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# NATURAL RESOURCE MANAGEMENT IN SOUTH AND CENTRAL ASIA

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## Community enterprise for conservation in India: Billigiri Rangaswamy Temple Sanctuary

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### Introduction

The debate over the goals and means of biodiversity conservation has reached a stage where it is becoming increasingly accepted that, for ideological reasons or instrumental ones, the involvement of the local community living in and around protected areas (PAs) is critical to the success of the conservation effort. This acceptance of 'community-based conservation (CBC)' is, of course, at a very general level; the devil is in the details of what is meant by involvement, what incentives are necessary and sufficient to obtain local involvement, what rights and responsibilities can be and should be devolved to the community, what process and institutions will ensure broad-based participation and sustainability of the arrangements as well as of the ecosystem, and so on.

One particular approach being experimented with by several agencies is rooted in the belief that if communities living in and around PAs are to be willing partners, they must develop a *direct and substantial economic stake* in the biodiversity of the area. If such an economic stake is created (either by strengthening an existing biotic resource-based enterprise or creating a new one), the community will have the incentive to regulate its own activities vis-à-vis the protected ecosystem/area. In this paper we describe the preliminary results of an ongoing 'enterprise-based conservation' effort taken up by us in southern India. This work is being carried out under the aegis of and financial support from the Biodiversity Conservation



Network (BCN, a programme funded by the US Agency for International Development; see also Bhatt in this book).

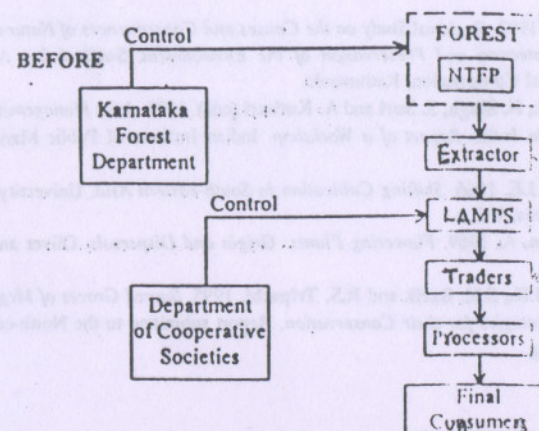
### The BRT Sanctuary and the local community

The Biligiri Rangaswamy Temple (BRT) Wildlife Sanctuary, located in the Mysore district of Karnataka state, lies at the confluence of (and hence includes biota from) both the Western and Eastern Ghats regions. Its 540 sq. km of forests, spread over an undulating terrain ranging from 600 msl to 1,800 msl, can be categorized into five broad types: scrub thorn forest (28 per cent of total area), deciduous forest (61 per cent), evergreen forest (7 per cent), high altitude grassland (3 per cent) and high altitude stunted cloud forest (*shola*, 1 per cent). The Sanctuary harbours many large mammals like the Elephant (*Elephas maximus*), Tiger (*Panthera tigris*) and Leopard (*Panthera pardus*), apart from a variety of small mammals and amphibians.

The earliest inhabitants of these forests are a tribal community called Soligas, of whom about 4,500 still live in 25 settlements scattered in or on the fringes of the Sanctuary. The Soligas traditionally engaged in shifting agriculture and trapping. They also collected a wide range of non-timber forest produce (NTFP), initially for their subsistence needs, but later for forest contractors as well. Shifting agriculture has been discouraged since the late 19th century, and with the declaration of much of the area as the BRT Wildlife Sanctuary in 1974, shifting agriculture and hunting were completely banned. The Soligas were allocated small pieces of land where they could practise settled agriculture. However, the extraction of NTFP continued under the aegis of tribal cooperatives, called Large-scale Adivasi (tribal) Multipurpose Societies (LAMPS).

The existing situation with respect to NTFP harvesting and marketing in BRT Sanctuary is shown in Figure 23.1(a). The Soligas harvest NTFP and sell them to the LAMPS. The LAMPS, created in the late 1970s–early 1980s as vehicles for tribal development, are state-controlled tribal forest cooperatives (one in each taluka, a sub-district-level area) that are given two-year renewable leases for NTFP extraction in the forests of that taluka by the Forest Department (FD). Their main objective is to ensure maximum prices for NTFP like the fruits of *amla* or *nellikai* (*Phyllanthus emblica*) and gallnut or *aralekai* (*Terminalia chebula*) to the tribal collectors through pooled marketing of the raw produce.

