

Common Property Resource Management in Haryana State, India - A success story of the Rehabilitation of Degraded Village Common lands.

P.V Subhash Chandra Babu¹, J.B Dent²
University of Edinburgh, UK.

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513 NORTH PARK
INDIANA UNIVERSITY
BLOOMINGTON, INDIANA 47403-8186

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Abstract³

Common property resources continue to be a significant component of the land resources base for rural communities in developing countries such as India. This is prominent in the semi-arid and arid areas of Haryana. Despite significant contributions to the rural community, common property resources have experienced severe degradation, continuous erosion and are becoming transformed in to open access regimes due to increasing population pressure. For many villages in southern Haryana this has increasingly turned out to be the dual tragedy of environmental collapse and pauperisation of the already poor.

Southern Haryana consists of the oldest mountain range in India, the Aravallis. The Aravallis play a significant role in protecting the fertile Indo-Gangetic plains on their eastern side against invading sand drifts from the Thar desert. Increasing pressure from human and livestock numbers has taken a heavy toll of the vegetation leaving the Aravallis almost bare with consequent adverse environmental effects. This has resulted in reduced welfare of the inhabitants of the region, particularly the women, who have to travel long distances to collect firewood and fodder. Realising the enormity of the problem and the critical need to initiate action for greening the Aravallis, the Government and the people have come together to establish a participatory planning and development process at the village level.

Where the participatory process has resulted in establishing a common property regime in place of an open access system reversal of environmental degradation has been recorded together with improvement in welfare of local people. Mechanisms and processes involved in assisting local people to establish common property resource management will be discussed.

Keywords: Haryana, Common Property, Aravallis, Institutional Development

¹Research Scholar, Institute of Ecology and Resource Management, University of Edinburgh, West Mains Road, Edinburgh, EH9 3JG, UK

²Professor, Agricultural Resource Management, Institute of Ecology and Resource Management, University of Edinburgh, West Mains Road, Edinburgh, EH9 3JG, UK.

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INTRODUCTION

Common Property Resources are broadly defined as those resources in which a group of people have co-equal use rights, specifically rights that exclude the use of those resources by other people. Individual membership in the group of co-owners is typically conferred by membership in some or other group, such as village or tribe etc. (Magrath, 1989)

The tragedy of the commons, the prisoner's dilemma and the logic of collective action are the closely related concepts that have defined the ways of viewing many problems that individuals face when attempting to achieve collective benefits from common property resources (Ostrom, E. 1990). The free-rider problem is the core issue of all these models. All the three models are extremely useful in explaining how perfectly rational individuals can produce, under some circumstances, personal outcomes that are not rational when viewed from the perspective of all those involved.

Common property resources are an important natural resource for rural communities in developing countries such as India because they continue to be a significant component of the land resources base of these communities. This is more prominent in the semi-arid and arid tropical areas of India.

In the arid areas of Haryana common property resources contributions are mainly employment, income generation, food supply, water, fibre, fuel wood, fodder, grazing by the cattle and other live stock and several other associated backward and forward linkages such as development of handicrafts and other cottage industries. Other social and economic contributions include drainage, recharge of ground water, improvement of micro-climate in the village and sustainability of the farming systems. Traditionally common lands in Haryana have provided a range of products, but at present they are mainly used as a source of fuelwood and fodder.

DESCRIPTION OF THE AREA OF CASE STUDY

The state of Haryana is one of the 25 states of the Indian Union and was created in 1966 when it was carved out from the Punjab. Haryana encircles the union territory of Delhi from North, West and South. With its 44,212 sq. km. area it is one of the smaller states of Northern India. The population according to the 1991 census is 17.107 million, of which 78% live in the rural areas. The state's endowment with the natural resources such as

minerals and forests is meagre compared to the other Indian states. Haryana has the lowest proportion of its geographical area under the forest cover at 3.86%, which is significantly below the national average of 23%. Pressure of the population combined with the favourable agro-economic factors have led to the expansion of agriculture to areas formerly under the forest cover. Availability of fodder for the increasing livestock population and of the fuelwood has suffered as a result. The climate, except during the monsoon, is dry with a hot summer (March to June), a cold winter (October to early March) and a rainy season from July to mid September

