Common Property Resources as Development Drivers: A Study of a Fruit Cooperative in Himachal Pradesh, India

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Abstract

This study investigates the role of common property resources as a source of sustainable income in the context of opportunities created by economic development. Commercialization of the commons can increase rural incomes and create incentives for conservation. However, income opportunities can also enable households to take advantage of exit opportunities; hence the long-run impact on the resource can be ambiguous. These issues are explored by analyzing data from fifteen villages in the Kangra district of Himachal Pradesh, India, where households are engaged in a fruit processing cooperative. The study finds that households gain with increased commercial use of tree products from the commons. However, welfare gains are skewed in favor of rich households because of the complementarities between land and market access and returns to common property resources. Further, richer households are more likely to plant new trees in their own land while commercialization appears to motivate poorer households to plant trees in the commons.

Key words: Common property resources, tree-planting, commercialization, sustainable livelihoods, market opportunities.

Common Property Resources as Development Drivers:A Study of a Fruit Cooperative in Himachal Pradesh, India

Purnamita Dasgupta

1. Introduction

This study investigates the role of common property resources (CPRs)[1] as a source of sustainable rural incomes. The role of CPRs in supporting rural livelihoods through initiation of value-added activities has been well-documented.[2] Much less is known about the long-term implications of such value-added activities for the resources themselves and the institutions that govern the use of these resources. This paper examines changes in the use of CPRs in the context of a fruit cooperative in India. It investigates whether market linkages promote conservation and sustainable use of resources. It also explores whether they create alternative opportunities for some households that draw *some* segments of the communities away from their dependence on CPRs.

Commercial use of forested common lands can increase the returns per unit time spent on collection activity. Improved access to markets, and higher returns from sales, by adding value to forest products, can motivate preservation of the forest. On the other hand, alternative income opportunities resulting from economic development can also adversely affect incentives for conserving natural resources. When initial interventions lead to increases in human, social and natural capital, they also provide the means to move away from the resource. Economic development can strengthen the ability of households to take advantage of exit opportunities, raise the opportunity cost of labour, or reduce users' interest in the resource (Baland & Platteau 2003). If this happens, the impact on the resource is ambiguous. Further, in terms of welfare implications, it may also lead to distributionally regressive outcomes, with newly emerging opportunities being more accessible to those with greater initial wealth and greater market access.

The study explores the implications of commercialization of CPRs through a study of 15 villages in the Kangra district in Himachal Pradesh where certain households are engaged in a fruit processing cooperative. The fruits are obtained from nearby forests, common lands and privately owned trees. As demand for and profitability of the fruit-based products from the CPR are perceived to be increasing, households have become interested in planting fruit trees on private lands as well. The paper explores the incentives and determinants for fruit collection, tree-planting, and forest protection among rural households. Some of the findings run counter to the conventional wisdom

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[1] CPRs are defined here as resources with varying degrees of access for which multiple and often overlapping property rights and regulatory regimes exist. Such rights of access include those defined for different categories of government forests. The de-facto access may be limited to some groups and legitimized either by law or convention, customary rights or traditional practices.

[2] See references provided later in the text.

that promotes such value-addition activities as a means of managing the resource in the long run.

Section 2 below examines existing research on the role of CPRs in the development process and in sustaining livelihood strategies. The conceptual framework and hypotheses identified for the study are also presented in this section. Section 3 details the study area, sample frame and summary data for the study. The empirical findings and results are presented in Section 4. Section 5 concludes the paper with a discussion on policy-relevant findings.

2. Commercialization and Conservation of Common Property Resources

This study builds on the understanding that the commons can be a driver for development by generating surplus that can be re-invested in physical, social or natural capital.[3] In many parts of the developing world, very poor households make ends meet in part by relying on the local CPRs for subsistence consumption. Somewhat better-off households who have private assets also use local CPRs for inputs into production of crops or livestock. Others draw on the CPRs to produce commodities they are able to sell in the market.[4] The uses to which the commons are put may thus change and some can even disappear over time.

Commercial use of common lands can increase the returns per unit time spent on collection activity. Value-addition at the local level, to the extent that it represents reduced transaction costs or a move towards more optimum rents, implies a welfare improvement. Further, benefits are likely to grow over time from the learning process involved in local entrepreneurial activity. From the point of view of preservation of the resource, it is also likely that the implicit discount rate could be higher for outsiders (as buyers) than for the local community. This implies that there is better preservation of the resource even with commercialization if value-added activities benefit locals.

There is a large amount of literature that focuses on the impacts of market pressure and population growth on resource systems. However, the conclusions are quite polarized, particularly with regard to the role of population (Chomitz 1995; Agrawal 2001; Agarwal and Yadama 1997). In the Indian context, Jodha (1985) discusses the role of market forces and the effects of improved market-related infrastructure. He notes that "the positive role of market forces in promoting growth cannot be denied. The negative impact felt at this stage could be a necessary evil, characterizing a transitional phase before market forces develop mechanisms that induce protection and restoration of CPRs." Markets change the relative importance of different functions performed by the CPRs. This can lead to

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[3] Byron and Arnold (1999) in their attempt to deconstruct the term "forest-dependent people" distinguish between two crude categories: a) those who choose to generate their livelihoods from forests because it is an attractive, viable option and b) those for whom forest dependency is a livelihood of last resort—a symptom of their limited options and /or poverty—which they will abandon as soon as any plausible better option emerges.

[4] A large number of studies have documented the role and contribution of CPRs in rural areas (Jodha 1997; Pasha 1992; Chopra, *et al.* 1990; Chopra and Dasgupta 2002; 2003; Rao 2000; Ravindranath, *et al.* 2000; Agarwal 2001).

shifts in the control and governance of resources, even contributing to conflicts over these resources. Bon (2003) examines three types of CPRs in Himachal Pradesh and finds that customary regulation of village resources becomes extinct as a result of changes in the use to which local natural resources were put. This study suggests that social boundaries on households' use of commons are important in the context of subsistence economies. However, these norms may become irrelevant if the overall economic scenario changes.

Careful and effective management of the commons is expected to result in increased rents from the commons. There are many examples worldwide of commons that have been well-managed and sustained over time (Ostrom 1990). However, rigorous quantitative analysis providing evidence that a common property management regime actually increases rents in the long run is still relatively rare. Bluffstone, *et al.,* (2004) study the hypothesis that better institutional structures and instruments (tools of management such as quotas, formal and informal sanctions, fees and work responsibilities) in CPR management translate into higher forest productivity and time-savings for households, releasing labor for other tasks. Such efficiency gains are consistent with increased resource rents and potentially higher household incomes. Interestingly, they find that in low agricultural productivity situations the degree to which households benefit from CPR management depends on factors such as labor market performance. Similarly, Dewees (1995) notes that household resource allocation processes and factors that affect these processes are crucial for the success of rural afforestation programs. Thus, the returns to improved commons management are a function of a variety of market and other factors.