(a) Existing before the Initiation of the Enterprise-based Conservation Project



(b) Hoped to be Achieved on the Completion of the Project

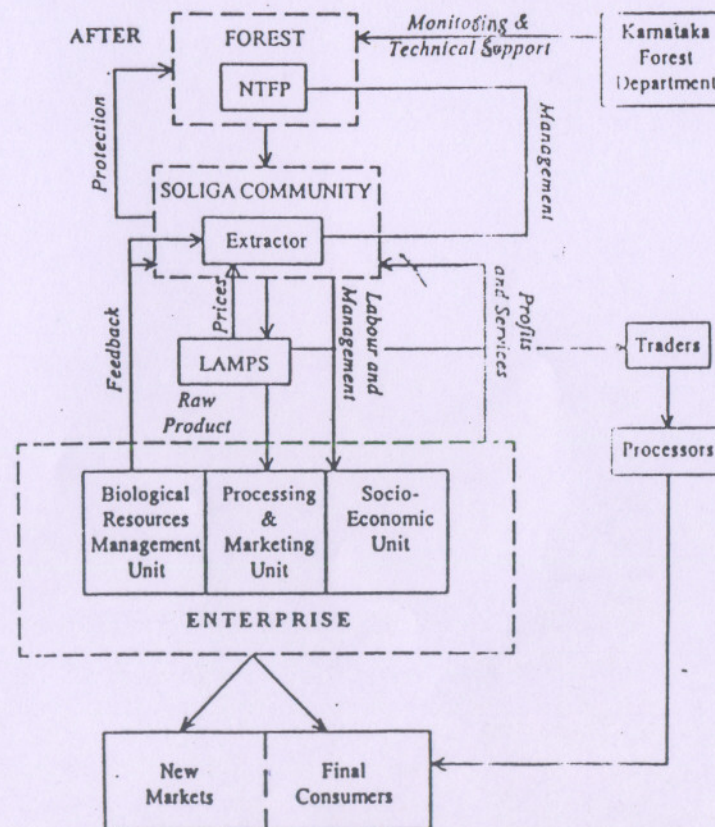


Figure 23.1: Relationships between the forest, the Soliga community and the larger society



Preliminary studies (Hegde et al. 1996; Uma Shankar et al. 1996) indicate that Soligas of BRT Sanctuary: (a) rely heavily on NTFP as a source of cash income, with more than 50 per cent of total income coming from it;<sup>2</sup> (b) derive inadequate returns from the NTFP due to lack of value addition and poor marketing; and (c) have little control over harvest with respect to amount, location and timing of the collection. Preliminary biological research also suggests that many species yielding NTFP are not adequately regenerating, possibly due to over-harvesting (Murali et al. 1996).

### The enterprise

In this context, a project for enterprise-based conservation has been initiated in consultation with a local NGO, the Vivekananda Girijana Kalyana Kendra, working with the Soligas since 1981 on healthcare. The core of the idea is to increase the Soligas economic stake in the Sanctuary's biotic resources by generating additional income by processing several of the extracted NTFP on site and marketing them directly, so as to capture a greater share of the final value. Simultaneously, the project seeks to ensure the ecological sustainability of these resources and the larger ecosystem by establishing a community-based biological monitoring and feedback system that will regulate NTFP extraction and ecosystem health. The project thus aims to create an 'enterprise' owned and operated by the Soligas that will consist of (a) a *processing-cum-marketing unit* for income generation, coupled with (b) a *biological unit* to ensure sustainable utilization of the biotic resources, and (c) a *community outreach unit* to ensure broad-based participation of the local communities and an equitable flow of benefits from the enterprise. The desired situation is depicted schematically in Figure 23.1(b).

