability while their degeneration is attributed to the pressure of overstocking.

Some of the concerns expressed in this paper find mention in the plan documents as well. While the eleventh plan document recognizes the 'perennial problem of feed and fodder for exotic breeds', the draft approach paper for the 12th five year plan identifies the importance of livestock for rural households in dryland and mountain ecosystems and stresses on the need for 'decentralization and convergence of policy support' to make these viable. However, these references are few and far between, let alone prioritized.

Several states have separate livestock development policies, a select study of which reflects a similar impetus on productivity, market efficiency and improved breeding. To be sure, the need for developing grazing land and other common pool land resource is emphasized in almost all policies. But this is only as a source of feed and fodder for livestock production

that would nevertheless take place in a stall-fed, intensified system. When the need for participatory resource management is acknowledged, as in odisha, it is done as a way of 'mitigating the adverse impact' of livestock sector growth and modernization, and not as an essential element of livestock production. Needless to say, this emanates from a failure to appreciate the strengths of extensive production systems through the involvement of communities in the management of common pool resources and of the potential complementarities between extensive and intensive production systems, and the dominance of the private-public construct in public policy.

The national policy for farmers 2006 advocates 'crop-livestock integrated farming' as 'the pathway to farmers' well-being' by 'addressing household and nutritional security and promoting organic farming'. Again, notwithstanding these claims, typically, crop-livestock integrated farming is one where 'crop production and livestock production are considered as separate businesses which are integrated, intra- or inter-regionally, to achieve certain benefits' (E C Wolfe, 2011). Clearly, this is a system which does not preclude intensification, if not actively promoting it. Coupled with bias towards intensification in policy discourse, the nature that this crop-livestock integrated farming would take is not difficult to predict.

Commons as Wastelands

Among the many constructs which have governed the policy bias for grazing based production systems and are rooted in its conception from the colonial era is that of 'wastelands'. The concept of wastelands originated during the colonial period and included all lands that were not under cultivation through the process of settlement for all land held under different property regimes. Specifically, it classified all lands from which government could not collect tax as wastelands. This classification was governed by two dominant production sources - agriculture and forest, and did not in itself reflect the nature of land. This brought a vast majority of lands used for pastures (and multiple usages such as fuel wood, medicines, timber, food etc.) under the domain of wastelands, available for alternate land use and undermined long evolved common property institutions. The conception of 'commons as wastelands' relegated a vast tract of land, the natural vegetation and biodiversity it harboured and the production systems it sustained. While communities continued to define their commons in their own vocabulary, irrespective of whether these lands were classified in the land revenue records as 'charagah'

(permanent pasture), 'gairmumkin' (revenue free state government lands). 'Siwai-chak' (lands vesting in the state government) or as lands falling under the jurisdiction of the forest department, the actual extent of commons has been evidently understated in official land records⁶ (Brara, Are Grazing Lands 'Wastelands?', 1992). The absence of a systematic database and policy orientation disposed to the construct of 'wastelands', has led to a decline in the extent and quality of commons. This decline has been recorded by several studies (Jodha 1986, Iyengar 1988, Brara 1987, Chopra et al. 1990). The National Sample Survey Organisation (NSSO) data of 1999 estimates a decline of 0.38% per annum in common pool resources at an all-India level. The qualitative and quantitative decline in the common pool resources has intensified the conflict over resource use, with the rural poor usually at the losing end, either by denial of access to these resources (mainly because of privatization of the common pool resources by a few) or by diversion of these resources to alternative uses (Iyenger, 1989; McKean, 1992; Beck, 1994; Iyenger, 1997; Beck, 1998; Beck & Ghosh, 2000; Cavendish, 2000).

It is slowly being recognised that these lands classified as wastelands

⁶ Common lands have been estimated to constitute 15% to around 25% of the total geographical area of the country. Based on the de jure classification the NSSO survey estimates, commons are estimated at 15% of the total geographical area of the country. 23% of this area is community pasture and grazing lands, 16% is village forests and woodlots, and 61% is attributed to the 'other' category, which includes village sites, threshing floors, and other barren and wasteland (NSSO 1999).

are not actually wastelands, and discussions and discourse have emerged on the relevance of the common lands (wastelands) in ecological and economic terms and against the use of such wastelands for commercial purposes. This has further been strengthened by the enactment of the forest rights act in 2006 and the recent judgments by the supreme court of India on the protection of common lands.

