Information for decision making:
Challenges for village communities

- T Balachander[1] & D Venkat Raj[2]

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1 Senior Project Officer, Foundation for Ecological Security, Anand, Gujarat, India (balachandert@gmail.com)
2 Team Leader, Foundation for Ecological Security, Madanapalle, AP, India (madanapalle.fes@ecologicalsecurity.org)

ABSTRACT

The importance of managing common property resources, and the central role of village communities in it is has formed a minor though important part of the Indian Natural Resource Management discourse and practice. The importance of common property resources in the lives of the poor and marginalised communities in India has been well documented. There have been numerous initiatives across the country by village communities of managing their common property resources, particularly land. These initiatives have included village level management of common property resources, as well as federations of a number of villages.

Traditional emphasis on common property resource management in India has been at a village-level where the community is managing the resources adjacent to the village. There have also been well-documented experiences of federations of village communities covering a large area forming the next tier of Common Property Resource management.

Recently however the Ecosystem approach to sustainable development (including natural resource management) has been gaining ground around the world. Cutting across the various boundaries demarcated on land and between different natural resources this approach advocates a holistic understanding of the ecosystem and development. The approach also envisages involvement of a wide variety of stakeholders in ecosystem management including village communities.

The Ecosystem approach recognises the 'Precautionary Principle' and advises management of ecosystems within their limits of functioning. This requires understanding of the dynamics of natural resources at various spatial scales and over time, considering the influences of a large number of external factors. Scientific research, whether participatory or otherwise, would be called for to assess many of these parameters with reasonable accuracy. However, CPR management has traditionally been able to build upon the knowledge base of communities for managing natural resources. There have also been well-documented instances of self-initiated CPR management initiatives in different parts of the country.

The implications of adopting an ecosystem approach, in which the management of

common property resources forms an important part, for the knowledge base that is required at the village community level therefore need to be analysed. The complexity of many ecosystem processes, including but not limited to the spatial and temporal dimensions, would present numerous challenges to the village communities in terms of access to relevant and timely information.

The paper proposes to draw upon the experiences of the authors in working with village communities on common property resource management in India and identify the issues involved in generating and sharing information with village communities on aspects such as carrying capacity, resource status etc. The challenges faced by the village communities in accessing such information as well as by organizations involved in supporting them would be analysed. It would also review the experiences of other initiatives to take technical information to village communities, such as ‘agricultural extension’, to draw implications for supporting community decision making on common property resources.

Key Words: Decision making, Information, Knowledge base, Ecosystem Approach, Communities.

INTRODUCTION[3]

Rural communities in India have depended over thousands of years on natural resources for their livelihoods. This is still the reality for millions of rural people be they agriculturists, livestock rearers, fisherfolk etc. This has meant that over the millennia they have developed intricate and diverse practices for managing natural resources. These include community based management and conservation of local forests, pasturelands, agro-biodiversity, bird and wildlife habitats, ponds and fisheries, both inland and coastal (Sarin, 2005). Community stakes in conservation may be rooted in increasing livelihood security, protecting ecosystem services or for cultural and spiritual reasons (Kothari *et al*., 2000).

The last two decades have witnessed a paradigm shift in conservation and natural resource management (NRM) away from state-centered control towards approaches in which local people play a much more active role (Shackleton, S. *et al*, 2002). Among the approaches that have come to find acceptance in various international and national fora is the Ecosystem Approach (EA) that brings together a conservation agenda inextricably linked with human stakeholders.

This EA is a strategy for managing land, water and living resources that promotes conservation and sustainable use in an equitable way. It is not a set of guidelines for the management of various ecosystems but is a framework for thinking and acting ecologically and a tool for mainstreaming biodiversity into decision making locally, nationally and internationally (Smith, R.D. and Maltby, E.).

The EA puts people and their natural resource use practices squarely at the center of decision making and therefore can be used to work towards 'an appropriate balance' between the conservation and use of biological diversity in areas where there are both multiple resource users and important natural values (Shepherd, 2004). Further, Principle 3, that 'Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems',

3 The authors would like to acknowledge the support from our colleagues in the Spearhead team in Madanapalle, and elsewhere in the organization during the field study as well as during our years of working together.

incorporates the element of 'precaution', i.e. the lack of certainty about threat of environmental harm should not be used as an excuse for not taking action to avert that threat.