Specifically, the processing-cum-marketing unit is to purchase at least four NTFP in raw form from the LAMPS: honey, *amla*, soapnut and *shikakai*. It will process them in various ways: honey would be filtered, pasteurized, subjected to moisture reduction and bottled; *amla* would be used for pickles, jam and medicine; *shikakai*, soapnut and *amla* would be used to make shampoo powder. These products will then be marketed as directly as possible so as to capture the highest possible fraction of the final consumer prices.

The biological unit is to set up systems for collecting, analyzing and disseminating information on NTFP and the ecosystem at large

and for generating recommendations for modifying harvesting practices and other resource management measures. This will be done at two complementary levels: the level of the community (necessarily simpler and rule-of-thumb) and the level of the enterprise (more sophisticated, by scientifically trained staff).

The original objectives of the community outreach unit of the enterprise were to ensure participation in, training for, and ultimate handover of the food processing unit (FPU) to the Soligas, and to facilitate the setting up of community-based biological monitoring. Subsequently, it became clear that the smooth functioning of the processing units and the passing on of enterprise profits to collectors through better prices for the raw NTFP depended critically upon reforming the functioning of the local LAMPS. The LAMPS is also the key body through which forest management efforts have to be channeled, since it has the NTFP collection rights from the FD. LAMPS reform has therefore been added to the list of objectives of the community outreach component.

In addition to setting up this broadly defined community-based enterprise, the project includes substantial online applied research-cum-monitoring by researchers. The idea here is that many questions relating to the specific resource management strategies to be adopted by the enterprise, or the approach and institutional structure to be adopted for community involvement in the enterprise, will require an understanding of the interactions between the local community (and other actors) on the one hand and the NTFP resources and broader ecosystem on the other. Developing such an understanding and monitoring outcomes (covering biological and socio-economic aspects) so as to provide ideas and feedback to the enterprise is the objective of this research-cum-monitoring activity.

To summarize, the project is an *integrated plan* for CBC that tries to mesh increases in *incentives* with increases in *responsibilities* and in *capacities*. It increases the economic stake of the Soligas through better NTFP prices, increased employment, and profits. It simultaneously increases their responsibilities by requiring them to monitor NTFP resource sustainability and wider ecosystem effects, and also to ensure fairness in distribution of benefits within their community. And it seeks to achieve this by increasing the capacities of the Soligas for financially sound and profitable processing and marketing, for socially acceptable management of the enterprise, and for biologically sustainable management of the resource. The project is initially



focused on the part of the Sanctuary that falls in Yalandur taluka (sub-district), a forest area of about 110 sq. km containing nine Soliga settlements with a population of about 1,400.

#### Activities to date

The project was initiated in March 1995, and is currently funded for three years. The progress achieved so far is described briefly below.

#### Processing and marketing for income generation

The processing-cum-marketing activity consists primarily of two units: a Honey Processing Unit (HPU) and a Food Processing Unit (FPU).<sup>3</sup> The project had also planned to increase Soliga incomes by initiating apiculture with another species of honey bee (*Apis cerana*). However, a nationwide epidemic of sac brood disease on this species has prevented this activity from taking off. These units were set up in the premises of and with infrastructural support from the local NGO. The main features of and physical targets achieved by each value-adding activity/unit are described below, followed by a brief description of the marketing strategies adopted, the net profits generated so far, and the level of Soliga staff training achieved. The funding from BCN has covered all capital costs, all operational costs for the first two years, and salaries of all specially hired professionals for three years.

The HPU is designed to process honey, currently collected primarily from wild rock bees. Begun in 1995, the unit has the capacity to process 30 tonnes of honey per year. The total revenue generated in 1996 from honey was Rs 700,000; the profit margin is approximately Rs 20,000 per tonne.

The food processing plant is intended to prepare pickles, jam, other food products and also shampoo powder. The principal NTFP being used is *amla* fruit for the food products and *shikakai* (with *amla*) for shampoo powder. In 1996, 2,000 kg of *amla* was processed, about half for pickle and half for shampoo powder. In 1997, the target is to process about eight–nine tonnes of *amla* fruit to generate a revenue of about Rs 450,000 and a profit of about Rs 60,000 from the various products.