Forests and livestock

While the notorious history of colonial and post-colonial forestry in India in terms of the complete disregard for customary rights of local communities does not need reiteration here, it is useful to examine forest policies from the point of grazing-based livestock production since extensive production systems also depend significantly on forest resources.

The National Forest Policy 1988 clearly states that rights of grazing in forest areas should be based on the carrying capacity of forests, grazing fees should be levied to discourage people from maintaining large herd sizes and stall feeding should be encouraged. The policy recognizes the need to undertake protection and (fodder) development of village and community lands and other degraded lands outside reserved forests. It also recognizes the urgency of extending

usufruct and limited ownership rights to communities. However, this is considered as a substitute for forest-based grazing, which on its own is considered as destructive and unscientific. In the same vein, the national environment policy 2006 recognizes the role played by traditional norms and institutions of local communities in preventing over-exploitation of resources but adds promptly that these norms have now degraded and that grazing constituted one of the 'proximate causes' for land and forest degradation.

The only progressive legislation in this regard was the Forest Rights Act, 2006. The Act recognizes traditional and customary rights of both settled and transhumant grazing as a community right. However, the record of implementation of this provision so far has been rather dismal. Campaign groups have pointed out that community rights, including those of grazing, are not acknowledged by the MoEF (Ministry of Environment and Forests) in the articulation of its position in recent times. These rights are overlooked in international negotiations for emission reduction under REDD (Reducing emissions from deforestation and forest degradation) as well (as stated in Common Voices, Issue no. 2).

Programmes for Livestock and Natural Resource Management

Derived from the construct of these policies, a range of programmes pertaining to livestock and natural resource management also reflect the biases discussed above. The newly launched accelerated fodder development programme, for instance, seeks to address the issue of fodder scarcity solely through technological interventions. These include promotion of high-yielding varieties of fodder crops through the production of breeder and foundation seeds, distribution of fodder production kits etc. and improving the access to post-harvest technologies for preservation of fodder.

Watershed development programmes in India changed for the better when the focus of classic soil and moisture conservation was replaced by a more holistic approach, which aims at strengthening livelihoods and maintaining environmental balance in watersheds through a participatory approach. In keeping with this change, the common guidelines for watershed development projects, issued by the department of land resources, ministry of rural development, government of India in 2008, state that strengthening livestock production is 'a central intervention'.

However, a close examination of the guidelines shows that common land and rights of ownership and management of the communities over it are not considered to be an important component of livestock production or that of watershed development. According to a study conducted by livestock environment interactions in watersheds (LEAD), 'most watershed development programmes result in a decline in fallow lands, increasing the net sown area and therefore the additional fodder availability through crop residues, leading to a momentum in stall-feeding of dairy cattle'. In fact, watershed projects in many areas are associated with a push to dairy enterprises. Echoing the bias against grazing, these programmes have often involved severe restrictions or a ban on grazing, resulting in large-scale sale of small ruminants by small and marginal farmers, as in the case of Western Maharashtra and Bundelkhand (LEAD 2005). While a disproportionate amount of funds are spent on private lands, usually in the more productive lower reaches, common land and water bodies, located in the upper reaches of a watershed and a vital component of the landscape are usually neglected. Further the tenure arrangements over common lands in favour of communities are usually not worked out, which not only negatively influences the degree of participation, but also the

distribution of benefits, particularly to the poor and marginalised.

Restrictions on grazing rationalized by the need to arrest forest and land degradation are a regular feature of Joint Forest Management Programmes (JFM) as well. This should come as no surprise in the light of the fact that the JFM resolution came close on the heels of the national forest policy 1988, discussed above. As per a study conducted by The Energy Research Institute (TERI) in 1998 for the MoEF, some states have allowed for rotational grazing while some like Gujarat, Haryana and Punjab have banned grazing completely. Further, 'afforestation and biomass-enhancing interventions on degraded lands and on JFM lands, by and large, have focussed on growing plantation crops which are useless as fodder'. Pastoral communities with unrecorded rights over such lands are known to have expressed their concerns over the same (as stated in Common Voices, Issue no. 2).

