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Readers' Forum

I was going through the Community Forestry journal and your write on Community Forestry and I was wondering if I wanted to publish something, whom should I be writing to at RCDC. Can you help me out on this?

Thanks,

B. Mitra, Ph.D

Ed.- Please send your articles at publications@rcdcindia.org with a mention in the subject 'Article for Community Forestry'.

I used to be a regular recipient of your esteemed journal and appreciate its contents. For some time now I have not been receiving the same. I will be glad if it is resumed.

S. Palit, IFS (retd.)

Ed.- Timely publication of 'Community Forestry' has been difficult chiefly due to want of right articles from external sources. This may create sometimes an impression that the publication has been stopped or not sent to the existing list of recipients though the fact is otherwise. While the eagerness of our esteemed readers has been inspiring for us, we are trying not only for the timely publication but also for an improved version of 'Community Forestry', and solicit your kind cooperation & contribution for the same.

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Cover photo: *Regional Centre for Development Cooperation.*

Editorial

The current issue of our quarterly magazine *Community Forestry* is a combined issue for two quarters for the period July to December 2011. This period saw some remarkable developments.

On the one hand the Government of Odisha adopted a revised version of the Joint Forest Management (JFM) resolution to comply with the civil society demands for conformity with the provisions of two important laws of the country that recognized community ownership over local resources. These laws are the Provisions of Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA) and the Scheduled Tribe & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. On the other hand, in a rather unique move, the villagers of Lundrubadi, a small tribal village in Rayagada district, erected a board that declares their rights and ownership over the local forest which they have claimed under the Forest Rights Act.

At the national level the Planning Commission constituted a committee to prepare a strategy for the development of forestry and other natural resources during the Twelfth Five Year Plan. However the discussions of the different subgroups constituted there under recognized several critical gaps including poor government attention, as reflected in the budgetary allocations, to the development of forest sector. It was also pointed out that the much promoted JFM system actually lacks a legal recognition under any law.

RCDC was a part of this process, and we tried our best to suggest necessary changes in the strategy and approaches. This in fact was a continuation of RCDC's support to the Haque Committee constituted by the Ministry of Panchayati Raj to look into the aspects of minimum support price, value addition, and marketing of minor forest produce in Schedule V areas.

RCDC's critical contributions have been particularly reflected in the report of the sub-group on NTFP which can be accessed at http://planningcommission.nic.in/aboutus/committee/wrkgrp12/enf/wg_subntfp.pdf . The Haque Committee report has also acknowledged RCDC's contributions though it is another matter that a number of our suggestions did not find mention in both of these reports. One such suggestion was defining 'ownership' over a common property resource like NTFP/MFP because we believe that the rights meant by ownership over a CPR should be significantly different from those for private property as the former involves a more responsible approach.

However, despite initiatives at various levels the actual achievements have not been satisfactory. The JFM resolution of Odisha is definitely an improved version of the previous one, but it is yet to fully comply with the mandate of PESA and FRA. In practice the Forest Department still appears to be uncomfortable with the provisions of community ownership/management under these two laws. Still it is important to note that this resolution transferred the power enjoyed by the departmental representative in the JFM committee to the concerned villagers, and also recognized the eco-development committees to be at par with JFMCs.

RCDC's endeavour to upscale the community forestry initiatives continues in various forms. For instance, RCDC organized an exclusive workshop in 2010 to orient the community forestry groups for incorporating NTFP management protocols so that their practice does not remain timber-centric only (See page 45). The latest in this direction is to help CFM groups experiment with REDD$^+$ on a pilot basis so as to see the pros and cons. The community based REDD$^+$ pilot project is being implemented in the Balangir district with the support of Community Forestry International.

We envisage that the crisis of generation gaps in CFM can be addressed by adding value to the identity as well as the practice, and our experiment with REDD$^+$ will help learn if this project can contribute to that cause.

Meanwhile we have tried to revitalize *Community Forestry* through a modification of the columns and sections. It may take some time to receive articles fully corresponding to each one of them, but the current ones, we hope, will still be useful.

Bikash Rath
Sr. Programme Manager
Regional Centre for Development Cooperation

Change in Social Capital of a Community under JFM Programmes

Introduction

Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common. They all consist of some aspect of social structure and facilitate certain actions of individuals who are within that structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence. Like physical capital and human capital, social capital is not completely fungible, but is fungible with respect to certain activities. A given form of social capital that is valuable in facilitating certain actions may be useless or even harmful for others. Unlike other forms of capital, social capital inheres the structure of relations between persona and among persons. It is lodged neither in individuals nor in physical implements of production.

This paper evaluates the role of social capital in the functioning of village level institutions. The primary aim is to understand the progress of sample villages towards sustainable management of forest resources, developed through regeneration investment by state forest department under Joint Forest Management (JFM) approach. This study analyses the role of initiatives for reviving community responsibility through JFM approach.

This study was out in Badhwani village of Harda district in Madhya Pradesh. Faced with waning community interest in forest regeneration, some intensive efforts were initiated recently to strengthen community institutions in this district.

Background of JFM in Madhya Pradesh

In 1991, the Government of Madhya Pradesh (GOMP) issued a Government Order (GO) specifying how JFM would be implemented in the state. The 1991 order stipulated that Forest Protection Committees (FPCs) should be constituted in "sensitive areas" that have a forest cover of above 40%, and that the FPCs should get 20% of the net income derived from forest areas so protected. In degraded lands, where the canopy cover is less than 40%, forest regeneration activities should be taken up by forming Village Forest Protection Committees (VFPCs, hereafter referred to as VFCs). VFCs were allocated 30% of the final timber produce, 30% of income obtained from nationalized Non-Timber Forest Products (NTFPs) and unrestricted access to non-nationalized NTFPs. In addition, VFCs were entitled to 100% of revenues from intermediate yields such as from thinning and clearing (SPWD 1992).

In 1995, the GOMP amended many provisions of the 1991 order. The main changes were: FPCs were no more entitled to a percentage of the final timber harvest - only guaranteed access to traditional (*nistar*) rights; the earlier provision guaranteeing 30% of income from nationalized forest products to VFCs now stood revoked; The Forest Department's Working Plans were replaced with a 10-year micro-plan developed in consultation with the villages; all FPCs/VFCs are to be constituted in villages or clusters of villages located within 5 km of the forest boundary; and provisions have been made to engage Gram Panchayats (local governing institutions), women and the landless in the JFM process (GOMP 1995). Although the 1995 amendment clarifies and further develops several components of JFM, the revocation of financial and other benefits significantly narrows down the scope of the program.

Status of JFM in Harda Division

An intensive programme of reforestation was carried out in the Harda division under the JFM approach over the last ten years. As a mandatory provision, a FPC was formed in the village before taking up any forestry activities. Prior to the formation of FPCs, village level meetings were conducted to explain the concept and implications of JFM for motivating the villagers. The level of sincerity with which villagers were sensitized and made aware of their responsibilities varied considerably according to the ability and dedication of the concerned staff. The pace of reforestation activities in the area had declined considerably about two years after the closure of an ex-

ternally aided project, through which most of the reforestation activities in this division had been supported. In Harda division, there are six ranges consisting of 89 FPCs and 61 VFCs (*Table-1).*

Badhwani is 10kms.from Rehatgaon range, which comes under Harda division Badhwani and under Hoshangabad circle. The Van Suraksha Samiti (FPC) in the village was formed on 25th March 1991.

motivate community members and improve their capacity for collective action and thereby strengthen their social capital. In a given society, culture, conventions, the institutional arrangements and the attributes of

Table-1: Range wise no. of FPCs and VFCs in Harda Division, Madhya Pradesh

Range	FPCs	VFCs -	Forest Area (htrs.)	Avg. forest area per Committee (Htrs.)	Forest Area (Sq.km.)
Rehatgaon	13	02	16,500	1269	269.00
Temagaon	15	-	15,355	1023	117.40
Borpani	17	01	21,000	1235	151.00
Magarda	11	10	21,000	1909	182.00
Makdai (Shirali)	28	48	18,000	671	179.50
Khandiya	05	61	13,000	250	169.00
Total	**89**	**122**	**1,05,655**	**6357**	**1067.9**

Village: Badhwani

The village is about 10kms from Rehatgaon Borpani road. Inhabited almost entirely by the Korku tribes, the major occupation of the village is agriculture & wage labour the secondary option.

General information

Some of the immediately relevant information on the village is available in Table-2.

Table-2: Badhwani in a nutshell

Population	588
Total no. of households	102
Forest Type	Reserved forest
Area under the FPCs	1447.065 hec.
Literacy	10 %

The strength of collective regulation in Badhwani village also declined considerably in the absence of follow up after the closure of the programme. Badhwani is a village panchayat. The villages under Badhwani panchayat are Khumi, Kheljari & Badhwani.

Badhwani became the first village to initiate JFM in the region. The total number of executive committee members in this samiti is 11 (8 male, 3 female). Executive committee meetings are held once every month (between the 10th and 12th of every month). The General Body (Aam Sabha) meets once every three months. There is a provision for emergency meetings. Personal assistance is offered by F.G. to the villagers to meet their emergency needs of the villagers.

Irrigation facilities

Table-3 presents the status of the source of irrigation accessible for the village:

Table-3: Irrigation potential in Badhwani

Mode of irrigation	No	Irrigated area	Increase in annual income
Stop dams	03	18,000 hec.	1,35,234/-
Jeewan dhara wells	03 (proposed19)	27,000 hec.	1,19,078/-

Efforts for fostering social capital

At this stage, it was considered desirable that intensive efforts are made to

people's behaviour in terms of work ethics, orientation towards group action and collective concern and sharing systems, motivation profile, reward/incentive preferences, etc. affect the output of the efforts for social capital formation (Jodha, 1994). Most of these attributes are not easily amenable to change in a short period. Therefore, the best approach could be to create facilitating circumstances and greater communication for social interaction and learning (Jodha, 1994). This helps in developing systems of co-operation by people and each successful collaboration builds connections and trust or in other words social capital (Putnam, 1993). Considering this, the efforts for fostering greater social capital were targeted at sensitizing community members about the rationale and benefits of collective action so that all or

most of the people not only understand the value of collective regulations but also abide by them in their own self-interest. Emphasis was placed on developing effective systems of enforcement of community regulations and on achieving self-sustainability and self-reliance. Awareness was raised about technical activities and such other measures that are periodically necessary to improve forest productivity and about the role of voluntary efforts in supporting the regeneration process. Besides, special emphasis was placed on encouraging participation of women. Periodic meetings were held, generally quarterly, to cover all these relevant issues.