To facilitate marketing, necessary regulatory approvals have been obtained and trademarks registered. In particular, the HPU has obtained

'Agmark' certification of quality from the Indian Standards Institution. The FPU has received FPO certification (Food Products Order from the Central FPO Licencing Authority). Both units market their products under the registered trademark 'Prakruti' (meaning 'nature'). In marketing these products, a conscious strategy of product and channel diversification has been followed. Honey is currently being marketed through the state-owned Khadi and Village Industries Commission, and through wholesale and retail outlets in Bangalore. The same outlets will be used for FPU products. A retail outlet has also been opened near the BR Temple, which will sell all these products.

Over the period March 1995–December 1996, the HPU and FPU together made a net profit of about Rs 140,000 and generated about 2,400 person-days of wage-labour employment for the Soligas. Skill improvement has been significant on the production side: it is estimated that the production activities in the HPU will be entirely Soliga-managed within a few more months.

The processing-cum-marketing activities are managed by a professional manager, and the local NGO has provided accounting and secretarial support. Initially, a Management Committee comprising six–seven Soliga representatives, an NGO representative and the authors of this paper was formed to oversee the operations of the enterprise and the project as a whole, with the Soliga representatives being nominated by the NGO. This committee, however, failed to function: the Soliga members did not show up or participate, the nominees kept on changing, the meetings were called infrequently, discussions were repetitive and superficial. The exact powers and responsibilities of this committee were not clear; *de facto*, all operational decisions about the processing-cum-marketing activity were taken by the NGO.

The causes of this lack of community involvement and our efforts to regenerate community interest are described later below. Suffice to say that it has now been decided that the Soligas will set up a separate registered society to which the NGO will formally hand over all the assets of the enterprise by 1 April 1997, and the Executive Committee of this society will manage the enterprise, with advice from us and the NGO, and with professional staff wherever required.

#### Enterprise-based biological resource monitoring

The basic motivation for systematic biological monitoring is twofold. First, the enterprise itself must have a way of knowing how its activities



are affecting resource sustainability and overall biodiversity, so that it may take appropriate management measures. Second, if the concept of CBC in general and enterprise-based or incentive-based conservation in particular is to be shown to be viable (so as to replicate it on a larger scale), there must be a demonstrable improvement in the resource and ecosystem condition following the setting up of the enterprise. While the first clearly needs to be community-based, the second may perhaps also require some outsider participation to ensure reliability and rigor.

The project visualized that this enterprise-based biological monitoring might be in two forms: a simpler, community-based monitoring system, and a more scientific system using ecologists employed by the enterprise. Till recently, the latter was being conducted by the project's biological research team working somewhat independently of the enterprise and the Soligas, although on topics related to the enterprise's activities. Starting late 1996, one of the biologists in this team began to work directly with the enterprise.

Prior to initiating efforts for community-based monitoring, the project conducted a rapid assessment of traditional knowledge and attitudes to contextualize our efforts. This assessment revealed that while the Soligas' knowledge is very substantial and detailed, certain seasonal information (such as the distribution of *amla* fruit) is unevenly distributed across the community, and also that traditional knowledge is probably not sufficient to ensure sustainability in the face of the recently commenced intensive (commercial) NTFP extraction. It also revealed the limitations of our own 'rigorous' biological monitoring programme. The Soligas repeatedly pointed out that fire, now suppressed vigorously by the FD as a part of its sanctuary management plan, was actually an integral part of the ecosystem and lack of fire may be partly responsible for the lack of regeneration of a number of the species. Our original studies had only focused on extraction pressures, missing out this vital factor.

Progress towards setting up the community-based resource monitoring system, however, has been much slower than desired. So far, a few Soligas have been trained in systematic monitoring of resource extraction and in NTFP availability estimation; community interest and participation has, however, been slow in coming. In November 1996, the project got key persons (collectors, LAMPS agents and directors) in the community to estimate the size of the *amla* crop in their traditional manner, and found it to be similar to the estimates

arrived at by the project through more rigorous and systematic methods. In December 1996, a training programme on participatory resource mapping was conducted with the help of a resource person from Centre for Earth Science Studies, Trivandrum. Using this, a comprehensive programme of participatory monitoring of *amla* harvest and regeneration was initiated in January 1997, which included pre-harvest discussions, online monitoring of harvest percentage, presence of parasites and seedlings, and post-harvest feedback sessions on all harvest days. The response obtained was encouraging; similar efforts are planned for other products in the future.