Contesting Evidence

While there is plethora of evidence on what has gone wrong in programmes, there are contesting evidences as well which highlight the benefit of common land development to grazing based livestock production system (and to the larger rural production system) and practices which can help communities to successfully

claim, regenerate and manage their commons. These show that robust institutional mechanisms specific to local social-ecological contexts are the necessary foundation for restoration of common lands and dependent production systems. Interventions for strengthening governance of commons have been successful where they have been built on existing common property institutional arrangements, secured rights of communities on these lands and evolved institutional mechanisms for decision-making and benefit sharing which are inclusive. The FES study in 2010 showed that where community institutions for natural resource management exist, the people perceived their access to the commons to have improved over time. A disaggregation in terms of landholding and social categories further revealed that in cases where CPR institutions are absent, the households that perceive the greatest amount of losses were those with small and marginal landholdings and those belonging to socially underprivileged groups, especially the SCs and OBCs (FES 2010).

These perceptions are corroborated by a study supported by the South Asia Pro Poor Livestock Policy Programme (SAPPLPP). The study, covering 17 villages spread over 6 districts which fall under different agro-climatic zones in the states of Rajasthan and Madhya Pradesh, showed that

common land development through appropriate biophysical measures and community led management of resources, facilitated by FES and BAIF led to a significant increase in the soil and moisture conditions and in the vegetative cover. With a focus on natural regeneration and measures which support a diverse mix of native tree, grass and shrub species, there has been an increase in the vegetative density, diversity and increased availability of palatable grass species. Given that vegetative cover and composition are crucial for feed and fodder availability for livestock, it is significant that palatable biomass in the study villages increased by almost 450% in Rajasthan and 300% in Madhya Pradesh. Further, the dry matter from the commons in the study villages constituted 60% of the total fodder availability in Rajasthan and 50% in Madhya Pradesh. The average value of the fodder derived by a household from the commons was estimated at Rs. 10,700 per annum and Rs. 7,600 per annum in Rajasthan and Madhya Pradesh, respectively. The study villages also showed higher livestock holdings in landless and marginal landholding groups in comparison to villages with no such institutional arrangements (SAPPLPP 2009).

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Section 4

Policy Recommendations

Contrary to the popular belief of a shift in livestock production system from an extensive-grazing based production system to intensive stall fed systems, the analysis of the transition in livestock populations and land use shows a continuity of grazing based systems through a change in species composition, continued dependency on commons and opportunistic exploitation of new niches. Commons and institutional arrangements around them continue to play a critical role even after prolonged neglect in policies and programmes. In rained regions, the subsidy derived from commons forms a critical contribution to both livestock and agricultural production systems, and they act not only as a 'refuge' to which vulnerable households and populations turn to when everything else fails, but also, the foundation for rural production systems, especially livestock, in variable environments.

However, it is evident that common pool resources and institutional arrangements around it are on a decline. Commons and grazing based livestock production systems remain neglected in policies and programmes. This neglect can

be located in the construct of mainstream development strategy and the various perceptions of grazing based livestock systems' inability to address ecological, social, institutional and economic objectives. As mentioned earlier, while a considerable body of evidence exists which challenges these perceptions, the policy and programme formulations continue to be guided by panaceas to issues of resource conservation, governance of natural resources and achieving higher production objectives. These solutions have themselves favoured indiscriminate resource-use intensification favouring certain production patterns and have led to narrow specialization and sectoral segregation. Strategies focused on food production (including livestock products) have ignored a range of production systems, their diversity and appropriateness for regional specific contexts and inter-connectedness between systems. Intensive cropping programmes encouraging land use intensification have weakened the complementarities of the agriculture and livestock production systems and accentuated the process of decline and degradation of grazing

space. The consequences of the breakdown of diversified production systems and indiscriminate resource intensification are manifested in various forms of resource degradation, fall in resource availability and resource productivity, and the degree of desperation in people's responses to the deteriorating situation.