Reasons for the lack of participation

The reasons for the lack of participation of villagers in the JFM programme in Badhwani village can be summarized from primary source based on empirical study.

1) Lack of Information

Villagers knew very little about the provisions of the JFM programme and their own roles and responsibilities in it. In addition, there was a lack of clarity about the applicability and gains of JFM, which often led to a lack of interest among the villagers.

2) Attitude of FD Staff

FD staff generally consider the involvement of villagers a mere formality. Special efforts are rarely made to understand the people's point of view and to seek their participation. For most FD staff, the participation of villagers is desirable only as a less risky and more effective mechanism of persuading or coaxing intruders into stopping resource extraction from nearby forests. A major agenda during meetings of the Beat and Range level FPC Coordination Committees set up by the MP FD highlights the increase in villagers' participation for this purpose. Said a Range Officer "We would really like to increase villagers' participation by 90 so that forest related offences can be lessened". In addition, inadequate training and orientation of lower level FD staff have left them ignorant about the ways and means of facilitating villagers' participation.

3) Villagers' views are not worth considering(?)

Frequently FD staff feel that it is a waste of time trying to understand the views of the villagers on issues such as natural resource management because village folk, they believe, do not have any knowledge that would be of value.

4) Lack of wages

FD has failed to take into account the loss of wages that the people, especially those from the lower income groups who are the sole bread earners of the family, have to suffer to attend JFM meetings and has failed to compensate for the loss.

5) Family responsibilities

Due to family and other chores, people find it extremely difficult to find time to attend meetings, which are often organized at times and venues inconvenient for them. It has been found that villagers shoulder the lion's share of family responsibility, like collecting food and fodder from the forests.

6) Social and cultural restrictions

Hemanta Bag[a] , and Purnajyoti Brahma[b] In the Korku community, women are not allowed to sit on the same platform with men. They are not expected to speak in front of men either. In general, unmarried women, mothers of two or three children and elderly ladies can express their opinions more readily than young married women who are inhibited in speaking out because it goes against the prevailing norms of social behavior.

7) Lack of confidence

It is not as if there are no villagers who realize the benefits of JFM, are aware of their roles and responsibilities and want to participate actively. However, they often find themselves in a minority and are inhibited in raising issues concerning them out of fear of being ridiculed or ignored.

8) Lack of security

There is no provision to ensure security for villagers taking active part in conservation activities.

9) Very few direct benefits

The direct benefits that would accrue to the people is seldom discussed in FPC meetings. The focus is generally on timber and not on fuel wood and fodder, both of which are crucial to villagers. In addition, the committees look down upon fuel wood collectors and often prohibit such activities

in the Protected Areas. No alternatives are made for villagers who depend on fuel wood. As a result, villagers are not very enthusiastic about conservation activities.

Conclusion

The above-mentioned reasons for lack of participation of villagers in the JFM programme can be avoided to a fair extent if a simple and low-cost technology based training programme is initiated in some of the forest areas under JFM regulations, where villagers' participation can be ensured by following some of the said strategies. The hurdles mentioned earlier - lack of security, lack of confidence, social and cultural restrictions etc - stand in the way of people's participation in JFM programmes. Massive efforts have been undertaken by the FD and other major institutes to impart different kinds of trainings based on Non Timber Forest Produces (NTFP), namely, Sabai grass (*Eulaliopsis binata*), Sisal (*Agave sisalana.*), Sal leaf (*Shorea robusta*), Bamboo (*Bambusa tulda*) Atari (*Combretum decandrum*), various plant parts, mushroom, honey etc in order to enhance the economic standard of the tribal forest-fringe people of this region.

Motivation and sensitization of people in this village are to be taken up with the objective of making sure that villagers are not only trained but acquire the necessary expertise in producing excellent export quality products of Sabai, Sisal and Bamboo such as bags of good designs. This entrepreneurial quality has a direct bearing on the changing role of villagers in the JFM administration. Villagers will naturally find themselves in a socially firm and economically secure position, which will not only give them more incentive to work, but also enhance their standing both in household and in forest- related matters. The role of collectors of NTFPs, who feed hungry mouths at home, in forest related affairs cannot be ignored. The belief that they have a say in forest issues as well as in Samiti meetings will give them a new spirit of self-reliance and self-respect – attributes which have been in short supply for a long time. Villagers have to be given special responsibilities to protect their own forest timber from intruders of other FPCs. Besides, they also have to be entrusted with the responsibility of collection of Sal leaves, mushroom and medicinal plants from forests to meet the needs of their families. .

Men in this remote, rural area also have to realize the crucial role of women and give them a say in meetings on forest issues. Women in this region can no longer be ignored or overlooked by their male counterparts. Sometimes, it so happens that the male members become quite dependent on the womenfolk because of the steady flow of income that they are able to bring into their respective households through sale of forest based products. In any case, men can hardly compete with women as far as knowledge and experience of forests are concerned, because the latter have traditionally been the protectors of forests from intrusion as well as collectors of food and fodder for feeding family members and their cattle. In the long run, therefore, forest officials cannot ignore the rights of women in forest affairs.

Forest Department functionaries like Range Officers and the Beat Officers should be trained to be more aware of the usages and utilities of different kinds of NTFPs for the livelihood generation of forest–fringe people. These officers, once very skeptical about the role of villagers in NTFP management and preservation of the eco–environment, have now realized the significant role played by villagers in forest–related matters.

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Climate Change in the Present World

Introduction

Climate change is the greatest environmental challenge facing civilization today. If emissions are not curbed, their negative consequences on life on earth will be profound. Natural ecosystems around the earth, both marine and terrestrial, as well as human communities will be irreparably harmed. The increase in global temperatures is expected to result in other changes, including rise in the sea level and drastic changes in the amount and pattern of precipitation (any form of fresh sky water). These changes, in turn, may increase the frequency and intensity of extreme weather events such as floods, droughts, heat waves, hurricanes and tornadoes. It may cause higher or lower agricultural yields, glacier retreat, reduced summer stream flows and large scale species extinction. Together, these occurrences could render 150 million people environmental refugees by 2050 with billions more at risk of starvation and disease. There is overwhelming evidence to show that climate change presents a growing threat to public health security - from extreme weather-related disasters to the wider spread of such vector-borne diseases as malaria and dengue. The impact of climate change on human health will not be evenly distributed around the world. The Third Assessment Report (Inter-governmental Panel on Climate Change-2001) concluded that vulnerability to climate change is a function of exposure, sensitivity, and adaptive capacity. People in developing countries - particularly in small island states, arid and high mountain zones and densely populated coastal areas - are considered particularly vulnerable.

India is a large developing country, with the Great Himalayas, the world's third largest ice mass in its north and a 7500-km long and densely populated coastline in the south and east. Nearly 700 million of the country's over one billion population living in rural areas directly depend on climate-sensitive sectors (agriculture, forests and fisheries) and natural resources (such as water, biodiversity, mangroves, coastal zones, grasslands) for their subsistence and livelihood. With drastic temperature changes, India may become more vulnerable to heat waves, floods (land and coastal) and draughts in the days to come. Incidences of major public health problems like malaria, malnutrition and diarrhea may increase because of this sudden change. Any further increase, as projected in weather-related disasters and related health effects, may cripple the already inadequate public health infrastructure in the country. Hence, there is an urgent need to respond to the situation. Response options to protect human health from the effects of climate change include both mitigation and adaptation. Both can complement each other and together can significantly reduce the risks of climate change.

Climate change factors

The temperature of the earth as a whole is determined by the incoming shortwave radiation and the outgoing long wave radiation at night. Climate change arises from changes to the earth's heat balance. Both natural and anthropogenic factors can influence changes in the climate. Extraterrestrial factors like variations in the sun's activity and slow changes in the earth's orbit and the tilt of its axis also contribute to climate change. The main influence within the earth is volcanism and the slow drift of continents. Mountain building also affects climate, but it occurs only over millions of year and hence can be considered constant over time scales of decades to centuries. The natural influences of climate change have caused changes in the earth's climate over hundreds of thousands of years, though on a smaller scale. Exchange of heat and gases between the earth's atmosphere and its oceans and land vegetation are also natural influences on the climate system, but these processes are now being affected by human activities to various degrees. The atmosphere contains green house gases that are transparent for the earth's shortwave radiation but absorb 30% of the earth's long wave radiation causing the average temperature of the earth to be 33°C warmer than it would have been if there were no atmospheric blanket. The impacts from such anthropogenic processes, through the enhanced greenhouse gases effect, are

likely to cause contemporary climate change which, in turn, could bring about considerable environmental, social and economic disruption. Greenhouse gases are accumulating in the Earth's atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise. The ever increasing level of greenhouse gases in the atmosphere is by far the most important among the factors causing contemporary climate change. The mid-range model estimate of human induced global warming by the Intergovernmental Panel on Climate Change (IPCC) is based on the premise that the growth rate of climate forcing agents such as carbon dioxide will accelerate. The primary source, fossil fuel burning, has released twice as much carbon dioxide as would be required to account for the observed increase. Tropical deforestation has also contributed to the increased amount of carbon dioxide in the last few decades. Like carbon dioxide, methane is also more abundant in the earth's atmosphere now than at any time in history. The increase in the level of methane is mainly due to human activities such as rice growing, raising of cattle, coal mining, use of land-fills and natural gas handling, all of which have increased over the past 50 years. A small fraction of ozone produced by natural processes in the stratosphere also mixes with the lower atmosphere. This tropospheric ozone has been created locally by the action of sunlight upon air polluted by exhausts from motor vehicles, emissions from fossil fuel burning power plants, and biomass burning. Nitrous oxide, one of the other greenhouse gases, is formed by the microbial activities in soil and water because of the increasing amount of chemical fertilizers being used by humans these days. One of the biggest contributors of nitrous oxide in the atmosphere is the airline industry and military jet planes. Atmospheric concentrations of CFCs have also increased steadily following their first synthesis in 1928 and reached its peak during the 1990s. Nowadays, hydrofluorocarbons are replacing CFCs. They also have greenhouse effect, but it is less pronounced because of their shorter atmospheric lifetime. Besides green house gases, human activity also contributes to the atmospheric burden of aerosols, including both sulphate particles and soot (black carbon). Sulphate particles scatter solar radiation back to the space, thereby reducing the green house effect to some extent. Black carbon aerosols are the end products of incomplete combustion of fossil fuels and biomass burning (forest fires and land clearing). They impact, directly or indirectly, the radiation budget although it is difficult to quantify their contribution to global warming at this point.