Lybbert, *et al.,* (2002) explore the effects of a market-based conservation approach on local people's welfare. They find that newly emerging opportunities become more accessible to those with greater initial wealth and greater market access. Thus, distributionally regressive outcomes may occur with commercialization of resources. Further, the effects on the resource are ambiguous. Often, semi-private tracts of forest land benefit while communal tracts continue to be exploited and degraded further.

The present study explores a set of similar issues, seeking to examine the livelihood impacts and conservation implications of the commercial use of non-timber forest products (NTFPs). In the Indian context, collection of NTFPs is more market-driven than collections of fodder and fuelwood. Yet, there are few regulations on extraction of most NTFPs (Ravindranath, *et al.,* 2000). This lack of regulations could arguably result in over-extraction of NTFPs in the long-term. Alternatively, improving access to markets and higher returns from NTFP-based sales could provide the motivating factor for better preservation of the forest.

Conceptual framework and hypotheses

In the study area in Himachal Pradesh, commercialization of CPRs is seen as a means for both economic development and resource improvement. For example, a recent report on the area notes that "the impacts on conservation are now easily available. The Amla[5] trees in forests and haylands, which were just like a bush to them and were cut for firewood, are today carefully preserved. The right holders are now zealously

[5] See page 9 for more details.

guarding the Mango trees on common lands, which were beginning to be cut and to be made into furniture. Families are now planting lime and other trees on private lands" (Ahal 2003).

It is in this context that the study seeks to test two hypotheses that examine the impacts of commercialization of the commons on livelihoods and resource conservation.

Hypotheses
1) Value-addition of CPR products leads to increased income from and dependence on CPRs; the increased income from CPRs resulting from commercialization contributes to increased protection of trees in CPRs and the creation of institutions, i.e., norms, to protect trees in CPRs.
2) Commercialization of CPR products leads to tree-planting activities on private land outside the CPRs. In the absence of complete and secure rights over CPRs, this in turn implies that the returns in the long run could benefit households differentially while having ambiguous effects on the CPR itself.

Hypothesis 1 addresses the possibility of NTFP-based activity generating surpluses for rural households, surpluses which can be interpreted in terms of CPRs becoming sources of sustained incomes. Surplus at the household level is reflected in an increase in incomes. Savings from this additional income may be invested by the household in either furthering local CPR-based activities or in non-local or non-CPR activity.[6]

The hypothesis elaborates on the role of the institution in ensuring the sustainability of incomes through conservation of the resource. Institutions can be defined in the present context as sets of rules and norms that shape interactions of humans with other humans and nature (Agrawal and Gibson 1999). The hypothesis states that an incentive to preserve the resource stock in order to ensure future supplies is created if income to the household from the resource can be increased in a sustainable manner. This in turn links with the issue of the rights of local communities on the CPR.[7]

Hypothesis 2 is developed as follows. As demand and profitability for the fruit-based product from the CPR increases, there are changes in the opportunity cost of time for the household. There are two options for the individual for ensuring supply. One is the tendency to establish property rights over fruit trees growing in the CPRs or at least (*de facto*) collection rights. This is reflected in the fact that many households in our study area collect fruit from CPRs, including the government forests. The other alternative is to procure fruits from trees growing on private land. Presumably, for the individual household, uncertainty over fruit supply in the long-run is reduced if it chooses private resources over government forests. Thus, an individual who wishes to maximize expected benefits over costs would compare different ways of ensuring supply and minimize costs of doing so. In the present case, one would compare the costs of tree

[6] Investments in non-CPR based activity also contribute to human well-being—for instance, in the form of investment in a child's education or better nutrition.

[7] The link between institutional change, incentive structures and decision-making has been explored extensively in the literature on institutional economics and on collective action (North 1994; Ostrom 1990; Libecap 1978; Bromley 1989; Schmid 2004).

planting with the costs of collecting from the CPRs. This could, for instance, be reflected in time-costs of collection.

To examine the second hypothesis more thoroughly, we explore the household decision-making process on planting trees on private lands. Rural households in Kangra are planting trees while also reporting reduction in the felling of trees. Private farmers are also opting to sell products from fruit trees to the production centres. Research has shown that trees can also compare favorably with other vehicles for savings among the poor (Chambers & Leach 1989). Several scholars have studied household tree-planting decisions through an econometric approach (Schatzki 2003; Place and Otsuka 2001; Shively 1999). We do not build an elaborate theoretical model for explaining household decision-making. Instead, defining the tree-planting activity as an outcome of the institutional form, we estimate tree-planting activity as a reduced form equation expressing it as a function of exogenous variables only.[8]

3. Fruit Processing in Kangra District

This study undertakes an empirical analysis of household and village-level data from Kangra district in the state of Himachal Pradesh. This state is among the better performing states in India, in terms of achievements in gender equality, decline in poverty and access to safe water and shelter (see Appendix I). The legally classified forest area in Kangra district is 58% of the total area.[9] Ecologically, the study area falls within what is called the *Changar* belt. This area is part of the highly fragile and degraded peri-Himalayan Shivalik region with altitudes between 500 and 1300 m.[10] The study area comprises of villages where households have women who are members of a fruit processing and marketing cooperative called *Samridhi Mahila Cooperative Society* (SMCS).

Samridhi is considered to be a success story in Kangra and is perceived to have improved rural livelihoods along with conserving the environment (Ahal 1996; 2003). It is seen as a successful agro-business consortium and as an example of rural women's empowerment ("Gender Empowerment," Himachal Pradesh Development Report, 2005). Under *Samridhi,* local women form cooperatives called Women's Production

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[8] Admittedly, the results thereby obtained are an outcome of the combined effects of the exogenous variable concerned and all the endogenous variables that are operating in a hidden way behind the estimated equation (For details on the problem of endogeneity in models with cross-sectional data, see Baland and Platteau 2003).

[9] Source: Himachal Pradesh Forest Department Statistics, 2000, Forest Department, Himachal Pradesh.

[10] In the local dialect, "Changar" means dry zone with a rugged terrain. This area is a relatively drier area compared to the rest of Himachal. There have been large scale conifer plantations by the Forest Department (pine plantations particularly in the NDPF) in the last couple of decades.The area consists of mostly protected forests. In terms of the agro-ecological situation, it is a mid-hill sub-humid zone, rain-fed and sub-tropical for the most part, with low rainfall, and represents 19.3% of the district area (Source: Extract from the Strategic Research and Extension Plan for District Kangra, National Agricultural Technology Project, Government of India-www.manage.gov.in/NATP/SREP/Kangra.pdf).

Groups (WPGs) and collect and process fruits into pickles, chutneys and candies. The products are made at village production centres. These products are further processed, checked for quality, packaged and marketed by the "Apex" located at Thakurdwara, near Palampur town in Kangra district. The Apex represents the head-quarters of the cooperative and is managed by the top office-bearers of the co-operative, who are also members drawn from the surrounding villages.