The average annual rainfall varies from 337 mm to 781 mm. Total number of rainy days varies from 23 to 56 in a year. There is a prolonged hot period lasting from March to June. Temperature varies greatly and with a maximum of up to 47° C during May and June; falling to freezing in January. The earliest historical accounts show that at one time the Haryana hills were covered with forests of *Anogeissus pendula*. Most of the original vegetation on lands belonging to the community have been reduced to a shrubby form and root stock have been stunted under the pressure of excessive grazing and over-exploitation for fuel needs. The most important grass for soil and water conservation found in the area is *Saccharum munja*. It is economically very important and is used in making chairs and thatching etc. *Cenchrus ciliaris* and *Cenchrus setigerus* are the important fodder grasses and *Zizyphus numularia* is an important shrub providing fruits and fodder.

BACKGROUND TO THE PROBLEM

Common property resources such as village common lands covering 10% of the total area of Haryana state have a pivotal role in the subsistence economy of the state. They serve the protection, production and conservation roles and most often these roles become conflicting in the face of growing demographic pressures adversely affecting the sustainability of the resources.

Historically, these common lands were managed under traditional methods by the villagers coupled with state control. In the post - independence period, development was seriously influenced by theories of economic growth (such as the Harrod - Domar model) placing emphasis on savings and investment in the labour surplus economy. Planned investment in common property resources especially tree planting and fodder development was very limited in relation to the multiple demands to which common property resources were subjected. This probably explains the dualistic development paradigms of the times, which emphasised the rapid industrialisation of developing countries for their faster economic

growth. However, the role of the primary sectors in the overall growth of the developing countries substantially got a boost with the introduction of the Green Revolution

In tune with the trends of development policy, policies adopted by the state towards development of these common property resources has been modified to reflect the growing concerns of policy makers and the villagers and their changing needs. Investment in the village common lands have several backward and forward linkages to a wide range of activities such as agriculture, industry, energy and soil conservation. Over the years many conservation and production oriented schemes have been implemented with mixed results.

The growing population pressure and the growing industry demands has meant that most of the primary forest tracts of the common lands have been degraded into secondary and subsequently, degraded village forests. Since the 1980's there has been a marked shift in policy towards conservation with the enactment of the Forest conservation act -1980 and the new National Forest Policy of 1988.

The recent policy shifts from government changed the interventionist role of public investment in the development of these common property resources to a more decentralised and participatory approach involving the government organisations such as the Forest Department and the village subsistence users of these resources. The objective of government investment in the forestry operations of common property resources is to meet the subsistence needs of the rural and urban populations, the requirements of the industry and the needs of conservation and rehabilitation of degraded common property resources through institutional development at the village level.

Extent of Common Lands

The current study area is an area of common lands belonging to 293 villages bordering the Aravalli Hills in the districts of Faridabad, Gurgaon, Mohindergarh, Rewari and Bhiwani. The low Aravalli hills, the oldest mountain chain in India, reach from Rajasthan into southern Haryana. The common lands of the area belonging to these villages provide most of the fuel and fodder requirements of cattle and live stock numbering 278,423 in an area of 40,335 ha. The average stocking rate is estimated to be the equivalent of 1 tropical bovine factor (TBU) for 0.3 ha, which is much higher than the prescribed levels of 1 TBU for 3 or 5 ha in a year with average annual rainfall (Haryana Forest Dept, 1988)

According to a recent survey conducted by Bokil (1993) the proportion of common lands to total area of the villages ranges from 2% to of 81%, with the average being 26%. The average person to common land ratio is 17.3 with the ratio widely fluctuating between 1:1.4 to 1:127. This clearly indicates the existing pressure of population on most of the common lands.

The proportion of poor depending on the common property resources for fuel, fodder and food items ranges from 40% to 80% in the villages of Haryana. A survey reported by Bokil (1993) shows that poor and landless families (about 30 percent) were more dependent upon the common lands for fuelwood. The other sections of the population, especially farmers collect fuelwood from their own lands and in addition use cow dung cakes for their fuel needs. The distance travelled for collecting fuelwood varies from 1 to 6 km.