Impacts of climate change

Little is known about the vulnerability of climate change in the environment. Scientists from around the world in the Intergovernmental Panel of Climate Change (IPCC) mentioned that during the past 100 years, the world's surface temperature has increased by 0.6°C. Even a 1°C change can affect the earth. Climate change has affected agricultural yield directly through changes in temperature and rainfall and indirectly through changes in soil quality, pests, and diseases. It has made the monsoon unpredictable, affecting the production of rain fed crops like cereals in the process. The crop yield per hectare has been hit badly, causing food insecurity and loss of livelihood. Over the past 100 yrs, glaciers in all areas of the world have decreased in size, Greenland ice sheet is also melting faster. Due to the melting of the glacier ice and the expansion of warmer sea water, the sea level rose by about 15 cm during the 20th century. It is expected to increase to about 59 cm during the 21st century, thereby posing a serious threat to coastal communities, wetlands and the coral reefs.

The IPCC report also predicts huge coastal erosion due to the rise in sea level caused by the fast melting of the glaciers in Himalayan ranges in India. It can also cause death of thousands of people and lead to an increase in the salinity level of the groundwater in the Sundarbans and surface water in coastal areas. The warming of the shallow sea water and oceans has contributed to the death of a quarter of the world's coral reefs in the last few decades. The deaths were basically due to weakening by bleaching, a process tied to warm waters. Also carbon dioxide dissolving into the sea has made the water more acidic, thereby causing an impact on the coral reefs and other marine life forms. The increased temperature in lakes and wetlands has led to an increase in the amount of algal blooms, invasive species and stratification in lakes and lower lake levels. Warmer temperature has caused flooding in some areas and at the same time has caused a higher rate of evaporation and drought in some other areas of the world. Animals that are particularly vulnerable include the endangered species, coral reefs and polar animals. Warming of the temperature has also changed the

timing of the seasons and the length of the growing season. It is likely that heat wave is striking in some parts of the world. There have also been reports of heat waves affecting human health, causing deaths and also more allergy attacks as pollens seasons have grown longer. The Third Assessment report of the IPCC, quoting recent modeling studies, concluded that forest ecosystem could be seriously affected by future climate change. Even a slight increase in the amount of temperature of 1-2° C can create an impact in the ecosystem and landscape through changes in species composition, productivity and biodiversity. These have implications for the local habitants who depend on forest resources for their livelihood.

Mitigation measures

Many ecosystems have their own natural mitigation process, such as carbon sequestration and storage. They store carbon in woods, leaves, soil, water, roots and sediment. Soils are the largest terrestrial sink for carbon on the planet. The amount of carbon stored in soil organic matter is influenced by the addition of carbon from dead plant material and carbon losses from respiration, the decomposition process and both natural and human disturbance of soil. Appropriate management of this carbon sink is necessary to maintain this ecosystem service. Fast growing forests absorb through photosynthesis and store carbon in the form of wood and other vegetation and soil carbon. Young fast growing trees hold carbon more rapidly than the older trees. Though the older trees fail to absorb carbon, they can hold carbon in the form of biomass over long periods of time.

Use of fossil fuels is the single biggest human contribution to atmospheric carbon. Tropical deforestation accounts for 20 percent of global CO_2 emissions. Forests sequester carbon through their natural processes and hence management of forest should be at the top of the agenda to reduce carbon emissions. Replanting trees on lands that have been deforested or degraded or overgrazed is one of the initiatives that could be implemented. With the idea of encouraging growth of forests to sequester carbon having gained increasing acceptance in recent times, strategies like thinning and increasing the length of the rotation to minimize the risk of forest fires have been incorporated into the overall forest management process.

Biochar process is being initiated especially in the European countries. This practice not only helps in trapping carbon in the soil, but also absorbs carbon from the atmosphere. Biochar basically deals with the burning of organic matter under the soil through pyrolysis process (burning in absence of oxygen). One of the ways in which carbon can be mitigated is by switching to low carbon technologies. Use of renewable sources of energy, energy that doesn't put a strain on the carrying capacity of the earth, is another option. Hydro, wind, solar and geothermal energies are storehouses of energy which, if drawn in a sustainable manner, would power the earth for a long time. Like alternatives sources of energy, energy efficiency has not got the attention it deserves in India. Our average electronic equipment draws more power than they should. A lot of technological research is required in this field. Nowadays, a whole lot of equipment are available in the market that work on individual energy input like crank start mobile phone chargers, torches and even laptop chargers. India must allocate more funds in this sector because if we keep using our resources in the present manner, we would risk the lives of our future generations.

Conclusion and discussion

Both national and international measures are required to combat the increasing threat from the global carbon problem. Climate change is one of the most serious questions in recent times that need immediate answers. It has to be solved at a global level with all countries participating and working together on possible solutions, especially the world's biggest emitters of green house gases like the developed countries. Combating climate change has become the top most priority for Europe. Europe is working hard to cut down on emissions of greenhouse gases substantially while encouraging other nations to do likewise. Reining in climate change carries lots of costs but allowing the present situation to unfold itself will be far more expensive in the long run. All these actions should be carried out within a sustainable and equitable development framework. The IPCC concluded that most of the warming in the last 50 years has been due to the increase in the concentration of green house gases. The majority of the scientific community is of the view that humanity has contributed the most to long term climate change. Policies to reduce carbon using natural ecosystems to sequester carbon can be accompanied by artificial technological solutions to reduce emissions and trapping of carbon from the atmosphere. Development of these green technologies to cut emissions will create job opportunities and boost the

national economy. Since the primary outcome of climate change is the overall cooling of the earth, many innovative scientists have developed technologies like the ones mentioned above that have a cooling effect on the earth. Such technologies, however, are in their infancy and need greater support from the international scientific and political community for wider acceptance. Scientific evidence shows that the world needs to limit global warming to no more than 2°C to prevent the most severe climate change. To stay within this limit, we have to stop the emission of greenhouse gases by 2020, at least half these gases by the middle of this century and continue cutting them down thereafter. Although renewable energy is becoming quite popular, a lot of research and funding has to be invested in it before it becomes a viable, alternative source of energy. As individuals, we too have to be aware about environmental degradation and do whatever is possible on our part at the local, regional and global level.

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Editorial comment

Recent studies and experiences have questioned the predictions of IPCC because the realities have been found to be quite different in a number of cases. For instance, the rate of melting of Himalayan glaciers has been found to be slower than predicted/expected. While it is a relief to know that the real dynamics of climate change impacts may not be so drastic in the near future, that however in no way lessens our responsibilities for necessary mitigation & adaptation measures; rather it suggests as if this is our last chance to take care of nature & the environment, and if we still fail then the results can be really drastic even in the near future.

Villagers' forest and village forest

The 1996 version of the JFM resolution in Odisha was considered to be much progressive in the sense that it provided for declaration of patches of Reserve forest as 'village forest' in lieu of the protection & management of such patches by the village communities. That could have brought a revolution despite its limitations (vide section 28 of the Indian Forest Act, 1927). However, this version was never implemented and the 1993 version continued to prevail for a long time. In December 2010 RCDC had drawn attention of the then Principal Secretary of Forest & Environment Department, Odisha to such deviations, and it is interesting that the draft version of the 2011 resolution spoke about this with a clarification that " it could not be implemented due to its contravention of the provisions of the Forest Conservation Act 1980" (the final resolution however excluded this statement, for dubious reasons).

Recently, the report of the Planning Commission's Working Group on Forest and Natural Resource Management for the 12th 5-year Plan made a statement that "village forests are those reserve forests which are assigned to village communities for management" (section 7.2). It concluded further that there are only two types of notified forests under the Indian Forest Act, 1927: Reserve Forest and Protected Forest. While it remains silent about the actual implementation of Section 28 of the Indian Forest Act, 1927 and doesn't take into account the provision of Odisha Forest Act, 1972 what is more remarkable here is that it did not say that giving patches of RF to village communities for management would contravene the Forest Conservation Act, 1980.

Village forests(VF) existed as a separate category during the British period in the princely states. However, the 1954 amendment in Indian Forest Act, 1927 totally ignored this. Patches specified/ delineated as 'forest' within the revenue boundary of villages were then normally regarded as 'village forest'. Alternatively 'Village forest' was also considered to be corresponding to Undemarcated Protected Forest. The Odisha Forest Act, 1972 (vide section 30) went a step ahead from IFA, 1927 and instead of confining 'village forest' to only RF, said that it can be any land under the disposal of the government. The Village Forests Rules, 1985 was then formulated under it for the management of such notified 'village forests'. But, it has been observed that the spirit of the Rule has probably been corrupted (see for ex., http://www.orissadiary.com/ShowOriyaColumn.asp?id=10655). It is high time that such ambiguities be reviewed thoroughly particularly in view of PESA, Forest Rights Act, and the Biological Diversity Act; and steps be taken to develop a provision that takes care of both the rights of village communities and the conservation of forests.