Samridhi had its beginnings in 1996 under the *Indo-German Changar Eco Development Project* (IGCEDP) which had been initiated in 1993 with support from the Government of HP and Government of Germany (through GTZ) in an effort to improve natural resources and forest-based livelihoods in the *Changar* area. Although the IGCEDP provided support in a number of ways, it gradually withdrew professional support and by 2000 had done so completely, handing over the entire administration and financial responsibility to the SMCS (Sircar 2002). SMCS has grown steadily from 16 members in 1996-97 to 182 members in 2000-01, with sales rising from Rs. 17,000 to Rs. 17,26,671, production from 425 kgs to 22,685 kgs, and total wages paid from Rs. 4250 to Rs. 4,16,156 over the same period.[11]

Collection of fruit is mostly from government (protected) forests although, in recent times, there has been an increase in fruits collected from trees planted on private lands as well, which indicates that farmers view the sales of the fruits to the production centres of *Samridhi* as an income earning opportunity. Some smaller amounts of collection also take place from common lands around villages. Among the fruits being collected, the two most important ones are Mango (locally called "Aam" – *Mangifera indica)* and Amla (*Emblica officinalis)*.[12]

In 2003, there were a total of 22 WPGs (or Women Producer Groups) of which 19 were located in Kangra district, with a total membership of 235 women. Membership ranges from 10 to 15 members at the village production centres (or WPG). These have three elected office-bearers—*Pradhan* (chairperson), *Koshadhyaksha* (Treasurer) and *Sahayogini* (Assistant). Each member has to buy a share of Rs. 500/- as a one-time investment, which is payable in installments. Each group has a savings account maintained in a nationalized bank. Each member contributes a minimum of Rs. 10 as a deposit to this account, along with a certain percentage of the wages earned at the end of each season/cycle of production.

Members of the society procure (either through own collections or through paid collectors) fruit and purchase basic ingredients for processing such as oil and salt. Fruit processing is done jointly at the village production centre (a room in the village) and final products are dispatched by bullock carts to the Apex. Production activities continue throughout the year depending on the seasonal raw material availability. Aggregate production during the year of 2003 was 35 tons while total sales amounted to Rs. 22,47,349, an increase of 38% over the previous year's sales.

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[11] Appendix II provides detailed data for the year 2002-2003.

[12] Other locally available fruit include nimbu, bamboo, gal – gal and dhiun (all local names).

It is important to understand fruit collection activities in relation to rights over CPRs in the region. Legal rights over forest and forest lands are historically the result of land tenure, land revenue settlements and forest settlements of the British period. Prior to the 1970s, forests were classified in the following manner: *Ban-Muafi* Forests (which were the absolute common property of the village proprietary bodies); Reserved Forests (which were the absolute property of the Government and were practically free of rights, without access for locals); Unclassed Forests (where trees belonged to the Government but no closures could be made without the consent of the people); Demarcated Protected Forests; Undemarcated Protected Forests; and Delimited Protected Forests. The last three categories were under the Forest Department or the Deputy Commissioner's control and management alone.

In 1974, with the enactment of the H.P. Village Common-Lands (Vesting and Utilization) Act, ownership of the soil which was earlier with the village proprietors became vested in the State. As a result, the *Ban-Maufi* Forests which were the property of the villagers became state property. Similarly, the Unclassed and Protected Forests, which belonged to the people (the State having proprietary rights only on the trees of spontaneous growth or on trees planted by it) were also vested in the State, with the forests becoming the absolute property of the State.

About half of the earlier *Ban Maufi* Forests and the village common lands (*Shamlats*) in each village were to be kept as an "allotable" pool, for allotment to the landless and for other common purposes. The remaining areas were required to be handed over to the Forest Department for creation/management as forests. However, survey and demarcation of these areas is still going on (Working Plan, 1981-82 to 1995-96). Thus, at present, there is no legally well-defined common village land in the *de jure* sense although, in a de facto sense, common lands exist. Thus, in this paper, we treat as common lands all lands from which fruit are collected other than private lands held by households. With the enactment of the Forest Conservation Act (1980), no forest land can now be diverted for any non-forestry purpose without the permission of the Government of India.[13]

Data for the Study

For this study, 15 villages in Kangra district which had *Samridhi* members were surveyed. Two villages which were in a different district and 3 villages in which the group had been recently formed and hence not properly functional as yet have been left out.

Village-wise data on the number of households who have members in the cooperative was obtained from the Apex records for 2000-2001. Data on the total number of households was taken from the 1991 Census. This was the latest available data at the

[13] Legally, a further distinction is made between Undemarcated Protected Forests and New Demarcated Protected Forests. The NDPF consist of revenue lands that were transferred to the FD in the name of better conservation in 1974.

time of the survey. The selection objective was to sample all the member households along with a representative sample of non-member households. The sampling technique was simple: with a target sample size of 500, all the member households were selected and the non-member households were distributed across villages in proportion to the total number of households.

The 15 selected villages had 182 member households (as reported in the secondary sources) out of which 173 were available at the time of the survey.[14] Further, at the time of field work it was found that 11 members of the *Boun* centre were no longer members of the production centre. They were hence classified as non-members. 9 members of *Kosri* centre were also classified as non-members since the centre was not functional at the time of the survey. After making the necessary statistical adjustments, a total of 339 non-member households were surveyed.[15] The sampling sheet is presented in Appendix III.

Five types of questionnaires were used for the study: a household schedule (for sample households); a village schedule (administered to Panchayat office bearers, school teachers and other knowledgeable elders in the village); a user group schedule (for the president of the village cooperative unit); a Forest Department schedule (for FD officials); and a schedule for the Cooperative office bearers at the Apex. Quantitative data, as well as qualitative information through semi-structured interviews, were gathered. Semi-structured interviews were also held with villagers; office bearers of the Panchayat; school teachers; office bearers of the production centres; key informants at the Himachal Pradesh Forest Department; ICGEDP project officials; resource persons at the Himachal Pradesh Agricultural University at Palampur, Kangra; *Samridhi* "Apex" Officials and *Navrachna.*

In the study area, some 55% of land is legally classified as forests while 10% can be considered as common lands (around villages, also known as the "allottable pool" belonging to the Revenue department) and the rest (35%) private land holdings (*theke ki zameen, mulkiyat*). Fruit is collected from both the forest land as well as the village common lands.[16] Private lands can be broadly divided into two categories: 40% cultivated land and 60% hay / grass-lands (called *Kharetars*). The main crops cultivated are: Maize (*Chhali*) and Wheat (*Kanak*) with Rice (*Dhan*) in some pockets.

Out of a total of 492 sample households, 75 percent were male-headed households while the remaining 25 percent were female-headed households. The literacy rate in the sampled *Samridhi* villages (82 percent) is higher than the rate for Himachal Pradesh (77 percent) and slightly higher than that for Kangra district (81 percent) for the year 2001.

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[14] While one member had passed away, the remaining eight were away for a prolonged period of time, including those who had shifted residence.

[15] A minimum of 5 non-member households was taken for two villages where the selection technique yielded a number of less than 5 for non-member households.

[16] It is not possible to put a number on the proportion collected from forests versus the proportion collected from village commons.