The crisis is also a manifestation of institutional apathy. Neglect of traditional institutional arrangements and the customary rights of people in institutional solutions proposed under different policies and programmes have raised the concerns of legitimacy of these institutional arrangements among those who are directly dependent on them. Programmes for decentralization based on a prescriptive top-down approach without an understanding of the local social-cultural dynamics and the economic and ecological conditions have failed miserably. This has drawn the attention of policy makers to 'local solutions' as an alternative to centralized governance or market led solutions to address issues of environmental degradation (Ostrom, 1990; Chambers, 1983).⁷ Since the 1990s there has been a shift in the policy paradigm towards more participatory forms of development in general and natural resource management

in particular, as reflected in the 73rd amendment of the constitution enabling a greater role to Panchayati Raj Institutions (PRIs), the introduction of the joint forest management arrangements, and recent legislations such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and the Forest Rights Act.

However, several challenges remain at the institutional level in order to realize the potential of this shift. Studies on institutions have indicated that human-environment interactions take place at multiple scales and are impacted by, and influence the wider social-ecological-economic-political settings (Ostrom, 2009).⁸ Governance arrangements at any single level, whether international, national, regional or local, cannot provide solutions for the overarching challenge of governance of natural resources. At the local level, while user groups have comparative advantages in gathering and maintaining knowledge of local ecological complexity that would be costly for governments to collect, communities may have comparative disadvantages in managing large-scale natural resources and environmental pollution problems. Even at the local level, wide variations exist in the processes through which communities manage their natural

7 Chambers, R. 1983. *Rural Development: Putting the Last First*. London: Longman; Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

8 Ostrom, E. 2009. "A General Framework for Analyzing Sustainability of Social Ecological Systems". *Science* 325 (5939) (24th July: 419-422).

resources and the resultant outcomes. Extensive study of communities of users has established that polycentric arrangements that enable users to develop rules and organizations at multiple levels can work effectively (Ostrom et al. 1978; Bromley & Feeny 1992; Ostrom & Parks 1999).⁹

In the present context, effective formal and informal institutions have not been crafted to protect, develop and manage common lands. The creation of new institutions at the hamlet, revenue village or higher levels, required for effectively and efficiently managing resources, usually bypass Panchayati Raj Institutions (formed under the 73rd constitutional amendment), which are the bedrock of local self-governance, have a constitutional mandate, and automatically include every adult citizen as a member of the panchayat gram sabha (Chandrasekhar, 2011)¹⁰ results of Joint Forest Management (JFM) have been, at best, mixed, in terms of providing communities access to limited ntfp. Panchayati Raj Institutions have, on the whole, shown limited capacity to manage and develop common lands and to prioritize MGNREGA and other developmental funds for CPRs. At times, these have also come into conflict with community-led initiatives, both traditional and facilitated by external agencies. In a context where conflict over the management of resources is likely to

intensify and governance issues are likely to become increasingly complex, there is a need to review the current status of the commons and dependent production systems keeping in mind their contribution to the livelihoods of the poor and vulnerable communities.

Fundamental to achieving this, is the creation of an alternative paradigm for development of rainfed areas. Historically, these areas have suffered from policy neglect, low investment and the implementation of policies designed for irrigated contexts/areas. A shift in paradigm demands that the resilience and diversity of local production systems are strengthened. Integration of the goal of productivity enhancement with that of resource conservation and sustainable use and management of resources has to be the core strategy for rainfed areas. The essential components of this shift would include a systems approach; strengthening livelihood and ecosystem resilience; building institutional capacities at different levels; and promoting iterative planning-implementation-learning cycles. This needs to be complimented by a holistic livestock development strategy recognising the complementarities between intensive and extensive systems, and the logic of grazing based production and its suitability to uncertain environments. This would entail a shift in the focus

⁹ Ostrom, E. and Cox, M. 2010. Moving Beyond Panaceas: A Multi-tiered Diagnostic Approach for Social and Ecological Analysis. *Environmental Conservation* 37 (4): 451-463. Foundation for Environmental Conservation 2010.

¹⁰ Chandrasekhar, L. 2011. Undermining Local Democracy: *Parallel Governance in Contemporary South Asia*.

of public policy and intervention from technological solutions and high-yielding breeds to commons and common property institutions, local breeds, complementarities between species composition, dynamic and opportunistic use of available biomass and better appreciation of commons-livestock-agriculture interface.