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Comments on Draft Eco-Tourism Guideline by MoEF

On 2nd June 2011, the Ministry of Environment and Forest(MoEF), Government of India released a draft guideline on eco tourism and invited comments from the public on the same. We offer our views and comments on the guideline, which describes itself as the first ever guideline on eco tourism, and suggest some amendments that would benefit forest dwelling communities and relocated forest dwellers.

CODE	THEME	DRAFT GUIDELINE (selected texts)	COMMENTS
Foreword	About eco tourism	Ecotourism is tourism that is compatible with these fragile landscapes, providing enhanced livelihoods to local communities	Need to arrive at a better definition of ecotourism which is wider, acceptable worldwide and contains various aspects of ecotourism. Should give more emphasis on preservation of the existing ecology.
Foreword	Need for the guideline	These Guidelines have been long overdue and are part of the key recommendation of the Tiger Task Force Report (2005) as well as the 2006 amendment to the Wildlife (protection) Act (1972).	It appears as if the Government has no serious intention of bringing out a guideline but is simply giving in to the recommendations of Tiger Task Force(2005) and to the 2006 amendment to the Wildlife(Protection) Act(1972). Shows lack of seriousness.
Preamble	Potential of eco tourism and conservation	Ecotourism has the potential to enhance wilderness protection and wildlife conservation, while providing nature-compatible livelihoods and greater incomes for a large number of people living around natural ecosystems. This can help to contribute directly to the protection of wildlife or forest areas, while making the local community stakeholders and owners in the process.	The desired effect of ecotourism is yet to be seen and the connection between ecotourism, conservation and livelihoods has not been established yet. Ecotourism can generate funds for conservation but it is doubtful whether it will be good in conserving the ecosystem and the existing environment. Moreover, the bureaucratic nature of the forest department would make it difficult for FD staff to accept the ownership of local communities in the process.
Preamble	Design of framework	This document lays out a detailed set of framework guidelines on the selection, planning, development, implementation and monitoring of ecotourism in India.	The document does not draw a detailed framework of conservation and protection of wildlife through eco tourism. Rather, it is aiming at the planning and implementation process.
Sections : 1.1	Definition of eco tourism	Ecotourism is defined as 'responsible travel to natural areas that conserves the environment and	The definition of ecotourism is just a reproduction from International Ecotourism Society (IES) whose com-

		improves the well-being of local people'. Such tourism is low impact, educational, and conserves the environment while directly benefiting the economic development of local communities.	ponents are very limited. As per the Odisha forest department definition, the word "well being" is replaced with "welfare" which brings out a different sense. We urge the MoEF to use a more meaningful definition as adopted by IUCN which is as follows: *Environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features - both past and present) that promotes conservation, has low visitor impact, and provides for beneficially active socioeconomic involvement of local population.*
1.3	Scope for conservation and education	Ecotourism, when practiced correctly, is an important economic and educational activity. It has the scope to be linked to a wider constituency and build conservation support while raising awareness about the worth and fragility of such ecosystems in the public at large.	Here it doesn't seem much compatible with the 2nd line written in preamble: *Ecotourism has the potential to enhance wilderness protection and wildlife conservation, while providing nature-compatible livelihoods and greater incomes for a large number of people living around natural ecosystems.*
1.4	Misuse of ecotourism facilities	In recent years, the mushrooming of tourist facilities around Protected Areas has led to the exploitation, disturbance and misuse of fragile ecosystems. It has also led to misuse of the term 'ecotourism', often to the detriment of the ecosystem, and towards further alienation of local people and communities.	At least MoEF has acknowledged the truth.
1.5	Applicability of the said guideline to any Protected Area.	These directives and guidelines for ecotourism are applicable to all Protected Areas, whether rural or urban, including National Parks, Wildlife Sanctuaries, community reserves, conservation reserves, sacred groves, or pilgrimage spots located within Protected Areas and forested areas.	Amendments to the Wildlife Protection Act in 2003 has given a recognition and legal backing to community initiated wildlife protection, thereby providing a flexible system to achieve wildlife conservation without compromising community needs. 20% of forest areas of Odisha, with a variety of wildlife, are being protected and managed through self initiated forest protection initiatives by 12, 000 village communities. If community initiated wildlife protection is called 'community Reserve', then why is community initiated forest protection and management not getting its due recognition?

2.1.2	Prescription for ecologically sensitive land	The state-level ecotourism strategy must be in tune with the framework of guidelines provided here. Ecologically sensitive land use policies should be prescribed for the landscape surrounding Protected Areas. Adequate provisions must be made to ensure that ecotourism does not get relegated to purely high-end, exclusive tourism, leaving out local communities. Relevant modifications in State rules and regulations must be carried out in order to ensure adherence to these standards by tourist developers and operators.	How does one define Ecologically sensitive land? Is there a universally acceptable definition? What is Ecologically sensitive land use policy? What type of land (forest, revenue) could be incorporated under this category? More clarification is required in this regard.
2.1.3.	Tourist facility	No new tourist facilities are to be set up on forest lands. This is in compliance with the Wildlife (Protection) Act, 1972, and the directives of the Honourable Supreme Court.	What is called a tourist facility? Is it providing the facilities i.e. lodge, recreation or interpretation centre, lawns, swimming pools? If these facilities continue, where does that leave community based tourism? The guideline says no new tourist facilities will be set up on forest land and as per the section 2.2.7, permanent residential facilities will be shifted to revenue land. But it is not clear what distance will be maintained while shifting?
2.1.4.	Use of resources	The State Government must develop a system by which gate receipts from Protected Areas should be collected by the Protected Area management, and not go as revenue to the State Exchequer. This will ensure that resources generated from tourism can be earmarked for protection, conservation and local livelihood development.	What will be the percentage of money invested in community development work and for other requirements? Without clarity on this score, it will simply not work.
2.1.9.	Conversion of revenue land to forest land	Financial assistance/ incentives should be provided for communities/individuals who own revenue land outside Protected Areas and want to convert such land to forest. The value of such land for wildlife will be enhanced, even as it improves the income of the landowner from ecotourism.	The ministry has either not done the necessary ground work or has not applied its mind in the matter. A simple question that arises is: will the owner of such revenue land agree to convert his/her valuable land into forestland and then manage ecotourism business there? If the said revenue land is owned by a forest dweller or has been received after conversion from forest land under the Forest Conservation Act, 1980

			through individual claim or through re-settlement under Forest Rights Act 2006, then what will be happen to such land? Will the forest dweller continue to be the owner of the forest land? There are a host of related questions: is the ministry preparing to buy or acquire the land through legal process? Will it be counted or regarded as private forest land? How many acres/hectares of land will be converted from revenue land to forest land? How much of land the ministry actually wants for eco tourism activity? Conversion of forest land must not be encouraged. It will not provide real benefits to forest dwellers relocated from the Protected Area. MoEF should have a rethink on the matter. This should be avoided. We seriously doubt the efficacy of the buy-back proposal of revenue land by the Govt since people generally tend to acquire land than surrender it for the welfare of the forest. If the landowner is given the right to start his/her own business from the same land for ecotourism, then would it not further burden the already disturbed ecosystem?
2.1.11.	Composition of Local Advisory Committee	Composition of LAC:· • District Collector (Chairman)· • PA Manager (Member Secretary)· Local Territorial DFO· • Honorary Wildlife Warden (if present)· • Official of State Tourism Department· • Block Development Officer (1)· • Members of Local Panchayats (2)· • Wildlife scientist (1)· • Local conservationists (2)· • Representative from Civil Society Institution (1)· • In case of North Eastern States, the traditional village councils	As per, Section 5 of Chapter 3, Forest Rights Act 2006, The holder of any forest right, Gram Sabha and village institutions in areas where there are holders of any forest right under this Act, are empowered to –(a) Protect the wildlife, forest and biodiversity;(b) Ensure that adjoining catchment areas, water sources and other ecologically sensitive areas are adequately protected;(c) Ensure that the habitat of forest dwelling scheduled tribes and other traditional forest dwellers is preserved from any form of destructive practices affecting their cultural and natural heritage;(d) Ensure that the decision taken in the Gram Sabha to regulate access to community forest re-

		should be recognized as equivalent to Panchayat Members, wherever such councils exist.· • For Tiger Reserves, the Tiger Conservation Foundation should be the overseeing authority and should include members that are not represented in the Tiger Conservation Foundation.· • The Detailed Terms of Reference of individual Local Advisory Committee will be determined at the State level.	sources and stop any activity which adversely affects the wild animals, forest and the biodiversity are complied with.These guidelines should follow the provisions of the Forest Rights Act and include the local forest right committee in the local advisory committee. If the Honorary Wild life Warden is not present in the committee, then who will take his/her place or represent him/her? Is there any provision for appointing an honorary wildlife warden for the concerned Protected Area? And who will choose the Panchayat member? What will be the post of such member in the Panchayat? These questions need to be answered by the guideline.
2.2.1 (V)	Participatory Strategy	Develop a participatory community-based tourism strategy, in collaboration with local communities, to ensure long-term benefit-sharing and promotion of activities run by the local community.	The MoEF should come out more clearly on the definition of participatory community based tourism strategy, its composition, functions, regulatory mechanism and how it is going to address the vital concerns regarding ecotourism policy.
2.2.2.	Compensation	In case of human-animal conflicts, compensation should be paid within a period of 15 days apart from immediate payment of ex gratia. In case of North Eastern States, the traditional village councils should be recognized and made responsible for this purpose, wherever such councils exist.	Specify who will pay and who all will benefit from the compensation package in case of any such conflict? It is not clear if ecotourism will continue regardless of whether incidents of man-animal conflict become more frequent. Or whether they will be stopped forthwith?
2.2.5.	Core area & ecotourism	Any core area in a Tiger Reserve from which relocation has been carried out, will not be used for tourism activities. Forest dwellers who have been relocated will be given priority in terms of livelihood generation activities related to ecotourism in the Protected Area from which they have been relocated. Protected Area Management will make a special effort in this regard.	On the positive side, the draft guideline is following the Forest Rights Act, 2006. The flip side is how are the tourist Guides/ people expected to know that it is the closest to the core area /CWH/CTH where relocation was carried out, when human settlement and human activity cause irreversible damage and threaten the existence of the species and their habitat? Are wildlife there in the area only to get disturbed? Has the forest and environment department prepared a plan to relocate tribals from core area/ CTH/CWH and to resettle them in the