The main source of drinking water in *Samridhi* villages is piped water with 68 per cent of the households procuring water for drinking purposes from piped sources followed by tank/ponds/*bowri*. In all, 56% households have LPG connections and use it either as the primary or the secondary source of cooking fuel. However the majority (87%) do use fuelwood as a source of cooking fuel. 26% households lived in *"pucca"* constructions, 54% had semi-*pucca* constructions, while the rest had *kutcha* constructions. [17] A composite variable called *access to facility* was also generated from the data on whether the source of drinking water was piped, whether the household had an LPG connection and whether the house was a *"pucca"* construction.

The survey also collected data on some major items of household expenditure. While the mean monthly household expenditure was Rs. 2375, the expenditure on food items averaged at Rs. 1374 per month. This can be compared with the reported mean monthly household income of Rs. 4549. The second item on which a sizeable proportion of monthly expenditure is incurred is on education of children. A comparison of the average monthly household income with expenditure shows lower-income villages spending proportionately higher amounts of their incomes, which is to be expected.

Most households fall into one of two categories: those which have an assured wage labor through the year (mostly through grass-cutting, agriculture and construction activities although this group also includes some households involved in petty business) and a higher income category of households which comprises of those employed in government jobs and small businesses (including grocers, service providers, etc.). The bulk of the work force, 52 percent, is engaged in salaried employment. The second major occupation category is assured wage labor (15%), followed by petty business/ manufacturing and work at the cooperative (12%) and casual labor (8%). Farm cultivation and collection for self-consumption have a negligible share in the primary occupation of households in these villages.

The distribution of average monthly income by different occupation categories shows that salaried employment has the highest returns followed by petty business/trade/ manufacturing, which is in turn followed by own farm cultivation. Among member households 39% stated salaried employment to be the primary occupation while another 16% reported assured wage labor to be the primary occupation.

An alternative variable was generated to capture the "wealth" aspect of households by taking into account the assets owned by the household. Five assets that were found relevant to the study were bicycles, scooters/motor bikes, refrigerator, television and telephone. A household got a score of one for each asset that it owned and 0 for those which it did not. Subsequently, a principal components analysis was done and a score was thereby generated as a proxy for capturing the wealth effect. Across 492 households, the mean value was 1.71. 71 An alternative standard of living measure was also attempted using asset ownership as well as household income. The same

[17] *Pucca* constructions in the study area refer to households which are made of brick and cement. *Kutchha* refers to constructions with materials other than brick such as straw, mud, etc.

procedure of a principal component analysis and a subsequent calculation of the scores yielded a mean value of 2.32. There was however not much difference in the relative ranking across households using either of these two measures.[18]

The villages of Kangra district that fall within the sample area represent a relatively high aggregate percentage of upper caste households (57 percent) as compared to the lower caste households.[19] The upper castes were represented by *Rajput, Brahmin, Chowdhury* and *Dheeman* castes while the lower castes were represented by *Koli, Kabir Panthi, Mhasa, Jogi, Doomer, Lohar* and *Harijan.* Out of a total of 14 villages, 8 villages were dominated by higher castes whereas 4 villages had a higher proportion of lower caste households. However, it is worthy of note that, barring 3 villages (*Tambar, Daglehr* and *Dhati*), all other villages recorded a higher representation of lower caste households in the WPGs.

4. Empirical Findings

The study seeks to explore a process of change. Since one is essentially talking of a process of cumulative causation here, econometric techniques have their limitations. In this section, therefore, a mix of qualitative and quantitative data is analyzed. An attempt was made to enhance the understanding of the field situation through a set of semi-structured interviews that were conducted among a few key informants. The informants included *Panchayat* members of the village (village leaders), school teachers, elders from the village and the office-bearers of the production centres. A few quotes from these interviews are presented below.[20] These highlight the existence of a complex web of interactions between the economic and social aspects of well-being. These also serve to motivate the two hypotheses.

Discussions with WPG members made it clear that *Samridhi* had helped women earn income but, more importantly perhaps, boosted their self-esteem. Ninety-two percent of the members felt that the time spent in activities other than those related to processing had increased over the last two years, indicating that their involvement with the WPG has been growing over time. Many women said that the most important reasons for the formation of WPG were, "interest, satisfaction and desire of women to go out and work." Further, to cite Preeti Devi, "We took it as an opportunity to improve our personality and money was considered as a secondary thing." The work that they did together means a great deal to the women in Kangra district. The feel-

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[18] It has been common in the literature to consider livestock ownership as an indicator of household economic status. In our dataset more than 75% own livestock. We are not however sure of the numbers that have been reported. Also, there are problems of conversion across livestock types. Hence, we do not use it for the present. The majority of the livestock (62%) are either stall-fed or fed on fodder obtained from private lands.

[19] According to the Census of India 1991, there were about 63 per cent upper caste households and about 37 percent lower caste households in these villages. The data collected by the National Sample Survey Organisation in its 54th round (NSSO 1999) on the magnitude and utilization of CPRs in India indicates that while limited data is available on fuelwood and fodder collections by households, data on NTFPs is very poor. Therefore it has not been incorporated in this study.

[20] All names in the quotes have been changed in order to maintain confidentiality.

ings of Vimla Devi, when she said, "We were very happy to think that we were recognized as working women," or Kusuma Devi's statement, "W*omen were interested and excited to be able to earn money and acquire knowledge,*" are echoed by many others. The money earned, of course, is important too. As Romila Devi said, "*Changar* people (Rajiv and Rahul) came and introduced the concept and we liked it for we could earn income for our family."

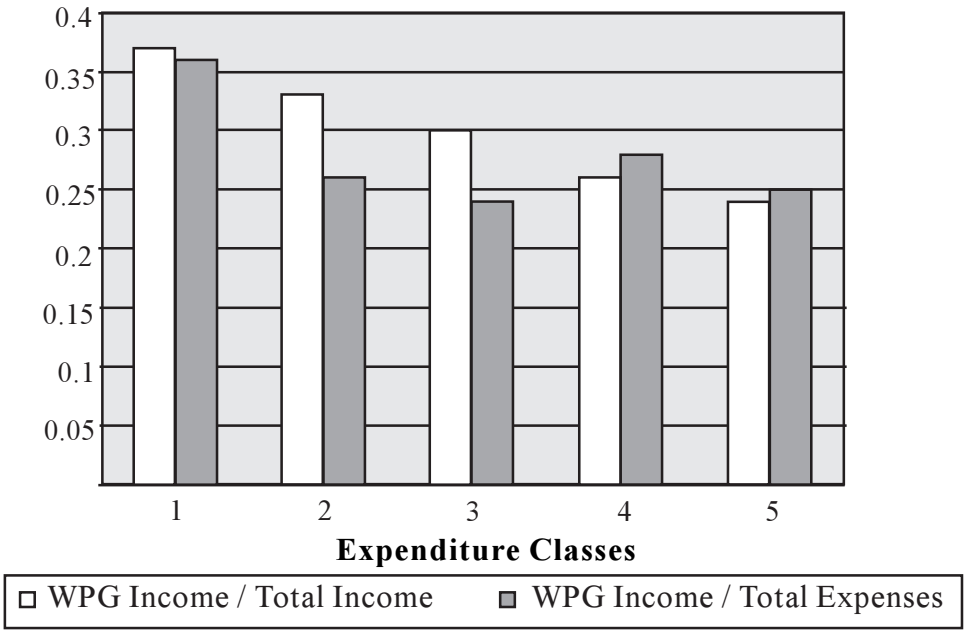
4.1 Increased Incomes from CPRs

Across the board, all households who are members of *Samridhi* report that their household economic position has improved since they joined the organization. Members are paid wages at the village centers according to the nature, quality and amount of work done by a member. Wages paid to members in 2003 totaled Rs. 4,08,864 while the cost of raw materials reimbursed to members or other families at the village level amounted to Rs. 1,00,362. The latter reflect the opportunity cost of collection time to the extent that the raw materials are procured from CPRs.