Degradation of Common Property Resources

Despite significant contributions to the rural community, common property resources have been undergoing severe degradation, continuous erosion and are becoming transformed into open-access resources. Although CPR's contribute greatly to rural populations, the potential of involving local people in equitable and participatory development has been continuously ignored by policy makers, researchers and planners. There have been some development interventions in the village common lands but in the main these have been half-hearted and did not involve systematic planning for participatory development. This has meant that although these areas have received technological inputs and financial support they continue to be degraded. The tragedy of commons is used to justify the adoption of incorrect methodology. In village common property, resources include village forests, pastures, waste lands, thrashing grounds and dumping grounds for agricultural crops and for storing cow dung, village ponds and small streams and rivers and their banks etc. Common property resources play an important role in assuring the livelihood of the rural poor. The breakdown of traditional common property resource management systems not only causes environmental harm as resources are severely degraded under open-access regimes, but social harm because the poor can no longer depend on them. For many villages in the semi-arid and arid zone of Haryana, this has increasingly turned out to be the dual tragedy of environmental collapse and pauperisation of the already poor. Further conversion of the common property resources into open-access regimes is profoundly detrimental to socio-economic development and environmental enhancement.

Rehabilitation of Common Property Resources

In a way, rehabilitation of common property resources is less of an investment and technological problem and more of a resource management problem. Impacts of investment and technology may prove short lived unless management and usage aspects of the common property resources are effectively handled (Jodha N.S. 1992). In most areas, even natural regeneration itself can make common property resources more productive, provided it is permitted through the controlled and regulated use of the resources (Jodha, N.S 1992). However, this cannot happen unless common property resources are converted from open-access to true common property regimes. In practical terms, this means re-establishing and enforcing usage regulations and user obligations.

At an aggregate policy level, this could be facilitated by legal and administrative provisions which would give not only legal sanction to adequate usage practices, but would also empower local communities to implement such provisions. Some of these provisions in terms of a mandate to village panchayath (an elected village council) already exist. But village panchayaths have failed to implement such provisions. One reason for the failure is the legal and formal status of the village panchayaths which makes them a small scale replica of the state authority rather than a representative body of the common property resource users. Consequently, village panchayaths have failed to replace the traditional management systems for common property resources. Still, there are certain elements which could be integrated into workable strategies for management. The focal point of such strategies can be the organisation of the common property resource user groups, who have a stake in them. This means that a participatory development and planning process is a potential solution in reversing the degradation of these common lands and ensuring sustainable supply of the products of the common lands

THEORETICAL FRAMEWORK

Hardin's Tragedy of Freedom in a Commons

According to Garrett Hardin the tragedy of the commons develops in this way. In a pasture open to all it is expected that each herdsman will try to keep as many cattle as possible. Such an arrangement worked reasonably satisfactorily for centuries because population growth rate, tribal wars and poaching kept population levels of both men and animals below the carrying capacity of the land. While these factors remained in balance there was no problem but as pressure comes on the resource the inherent logic of the commons remorselessly generates the tragedy.

As a rational being, each herdsman seeks to maximise his gain. They ask, "What is the utility to me at adding one more animal to my herd". This utility has one positive and one negative component. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is +1. The negative component is a function of the additional overgrazing created by one more animal. Since, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision making herdsman is only a fraction of -1.

Adding the component partial utilities, the rational herdsman concludes that the only sensible decision is to add another head of cattle; and another, and another. . . and so on. However if this is the conclusion reached by each and every herdsman sharing the commons, therein lies the tragedy. Each herdsman is locked into a system that compels him to increase his herd without any limit in a situation where the resource endowment is limited. Ruin is the destination towards which all humans rush, each pursuing their own best interest in a society that believes in the freedom of commons. Freedom in a commons invariably brings ruin to all

This free rider problem results when an individual shirks responsibility to the community. It is often argued that the incentive for this behaviour is logical from the point of "self interest". Tragedy of the commons is often used to describe this behaviour in which private benefit of grazing an additional head of cattle on a common range exceeds the private cost, because the costs of maintaining range quality can be shifted to the group as a whole (Hardin, 1968). The tragedy of over-grazing results from each person's incentive to free ride regardless of the expected actions of others. Even if an agreement is reached that specifies that all will refrain from further grazing, the strict dominance of free rider strategy makes such a contract unstable.

