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## Differential impacts of development intervention on multiple ethnic groups

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### Introduction

This paper describes the findings of a research that looked at the effects on livestock of silvi-pasture development on common lands in relation to (a) ruminant feeding systems, and (b) livestock numbers and patterns of livestock ownership in Rajasthan, India. The research paid particular attention to how the poorer ethnic groups were affected, for whom small ruminants tended to be an important asset.

The poorer rural livestock-keepers in Rajasthan tend to be small or marginal farmers (or landless people) who do not have sufficient land to grow forage crops, preferring to give priority to food crops and cash crops. For them, common lands, particularly village grazing lands and state-owned forest lands, are often the most important source of forage for their goats and other livestock. The use of common lands in Rajasthan has been primarily open access during the last few decades and a large proportion of them has become degraded. During the last 15 years or so there have been many initiatives to rehabilitate and protect them, including various watershed development programmes and the Joint Forest Management (JFM) programme. Areas protected under such initiatives are referred to here as Protected Silvi-Pasture Areas (PSPAs).

The approach taken has normally involved enclosure of the area and exclusion of all ruminants. The standard technological package has been to construct a boundary wall, and to plant trees and grasses within the protected area. Forage is normally only obtained from the enclosed areas through cut-and-carry, and has to be stall-fed. In JFM programmes, lopping of trees tends to be prohibited. Thus, the principal (sometimes only) kind of forage harvested from the protected sites is grass.

Until the current decade, there was very little published information in the existing literature on the effect of these initiatives on (a) livestock, including their feeding systems and numbers; and (b) different types of livestock-keepers. Thus, in late 1999, the DFID-funded project commissioned 15 case studies of silvi-pasture development interventions, with a view to filling in these and other knowledge gaps. The main findings were synthesised in a report (Conroy and Lobo, 2002): some of which will now be presented.

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### Ruminant Feeding Systems

Seasonal feed calendars, one each for large and small ruminants, showing the contributions of different sources at different times of the year, were prepared by livestock-keepers in most of the study villages. These enabled us to see how fodder from the PSPAs fitted into the overall feeding systems.

There are a number of important sources of feed for large ruminants. In most villages, open grazing makes a significant contribution throughout the year. Cut grass is important during the rainy season, and thereafter stored crop residues and stored grass from the PSPAs make substantial contributions until the following rainy season.

A striking aspect of the feeding systems for small ruminants is the overwhelming importance of 'open grazing' throughout the year. In many villages, the minimum contribution from open grazing in any month was 80 per cent. There are three sources of grazing for small ruminants that are likely to be available in most villages -- common land, privately-owned pastures and private crop land. The contributions from each source can vary considerably between villages and between different groups in the same village. Common land makes its biggest contribution during the rainy season. In villages with PSPAs the contribution of common lands to open grazing may be reduced. Privately-owned pastures are also used throughout the year. Private crop land is grazed as an open access resource after the rainy season and, post winter, season crops are harvested.

### Utilisation of forage from PSPAs

In all but two of the cases the grass from PSPA was harvested, usually in November or December and then stored for a period of time, which varied considerably (see Table 1). In several villages people stored the grass for a few months, feeding it in the dry season or even in the early rainy season. The harvested grass was fed almost entirely to large ruminants, which in most cases were given grass from PSPA for at least half of the year. Small ruminants do not receive any forage from PSPAs in most villages; and, in the few villages where they do, it only constitutes a small proportion of their diet for a short period in the year.

Where the forage is being stored for use in times of scarcity it may mean that the owner no longer needs to purchase forage at those times, or that the animals can be maintained in a better condition nutritionally. In a drought year, grass from PSPA enables some people to avoid purchasing grass from outside; and may even save them from selling off their animals.

For those maintaining milch animals, PSPAs have made fodder available for longer periods than was the case under grazing regimes; and this has reduced the demand for purchased fodder and enhanced the viability of dairying. Some families have managed to change their livestock composition in favour of milch animals as a result. The period of time over which the grass is stored before being fed to the animals depends partly on the availability of forage from other sources and partly on the storage space available to the owner.