The difficulties faced in devising and institutionalizing a community-based resource monitoring system are myriad. One may be that our 'scientific' training makes it difficult for us to conceptualize a socially acceptable monitoring system. And there are hardly any other sites where such systems have been set up that can serve as a guide. But the major barriers to setting up such a monitoring system are the facts that the community today has no incentive to get involved in enterprise activities (as even at the end of the second year it has received very few tangible benefits), that it is yet to see any tangible effects of its own recently intensified NTFP extraction, and that even when it does wish to act on the basis of new information it knows that it has very little say in forest management.

With the transfer of the enterprise to their hands, we hope that the involvement will increase. The project is also trying to set up some specific incentives for the NTFP collectors in the form of bonus payments from enterprise profits, and experimenting with different techniques for making the monitoring simple yet useful. The results of the 'scientific' research are being taken back to the community to show that there is in fact some cause for concern over certain aspects of the forest ecosystem, such as the regeneration of NTFP species. We are also trying to emphasize that systematic monitoring can be used as a tool or argument for gaining greater control over the resource. Simultaneously, efforts to lobby the FD to grant greater control to the local community also continue.

#### Community outreach: Involvement, empowerment, and benefit distribution

As described earlier, the project was conceived in consultation with an NGO that has been working for Soliga development for the past



15 years and most of whose staff and board members are Soligas themselves. The enterprise activities have been based physically and operationally in this NGO, which had already initiated a number of vocational training programmes and even some small-scale NTFP processing activities with the Soligas before our project began.

Thus, in one sense the Soliga community has been aware of and involved in the enterprise from day one. On the other hand, the enterprise is still quite far away from its goal of true community involvement, i.e., making the enterprise activities entirely managed, **controlled and owned by the Soligas. Soliga response to all** outreach efforts was quite lukewarm for the first year-and-a-half. The meetings of the Soliga Managing Committee set up for overseeing all the enterprise activities initially evoked little response in the community.

Subsequent intensive and candid discussions with the community and introspection amongst ourselves indicated two major problems. First, in spite of us having a local, well-established NGO as our collaborator, the Soliga community was not at all well-informed about the basic objectives of the project and their role in it. The Soligas saw the project as just another activity run by the local NGO in which they would get some wage labour, not as an enterprise that they would jointly manage and eventually own. Indeed, the NGO itself was unclear about what 'community-based enterprise' really meant. It became apparent that the NGO was overloaded with many other programmes and projects, and that separate community outreach efforts needed to be initiated for spreading the message and building Soliga capacity for CBC.

Second, these consultations also reinforced the feeling that a centralized, capital-intensive, and technologically sophisticated approach to processing was not generating sufficient interest among the dispersed, seasonally employed, largely illiterate and infrastructurally constrained Soliga community. The people repeatedly expressed a need for processing activities that could be taken up at the *podu* (hamlet) or even household level.

To tackle the first problem, the project hired a social worker and began an intensive community outreach campaign starting September 1996. In January 1997, a public meeting was held in which the local NGO promised to hand over the units along with profits and working capital to the Soligas. The Soligas, with the help of the community outreach unit, are now in the process of forming and

registering a society that will operate on the lines of a cooperative to take over and manage the enterprise.

The second problem cannot be solved immediately or directly, since the investments in the processing units have already been made. The project has therefore tried to broadbase the benefits flowing from the enterprise by including LAMPS reform as one of its activities, and will also attempt to pass on some of the profit margins in the enterprise to the collectors through bonus payments on the NTFP they contribute. Finally, possibilities for decentralized processing of some other NTFP are being explored.