It is important to recognise that common property might provide a solution to the open access problem, because certain resource characteristics or social institutions may require a common property solution, whereas a private property solution might fail. Runge (1981) has pointed out that some traditional societies have long depended on group use of a natural resource.

Open-access is an undesirable regime under which to exploit a natural resource, when extraction levels become intensive. The solution often given, is to vest property rights. Common property also possess a set of property rights relationships designed to eliminate

open access exploitation. The number of users is limited, each user understands how much of the resource to extract, and decisions about resource allocation are made by some group process. Property rights have been vested in this situation, and they may be adequate to prevent the Hardin's tragedy. In these situations there are enforcement mechanisms with which to punish those exceeding agreed extraction levels.

Thus, although private property can provide the incentives to attain proper resource allocation, it may not be the solution towards which all the allocation systems must move. According to Hardin an open-access grazing area can operate satisfactorily for centuries if it is used below its carrying capacity. That means social and economic problems arise only when use exceeds this level. However a number of neo-classical economists have been trying to substitute another definition for over exploitation. They point out that social policy should be to maximise net economic yield, which in general is not synonymous with maximising output, that is, it is not the same as utilisation at maximum carrying capacity. Economists argue that any level of inputs beyond that which would maximise net return from the resource is over use.

Game Theoretic Models of Open Access

The prisoner's dilemma can be shown to represent open access if we imagine two cattle owners who use a grazing area that is at its maximum economic yield. The assumption of a constant number of herdsmen (i.e., two) confines this model to the situation of limited user open access, i.e., a limited number of firms but open access towards inputs. Each grazer has a choice of either adding a head of cattle or not adding a head, and the graziers may not collaborate. Assume that the marginal revenue product for the grazing area is -£2 per animal, and that this is composed of -£6 in reduced output from other animals in both graziers' herds and +£4 in value from the animal added. Here we assume that the marginal revenue product to the grazing area -£2 and the value of the additional animal +£4 are net of costs of providing the animal, e.g., purchase price, supplementary feed costs, veterinary costs, etc. Assume identical players and individual herds, so that the loss in value of outputs from the existing animals from adding a head divides equally between graziers (i.e., -£3 each). For simplicity assume these values are constant for the first two animals grazed beyond the optimum.⁴ Given these assumptions the following figure gives the payoffs for the game.

⁴These assumptions are arbitrary, but they meet a set of conditions that make the open access herding example a prisoner's dilemma. These conditions are

$$c_i < b_i < 0 < a_i \text{ and } a_i + c_i < 0.$$

		HERDSMAN 2	
		ADDS	DOES NOT ADD
HERDSMAN 1	ADDS	(-2,-2)	(1,-3)
	DOES NOT ADD	(-3,1)	(0,0)

The Open Access Problem as a Prisoner's Dilemma

If both herdsman '1' and '2' decide not to add an animal there will be no loss to either one; both payoffs are zero. If herdsman '1' adds, but herdsman '2' does not add, the former will gain the value of the additional animal less the costs he imposes on the rest of his own herd (£4-£3 = £1). Herdsman '1' enjoys a net gain, which is necessary, for otherwise he would not make this move in the absence of Herdsman '2's adding an animal. Herdsman 2's loss is greater here than in any other scenario, because he has not added an animal to offset costs imposed on him (£0-£3=-£3). This is the upper right hand box in the game. The reverse payoff occurs if Herdsman '2' adds a head while Herdsman '1' does not. This is the lower left hand box in the game; Herdsman '1' incurs his greatest loss while Herdsman '2' faces his sole chance for gain. Finally if both add a head of cattle, losses to each are moderate because they are offset by the value each herdsman gains from the additional animal he grazes (£4-£6=-£2), but the total loss to the grazing area is greatest.