The average annual income to WPG members from WPG activities was Rs. 1770 in 2001, with approximately 10% households reporting incomes (comprising both collection and processing incomes) above Rs. 3000.[21] This amounts to on average 0.04% of the total income of these households, i.e., it is a relatively small proportion of total household income. In order to understand better how CPR-related income contributes to household welfare, we first divided households into five expenditure quintiles. The total number of households in the survey is found to be distributed uniformly across expenditure classes. The ratio of annual WPG income to total annual household income was first calculated for each household. As Graph 1 shows, the share of WPG income in total household income decreases with overall household expenditure.

[21] 80 percent of the households report that they spend in some months up to 90% of their WPG earnings, which includes tree-planting and educational expenses.
Eighty-two percent of the members who reported savings data stated that their monthly savings varied between 5 and 50% of what they earned, while around 18 percent save in the range 60-100 percent of their WPG income.

Graph 1: Contribution of WPG Income to the Household



We further examine the contribution of CPRs to household income by creating a ratio of WPG income to total household income. In examining how this ratio (or contribution), which reflects household dependence on CPRs, changes as household income increases, the study adds to existing literature on forest use and dependence (Jodha 1997; Cavendish 2004; Dasgupta and Chopra 2003; Adhikari 2003).

Table 1 summarizes data on the ratio of annual WPG income to total annual household income. The ratios were grouped into four quantiles in increasing order. The number of households falling into each "ratio quantile" was subsequently examined. The distribution of households across different ratio quantiles was also looked at separately for each expenditure class. This helps in examining the variation in both the number of households and their extent of dependence on WPG income across the expenditure classes.

Table 1: Variation in Distribution of Households with regard to Ratio of WPG Earnings to Total Household Income

Expenditure Class (expenditure in Rs/month)	Percentage distribution of households across 4 "ratio" quantiles*(ratio = WPG income / Total Household Income)				Total
	1 (≤ 0.17)	*2 (>0.17,≤ 0.25)*	*3 (>0.25, ≤0.33)*	*4 (> 0.33)*	
1 (≤ 1400)	*9*	*11*	*27*	*53*	*100*
2 (≤ 1900, ≥ 1401)	*9*	*28*	*30*	*33*	*100*
3 (≤ 2436, ≥ 1901)	*16*	*53*	*22*	*9*	*100*
4 (≤ 3175, ≥ 2437)	*32*	*53*	*15*	*H" 0*	*100*
5 (≥ 3176)	*37*	*57*	*6*	*H" 0*	*100*

Note: * Figures in parentheses show the range of values taken by the ratio in the respective quantile.

In the lowest expenditure class, for instance, this ratio (extent of contribution of WPG income) is more than 33% for 53% of the households. The proportion of households with such high contributions from WPG incomes falls steadily as one moves up the expenditure classes. When it comes to the contribution of CPR-based incomes in improving household incomes, it is clear that the less well-off gain more relative to their total incomes from such value-addition activities.

4.2 Fruit Collection, Fees and Time Costs

Households collect fruit in almost equal proportions from government forests and private lands. Collections from village common lands constitute a smaller proportion of total collections. Further, 10% of the households report that they pay a fee for collecting fruits from others' private lands, the fee varying widely from Rs. 0.50 to Rs. 5.00 per kg. We find that as expected among households that pay fees for collection, the proportion of households goes up from 7% amongst the poorest households to 27% in the higher expenditure quintiles. This could be due to varying affordability among households, access to credit, or simply due to entrepreneurial ability.

The time spent in collection was another important variable of interest. The time reported as spent in collection varies across households. On average, women report that they collect the different fruits (mostly *amla* and *aam*) during four to six months in the year. The time spent in collection on a typical day spent in collection activity averages to approximately 3 hours. At the maximum, this fetches an income of Rs. 10 approximately at the WPG. We find that 59% of the poorest households spend more than the sample average of 3 hours in collection. This proportion decreases and varies from 25% to 41% amongst richer households. Thus, as households get wealthier, they appear to spend less time on collection activities. The opportunity cost of time increases with wealth. Thus, for wealthier households, activities that do not add much value, such as collection, become less attractive.

We also examine the time spent in processing relative to the time spent in collection. Women spend approximately four hours in processing on a typical day spent only on processing and on average earn Rs. 18.50 for this.[22] We find that the time spent in processing as a ratio of the time spent in collection increases as we move up the expenditure classes, with a marked rise after the third expenditure class (see Table 2). Given the difference in the returns to time spent in collection and time spent in processing, this is not surprising. Better-off households spend relatively less time on collections, both because time costs are lower for collecting from own lands rather than CPRs and also because they may have easier access to disposable income to pay fees to other villagers for collection.

[22] The returns to collection and processing activity can be compared with the daily agricultural wage rate for Himachal Pradesh which is Rs. 86 per day currently. However, computations of the opportunity cost of time using this wage rate would be fraught with difficulties given that wages differ widely between men and women, across villages and across seasons, and by type of employment within agriculture.

Table 2: Proportion of Households with Ratio of Time Spent Processing to Time Spent in Collection, within Each Expenditure Class

Expenditure Class (expenditure in Rs/month)	*Time processing / Time collection (≥ 3)*
1 (≤ 1400)	38 %
2 (≤ 1900, ≥ 1401)	44 %
3 (≤ 2436, ≥ 1901)	48 %
4 (≤ 3175, ≥ 2437)	70 %
5 (≥ 3176)	88 %

4.3 Forest Protection as a Result of Commercial Use of CPRs

Not just WPG members but other villagers too felt that the forest area had "increased" over the last 5-10 years mainly due to the government (including the *Changar* project) and local (that is, villagers involved with *Samridhi* activities) efforts in conserving forests. Decreasing dependence on fuelwood was also cited as one of the reasons. Sixty-eight percent of the households felt that there had been an overall reduction in tree-felling in the CPRs during the past 5 years. Interestingly, of the 68% households who felt that tree-felling had decreased, approximately half (48%) belonged to the two lowest expenditure classes. This suggests that interventions that increase incomes for the poor contribute to increased awareness of conservation benefits as well.