Efforts at reforming the functioning of the LAMPS have evoked a somewhat more enthusiastic response from the community. These efforts were initiated at two levels: reforming the local LAMPS, and changing state-wide policies towards LAMPS in general. The first level directly involved the BRT Soliga community, while the second level targeted the Karnataka-wide tribal community. At the local level, a greater awareness has been generated in the community about the malpractices occurring in the LAMPS, demands are being made by the Soliga members to revise the pricing system so as to reduce LAMPS' and agents' margins, and some improvements in the NTFP tendering/auctioning system have been attempted. At the state level, significant momentum has been generated amongst tribal organizations and tribal development NGOs to push for LAMPS policy reform, resulting in the drafting of a detailed action plan that is being finalized and submitted to the government (Lele et al. 1996).

#### Applied research-cum-monitoring

This is an interdisciplinary effort involving biologists and social scientists. Its objectives are to generate rigorous information on the overall vegetative landscape, the distribution, regeneration and productivity of NTFP species in particular, the effects of current extraction patterns and other factors (weeds, fire) on these variables, and the socio-economic factors influencing Soliga extraction practices and their ability to derive income from the forest. The results obtained so far are described very briefly below; for further details, including methodology, see Bawa et al. (1997).

Vegetative sampling covering the entire 540 sq. km Sanctuary area, now being incorporated into a Geographical Information System (GIS) and combined with satellite imagery, has produced a detailed



picture of the overall vegetation in the Sanctuary. It indicates that the distribution of NTFP species is very uneven, and that exotic weeds (*Lantana* spp. and *Eupatorium odoratum*) are widespread. Regeneration studies suggest that some of the NTFP species (such as *amla* and *aralekai*) are not producing adequate numbers of seedlings. There is evidence from controlled harvest experiments that, in the case of *amla*, current levels of fruit harvest could be partly responsible for this. However, further fieldwork suggests that weeds and fire may also have an adverse effect on regeneration, and studies are being initiated to thoroughly understand these effects. The life of *amla* trees may also be affected negatively by a semi-parasitic mistletoe vine, and Soliga harvesters have begun pruning these parasites to ensure future productivity. Studies have also been carried out for some medicinal plant species that could be used for medicinal products in the future, and they indicate significant variation in the requirements for sustainability across species (Murali 1997).

Results of monitoring the community's participation and intensity of NTFP collection as a whole and harvest of *amla* (supposedly the most popular NTFP) in particular are as follows. Soliga households are differentiated into traditional ('hard-core' or 'full-time') NTFP collectors who collect all products (15–25 per cent of all households), marginal or 'part-time' collectors who only get involved in the relatively unskilled and lucrative collection of fresh *amla* fruits (40–50 per cent), and those who are not involved in commercial NTFP collection at all (35 per cent), the last fraction being much higher than anticipated. The project also found that non-participation in *amla* harvest is significantly correlated with household member(s) being engaged in salaried jobs or steady wage work, and that the biggest beneficiaries from NTFP harvest are the tribal agents appointed by the LAMPS who earn commission on each kilogram harvested, while also acting as moneylenders.

A detailed study of the extraction of wild honey (the NTFP with biggest margins for the processing unit) showed that timing of extraction significantly affects productivity (kilogram of honey per comb) and possibly sustainability (through its impact of larval loss). The timing of extraction is clearly affected by the nature of tenure on the honey resource: open-access trees/cliffs get harvested earlier than is optimal. The establishment of tenure itself appears to be a complex social process, in which the emerging tribal elite (LAMPS agents) play key roles. These findings are being incorporated in

developing a detailed plan for community-based honey extraction, training, and experimentation during the next honey season.

### Implications for CBC

While our project is as yet incomplete, we can offer some insights based on our experience so far that could be useful when devising other CBC programmes. We have attempted to organize these insights broadly along the lines laid out in the overview paper of Kothari et al. (in this book).

#### Identifying the 'local community'

Identifying who represents the local community and getting their involvement is always the biggest challenge facing CBC, or for that matter any development activity. Outsiders are therefore tempted to take the help of local NGOs in such activities. Indeed, 'local NGO involvement' has been made a prerequisite for development activities by most funding agencies. However, one must be careful not to confuse 'local NGO' with 'local community'. Rural development NGOs are often set up by outsiders, and they may not necessarily represent the entire community. Further, they may not even facilitate community involvement: the NGO may be more concerned about self-development and can become an obstacle to genuine community empowerment. There is thus no simple formula for properly identifying who speaks for the local community; diverse approaches have to be tried and evaluated in a spirit of genuine self-reflection.