Table 1: Timing of Grass Utilisation from PSPA

Village	Period of feed utilisation from PSPA <sup>1</sup>											
	1	2	3	4	5	6	7	8	9	10	11	12
Sagatadi	+	+	+									
Fila -Dangis	+	+	+	+	+	+	+	+			+	+
Fila - Rawats	+	+	+									
Patukheda <sup>2</sup>	50%	50%	12.5%									
Selu <sup>3</sup>	+	+	+	+	+	+					+	+
Salukhera	+	+	+	+	+	+	+	+	+	+	+	+
Suali <sup>4</sup>	**	**	**	**	**	**	**	**			**	**
Bada Bhilwara	+	+	+	+	+	+					+	+
Jodha ka Khera <sup>4</sup>								**				
Gudha Gokulpura Chota Saradhna	+	+	+	+							+	+
Jogio ka Guda	+	+	+	+	+	+	+	+			+	+
Keli			+	+	+	+	+	+				
Seedh	+	+	+	+	+	+	+	+				
Tank				+	+	+						

1 The numbers 1 to 12 correspond with the months of the year, starting with January.  
 2 The percentages given here represent the contribution of grass from PSPA to the total feed intake of large ruminants during these months.  
 3 In Selu, harvested grass accounts for a large proportion of the diet of large ruminants during the November-February period, and a small proportion from March to June.  
 4 In these two villages there is grazing rather than cutting of grass.



**Impact of PSPAs on Livestock Numbers**

The researchers collected data on the current populations of each kind of livestock in the village, and attempted to obtain similar data for the year in which work on PSPA was initiated. The general results are summarised in Table 2. Interpretation of changes in livestock populations is a challenge, as the creation of PSPA may be only one of several factors that have contributed to changes. Other factors include: shifts from draught power to tractors; the introduction of irrigation facilities, which may increase the demand for draught power; reduction in farm sizes; and the establishment of dairy milk cooperatives in some villages.

The findings were mixed as far as the numbers of cows and bullocks is concerned, with numbers increasing in some cases and decreasing in others, and in two cases remaining fairly constant (see Table 2). The picture is also mixed for goats. Much clearer trends emerge, however, for buffalo and sheep. In most villages there have been marked increases in the buffalo (and in some cases cross-bred cow) populations. In contrast to buffaloes, the sheep population declined in most villages where they were kept, not increasing in any.

**Differential Impact of Silvi-pasture Development**

Most of the villages for which the case studies were undertaken contain socially heterogeneous communities. In such communities the pattern of livestock ownership can vary considerably between sub-groups: hence this kind of intervention can affect different sub-groups in different ways. Tribals are the largest groups in most of the villages studied, and also the poorest. Rajputs are one of the higher castes, and tend to be better off (in terms of natural, financial, human and social capital) and more powerful than the tribals. Rebaris and Gayris are two castes for which livestock husbandry, as well as crop production, is a major livelihood activity.

Goat ownership was higher among the Bhils than the Rajputs in all cases but one. Gayris and Rebaris generally keep similar numbers of goats as the Bhils. Ownership of sheep is limited almost entirely to Gayris, for whom sheep-rearing has been a traditional livelihood activity. Buffalo ownership is generally low amongst the Bhils, and higher among the better-off castes, such as the Rajputs. In one or two of the villages, there has been a shift among the Gayris from sheep to buffaloes.

Livestock ownership patterns are strongly influenced by access to various kinds of assets or capital (natural, financial, human, social and physical), and some ethnic groups have better access to assets than others. Hence changes in ownership patterns as a result of silvi-pasture development tend to differ by ethnic group. The relationships between livestock ownership, access to assets and ethnic groups are illustrated in Box 1 by the example of Barawa village, Udaipur.