Securing property rights of communities over commons and facilitating institutional mechanisms through which they can claim, consolidate and verify their rights, is a key step in strengthening the resilience of rural livelihoods and providing incentives to communities to invest in productive technologies and sustainable management of resources in the future. There is a need, therefore, to build these into relevant policies and architecture of associated programmes. The Forest Rights Act 2006 has already created a precedent in recognizing community claims, including the right to protect, regenerate and manage common forest resources. On the same lines, community claims over other common land and water resources also need to be recognized and these resources must be brought under the custody of the gram panchayat/gram sabha. This process may be further strengthened by devolving the rights of use and management of common pool resources to village/habitation level institutions where the primary users of the resource reside. And

these institutions must be nested under the constitutionally enshrined umbrella institution of panchayats and work directly with panchayats and their sub-committees.

Needless to say, this would require going beyond the construct of commons as 'wastelands' and recognising the value of these resources for rural communities. The commons need to be integrated in programmes and adequate public investments need to be channeled towards their development. A large proportion of these investments can be met through channeling MGNREGA funds towards activities of common land development. Estimates¹¹ suggest that 20% allocation of MGNREGA funds towards common land development can help address eco-restoration efforts on more than 3 million ha. These investments need to be backed by strengthening community rights over the commons and addressing the institutional deficit at local levels. In fact, the right to employment and the right over resources (including both access and use) combined together can have a significant impact in creating durable assets, both as biophysical resources and as institutional regimes.

Further, a programme architecture has to be explored and developed at the district level (and downwards) which strengthens governance

¹¹ Summary Report of the Sub-Group on Institutions and Commons, 12th Five Year Plan

at different landscape levels and sets up a strong natural resource management agenda, improves the planning process (from village to district level), strengthens capacities at different levels, addresses issues of community rights, develops coherence and convergence between different programmes and schemes, and undertakes natural resource management activities in an integrated manner.

These investments have to be complemented by long-term investments on capacity-building and institutional strengthening, a long-standing irritant in proper implementation of programmes and furthering decentralised planning and local governance of natural resources. These efforts are essential in order to build upon the knowledge, skills and leadership capabilities of communities under dynamic conditions, assist them in articulating collective needs and thereby in making these programmes their prerogative.

These efforts need to be complemented by long-term planning in order to ensure that the utilisation of funds at the local level for environment and livelihood-related activities is undertaken in a manner that takes into account the requirements of local communities, improves convergence and promotes actions based on a long-term perspective. An architecture for regional or block/

district level planning needs to be built, therefore, which is based on local agro-ecological conditions and is guided by sustainable land and water use considerations.

Placing communities at the forefront of these initiatives would also entail providing them with information on key indicators and mechanisms for collating and disseminating such information. This must be coupled with investments in monitoring local ecological conditions, diagnosing the complex issues of social-ecological systems and identifying the best fit practices, success and failure stories in different contexts.

Managing natural resources at a landscape level also entails the involvement of a number of stakeholders apart from village communities, such as the relevant government departments, local academia that generates knowledge about the area, civil society organizations that are involved in various facets of development of the area. Bringing together these actors on local platforms to deliberate on issues related to natural resources can lead to the evolution of land and water use plans at the landscape level that incorporate the concerns of all actors and reduce possibilities of conflict over resources. Such an arrangement also helps in addressing the differential access to information pertaining to natural

resources among different actors and reduces the possibilities of unequal access to resources. In areas where the knowledge or analysis of the constraints and potential of the area is inadequate, the expertise of different stakeholders helps to build a larger perspective which draws on different thematic strengths.

Finally, in order to anchor these changes, we propose the introduction of a commons policy in the form of a model common land bill at the national level which can guide suitable actions at the state level. The fundamental tenets of such

a 'model common lands bill' are
a) The devolution of management and governance of common lands to hamlet level gram sabhas and nesting them within panchayats;
b) Appropriate tenure arrangements with such institutions so that the constituent village communities can make secure investments of their efforts and energies and benefit from accessing the produce from commons; and
c) A programmatic approach with a telescopic design such that location specific annual plans are drawn from long-term action plans for ecological restoration.



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