While an overarching approach such as the EA would have a diverse set of implications for communities conserving natural resources, the paper would focus on the challenges it throws up in terms of the information needs of the communities. The case study presented here would touch upon some of these aspects such as intervention at appropriate spatial and temporal scales, the need to consider effects of activities on other ecosystems, balancing conservation and use of biodiversity, the need to consider scientific and indigenous and local knowledge, while seeking to manage ecosystems within the limits of their functioning.

INFORMATION TO SUPPORT COMMUNITY PROTECTION: A CASE STUDY

This case study is drawn from the experience of the authors in the villages in and around the Sadhukonda Reserve Forest, Chittoor District, Andhra Pradesh, India. Having worked for more than a decade to support community initiatives in protection and management of common land and forest resources, there was an emerging need to tackle questions of their carrying capacity and levels of extraction of biomass. A study was undertaken by the authors and their colleagues in 2002 with the support of some members of the community to quantify the above ground phytomass availability and assess the phytodiversity. Simultaneously, the satellite imageries of the forest and nearby common lands were also analyzed to assess the changes in forest cover over the period 1996-2002, with a view to providing this information as input for the discussions of the village institutions.

Background

The Tree-growers' Cooperatives Project (TGCP) was initiated by the National Dairy Development Board (NDDB) in 1986 in three states of India, namely Andhra Pradesh, Karnataka and Gujarat. The project was aimed at replicating the success of the cooperative model in Dairy Development to revegetate degraded wastelands for meeting the fuelwood and fodder needs of the rural communities. With the assistance of the Canadian International Development Agency (CIDA) the pilot

project was scaled up in the Cuddapah, Chittoor and Anantapur districts of Andhra Pradesh. Beginning with the formation of Tree Growers' Cooperative Societies (TGCS) across the Chittoor and Cuddapah districts based on the availability of degraded revenue wastelands with focus on growing plantations, the interventions were gradually consolidated within the boundaries of the catchment of the river Papagni, a tributary to the river Pennar, in the Chittoor and Anantapur districts.

The project began with the objective of organising village level TGCSs and obtaining lease on up to 40 hectares of revenue wastelands for a period of 20 years in favour of the TGCSs. The village communities who were the members of the TGCS would undertake with financial support from the project Soil and Moisture Conservation and revegetation activities in these plots. These efforts, combined with the regeneration potential of the wastelands in the area, led to the communities deriving the benefits of increased fuelwood, fodder and other produce from these plots as well as experiencing improved water availability in and around these plots.

Over the years the project expanded to cover villages dependent on forestlands and those without substantial amount of commons, but which nevertheless were consumers of fuel wood and other produce from the commons indirectly. The project interventions also incorporated a holistic view of the natural resources in the watersheds, growing from the initial 'fuel wood and fodder supply' mode of thinking that led to the initiation of the project in isolated villages in a scattered manner. This growth in the conceptual underpinnings of the interventions resulted in the project working with all the habitations in the catchment of a drainage, covering upstream as well as downstream habitations.

While the TGCSs continued to be formed for the protection and management of revenue wastelands, the developments in the management of forests in the 90s in the form of the Joint Forest Management (JFM) programme provided an opportunity for the village communities to form Vana Samrakshana Samithis (VSS) to manage forestlands. These institutions were recognized by the forest department for the purpose of protecting the allocated forest land plots and undertaking Soil and Moisture conservation, revegetation activities according to the approved micro plans, and for sharing the benefits arising from the regenerating forest.

Habitations protecting different parts of the same wasteland or forest patch depend on each other to ward off common threats such as fire, or illicit cutting of fuel wood. Building on this need across habitations and to strengthen the protection and management initiatives in each habitation, local level federations of village institutions were evolved, based on traditional affiliations among these villages. These federations not only resolve boundary disputes or inter-village conflicts, but also play a proactive role in ensuring adherence of all member villages to commonly agreed-upon protection and management measures. A major focus of their efforts is in prevention of fire in the protected lands and in spreading the awareness in neighbouring villages that may not be protecting and in semi-urban centers which are the major demand centers for biomass and water resources in the region.