Sixty-four percent of the households also reported that they took active measures such as building fences and barriers to protect trees. Forty percent households indicated that they had actively encouraged their neighbors in tree-protection activities. It is of interest to note that within each expenditure class, there is not much variation in the proportion of households that report being involved in protection of trees. However, within an expenditure class, the proportion of those who say they have actively encouraged others in tree-protection activities falls from 46% to 15% as we move up the expenditure classes. Thus, the poor not only seem to have a heightened awareness of the benefits from conservation activities but also engage much more in encouraging such activities among the community.

Table 3: Households Undertaking Tree Protection Activity by Expenditure Class (in percentage)

Income Class	No Protection	Protection*
1	34	66 (25)
2	37	63 (21)
3	38	62 (19)
4	43	57 (19)
5	48	51 (16)

Note: * Figures in parentheses show the distribution of the 295 households that protect trees.

The point emerges more sharply if we combine both the activities of protection and the encouragement to protect trees, and view both as important for the protection of CPRs. Table 3 demonstrates that a larger proportion of relatively poorer households are involved in such activity both across and within income classes. This suggests that the poor contribute relatively more to the protection of CPR resources as compared to the better-off.

4.4 Commercialization and Tree Planting Activity

Throughout all the villages of *Samridhi,* the *Changar* project provided saplings to the villagers. While some were distributed free of cost, some were bought by the households. The villagers were also trained to grow and protect these plants. The purpose in planting trees was to earn income in the near future through the WPG activities. The quotes below highlight future problems as well as opportunities as perceived by the members of the WPG.

- "*There are not many problems, may be some shortage of fruits but we have planted more new plants so we will be able to overcome these problems*" (Rishra Devi);
- "*Raw material availability is a problem as fruits are decreasing every year and there is a problem of credit as well.*" On opportunities she had this to say: *"more women are eager to join or form a new group*" (Usha Devi);
- "*If wages are paid on time, then we can work enthusiastically. There are some problems of availability of fruits in future as the area is very dry"* (Sushma Devi);
- "*Some women have to go long distance to fetch fruits and it is dangerous as well*" (Madhu Devi);
- "*Earlier the land was used for grazing and it became infertile and prone to flooding. So there was less opportunity of planting trees, but once Samridhi came, people became aware of the profits from plants (amla, mango, etc.) and started growing plants*"(Rubi Devi);
- "*Changar people provided the saplings and made villagers aware of planting trees." Also "future income and protection of nature was the purpose"* (Indra Devi);
- "*Changar people gave seeds and villagers grew plants for environmental conservation and income*" (Sarala Devi).

Seventy-one percent of the households thought that tree-planting activities had increased in the village over the last 5 years.[23] A total of 335 households (68%) reported that they had themselves planted trees. Saplings were available mostly for free, and only 114 households reported that they had spent money purchasing saplings. The amount invested (cost of saplings) by these households varied from Rs. 10 to Rs. 500 annually, and the mean amount was Rs. 139 per household

[23] This perception is uniformly present among rich and poor households.

Table 4: Number of Trees Planted, Place of Tree Plantation and Number of Planting Households

Range of trees planted	*Place of Plantation with number of Households*		*Total number.of Households*
	Own Land	***Village forest/ common land***	
1-5	29	98	127
6-10	45	84	129
11-15	6	10	16
16-20	6	5	11
21-50	13	9	22
51-125	5	4	9
Total	104	210	314

Note: Out of a total of 492 households, 335 households have planted trees. 314 households reported the place of planting trees while the remaining 21 responses were not clear.

Table 4 presents data on tree-planting activity. Approximately 33% of households who planted trees planted on their own private lands. However, the bulk of the households (77%) planted in common lands. This data shows that when households plant a small number of trees (1-5) almost all of them are planted in village commons or forested land. However, as the number of trees planted by households increases, a larger proportion of households states that they planted the trees on their own land.

An important question is whether there is any difference in tree planting behavior between rich and poor households. Table 5 shows that the distribution of households that plant at least one tree is reasonably uniform across expenditure classes. However, if this information is classified according to whether the tree is planted in common lands or private lands, we find that poorer households are much more likely to plant on common lands. Seventy-seven percent of the households, who planted at least one tree in the lowest expenditure quintile, located their trees oncommon lands. In the highest expenditure quintile, this percentage of households who planted in the commons reduces to 58%. This finding shows that the less well-off are investing relatively more in the commons. Along the expenditure continuum, the proportion of households planting more than 10 trees goes up steadily. The proportion of households that planted more than 10 trees is much lower (less than 10% households) in the lowest expenditure class. Two categories, households planting 16-20 trees and those planting more than 20 trees, have 47% and 36% households respectively belonging to the highest expenditure class. This reflects the fact that wealthier (land-owning) households plant more trees on their own land.

Table 5: Percentage of Households Planting Trees on Own and Common Land, by Expenditure Class

Expenditure on:** Class	Distribution of Total Households*	Distribution of Households Planting	
		Own land	Common Land
1	19	23	77
2	22	37	63
3	19	31	69
4	19	33	67
5	21	42	58

Note: * column total equals 100; ** row totals equal 100

4.5 An Econometric Analysis of Tree Planting Behavior

In the study area, households that have planted trees comprise both those which are members of the village production centres that are a part of the cooperative as well as non-member households. Households make a number of decisions related to the fruit trees that they plant. These include whether or not to plant trees, where to plant trees (whether in private lands or in the commons), and how many trees to plant. Some simple econometric exercises are conducted to understand the decision-making behavior of households.

The decision to plant trees is itself dependent on several factors. Households that do plant trees are to be distinguished from those that do not plant trees at all. Hence, the econometric model for analyzing the number of trees that households plant needs to take account of the fact that for a portion of the sample, the dependent variable takes values which are all transformed to a single value. In other words, the response to the number of trees planted is zero for a significant portion of households. This is a situation where the microeconomic data is censored. Conventional regression methods would fail to account for the qualitative difference between limit (zero) observations and non-limit (continuous) observations (Greene 2003). While an OLS regression would explain the determinants of the number of trees being planted, treating it as a continuous dependent variable, a logit estimation would address the whether-to-plant-or-not decision (a qualitative dependent variable). The latter would imply that available information on the actual number of trees is not being used. In this situation, the Tobit model is the most appropriate model for a complete specification of the tree-planting behavior. Since the data is censored, the Tobit model is appropriate for analyzing the number of trees planted. The distribution that applies to the sample data is a mixture of discrete and continuous distributions.

The latent regression is defined as
$y_i^* = x_i\beta + \varepsilon_i$
where, $y_i = 0$ if $y_i \leq 0$ and $y_i = y_i^*$ if $y_i^* > 0$.
The marginal effects are computed as: $\delta E(y|x)/\delta x = \beta$ * Prob ($a<y^*<b$); i.e., the probability that y|x would be observed in the interval (a,b).