Another oversimplification occurs when we use the term 'the local community': it suggests that there is one such single, homogeneous entity. This assumption is particularly easily adopted in tribal areas, because tribal communities are known to have strong communal traditions and cultures. Our experience shows that even tribal communities are no longer homogeneous. Both specialization and differentiation are occurring rapidly in these communities. Specialization, wherein some households move away from forest-based activities (typically into non-forest wage labour and sometimes into salaried jobs or trades) while some others remain 'hard-core' NTFP collectors, is perhaps the inevitable consequence of their contact with the modern economy. Simultaneously, tribal societies have drifted away (or been dragged away) from their communal and relatively egalitarian



social organization to situations where individuals in the community (like some of the tribal LAMPS agents) become exploiters (usually with some external support) and an elite is formed. Another 'tribalism', that women have a more or less equal status as men, is again becoming a thing of the past as tribal societies 'learn' from the gender-biased dominant communities around them.

Any interventions, including CBC programmes, will at the very least need to be sensitive to such variations in interest and differences in power. The interventionists will have to walk the tightrope between ensuring participation of the genuinely needy and forest-dependent sections and the ambitions (and even abilities) of the elite who will see these programmes as fresh avenues for self-gain. Extra efforts and specific strategies must be devoted to ensuring that the various interest groups within the community are identified and the opinions of the weaker ones are sought.

#### Form, magnitude and mode of benefits

The fundamental assumption of the BCN approach is that an economic incentive is necessary to get the community involved in biodiversity conservation, and that one way to increase this incentive is through value-added processing using capital investments and professional expertise. Our experience so far shows that the form of the incentive may be more than just economic, that the magnitude of economic incentives required for participation is hard to predict, and that economic benefits may often be more easily or effectively generated through alterations of property rights than through conventional modes of 'enterprise' or 'entrepreneurship' development.

While economic incentives are important, the legitimacy and political empowerment that may result from involvement in CBC can be an added incentive and often a more effective tool for mobilization. This seems to be particularly true in the context of monitoring the community's own resource use: the argument that 'this monitoring is necessary to show outsiders, including the Forest Department, that we [the Soligas] do not over-harvest the resource and hence to strengthen our demand for forest rights' was found to be critical in generating Soliga participation in resource monitoring.

We also found that there is palpable tension between two distinct schools of development thinking: the school believing in a capital-intensive, centralized, highly mechanized, professionally managed

format (so as to ensure competitiveness in today's 'global economy'), and the school which believes in a low-cost, decentralized, appropriate technology-based, and locally managed format (so as to ensure broad-based participation, genuine empowerment and opportunity for social adaptation). The latter format may yield slower and less spectacular results than the former, but it is likely to be more socially sustainable. However, funding agencies by their very nature are tempted to go for the former approach, both for its speed, its visibility, and the compulsion to throw money at any problem. CBC proponents must resist this temptation and choose a middle path depending upon local needs and capabilities.

Indeed, capital investment or technological intervention may be less important than (and even fruitless in the absence of) simple (but politically difficult) changes in the property rights arrangement. For instance, the fundamental problem with LAMPS today is not that the tribals lack adequate capital or marketing know-how or managerial expertise (as government reports claim), but that they lack clear and secure rights of access to NTFP and genuine control over the day-to-day operations of their cooperative (Lele and Rao 1996). Reforming these arrangements (so as to narrow the large gap between prices given to individual NTFP collectors by the LAMPS and prices obtained by the LAMPS subsequently when auctioning the products) would require no capital but could yield far more per capita benefits to the tribals than capital- and technology-intensive processing. In fact, the latter gains are dependent upon the former changes.