The threats to these villages are from many fronts and the village collectives have the confidence of dealing with some of them, such as the influential local landlord, who once used to harvest trees from the forest and common lands at will but later switched to using bamboo from other sources in recognition of the efforts of these communities. This is remarkable considering that the landlord had for decades been the conflict resolution mechanism in those parts, a role that is increasingly being played by the village institutions and their federations.

Context of the study

The Sadhukonda Reserve Forest (lat 13^0 46' 21.87" and 13^0 54' 35.15" N; long 78^0 25' 13.57" and 78^0 32' 13.15" E) in the Madanapalle division of Chittoor district covers an area of 6400 ha approximately and is the most prominent landmark in the vicinity. Sadhukonda is a contiguous hill forest with a high amount of anthropogenic pressure and is degrading at an alarming rate over the years. There are more than 200 habitations in close proximity to this forest and are dependent on it to varying extents for fuel wood, fodder, timber and other forest produce. There have been incidents of fire in this forest almost every summer, which has affected the available vegetative biomass and this risk in future could be detrimental to the entire ecosystem. The Sadhukonda RF in the project area had been selected for the study as the team has already been working with the communities dependent on it for their fodder, fuel wood and other NTFP requirements, since 1991. The Sadhukonda

Reserve Forest has had some portion under Joint Forest Management (JFM) with 8 villages protecting since 1996, and some portion under protection by 17 communities being supported by the project, since 1998-99.

Increase of aboveground phytomass is one of the major visible outcomes of the initiatives of communities in the management of forests and other common lands. Apart from performing ecological functions, including biodiversity, phytomass fulfills the two most important needs of the communities - fodder and fuel wood. From this and other needs arises the incessant pressure of extraction, which if not complemented by conservation efforts could result in decline of the resource. The decline in vegetation in turn results in the destabilization of soil and moisture regimes there. Therefore, while there is a need to assess the extent of aboveground phytomass and the changes in forest cover due to the protection by village communities, it is equally important to quantify the demand for phytomass from the same common property resource. Together these are likely to provide directions for the village institutions and their federations in their efforts to protect and manage the commons around them.

A primary objective of the study therefore was to inform the communities on the quantitative aspects of their biomass dependence. Similarly, a quantification of the losses due to fire in a forest or wasteland would also bring out the finer aspects of it and would hopefully lead to communities taking preventive measures. A large number of communities being already involved in protection against fire, the discussions would only strengthen their resolve. It is in this context that the study was undertaken.

Methodology

The study was undertaken between October 2002 and February 2003. In order to understand the supply-demand pattern of phytomass, we studied the Reserve Forest, Revenue Wastelands, and Private lands. The availability of phytomass was estimated from these three types of resources. The requirement of phytomass was assessed from the household survey using schedules as well as using standard factors and secondary data. The contribution of phytomass from each of these resources was estimated in meeting the biomass requirement of the communities.

Satellite imageries of 1996 and 2002 were analysed for the forest area to establish and assess the improvement in forest cover due to the protection and management initiatives of the village institutions. The field data on biomass availability from sample plots was fed into a GIS database and the total biomass availability for the entire forest was interpolated. The observations from the sample plots also included plant species diversity, indicators of presence of a few prominent fauna of the forest and soil properties at different depths. The parameters calculated and the conversion methods employed are summarised in Table 1 below.

Table 1: Summary of the parameters measured and techniques used to assess phytomass for trees, shrubs and grasses.

S No	***Component of Above ground phytomass***	***Field measurement***	***Phytomass measured by***
1	Trees	Girth at Breast Height, Height	Basal area in regression equation
2	Shrubs	Volume	Species-specific density factor measured in the field separately
3	Grasses	Harvested from sample plot	Dry weight of harvested grass

Summary of findings

- A total of 252 species of trees, shrubs and grasses were found in the Sadhukonda reserve forest during the study.
- The total above ground phytomass in the reserve forest was found to be 5,24,803 MT, or about 80 MT/ha.
- The number of seedlings found in the sample plots were very low. The cause for this has since then been established to be frequent fires in the forest and pressure from grazing.
- The extraction level of tree biomass is 1.73% of the total standing tree biomass of the forest. This is 60% of the Mean Annual Increment (MAI) of the tree biomass in the forest, and is more than the recommendable harvest limit (one-third to half of the MAI). (Ravindranath and Premnath, 1996)
- 75% of the biomass extraction was for fuelwood, which is the principal means of energy in the region. The penetration of Liquified Petroleum Gas (LPG) is low and Kerosene, though available, is still expensive compared to fuelwood.
- The comparison of the forest cover in 1996 and 2002 revealed a tremendous improvement in the forest cover with a 24 % increase in area under dense forest (from 1977 ha to 2449 ha) and 60 % increase in area under open forest (from 742 ha to 1184 ha) out of the total area of about 6400 ha.
- A similar comparison was undertaken for a nearby plot of degraded common land (Yerrakonda) being protected and managed by 11 habitations since 1998, with some portions being protected since 1992. The comparison of