			nearby area of the Protected Area for appointment in the eco tourism project? If no, then the current relocation process must be stopped. A plan must first be prepared to resettle the relocated people in the nearby area of the Protected Area.
2.2.6.	Eco-friendly construction	Tourism infrastructure must conform to environment-friendly, low-impact architecture, including solar energy, waste recycling,, rainwater harvesting, natural cross ventilation, reduced use of asbestos, controlled sewage disposal, and merging with the surrounding habitat	In 2.2.6, it says "reduced use of asbestos", but goes on to talk about "no use of asbestos" in 2.3.1. The stand must be clarified.
2.2.7.	Shifting of residential facilities	In a phased manner (within five years), permanent residential facilities located inside the core-critical tiger habitat/critical wildlife habitat, which are being used for wildlife tourism, should be moved to revenue land outside.	It is encouraging to know that the MoEF would take the effort of relocating the tourist facilities from CTH/CWH but one wishes to see the same courtesy extended to other ecologically sensitive areas like National Parks, Biosphere Reserves, Ramsar sites/Wetlands, Wildlife Sanctuaries
2.2.8.	Environmental norms	Protected Area authorities must ensurethat all facilities within a 5km radius of core/critical wildlife habitats/PAs/ reserves must adhere to all environmental clearances, noise pollution norms, and are non-polluting, blending in with surroundings. Severe penalties must be imposed for non-compliance	According to Point 9 of Wildlife Conservation Strategy, 2002 "Lands falling within 10 km of the boundaries of National Parks and Sanctuaries should be notified as eco-fragile zones under section 3(v) of the Environment (protection) Act and Rule 5 Sub-rule 5 (viii) & (x) of the Environment (Protection) Rules. "Therefore, this guideline must stick to the 10 kms rule instead of 5km.
2.2.10.	Caring capacity and control mechanism	In case of the number of visitors/ vehicles exceeding the carrying capacity, establish an advance booking system to control tourist and vehicular inflow. Rules of booking must be transparent, and vehicles must strictly maintain a distance of 15 m from one another when stationary. Violators must be penalized, since congestion and overcrowding disturbs wild animals.	As per 1.4 of the guideline 'In recent years, the mushrooming of tourist facilities around Protected Areas has led to the exploitation, disturbance and misuse of fragile ecosystems. It has also led to misuse of the term 'ecotourism', often to the detriment of the ecosystem, and towards further alienation of local people and communities.' And as per 1.2 of the guideline 'However, unplanned tourism in such landscapes can destroy the very environment that attracts such tourism in the first place.' Considering the above

			two points, it seems that MoEF is trying to repeat its mistakes by promoting ecotourism without ensuring adequate safeguarding measures so far the practice is concerned.
2.2.13	Local representation	In case of Tiger Reserves, ecotourism should be under the oversight of the respective Tiger Conservation Foundations for each tiger reserve, to enable Eco Development Committees/Village Forest Committees/ forest cooperatives to strengthen the institutional framework through a Memorandum of Understanding.	Representation of Panchayati Raj Institution should be added to the list, not only to strengthen the participatory process but also to conform to PESA and FRA.
2.3.3.	Noise pollution	All tourism facilities located within five kms. of a Protected Area must adhere to noise pollution rules under 'The Noise Pollution (Regulation and Control) Rules', 2000, and 'The Noise Pollution (Regulation and Control) (Amendment)Rules', 2010 issued by the Ministry of Environment and Forests.	According to the Wildlife Conservation Strategy, 2002 "Lands falling within 10km of the boundaries of National Parks and Sanctuaries should be notified as eco-fragile zones under section 3 (v) of the Environment (protection) Act and Rule 5 Sub-rule 5(viii) & (x) of the Environment (Protection) Rules.". Therefore, this guideline must stick to the 10 kms rule.
2.5.2.	Loan facility	Soft loans may be provided for Community Credit Programmes/ Special Trust Funds/ Special Central Assistance/ Developmental Schemes of Tribal Department/District level Integrated Developmental Programme/ Tiger Conservation Foundation, to pre-identified local-community/beneficiaries for promoting ecotourism.	What will be the process/method used to identify the community/beneficiaries? Is there any difference between community and beneficiary? It needs to be clarified.

References

1. *Wildlife Conservation Strategy 2002, web link: http://envfor.nic.in/pt/str2002.html*
2. *The Gazette of India, Forest Right Act 2006, web link: http://tribal.nic.in/writereaddata/mainlinkfile/File1033.pdf*

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Sweet are the Fruits of Toil

Introduction

The importance of forests is realized most when there are no forests or forest produces. Deogarh, a predominantly agricultural-dependent district, is a case in point. The rapid degradation of forests has had a disastrous effect on the forest dependent communities in terms of their lives and livelihoods. Soil fertility and moisture retention capacity of paddy fields dwindled alarmingly, significantly reducing the productivity of the soil. With their innate knowledge of the natural system, the poor and forest dependent people were quick to realize the importance of forests. With support from the farming community, they formed village level forest protection committees which took upon themselves the task of forest protection, conservation and management.

Process

From 2008, three villages of Khilei[1] GP and two villages of Nuadihi[2] GP have undertaken Community Based Sustainable Forest Management activities with the facilitation of Regional Centre for Development Cooperation. The villages in general and the institutions in particular have undergone several capacity building exercises to learn and implement forest protection and conservation methodologies. The villagers have shared and recorded their traditional knowledge of and good practices in forest protection and conservation. Both male and female members of the communities introduced rules and regulations pertaining to forest protection, conservation and management. Some of the rules are as follows:

- No green felling is allowed. There is a total ban on axes in the forest. For fuel wood needs, the village depends on dry twigs. Hunting of wildlife is also banned.
- Each family participates in Thengapali[3] activities on a rational basis and contributes Rs 5/- as Chulichanda[4].
- Grazing inside the forest is prohibited and "Gotha[5]" concept introduced to check free and indiscriminate grazing.
- Forest fire is totally controlled and no one is allowed to take matches with him/her when entering the forest.

[1] Siarimalia, Chakradharpur, Lualoi are the villages under Khilei GP

[2] Podadihi and Malarbahal are the villages under Nuadihi GP

[3] Thengapali: a process of forest protection by the villagers holding a club made with bamboo on rotational basis.

[4] Chulichanda: a small contribution collected at the village level as a mark of participation in forest conservation process

[5] Cattle confined to a particular place for necessary control.

- Gram Panchayat and the nearby villages are informed regarding the watch and ward.
- Proper boundary of the forest area under protection has been delineated. A rough sketch map has been prepared and trespassing has been made an offence. Fines and proscriptions are imposed on the offenders.
- Forest issues are identified on sample patches and specific activities taken up to eliminate and rectify them.
- People celebrate Van Mahotsav and Rakshya Bandhan in the protected forest.

Approach

Initially, the approach was to enhance forest dependency and to reduce the pressure on forest. When the people depended on agriculture for a livelihood, forest was a neglected area. However, it got as much priority as land once the people got sensitised and their forest dependency increased. .

Community based sustainable forest management is a practice which encourages the community to use the forest without harming its carrying capacity. For this purpose, the community has introduced a community biodiversity register to record the developments/changes occurring in the forest on a continuous basis. Efforts are taken to restore endangered and extinct species. There is greater focus on women as women are more linked to the forest than men.

People's knowledge and skill with regard to flora and fauna management is the basis of SFM. Decentralised forest governance and enhancing dependency on forests is central to forest based livelihoods, besides strengthening the protection and management regime of the forests.

Major advantages

Forests ensure unity among communities and democratic decision making keeps away conflicts. It empowers the women and the poorest of the poor to participate and share the benefits. The communities have applied for Individual Forest Rights and Community Forest Rights under the Forest Rights Act 2006. 54 claimants have got their individual titles whereas claims for CFR tiles in case of five villages are pending in DLC till date. These villages and the Forest rights holders have been included in various government sponsored development and livelihood programmes and schemes. Forest department has organized consultations to enhance the capacity of the communities.

Mushroom-a nutritional diet

This year, all the five villages have ripened the fruits of their toil in the form of mushrooms. People have prepared leaf composts near the mother patches during SFM activities like pest control, biodiversity assessment and forest inventory, including regeneration. For the last three years, these forests under Gagua Reserve Forest, Rambhadevi Reserve Forests and Chakradharpur and Lualoi revenue forests have not seen a single incident of forest fire. In July this year, the five villages collected about 15-20 kg of mushrooms, which was sold at Rs 60/- and Rs70/- a kg after household consumption. As per a rough calculation made by Ganapati Pradhan of Siarimalia, about 145 households benefited directly whereas 325 households benefited indirectly as they consumed mushroom for a period of 15 to 20 days. Decrease in rainfall recently has reduced its blooming. But it can be expected to gather momentum after the rainfall.