Playing the game without collusion results in both Herdsmen choosing to add a head of cattle, even though it causes losses to both of them and their mutual restraint would have resulted in losses to neither. If we consider the problem from the Herdsman '1's point of view, if the Herdsman '2' adds a head of cattle (first column), herdsman 1 finds that he minimises losses by adding a head of cattle: In absolute value terms -£2 is less than -£3. Considering his possibilities if Herdsman '2' does not add a head of cattle (second column), Herdsman '1' still decides to add a head of cattle, since +£1 > £0. That is he stands to gain rather than staying with no loss. Thus, Herdsman '1's dominant strategy is to add a head of cattle no matter what Herdsman '2' does. Since the game is symmetric, Herdsman '2' will

where c_i = the loss to each individual's existing herd (or one half of the total loss to both the individuals' existing herds) from adding an animal (this equals to -£3 in the example); b_i = marginal revenue product of an additional animal to the grazing area, composed of a both negative component of the reduced existing herd output and a positive component of the additional animal's output (-£2 in the example); a_i = the net private gain from adding an animal when the other individual does not add an animal, also composed of a negative and a positive component (+£1 in the example); and $i=1,2$ for herdsman 1 and 2. The last condition, $a_i + c_i < 0$, must be met, because if it is not, the net private gain from adding an animal a_i exceeds the loss to the other individual's herd c_i when only one individual adds animals. This would indicate that fewer animals stock the grazing area than are economically optimal at the beginning of the game.

make the same choice. Both add a head of cattle and the tragedy of open access occurs. More over after each has added a head, if the private gains and losses from adding a head of cattle shift only slightly from those assumed here, the herdsmen will add more cattle in future plays of the game This will continue until private gains and losses shift enough to reach an open access equilibrium (Stevenson, G G. 1991). This game theoretic explanation is simple and well known

The Logic of Collective Action

"The logic of collective action" developed by Mancur Olson (1965), explains the view of the difficulty of getting individuals to pursue their joint welfare, as contrasted to individual welfare. Olson summarises the accepted view in his own words:

"The idea that groups tend to act in support of their group's interests is supposed to follow logically from this widely accepted premise of rational, self-interested behaviour. In other words, if the members of some group have a common interest or object, and if they would all be better off if that objective were achieved, it has been thought to follow logically that the individuals in that group would, if they were rational and self-interested, act to achieve that objective." (Olson 1965). Olson further emphasises that unless the number of individuals is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests.

Hypotheses of Study

- 1 It is possible to define specific circumstances wherein the common property protects the natural resource base effectively.
- 2 There is a level of complementary relationship between common property resources and private property resources which leads to improved agricultural performance
- 3 Socio-economic and cultural factors favour converting an existing open-access resource to common property rather than to private property

Methodology

In all five districts of the south and south-western Haryana fall under the semi-arid Aravalli Hills ecosystem. There exist 293 villages in all in this area, which form a distinct entity. A project for the rehabilitation of the common lands has been in operation in this area since 1990. This entire area is divided into 5 divisions and 14 sub divisions from the operational point of view by the Forest Department. A list of the villages in each of the five divisions has been obtained from the local Divisional Forest Office. Three villages were selected in each of the divisions selected to ensure equal sampling procedure.

Village selection was carried out on the basis of the success of the common property resource(CPR) management level in each of the three villages: one in which proper CPR management is in force the other in which it is some where between open access and common property and the third being the totally open access. Project villages were classified on the basis of the success of the CPR management with the indicators being the success index of the plantations in these villages. Those villages in which more than 60% success index of the plantations raised with the involvement of the villagers was treated as villages with the proper CPR management in force while those having 30-60% success index of the plantations was treated as the villages which are between open access and the common property and the villages with less than 30% success index of the plantations is treated as the villages with totally open access.

In order to explore the level of peoples' participation and other factors responsible for differing success in these villages a survey of the households was conducted. A list of the households was prepared in each of the villages in sample villages. Based on such a list as a frame a minimum of 5% households have been interviewed personally through a structured questionnaire with both open ended and dichotomous questions consisting of attitudinal, qualitative and quantitative questions. Household selection is on the basis of the stratified random sampling with the strata being the caste, landholding capacity, income.

A separate questionnaire was used to conduct the interviews of the officials connected with the implementation of the project in order to capture the expert knowledge accumulated by their experiences

In all 15 villages out of 293 were sampled, making a 5% sample to ensure statistical significance.