vegetative cover in 1996 and 2002 for the *Yerrakonda* revenue wasteland of 465 ha shows a 36% increase in area under Open forest (from 47 ha to 64 ha) and 67 % increase in area under mixed degraded forest (from 143 ha to 239 ha).

Aiding community decision making

The need for the study, as discussed earlier, arose from the realization that decisions regarding judicious use of natural resources require locale-specific and timely information regarding the resource availability and extraction levels. In the case of this study, while the analysis of remote sensing imageries of 1996 and 2002 suggest that the forests and other common lands were regenerating due to community protection, the comparison of the extraction levels with the amount of standing phytomass puts it in the perspective of extraction being more than a 'sustainable limit'. It also established that fuel wood is the major reason for extraction of phytomass from the forests and wastelands. This information when shared with the federations and village communities prompted discussion on possible measures to reduce the flow of fuel wood from the forests and common lands. There were renewed efforts to enforce village-level rules such as 'collection of dry wood only in head loads for fuel wood' and 'blocking access of carts and tractors to the forest' to prevent the loss of phytomass beyond the acceptable limit of a third to half of the mean annual increment.

As a result of the dicsussion of these findings with the village communities, a federation of 10 villages known as '*Kailashgiri Paryavarna Samiti*' decided to regulate the flow of fuelwood from the fringe villages of Sadhukonda forest by installing a check post near *Kotagadapalle* hamlet which is the main outlet of all fuelwood transactions. This decision took almost four months of intense discussions among the representatives of these 10 habitations. Some of the norms that they have evolved are,

- One person from a designated household would be on watch at the check post for a day. When all the households in the village have discharged the watch duty by turns, then the responsibility of watch would move on to the next village, where the same method would be followed.
- A register is maintained to record the movement of fuelwood along the route.

- If some offence is committed, then the federation would decide on the penalty.
- If a monetary fine is imposed, then amount will be deposited with the *Kailashgiri Paryavarna Samiti*.
- To let everyone know about such initiatives *Dandora* (Announcements in public places accompanied by loud drumming to catch the attention of the people) has been taken up by the forum members in all the hamlets.

Lessons learnt

The central role of the village communities in the protection and management of the common land resources needs to be extended from the village level to looking at the entire landscape. At the village level, the village communities were able to evolve norms to control the extraction from the protected resources based on an intuitive understanding and their traditional knowledge of the impact of such actions on the resource. While this was being effective in preventing fires in forests and other common lands to a great extent, the extent of the problems of extraction of phytomass, water etc. were not apparent.

While formulating the study, the involvement of the communities was envisaged as that of local resource persons, i.e. some members of the communities would be involved in assisting the study team in identifying local plant species and in navigating through the forest. The involvement of the communities in the data analysis stage was not focused upon as the process involved scientific calculations including the use of statistical tools and GIS, which the study team itself was trying out for the first time. While the study was being undertaken, we observed that the villagers with basic literacy skills could carry out the entire exercise of data collection on their own, including the reading of the latitude and longitude coordinates from a handheld Global Positioning System (GPS). They were able to grasp the idea of representative sample plots and suggested a few locations that matched with the study criteria. We realized that with a bit of training from our side, some of the villagers, particularly those with good knowledge of the plant varieties, could easily monitor these parameters on their own. One of the enabling factors for this was the demystification of the entire process, e.g. in case of sophisticated instruments such as GPS, the focus was on its relevance to the task at hand rather than the many capabilities of the instrument, which can overwhelm a new user.

The analysis of the data, partly relying on statistical techniques and partly on remote sensing and GIS, seems a formidable challenge for village communities, particularly in an area with low literacy, low Information and Communication Technology (ICT) penetration etc. The study team did not find it feasible for the entire analysis of data to be undertaken in a participatory manner with involvement of the communities, due to the dependence on these techniques. The analysis was done by the team and the findings were shared with the communities in a number of forums such as village meetings, federation meetings, awareness campaigns etc.