Learning & replication

The initiative taken by these five villages is an example for others to emulate. It is evident that nature has its support system for man; but indiscriminate exploitation of resources has a lasting negative impact which harms the lives and livelihoods of the forest and forest fringe villages. Other forest dependent communities can certainly replicate the example in their forest. ✧

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Gender in Community Forestry: Cases of Role Reversal in Odisha

Introduction

The history of forest conservation initiatives by communities in Odisha is fairly long. The State has the unique distinction of having a large number of local self-initiated forest protection committees. This community based forest management arrangement, popularly referred to as *Community Forest Management* (CFM), is based on the collective efforts of local communities. The structure of individual forest protection initiatives, however, varies widely in origin, institution, management rules and regulations that are context and situation specific. These forest governance systems initiated by local communities have inevitably been pitted against the well entrenched forces responsible for forest degradation and livelihood deprivation. The local communities have faced many challenges while trying to alter the power dynamics surrounding the issue of conservation, but have managed to come out with solutions that have proved incredibly successful.

Existing literature suggests that women play a central role in the conservation, management and use of forests and biodiversity, the Earth's rich animal and plant resources, on which all life forms depend. Their contribution, however, is often overlooked. From the grassroots to the policy level, they are the "invisible" partners. Despite such indifference, women have related themselves differently to the forest, partly because of their social position. Women from some villages collect fuel wood while others gather *sal* leaves and other non-timber forest products. Apart from mobilizing local savings in their groups, the women discuss problems of the village, plant trees in the village and on the outskirts of the forests, clean and maintain village spaces, tend to backyard plantations and still have the time and energy to run small businesses together such as making snacks. Some of the groups look after herb gardens that they have raised. Several groups challenge local elites such as male landowners while others have resisted oppression by the police when trying to protect forests. In several instances, they have made sure that the community got the social services it was entitled to. By advocating community rights, they have held government officials such as block development officer (BDO) accountable to the community. Through their work in the village and in the forests, the women have contributed significantly to a more enabling environment for the management of forests.

According to these women, issues of village management were inseparable from the issue of the forests. To be able to work with the forests, the committees and the federation needed to deal with the concerns of the women in relation to forests and also with other village activities. How these activities affected forest management - and how forest management affected them- had to be recognized, since the women had little interest in complying with forest rules and regulations that did not take into account their lived realities.

To shed more light on the role of women in forest conservation, a study was conducted on the community-based forest governance systems in nine villages of three districts of Odisha. This study was conducted in three densely forested districts-namely *Keonjhar, Nayagarh,* and *Deogarh* - of *Odisha*. Nine villages with self-initiated forest protection groups were selected for the study. The names of the sample villages are as follows: *Guptaganga, Gunduriposi, Rangamatia*, and *Krushnapur* villages in *Kenojhar* district. *Gundurabadi* and *Dengajhari* villages in *Nayagarh district and Brahmanimal*, *Budhabahal*, and *Khajuribahal* villages of *Deogarh* district. These sample villages were selected randomly with the help of local organizations and institutions. Information pertaining to the topic was collected through common meetings and focus group interviews.

The author originally wrote this article when he was with VASUNDHARA in the capacity of a Programme Officer. He therefore acknowledges that the information furnished herein belongs to VASUNDHARA. –Ed.

The State of Odisha

Odisha, located on the eastern coast of the Indian sub-continent, is endowed with rich natural resources. The geographical area of the State is 1, 55,400 km^2 (4.74% of India's landmass) and the population 36.71 million (2001 Census). There are 62 Scheduled Tribes and 95 Scheduled Castes in the State. The State has the privilege of having the highest number (13) of Primitive Tribal Groups (PTGs). STs and SCs together constitute 38.66% of the total population of the State (ST: 22.13% and SC 16.53% as per 2001 census). While the recorded forest area constitutes about 37.34% of the total geographical area of the State, actual forest cover exists over only 31% of the geographical area. Out of this, 13% are open degraded forests. The State has a recorded forest area of about 58,136.23 km^2. Forests have been classified variously as Reserve Forests, Demarcated Protected Forest, Un-demarcated Protected Forest, Unclassified Forest, Village Forest, *Khesra* Forest and others[6].

Status of forest before the initiation of protection

Forests in all the nine sample villages had degraded considerably as these were cleared indiscriminately either for the expansion of agriculture or to establish new village settlements. Illegal tree felling and timber smuggling was rife and timber mafias, abetted by the timber contractors, were very active in all the three districts. All these factors had spelt doom for forest. In addition, unregulated hunting and poaching had pushed wildlife towards extinction in all the sample villages. After the large scale forest destruction, it had become difficult for the locals to collect even fuel wood and small timber for subsistence. The availability of forest products had decreased considerably, jeopardizing local livelihoods in the process.

Village institution for collective forest protection

Forest protection in all the nine sample villages was initiated in response to forest degradation which affected not just their livelihoods, but their very survival. The decrease in forest cover had led to severe scarcity of forest products vital for their survival. Though the first forest conservation effort dates back to the early 1970s in a couple of sample villages and the 1980s in the rest, constitution of formal institutions to oversee forest protection issues is a recent phenomenon. Local forest protection governing bodies have been constituted in the sample villages only in the last 2-5 years. All the sample villages now have a general body and an executive committee to enact and enforce forest protection rules and regulations. Exceptionally, a couple of sample villages (*Dengajhari* and *Budhabahal)* have two executive committees. However, the reasons for the constitution of two executive committees are different in these two villages. In *Dengajhari*, one committee has been constituted under the traditional forest governance system by the villagers while the other has been constituted by the forest department to implement its Joint Forest Management (JFM) project. The reason for two executive committees in *Budhabahal*, is that an all-women executive body has been constituted specifically to tackle the timber mafia. The timber mafias (usually men) do not attack women for cultural reasons and hence, this arrangement has proved to be very effective while dealing with them.

All the members (at least 02 adults) of every household are members of the general body in all the sample villages. It was observed that while membership of the general body is usually free, a nominal annual fee as cash or material is collected in 03 sample villages. This fund is utilized for activities of the forest protection committee. There is a variation in the composition of the executive committee from village to village. The number of members in the committee varies from the lowest of two in *Dengajhari,* to the highest of 27 in *Gundurabadi*. Most executive committees in the sample villages, however, have 07 to 17 members.

The responsibility of the executive committee is to protect the forest, ensure everybody's participation in forest patrolling on a rotation basis through *"Thengapali"* and resolve conflicts related to the forest as well as to the village.

The frequency of general body meetings also varies from village to village. Except *Gundurabadi, Dengajhari, Brahmanimal, and Khajuribahal,* general body meetings are convened once every month in five sample villages. The general body assembles once and twice a year at *Dengajhari* and *Gundurabadi* respectively, while it assembles once every three months at *Brahmanimal, and Khajuribahal.* The

[6] The latest assessments mention the population of the state to be 41.95 million and the forest cover to be 31.41% as per satellite survey(Source: State of Forest Report 2011). - Ed.

entire village participates in these general body meetings to discuss issues related to the village and the forest. The executive committee assembles fortnightly in all the sample villages. Besides regular meetings, emergency meetings of both the general body and the executive committee are convened whenever the situation so warrants.

The rules and regulations of forest protection are framed collectively in the general assembly. These rules are framed keeping in view local conditions and situations. The rules and regulations thus framed are approved by the executive committee and resolutions passed after a collective decision. While the decision making is collective, the execution power is vested with the executive committee. In all the sample villages, it was found, the general body not only elects the executive committee, but also evaluates its performance. Another practice that was found across all the nine sample villages was that the executive committee is dissolved and a new executive committee elected if the general body is dissatisfied with the performance of the existing executive committee..

Role of women in forest protection

It is evident that women are not a part of the traditional village governance system. But their role in the natural resource governance system has been phenomenal! Women seem to have assumed a crucial status in the management of natural resources in all the nine sample villages. A most remarkable and historic events took place in *Dengajhari* when *Smt Budhei Bewa*, an old widow, with the support of other women, challenged the might of 200 illegal loggers, successfully foiled their efforts and recovered the illegally felled timber. When forest protection efforts came to a stand-still following a dispute among the men, women took over forest patrolling and protection responsibility at *Gundurabadi* and *Dengajhari*. Women are actively involved in forest protection activities in all these villages.

Interestingly, executive committees in at least three of the sample villages (*Gundurabadi, Dengajhari,* and *Budhabahal)* consist exclusively of women. Executive committees in all these three villages have women as the chairperson and secretary. More remarkably, even the decision making power is vested in women. The number of women in the executive committees in the rest of the sample villages is either 03 or 04.

Women in all the sample villages actively participate in forest patrolling and management duties. They usually share forest patrolling duties by the day while men share the duties at night. Villagers of *Rangamatia* said they had realized the importance of involving women in the entire process. "Unless women are educated and sensitized, nothing is going to be fruitful. Women play a major role in our society when it comes to livelihood which includes collection, processing and sale of MFPs. Hence, their active participation and involvement should be ensured in forest protection efforts", they say.

Conclusion

One can observe from the example of these villages how local communities can experiment and find their own indigenous and ingenious solutions to problems facing them. In this context, the locals, especially women, have successfully turned their weaknesses into their strengths disproving long held conventional social beliefs. This study also provides an opportunity to observe the differences between self-initiated community-based conservation initiatives and government promoted conservation projects. The major difference between government led development projects and community-based conservation initiatives (CBCIs) is that the latter provide greater freedom and flexibility to the local communities to experiment and design their own rules and find their own solutions to problems, unlike government promoted projects like Joint Forest Management (JFM) with their rigid institutional framework and nonchalant bureaucratic environment which rarely provide such an opportunity. The oversimplified framework of government promoted projects such as JFM would not provide the space to incorporate or include such locally designed conflict resolution arrangements. Moreover, government officers would either ignore the conflicts and problems of the local communities or not care to take measures effective enough to resolve conflicts over resources permanently. Even when they do take such measures, they invariably remain palliative.

It is amazing how these incredible women gallantly took upon themselves the onerous task of forest conservation and protection when both the government supported forest department and local men failed to protect the forests from the timber mafia and illegal felling. These women are truly amazing and their efforts are remarkable! They stand tall as the

sentinels of nature and their forest. There is no doubt that they have inscribed an indelible saga in the history of community-based conservation movement. Unfortunately, though, there still is no legal recognition of their efforts and support for these incredible initiatives of the locals. More research studies on the ecological composition of forest should be carried out, especially in the two women-led institutions to substantiate the long standing belief that women are far better than men when it comes to natural resource conservation.