**Table 2: Summary of Changes in Livestock Populations**

Trend	Buffalo/ milch cattle	Bullock	Cow	Goat	Sheep
Increased	10	6	4	5	-
Decreased	3	4	5	6	5
Stable	1	2	2	1	2

**Box 1: Livestock Ownership by Ethnic Group in Barawa village**

Relatively speaking, members of the Rebari caste owned more of productive lands (natural capital) than members of the Bhil tribe, and had greater access to irrigation facilities (physical capital). They were also relatively wealthy and had better access to credit (financial capital), and were better educated (human capital) with better connections to traders (social capital). Rebaris estimated that there had been a 90 per cent decline in their camel ownership during the previous 50 years, partly due to reduced access to fodder from state forests (natural capital). On the other hand, relatively good access to all or most of these assets appears to have contributed to a rapid increase in buffalo ownership by the Rebaris.

**Livestock Ownership by Ethnic Group in Barawa village, Udaipur district, 1999 - 2000**

	Bhils (tribals)		Rebaris	
	Total	Mean/HH	Total	Mean/HH
Households	32	-	63	-
Beeds* (hectares)	10.1	0.33	111.25	1.78
Arable land (ha)	11.4	0.35	38.38	0.6
Buffaloes	2	0	61	0.97
Cows	22	0.7	60	0.95
Camels	0	-	102	1.6
Bullocks**	40	1.3	29	0.5
Goats <sup>1</sup>	17	3.7	213	3.4

Source: Jindal, R., 2000.

\* Beed is poor quality private land that is used mainly as a source of fodder.

\*\* The lower numbers of bullocks owned by Rebaris were due to most families having at least one male member employed in a permanent city job and not being available to plough the land.

Villagers estimated that the number of buffaloes in the village had more than doubled since silvi-pasture development had been initiated 10 years earlier. Their milk was sold for a good price in nearby towns, as its very high fat content was much valued by consumers, but only the Rebari households had acquired buffaloes and taken advantage of this income-generating opportunity. Buffalo rearing was deemed as 'risky' by tribals, as it involved allocating considerable cash for purchase of the animal and regular expenditure in terms of good feed, which is necessary for high milk yields. Only the Rebaris could take this risk and afford the cash outlays involved. Furthermore, their superior endowments of natural capital enabled them to obtain a large proportion of the necessary fodder (including green fodder) for most of the year.

The research found that livestock-keepers who primarily own small ruminants are adversely affected by enclosure of common lands when the enclosed site constitutes a large proportion of the common grazing land in the vicinity of their village. This was more common under government programmes, such as JFM, but sometimes occurred under non-governmental organisation (NGO) programmes as well. The size of the goat herds owned by tribal households was found to decline by as much as two-thirds, for example from 15 to five. As goats are a liquid asset and a valuable source of income, such reductions may have serious ramifications for the welfare of the household and its members. They may be forced to try and find other sources of income, such as wage labour (Kashwan, 2000), but there is no guarantee that wage labour will be available when needed. However, the research also found that if rights to grass from PSPA are distributed equitably among households then tribal households benefited, either by feeding their share of the cut grass to their bullocks or selling it as fodder.

The Gayri caste, who own large flocks of sheep and are more dependent on livestock than the other castes, were perhaps the worst affected. In one case, they were obliged either to sell-off their sheep or migrate for several months to grazing areas distant from their village. Migration of the Gayri men with their flocks of sheep imposed extra burden on women, who had to take on the responsibility of supervising agricultural operations (Vardhan, 2000), over and above other domestic chores.

**Conclusions**

Silvi-pasture development initiatives on common lands, including watershed development and JFM programmes, can have significant impacts on livestock feeding systems and on the types and numbers of livestock that people keep. The enclosure of large areas of common lands, and the switch from grazing to cut-and-carry systems, tends to go hand-in-hand with intensification of large ruminant production, and to undermine extensive small ruminant production. Development agencies need to anticipate the implications of their programmes for different groups of farmers, and design them in such a way that they do not penalise the poor.

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