The decision making process regarding judicious use of natural resources among several groups who comprise a user regime is by itself complex and multi-layered, with inter-village dynamics on the one hand and intra-village caste and class equations on the other. With the addition of information such as the potential of the resource and the amount that might be safely extracted, a different dimension is added to this process of community decision making. Typically decision makers draw on traditional knowledge and apply customary rules to arrive at decisions. Where new information from research is additional or contradictory to the existing knowledge base an intermediary process of assimilation of the new information is initiated. While there is a need to study this intermediate process in itself, what is clear is that this process involves a multi-step procedure in which the new information is first translated into intelligible vernacular and couched in community idiom.

Looking beyond the realm of community-based conservation of natural resources, one finds that the field of agricultural extension is an example of a large scale effort in transferring scientific inputs to rural communities. Public extension systems all over the world are being challenged to improve their relevance and effectiveness in contributing to agricultural and rural livelihood sustainability in an environment of increasing economic, social and ecological risk (Beck, U., 1992 quoted in Kroma, M. M., 2003). In this context, there is a widespread search for innovative and effective extension mechanisms. Drawing on some of the experiences from this field, could provide some leads to strengthen our understanding of the challenges and possible solutions for village communities vis-a-vis conservation decision making.

Feder *et al* identify eight generic problems inherent in extension functions including,

1. dependence of extension on the wider policy environment and other agency functions;
2. inability to trace cause and effect;
3. interaction with knowledge generation.

and offer innovations including

1. improving extension management;
2. decentralization;
3. institutional pluralism (mobilizing other players);
4. empowerment and participatory approaches; and
5. interconnecting rural people and the use of appropriate media.

The key to successful bridges across the various information divides appears to be a tailor-made approach, combining different, and locally appropriate means of communication. Some basic principles must be respected for networks and partnerships to function efficiently, include:

- each partner must be interested in them and benefit from them;
- networks or partnerships must be founded on specific goals and a clear vision shared by all members;
- a transparent programme of activities accepted by all, and which specifies the roles of each, must be established;
- relationships between members must be based on mutual respect and trust;
- relationships between national, regional and international scales must be based on the principle of subsidiarity and decentralization of responsibilities and activities;
- operating modes must be easy and flexible;
- information must not circulate according to a top-down (vertical) model, but must circulate in all directions and among all members (Wesseler, G. and Brinkman, W., 2002)

INFERENCES AND EMERGING DIRECTIONS

Drawing from the case study discussed above, the following inferences can be

drawn with regard to challenges to village communities with regard to information for decision making.

- Communities can use scientific information effectively in local governance decisions related to natural resource access and appropriation. The challenge however lies in converting the scientific data into information that is meaningful in the local context, considering that communities are composed of varied user groups, with caste and class differences.
- Provided the required information that captures the status of natural resources and their extraction levels, village communities have been able to negotiate between their livelihood needs and the need to conserve their resource within the limits of its functioning.
- The presence of decision making forums at appropriate levels (in this case, at village as well as the level of a group of villages) seems to be a necessary condition for effectively assimilating the scientific knowledge and translating it into action.
- Given the complexity of certain ecosystem processes, particularly the effect of time lags and feedback loops, scientific knowledge, with its ever improving tools and techniques, is most suited for the observation and understanding of these processes required to inform local decision making processes.
- Considering the low awareness of and general lack of access of rural communities to scientific information regarding ecosystem functioning, there is a need for a partnership that would bridge this gap between the rural communities and scientific community.

Some of the emerging areas that need further probing in this area are,

- At a landscape level, where the stakeholders would be numerous and politically and economically powerful, a meaningful partnership that strengthens the village institutions and their federations with appropriate, timely and location-specific knowledge of the ecosystem processes, can add to the bargaining power of the latter.
- With the growing momentum for decentralising governance in different parts of the world, and particularly in India, there is a need to strengthen institutional processes within which such partnerships for sharing information can be located.

- There is a need to devise innovative ways to take scientific information and analysis to illiterate and marginalised sections of the rural communities so that they are able to participate effectively to safeguard their interests in the decision making processes of the village institutions and federations.

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