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Carbon Trade: A Case Study on Low-carbon Community Economy

There is now universal consensus that global warming has taken place over the last decade and it is directly attributable to human activities. The impacts of global warming include rise in average sea level, decrease in snow cover and ice glaciers, as well as extreme weather conditions, including long dry spells and unpredictable heavy rainfall. These changes result in drop in agricultural yield; decrease in NTFP production, increased possibility of floods and droughts, adverse effect on human health and huge loss of bio-diversity.

Despite the fast pace of these changes, it is still possible to prevent the worst consequences of climate change while both developed and developing countries continue expanding their energy supplies to meet their ever increasing needs. However, the decisions made in the next five to ten years will have a great bearing on the kind of technology, systems, infrastructure and resource exploitation methods that will be needed to ensure that global green house gases (GHGs) would peak and start to decline within ten years.

While global mitigation strategies are still being debated and discussed in various workshops, consultations, meetings, etc, there are clear signs that Indian industry sector has accepted the global trend towards a low carbon economy, be it for genuine concerns for environment or to simply benefit from the carbon credits. Some of the Indian companies are acquiring climate friendly technologies under CDM and adopting processes and practices that would bring down the dependence on fossil fuels. The steady GDP growth rate of over 8% has been accompanied by a less than 4% growth in energy consumption.

This paper outlines the proactive role being played by the community, with support from the government, in adopting technologies and practices that will help the community and the country to effectively meet the great challenge posed by global warming.

Small village: Powerguda

Powerguda is located in Jainoor mandal[7] of Adilabad district of Andhra Pradesh; which is about 30 km from Utnoor town. It is spread over an 423 hectare area, out of which watershed covers 222 hectares and forests cover 201 hectares. The hamlet is located at 78°52' to 78°35' E and 19°22' to 19°25' N. The average annual rainfall of the village is 1,100 mm; the maximum temperature is 47°C (usually in May) and the minimum temperature is 9°C (usually in December). A lot of rainwater runs off the slope since most of the lands are undulating. The main crops grown are cotton, sorghum, mung bean and pigeon pea during the rainy season and sorghum and chickpea during the post rainy season.

According to the villagers, about 5.5% of their income comes from non-timber forest products (NTFP) collected from the adjacent forest. The rest-about 94% - comes from agriculture with some people working in their own farms and others employed outside the village.

According to the local administration, 32 families (or a total of 148 people) lived in Powerguda, most of them in poverty, in June 2000. Four families owned no agricultural land while 92% of the local residents were illiterate. There was a high level of water logging, soil erosion and run off, leading to low agricultural productivity.

Carbon credit through Pongamia oil

The Integrated Tribal Development Agency (ITDA) helped the women of Powerguda to form Self Help Groups (SHGs) and provided them training on organizing meetings, managing funds, analyzing income and expenditure, resolving conflicts, etc. This helped them build their self-confidence. Taking into consideration the needs of the people and the potential of oilseed, ITDA established an oil extracting machine in Powerguda village to help the community increase its income. The cost of the machine is around 3, 75,000. The mill has the capacity to crush 50 kg of oilseed per hour.

[7] A Mandal is a small district administrative unit

Pongamia Oil-a promising source of Bio-diesel

Pongamia oil is a non-edible oil extracted from the seed of Pongamia pinnata, commonly known as Karanja. It is a hardy tree of 12-15-metre height native to the Asian sub continent with branches spread into a hemispherical crown of dense green leaves. It grows all over India, from the coastline to the hilly slopes. Pongamia pinnata is one of the few nitrogen fixing trees (NFTs) to produce seeds containing 30-40% oil.

The people of the village have been collecting Pongamia seed from the adjacent forest. The villagers say there was plenty of Pongamia seed available near the village till five years ago. But after its commercial exploitation started, the quantity of the Pongamia seed has declined perceptibly. Presently, the Durgabai SHG purchases Pongamia seed from primary collectors at the rate of Rs. 8 to 10 per kg. Previously, it sold for Rs. 4 to 5 a kg. They now crush the seed of Pongamia in the machine and extract oil from it. Around three kg of Pongamia seed can produce one litre of Pongamia oil. They sell the Pongamia oil in the market @ Rs. 50. The oil is used for generating the electricity and to run power pumps. This oil mill has become an important source of income for the villagers.

Instead of selling the oil in the market, they have also made oil cakes from Pongamia oil and used it in agriculture as organic fertilizers instead of chemical fertilizers. Says Mankubai, Secretary of Durgabai SHG, Powerguda; "I experimented with the use of Pongamia oil cake instead of chemical fertilizers and found to my pleasant surprise a substantial increase in my cotton and sorghum crops. Now, other farmers too are slowly switching over to Pongamia based fertilizers and have become organic farmers by default".

The use of the nutrient rich oil cake enhanced soil fertility, nutrient availability and yield of crops like maize and soybean. The farmer thus has enough incentive to purchase a proven nutrient rich oil cake from women's self help groups at the rate of Rs. 5 per kg. The women too are able to generate income from selling oil cake.

Within just three years, Powerguda became an environmental pioneer by selling the equivalent of 147 tonnes of carbon dioxide. As a return, the World Bank paid US$ 645 to Powerguda women's self-help groups. The CO_2 emission reduction comes from the substitution of 51 tonnes of diesel by Pongamia oil over 10 years. 500 PPM, a carbon trading firm, verified the emission reduction on behalf of the World Bank.

According to K. Subadrabai, who received a check for $645 for the carbon sale on behalf of her women's organization, the money was used for a Pongamia nursery. "The village hopes to plant 10,000 Pongamia plants in 2004 alongside roads, watershed areas and on the edges of agricultural land." The villagers of Powerguda planted 4,500 saplings in 2002, and 500,000 were distributed in the Adilabad District.

Based on the progress of the SHG and availability of resources, International Crop Research Institute for the Semi Arid Tropic (ICRISAT) calculated the total yield of carbon and its value up to 2012. *(Refer to Table 1: Carbon calculations for Powerguda village.)*

Table 1: Carbon calculations for Powerguda village

Year	Total oil yield (kg)	C (t)	CO_2 (t)	Value (US $)
2003	410	0.3198	1.1737	6.7158
2004	494	0.38532	1.414124	8.09172
2005	590	0.4602	1.688934	9.6642
2006	1125	0.8775	3.220425	18.4275
2007	3600	2.808	10.30536	58.968
2008	5400	4.212	15.45804	88.452
2009	7200	5.616	20.61072	117.936
2010	9000	7.202	26.43134	151.242
2011	10800	8.424	30.91608	176.904
2012	12600	9.828	36.06876	206.388

Source: Global theme on Agro-ecosystems, Report No-11

Note

- Carbon emission reduction from fuel switch (from petroleum/ diesel to Pongamia oil) is 78%.
- Carbon value is calculated at US$21 per ton of carbon, or US$5.722 per ton of CO2 equivalent.

Efforts recognized

In 2003, Powerguda received two important awards. The first award was

given to Subadra Bai, president of the Durgabai SHG by the Andhra Pradesh Chief Minister in recognition of her leadership. She received a silver plate and a check for Rs 10,000.

The second was an international certificate for environmental leadership given by a German environmental group, on the occasion of Powerguda selling carbon credits equivalent to 147 tons of carbon dioxide to the World Bank. The certificate was signed by the Director of the World Bank's Agriculture and Rural Development Department.

Further Initiatives: Pongamia Plantation

The community decided to invest the Rs. 30, 000 received from the World Bank in a *Pongamia* nursery with a capacity of 20,000 saplings. 10,000 saplings were planted on community land and the rest sold to nearby villages and to the forest department. The survival rate of the saplings is around 85 percent. The income generated by selling the saplings was ploughed back into further investment in the nursery. With the introduction of a forest protection committee (Vana Samrakshana Samithi) in the village, forest department has also become a potential buyer of saplings. The local nursery thus remains a very viable business proposition.

Cost Benefit Analysis for Pongamia

Cost of Pongamia cultivation on one hect.	
Spacing	: 5 metre X 5 metre
No.of saplings	: 400 saplings per hectare
Wage	: 80 rupees per personday

The expenditure on Pongamia cultivation per hectare in the first year is around Rs. 11,110 (Eleven thousands one hundred ten only), in the second year Rs. 1, 848 (eighteen hundred forty eight only), and just Rs. 1320 (one thousand three hundred and twenty only) in the third and fourth year. The total expenditure on cultivation of Pongamia per hectare is around Rs. 15, 598 (fifteen thousand five hundred ninety eight only). From the fifth year onwards, the seed will be ready for harvest.

From the 5th year onwards, the seed will be ready for harvest. The expenditure incurred on maintenance and harvest of the seed averages just one rupee per kg.

*Around three kgs of Pongamia can produce one litre of oil.

Table 2 and Table 3 indicate that Pongamia is one of the most suitable species for production of Bio fuel.