Will, however, such locally-generated benefits be generally enough to ensure people's participation in conservation? This is a much-debated question in the literature on conservation policy and CBC. For instance, Gadgil and Rao (1994) have argued that external subsidies will usually be necessary to ensure local compliance and support for conservation practices. While our project is still incomplete, preliminary indications suggest that the local community should be able to generate sufficient economic income and non-economic benefits from the local biodiversity through both controlled NTFP harvests and through even less disturbing uses such as eco-tourism to obviate the need for external subsidies (the mechanism of which may be suspect and the very act perhaps degrading). Clearly, much further work on assessing the potential of various options is necessary for designing CBC programmes and policies.



On the other hand, we would also caution against the simplistic belief that economic incentives are 'sufficient' to ensure conservation. In fact, standard economic theory predicts, all other things remaining constant, increased extraction when product prices increase. If, for instance, in the existing situation the Soligas obtain significantly higher prices for a product, they will most probably extract more of that product without thinking about its future sustainability. Often, the major reason for this behaviour is again insecurity and incompleteness of tenure. Tenure must include not only long-term rights of access, but also an enforceable right to exclude others, and the right to 'manage' the forest resource as a whole.

#### Role of Indigenous and modern knowledge systems

The breadth and depth of local knowledge about local ecosystems is undoubtedly very substantial. This is particularly so in tribal communities, such as the Soligas. Legitimizing and nurturing this knowledge is an important task in CBC-type programmes.

At the same time, we would like to caution against romanticization of traditional knowledge to the point where one allows no role for modern methods of data collection or interpretation. It must be remembered that traditional knowledge has evolved over generations, typically under relatively static and low-intensity regimes of human-nature interactions. It is therefore unlikely that traditional knowledge will be adequate to understand and anticipate the full impact of the rapidly expanding forms and intensities of these interactions, such as commercial-scale harvests or air/water pollution by tourism. More than simple documentation of traditional knowledge, what is required is a way of involving those who serve as repositories of this knowledge in the day-to-day management under CBC programmes, such that they can begin to adapt their knowledge to new situations. Simultaneously, more formal 'scientific' monitoring will have an important role to play, especially in the initial stages. The challenge for the scientists will be how to share their methods and models with the local community in a manner that allows local perceptions to be incorporated and tested by local communities themselves.

#### Institutional Issues

While the project is yet to reach the stage where institutional issues come to the fore, we anticipate the following main issues to come up: how the balance between individual and community benefits (or

active participants versus non-participants or collectors versus non-collectors) is struck; and what will be the organization interfaces with the main governmental agency (the FD in this context) and with the local political bodies (like *panchayats*).

#### Legal and policy Issues

We need not elaborate here upon all the aspects of Indian laws (Wild Life Act, Forest Act, etc.) that we found detrimental to our attempt at CBC. Suffice to say that in the specific context of NTFP-based enterprises, the biggest hurdle will be that the Wild Life Act proscribes such extraction from National Parks; its amendment is therefore a prerequisite to taking up such activities in these areas.

Our experience also shows that between the Act and the field situation are innumerable administrative policies and procedures that serve to effectively marginalize local communities even when the law gives them a role. A classic example is that of the LAMPS, which do not always get the NTFP extraction lease even though there is a Government Order in Karnataka requiring that the lease be preferentially given to local LAMPS. Thus, CBC programmes will have to deal with many of these written and unwritten rules of the game that politicians and bureaucrats play.

#### NOTES

1. The average size of a Soliga landholding is 0.6 hectare, but approximately 30 per cent of the households have no access to cultivable land.
2. Other major sources of livelihood include subsistence agriculture and wage labour on non-Soliga orchards, coffee plantations, and FD works.
3. In addition, we have been involved in helping the local NGO manage another unit—a Herbal Medicinal Plant Unit (HMPU)—that it had set up with funding from the Foundation for Revitalization of Local Health Traditions (FRLHT) with the same concept in mind: increasing tribal incomes through processing and marketing of ayurvedic medicines using medicinal NTFP from the Sanctuary. Unfortunately, restrictions on the extraction of NTFP prevent Soligas deriving any additional income from medicinal NTFP harvest, while the location of the unit away from the Sanctuary prevents any Soliga participation in processing and management. Hence the activities of the HMPU are not described herein.

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