A variety of factors are hypothesised to influence the decision to plant trees. A village development indicator was constructed. Data on distance from the village centre to the following was considered: nearest market, metalled road, primary health centre, post office, fair price shop, primary school and cooperative/rural bank. A factor analysis was subsequently done and the first factor was retained (after rotation) to compute the "village development indicator." This indicator is expected to reflect increasing market linkages and access to village-level facilities. Village development is thus expected to increase motivation for commercial activities.

Two variables are used as proxies for capturing the economic well-being of the households: amount of agricultural land owned by the household and its access to facilities. Better economic status is associated with greater ability to take advantage of opportunities both within and outside the local village, including a greater ability to take risks in new investment. The first indicator is an "access to facilities" variable, which is based on whether the source of drinking water was piped, whether the household had an LPG connection and whether the house was a *pucca* construction as against a *kutcha* construction. Increased access to such facilities is expected to also reflect greater awareness of the benefits from planting trees. The amount of agricultural land owned by a household can have two effects: On one hand, it could have a wealth effect which is expected to depress the motivation to plant trees on common land; but, on the other hand, it could also have a positive effect on decisions to plant trees on own land.

Demographic variables such as age and years of schooling of the head of the household reflect increased awareness and experience and can motivate tree planting positively. A dummy variable is used to indicate whether the household is a member of the cooperative or otherwise. Membership of the cooperative is expected to impact positively on motivation for tree-planting, and is an important institutional factor in the analysis.

As discussed earlier, if time spent in collection activities by the household increases, it is more likely that the household will decide to plant trees. The daily hours spent in collection are expected to be an important determinant of tree-planting decisions. Table 6 summarizes the descriptive statistics for the variables used in the estimation. A number of independent explanatory variables affect the decision to plant trees, apart from the time costs of collection (the price variable).[24]

[24] It is also relevant to consider the institution as a hedging mechanism against price / return variability. One could model the tree-planting decision in terms of expectations regarding future returns (price changes). These expectations can in turn be based on naïve extrapolations from recent trends. The level of market risk and the ability to bear risk maybe correlated with income, with low income households being particularly sensitive to price risk. So one could explicitly include measures of price risk (see Shively 1999). However, time-series data was not available for conducting such an exercise in the present study.

Table6: All Households - Descriptive Statistics for Variables

Variable Description	Number of Observations	Mean Value
Dependent variable : Number of trees planted	492	6.78
Explanatory variables: Collection time (in hours per day)	492	2.51
Schooling of head of household (in years)	490	5.28
Age of head of household (in years)	492	55.01
Membership of Cooperative (dummy=1 if not member)	492	-
Access to household facilities (score)	492	0.98
Agricultural land owned (in acres)	492	1.03
Rich-poor dummy (=1 if household is poor)	492	-
Village development indicator (score)	492	1.63

Another possible indicator of economic well-being is to distinguish between rich and poor households. A dummy variable is defined which takes the value 1 if the household falls within the lowest two expenditure quintiles and the value 0 for all other households. However, given the significant positive correlation observed in the data between household expenditure and land owned (0.45, significant at 5% level), alternative specifications using the land owned and the dummy for rich-poor households were used.

The results from the Tobit regressions are summarized in Table 7.

Table 7: Results from Alternative Tobit Regressions

Dependent variable – number of trees planted; 490 observations 155 left censored observations at tottrees £ 0; 334 uncensored observations; 1 right censored observation at tottrees ³ 125; LR chi2 (5) = 0.0001; Prob (0,125): mean 0.565

Explanatory variable	Model Coefficients	Model 2	Model 3	Marginal (Model 3)
Collection time (hours per day)	2.09**	2.50**	2.17**	1.23
Schooling of head of household (in years)	0.38*	0.49*	0.37*	0.21
Age of head of household (in years)	0.11	0.19	0.10	0.05
Membership of Cooperative (dummy)	-4.9*	-5.8*	-5.33*	-3.01
Access to household facilities (score)	2.29	3.26*	1.62	0.91
Agricultural land owned (in acres)	3.67**		3.67**	2.07
Whether household is poor (dummy)	2.22	2.28		
Village development indicator (score)	2.39**	2.42**	2.35**	1.33

Note: ** and * denote that the t-statistic is acceptable at 95% and 90% level of confidence.

The results from the alternative specifications indicate that the dummy variable distinguishing between rich and poor households is not a significant one. As is evident from the above table, collection time, educational levels, membership of the organization, extent of development in the village, and the total land owned by a household impacts

significantly on the decision to plant trees. These results confirm the directions in which the variables were hypothesized to impact on tree-planting decisions. The results are also in keeping with those found by previous scholars working on forestry and CPR issues (Besley 1995; Godoy 1992; Amacher, *et al.,* 1993).

The findings on land holdings in particular deserve mention as being yet another confirmation of the importance of land rights in explaining investment in trees and tree-planting behavior. At the household level, it is individual land holdings that are important, apart from the other significant explanatory variables. The poor are constrained by lack of land. Given the importance of the village development indicator, this also signifies that it is the better-off in terms of land holdings that would be able to take maximum advantage of the complementarities with market linkages.

The marginal effects reveal that these are highest for membership of the organization, followed by land owned, time spent in collection activities, and the level of village development. Some of the results seem to run counter to the conventional wisdom on CPR-related developmental interventions as a measure to reduce inequality in the long run. For instance, the marginal effects for land holdings warn us about the possibility of tree-planting actually reinforcing inequality. Richer households plant more trees; thus they invest in natural resources, but not in CPRs. This has adverse implications both for management of the CPR in the long run, as well as for reinforcing inequality as commercialization proceeds. Table 8 presents the probability of planting for different expenditure classes. It confirms that taking tree-planting across the entire sample the probability of planting is higher for the wealthier.

Table 8:Probability of Tree-Planting, by Expenditure Class

Expenditure class	Probability
1	0.5
2	0.54
3	0.58
4	0.56
5	0.61

The findings thus far suggest that the place of plantation becomes very important. This is critical for understanding the sustainability and management of the CPR over time. A second econometric exercise was carried out to explore the specific question of who plants on the CPR. A simple logit estimation was done with the dependent variable taking a value of 1 for those who were planting on CPRs and 0 otherwise. The explanatory variables were the same as for the Tobit regression. The results are presented in Table 9.

Table 9:Results for Tree-Planting on CPRs (Logit estimation)

Observations = 490
Prob > chi2 = 0.0001
Dependent variable =1 if planting on CPRs, 0 otherwise

Explanatory variable	Model 1 Coefficients	Model 2 Coefficients	Model 3 Coefficients
Collection time (hours per day)	0.47**	0.31**	0.47**
Schooling of head of household (in years)	0.01	0.01	0.004
Age of head of household (in years)	0.01	0.01	0.01
Membership of Cooperative (dummy)	-1.35*	-0.95*	-1.38*
Access to household facilities (score)	0.34	0.09	0.28
Agricultural land owned (in acres)	-1.51**		-1.5*
Whether household is poor (dummy)	0.18	0.07	
Village development indicator (score)	0.32**	0.23**	0.31**

Note: ** and * denote that the t-statistic is acceptable at 95% and 90% level of confidence.