Results & Discussion

Degradation of Village Common Lands under Open Access

Due to continuous management under an open-access regime common property resources have become degraded because villagers have exploited them without maintaining their asset. This has been compounded by increasing demands from a rapidly increasing human and livestock population.

Traditional village-based authority systems have in the past regulated user access to the common property resources and enforced users' obligations relating to investment for the conservation and development of the village common property resources. Villagers used to respect their village elders and contribute to the upkeep of the common lands and other natural resources. Any violations of restrictions were met with stiff penalties. The community regulated access system was adversely effected during the second world war as result of large scale deforestation of the *Anogeissus pendula* for meeting the accelerated demand for charcoal. In the post independent period most of the old families migrated to the Pakistan and the new settlers from Pakistan did not have the same attachment with the common lands and other natural resources. This has lead to the collapse of the traditional management and gave way to the open-access system. The advent of the modern law and courts has also destroyed the authority village organisations had in dealing with abusers of communally accepted distribution mechanisms. The success of the traditional common property regimes in the past, in many cases, was due to the result of low levels of demand for resources, i.e., in the absence of economic scarcity. Although elected village councils, named village panchayaths still exist they seldom exercise their authority in dealing with the common property resources mainly because they are neither authoritarian nor bold enough to take measures which would anger their constituents (Jodha, N S 1991)

Realising the enormity of the problem of destruction of the vegetative cover of the common lands in the Aravallis the Government of Haryana started a participatory afforestation project in 1990 for the rehabilitation of 33000 ha. of area under common lands.

The Participatory Process: Institutional Development at the Village Level

In order to re-establish community participation in the management of common lands by villagers and to reverse environment induced poverty of the people, the Forest Department has provided an institutional framework for the formation of the village forest committee

(VFC). In each village a 9-15 member VFC with the Sarpanch (Chairman of the Panchayath) as its head has been constituted. The VFC includes the Sub-Divisional Forest Officer/Ranger and the concerned Forest Guard as its members and the rest villagers as members with at-least 3 women members. Adequate participation of the members of the scheduled castes was also provided at the time of the constituion of the VFC. The VFC functions as an executive committee of the Village Panchayath, an elected body of the village. All other villagers in the village are the general members of the VFC. VFC's meet as frequently as possible for the purpose of taking the decisions on the use of the village common lands and the distribution of the produce from the village common lands. The VFC members are in constant contact with the villagers and the Forest Department.

Microplanning

After lengthy discussions and several meetings through a participatory rural appraisal process taking due consideration of the villagers expectations and choice of the species to be planted an agreement is signed between the Panchayath and the Forest Department for handing over a part of the village common land for the purposes of tree planting and seeding of grasses and legumes. The villagers agree to not to graze in afforested village common lands till the trees become mature and reach beyond grazing limits. In the mean time, villagers are encouraged to cut and carry the grasses and legumes to stall feed their cattle from the areas under plantations. The Forest Department, after three years of maintenance, will handover the land to the VFC for further maintenance and management. The labour required for plantation activities will be drawn from unemployed labourers of the village on whose lands the afforestation is being done. In the meantime all efforts are made by the Forest Dept. to train the VFC and the villagers in all aspects that require a smooth functioning of the VFC and taking over of the management of the village common lands.

Incentive Scheme

In order to motivate and to strengthen the participatory process the Forest Dept. has provided a scheme of incentives for those villages whose plantations are very well looked after by the villagers and reach a success index of 60. The villages that qualify are given a cash incentive of Rs. 250 per ha. at the end of the first year, Rs. 200 per ha. at the end of second year and Rs. 150 per ha. at the end of the third year. The VFC's are encouraged to make use of these funds for establishing a sewing centre, which trains other villagers in sewing activities or a drinking water facility for the village or a school building or a fish farm. There has been much discussion in the VFC's on usage of incentive money. This

induced motivation through incentives has made it possible for the establishment of a successful community regulated access system in place of an open-access system.

Following are some of the results of the Survey conducted in the sample villages

It was observed from the survey that Large Farmers(owning more than 4 ha.) are less dependent on common lands for their fodder requirements than Small Farmers (2 ha. to ≤ 4 ha.), Marginal Farmers (≤ 2 ha.) and Landless. As the land holding level increases dependency on common lands increases(Table: 1).

Table1: Dependency on Various Sources for Fodder(in percentages) amongst the Households Surveyed

No.	Source	Large Farmers	Small Farmers	Marginal Farmers	Landless
1	Common Lands	11.2	47.3	56.1	83
2	Farm Lands	86.4	51.8	42.8	3.4*
3	Purchased Fodder	2.4	0.9	1.1	13.6
4	Total	100	100	100	100

* Collected from other's farmlands in exchange for some services.

Table2: Dependency of Different Economic Groups of Households for Fuelwood Supply from Different Sources(in percentages) amongst the Households Surveyed

No.	Economic Group	Common Lands	Private Resources
1	High Income Strata (HIS)	46	54
2	Middle Income Strata (MIS)	62.4	37.6
3	Below Poverty Line (BPL)	84.7	15.3

Women are primarily engaged in fuelwood collection. Dependency on common lands is quite significant for all economic groups such as HIS(annual income of more than 27,500 Rupees), MIS(annual income of 11000 to 27500 Rupees), and BPL(annual income of less than Rs 11000). Compared to the High Income Strata and the Middle Income Strata those who live under poverty line are more dependent(84.7%) on

common lands for their fuel requirements. The minimum distance required for fuelwood collection is 2 km and the maximum being 5 km. About 30 kg of fuelwood is collected in 5 hours time.

It has also been observed that there is a strong correlation between the People's participation level and the Success Index of plantations raised on the common lands. The correlation coefficient of 0.8869 has been recorded.

Table3: Villages Falling Between 0-30 Percent Success Index(Open-Access)

Sl. No.	Name of the Village	Level of People's Participation	Success Index of Plantations
1	Bawana Gujjar	5%	28
2	Bhond	28%	30
3	Kotla	12%	25
4	Pachnota	23%	30
5	Budin	30%	29

**Table4: Villages Falling Between 31-60 Percent Success Index
(In between Open-Access and Common Property)**

Sl. No.	Name of the Village	Level of People's Participation	Success Index of Plantations
1	Khol	63%	55
2	Thekhri	85%	57
3	Baroji Gundawas-Gaber	77%	54
4	Nayan	66%	59
5	Jerapur	52%	58

**Table5: Villages Falling Above 60 Percent Success Index
(Successful Common Property)**

Sl. No.	Name of the Village	Level of People's Participation	Success Index of Plantations
1	Rajgarh	63%	71
2	Mohammadbass	91%	80
3	Sonkh	78%	91
4	Kultazpur	83%	75
5	Madhogarh	76%	76

Following positive responses were recorded in the villages surveyed indicating various aspects of Common Property Resource Management, which are essential for the establishment of a common property regime in place of an open-access regime. The survey results also indicate that there is a high level of awareness of the commonly agreed restrictions and their enforcement by the VFC/Panchayath. 97 percent villagers are willing for the take over of management of their common lands by the VFC/Panchayath once the Forest Department handover the plantations at the end of three years of maintenance.

Table 6: Percentage of positive responses in respect of selected indicators.

No.	Indicators	Percentage of positive Responses
1.	Awareness about Village Forest Committee	83
2	Willingness to protect the plantations	94
3	Awareness about Commonly Agreed Restrictions with regards to entry into the common lands	76
4	Awareness about the Publicity & Extension efforts of the Forest Dept.	95
5	Friendly attitude of Forest Dept staff as perceived by villagers	98
6	Villagers perception about the future management of the common lands by the VFC/Panchayath	97

Conclusion

From the above results and discussions it can be clearly inferred that success of the plantations is directly linked to the people's participation. The degraded common lands of Aravallis can be rehabilitated only if there is adequate participation of the people in managing their common lands and the technical and financial support of the Government. The key factor has been the institutional development at the village level for managing the common property resources and the involvement of all the sections of the society in evolving commonly agreed restrictions and their enforcement at the village level. Many villages in which a total open-access on common property resources could be seen till the recent past are fast changing towards the common property resource management for their welfare.

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