The results on collection time, membership of the institution and village development are similar to those of the Tobit analysis for the number of trees planted by all households. The rich-poor dummy is also not significant here. It is interesting to note that the sign on the land-owned variable is reversed, and the variable is highly significant in explaining decisions to plant trees on the CPR. The probability of a positive outcome, i.e., the probability of planting on CPRs, is derived from the estimated model. It is found to decrease as one moves up the expenditure quintiles, taking a value of 0.45 for the poorest and 0.3 for the wealthiest. From the point of view of conservation of the CPR, this clearly shows that it is the poor who have a much higher probability of planting on the CPRs as compared to the better-off, whereas in terms of the number of trees planted, it is those with larger land holdings that have a higher probability of planting.

5. Conclusions and Policy Recommendations

This study narrates a story about the impact of value-addition activities on CPRs, which leads to the growth of a cooperative and a rise in private income for its members along with investment in tree-planting by rural households. The study leads to several conclusions.

First, value-addition activity initiated on the commons can lead to gains in terms of increased incomes (poverty alleviation) in the short run. In this study, households who are members of *Samridhi* make a small additional contribution to household income from their fruit collection and processing activities. While the contribution of CPR-based activity to the average household income is quite small, this contribution in the poorer households is quite large ranging from 20% to 40% of their incomes. This suggests that CPRs are still a very important source of income for the poor.

Second, the study shows that commercial demand for CPR products can also create incentives for investment in conservation. In the present study, over 64% of households undertook protection of trees and 68% actively planted trees. To some extent, this conclusion counters popular wisdom that an increase in demand and profitability from CPR products can lead to unsustainable harvests in the short run. Rather, this study shows that where there is a learning process about income earning possibilities, enabled by the creation and evolution of appropriate institutions, there is a dampening effect on the degradation of the CPRs and an increase in conservation activities relating to both private and CPR resources.

However, increased incomes from CPR-based activities can result in different behavioral responses. The poorer segments of the community have a heightened awareness of the benefits from conservation activities and engage much more in encouraging such activities among the community. Poorer households are also much more likely to plant trees on common lands while the better-off plant more on private lands. Among those planting five trees or less, the percentage planting on common lands falls from 93% in the lowest expenditure class to 66% in the highest. Similar trends are seen among those planting higher numbers of trees as well, with the fall in percentage planting on commons being much sharper as the number of trees planted increases to more than 10 trees. The results from the econometric estimation reinforce these findings with the poor having a higher probability of planting on the commons (0.45 for the poorest and 0.3 for the rich). The econometric estimation indicates that collection time, educational levels, membership of the organization, extent of development in the village and the total land owned by a household impact significantly on the decision regarding trees to be planted.

A key result from our study is that as households grow richer, they are more likely to try to protect their income stream by exiting from the CPR itself. Wealthier households in the Kangra region planted trees mainly on their own lands and less on the commons as a means to improve degraded commons. Thus an important question is how does one ensure value-addition to the CPR? Does one establish private property rights on the CPR or provide for long term leases? The property–rights view of institutional change would indicate that the market can only work efficiently if individual wealth maximizing agents are free to respond to private incentives to manage valuable assets in their own individual/ group (in case of co-owners) interests. Hence, atomization of property arrangements would lead to economic efficiency.

However, the first set of findings on differential impacts on the better-off and the less well-off suggests that to sustain income for the poor, it is crucial to ensure that collective rights are secure.[25] This implies the need for innovative forms of government intervention to ensure that CPR-based value-addition activities retain the necessary incentives to maximize economic rents for the poor who are most dependent on them.

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[25] zThis stands true quite apart from the other marketing or financial considerations which a budding organization may face and which might be driven by market forces such as access to capital for expansion and the need to find unique selling points for products (organic products for instance in the present context of CPR-based fruit products).

Public investments in the CPR cannot of course be considered only from the point of view of improving livelihoods. CPRs perform important ecological functions that need to be conserved. As stated in the Himachal Pradesh Development Report (2005), the value of the forests of Himachal Pradesh lies in preserving it for ensuring the ecological well-being of the entire north-west region in India.

CPRs in a developing country context need to be looked at separately from the short-run and the long-run points of view. While the impacts on household incomes through such investments have been dealt with extensively in this paper, it would be incorrect to consider only such short-run gains. What is also of particular relevance in the South Asian context is that the contribution of CPRs in enhancing the well-being of the communities dependent on them can be considered from several aspects, and not only in terms of economic well-being. Improved family and social relations can occur simultaneously with material well-being if interventions are well formulated and implemented. The present study finds ample evidence for this in its analysis of the qualitative data. The women's cooperative achieves much in terms of the empowerment and education of its women members, contributing also towards correcting gender imbalances in the local community. From a longer-run point of view, the purpose of preserving the CPR may change over time and during the development process. This could range from fulfilling basic consumption needs to solely maintaining ecological services.

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Appendix 1
Some Socio-Economic Indicators for Himachal Pradesh & India

Indicator	Himachal Pradesh	India
Population (2001)	6.08 million	1027.02 million
Sex Ratio (2001)	970 females/1000 males	933 females/1000 males
Population below poverty line (99-00)	7.63 %	26.1 %
Percentage employed (2001)	72.5 %	61.8 %
Literacy Rate (2001)	75.9 %	65.2%

Appendix 2
Data on Samridhi WPGs (Year: 2002 – 2003)

Name of WPG	*Number of members*	*Total Production (Kgs)*	*Wages Paid (Rs)*	*Savings (Rs)*
Trinda	14	2899	42358	2220
Ropri (A)	11	3882	60036	2300
Ropri (B)	10	1664	17884	1100
Thehedu (A)	10	2338	34509	2600
Thehedu (B)	11	1404	17404	560
Kosri	10	935	18898	1840
Samba	12	450	4650	7933
Kona	10	511	7672	6840
Boun (A)	10	1643	27482	7036
Boun (B)	10	-	-	700
Chandar	10	2135	23858	4134
Dhati	7	276	6454	2296
Rora	10	1292	20179	4374
Daihan (A)	13	10963	71957	5561
Daihan (B)	10	2000	13040	-
Droh	10	866	7825	6600
Kamla (A)	14	362	13936	5000
Kamla (B)	10	223	5405	2000
Riyan	13	972	11327	5324
Duglehad	10	89	2670	500
Umber	10	-	-	-
Tumber	10	44	1320	500
Total	235	34,928	408864	69418

Source: Annual Report, 2002-2003

Appendix 3
Sampling Sheet (in number of households)

Name of Village	Member Households	Non-Member Households	Total
Households			
Boun	5	16	21
Chander	10	18	28
Daglehr	10	5	15
Daroh	8	39	47
Dehan	22	16	38
Dhati	7	9	16
Kona	10	21	31
Kosri	0	59	59
Raura	10	15	25
Ropri	21	29	50
Samba	10	12	22
Tambar	8	14	22
Theru Lower	10	37	47
Theru Upper	10	19	29
Trinda	12	30	42
Total	153	339	492