Sl.no	Particular of works	Unit	Expenditure (Rs)				Total
			1st year	2nd year	3rd year	4th year	
1.	Land preparation	40 person days	3200	-	-	-	3200
2.	Digging of 400 Pits (45 cm3) and refilling of pits with Farmyard Manure (FYM) and soil	20 person days	1600	-	-	-	1600
3.	Cost of FYM	Rs. 500 per ton	500	-	-	-	
4.	Cost of chemical fertilizers (NPK). @ 100 gm per plant	Rs. 10 per kg	400	400	400	400	1600
5.	Cost of sapling 400 for first year (the survival rate is around 80%)	Rupees 5 per sapling	2000				2000
6.	Cost of sapling 80 for second year	"		400			400
7.	Cost of planting (80 plants per person days)	5 person days	400				400
8.	Cost of replanting (second year)	1 man days		80			80
9.	Weeding, fertilizers application	55 man days for all four year	2000	800	800	800	4400
10.	Total		10100	1680	1200	1200	14180
11.	Contingencies @ 10%		1010	168	120	120	1418
12.	**Grand Total**		**11110**	**1848**	**1320**	**1320**	**15598**

Table 2: Yield and income per hectare @Rs. 8.00 per Kg of seed

Year	Seed per tree (kg)	No. of trees	Quantity of seeds	Income	Net income from seeds
5	3	400	1200	7200	6,000
6	3.5	400	1400	9800	8,400
7	4	400	1600	12600	11,000
8	5	400	2000	16000	14,000
9	6	400	2400	19200	16,800
10	8	400	3200	25600	22,400
15	20	400	8000	64000	56,000

Table 3: Oil production and income per hectare @ 50 rupees per litre

Year	Quantity of seeds	Oil produced (in litre)	Income
5	1200	400	20, 000
6	1400	467	23,350
7	1600	533	26,650
8	2000	666	33,300
9	2400	800	40,000
10	3200	1066	53,300
15	8000	2666	1,33,300

Pongamia seed and oil are not only an effective way to improve the livelihood of the local community and increase the income of the community, but also a means to earn payments for environmental services as a form of bio fuel. In addition to this, the oil is used as fuel for cooking, lighting lamps, as medicine for the treatment of rheumatism. The leaves of Pongamia and the pressed cake have been traditionally used for improving soil fertility while dried leaves have been used as an insect repellent in stored grains, etc.

Conclusion

Powerguda had identified oil processing as a key growth area. The experience of Powerguda village has opened up a new vista not only in terms of increased livelihood opportunities through carbon trade, but also in terms of opportunities to increase soil fertility through oil cakes. Further, illiterate women have developed the mechanism for reduction of carbon dioxide.

On the other hand, there are frequent hike in the prices of fossil fuel and uncertainty in its supply in the international market. To minimize the import of crude oil, control global warming and climate change, improve the livelihood of the local community, and be self-dependent in generating electricity, *Pongamia* biofuels offer a good alternative because the source plants are available in the forest itself where their *in situ* conservation and propagation is possible without diverting agricultural land for a biofuel crop, and since Pongamia has been a part of the NTFP tradition, linking it with climate readiness and carbon financing is definitely a significant value addition. Pongamia biofuel is renewable and eco friendly, and unlike the controversial jatropha it has multiple benefits that can be further diversified and developed through research & development.

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Role of NTFP in the PVTG Livelihood

Odisha is one of the major states of the country in terms of the size as well as the diversity of the tribal population. More than 22% of the state's population is tribal. There are as many as 62 scheduled tribes, among which 13 (actually 12) are listed as Primitive Tribal Groups, later known as Particularly Vulnerable Tribal Groups (PVTGs). However, the list is not exhaustive as some vulnerable groups like the Paharias of Sunabeda sanctuary have failed to get the special status despite their extreme vulnerability.

Tribal communities become vulnerable in the following ways:

1. Natural: These include anthropological /genetic factors (like, the Juangs of Keonjhar), geographical factors (remoteness of the area, difficult terrain/physiographic, limited resources, etc.), and environmental factors (like rain shadow area, low soil fertility, etc.).
2. Man-made: These factors include socio-economic and socio-cultural practices (like food habits), customary taboos, external interventions such as mining & industrialization etc..

If the Bondas of Malkangiri have been known for killing each other for nothing more important than the ownership over the Salap trees or the tribals throughout the state are yet to milk their cows, then it can't simply be attributed to lack of awareness/education or innocence. Tribal way of life has many complexities and one has to carefully consider all the related factors while planning for their development. For instance, mere allocation of plain land may not be enough to lure the tribals away from shifting cultivation, which is not always a matter of helplessness arising out of the scarcity of productive land. It is their preferred mode of cultivation because certain crops, mostly millets, grow better in hilly terrain. Any attempt to stop the practice must, therefore, take this into consideration and secure their favourable hill crops.

For the Choktia-Bhunjia community of Sunabeda sanctuary ban on NTFP collection means a lot.

Forest has played a critical role in tribal livelihood and so have NTFPs. Interestingly, there have been differential choices among the PVTGs in making NTFP a source of their livelihood. For instance, the Mankidias deal in only the siali fibre and its products; and ignore the siali leaves used for plate making. They have expertise in making ropes and flexible baskets from siali fibre. The basket, because of its flexible nature, has a good demand, particularly in traditional oil extraction, involving manual pressing, from mahua seed. Similarly, the ropes made of siali fibre have also been in good demand, not only in the local market but also in neighbouring state(s) like West Bengal. In contrast, the Hill Khadias do not practice plate making, but are experts in collection of forest arrowroot, gum, and honey. However, with changing times and interventions of the government as well as the non-government sector, some PVTG groups have started adopting non-traditional practices too. For instance, Gram Swaraj, an NGO

This Paudi Bhuyan woman collects minor remnants of the harvest of lac by the owner of the tree. A day's collection in the season might fetch her one or two kg rice.

of Mayurbhanj, reports of the Khadias adopting siali leaf plate making in some villages.

Dwindling resource base, legal restrictions, changing market scenario and poor market access are some of the factors that are gradually forcing the PVTGs for a shift in their livelihood strategy. Moreover, the development interventions made for them and the consequent urge among these people to join the mainstream have also caused a shift in their livelihood approaches. The Government of Odisha has recently announced a special programme for the PVTGs. But unless the approach is a holistic one and adheres to some basic principles like conserving their ecological/resource base and helping them adopt some really sustainable practices, such interventions may not yield much despite their big budgets. If the government continues to have double standards like promoting lac cultivation in the Khandadhar area (this place in the Sundargarh district corresponds to the habitat of the Paudi Bhuyan PVTGs who have traditional skills in lac cultivation) and allowing mining in the same area at the cost of the special agro-climatic condition that has been suitable for the cultivation of lac, then the PVTG development projects may well become an eyewash, good on paper but useless on the ground.

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Participation of Women in Andhra's JFM System: The Differential Dynamics

1. Introduction

Though the Joint Forest Management (JFM) programme is widely spread across India, its overall performance has been rather modest with the exception of some successful pockets in West Bengal, Gujarat, Madhya Pradesh and Andhra Pradesh. One of the primary reasons for such poor performance of JFM[8] areas is the quality of implementation at the functional level. Failure to create a participatory environment, lack of autonomy for the Joint Forest Management Committee (JFMC) in day-to-day operations, lack of transparency and accountability of local Forest Department officials and inadequate focus on maximizing returns to local communities have combined to ensure that JFM never really took off.

Apart from the ones mentioned above, inadequate participation of women stakeholders has been a major factor in undermining the overall performance of JFM. The issue of gender in JFM has been debated widely ever since the programme was introduced in India (Sarin, 2001: Agarwal, 2001). As expected in a male dominated society like India, despite growing recognition of women's dominance over men in terms of use and management of natural resources, their contribution is still undervalued (The Hindu, 2004; WHO, 2000) as evidenced by the perpetuation of gender-blind policies and programmes. This is probably due to the prevailing misconception that women's roles, although very significant, are limited to the domestic sphere, dealing mainly with (unpaid) domestic work (general childcare and household work such as cleaning, food preparation, fetching water or firewood) while men do (paid) productive work (general income-earning work, agricultural and commercial activities).

In India, women's dependence on natural resources for survival is total. They collect fuel wood for cooking, fodder for cattle and roots, tubers, herbs and fruits for consumption. Moreover, collection and sale of bamboo, gum, tamarind, honey, leaves, spices, etc., provide an important source of income for the family. A study done by Uma Rani (1999) observed that women are losing up to 80% of their income due to degradation of forests. Women contribute 70% of total labour in gathering, processing, storing, utilizing and marketing forest products. A research study by Paudel (1999) concluded that women have greater knowledge than men about the multifaceted usefulness of wild plants and forest products and perceive their usefulness differently. Men gather plants primarily for use in agriculture (fodder and mulch) while women use the plants more for household purposes (medicines, cleansers, fibre, food and tools) (Flickenger, 2003).

The fact that women tend to be more involved than their male counterparts in collection of firewood, fodder and other NTFPs is proof that women are very closely associated with the forests. Rural women have considerable knowledge about the characteristics, distribution and site requirements of indigenous trees, shrubs and herbs. They play a leading role in maintaining populations of valuable wild plant species, as they know the diverse and multiple uses of plants. Women's traditional knowledge of the uses of plants for food, fuel, health and crafts can play an important role in the conservation of different species and varieties according to their usefulness to the community.

[8] The Andhra Pradesh Forest Department however calls this as CFM or Community Forest Management though CFM in its true spirit puts the stake and tenurial rights of the local indigenous community as the first and foremost factor that guides the forest protection, conservation, and management practices and approaches, unlike in JFM.-Ed.

It is obvious from the above how important it is to ensure participation of women in projects like JFM. Realizing this, a brief study was conducted on the enrolment and participation of women in the implementation of the JFM programme in two important forest divisions of Visakhapatnam Forest Circle of Andhra Pradesh, India.

2. Methodology

Eighteen Joint Forest Management villages spread across four forest ranges of two forest divisions - Narsipatnam and Paderu - of Visakhapatnam forest circle were selected for the purposes of the study. Of these, nine are from Narsipatnam Forest Division and nine others belong to Paderu Forest Division. The study was carried out from June 2006 to May 2008. Primary information pertaining to the involvement and participation of women was collected through general and focus group (especially women) discussion meetings and the minutes and proceedings of the general body meetings.

2a. Brief on the study area

The study area is an integral part of the Eastern Ghats systems and lies between 170 12' and 180 27' North latitudes and 810 55' and 830 09' East longitudes which comprises of Narsipatnam and Paderu divisions belonging to Visakhapatnam Revenue District of Andhra Pradesh. 18 study sites were selected for the present study, which are described separately.

2b. Brief on the study sites

The study area comprises two forest divisions Narsipatnam and Paderu divisions of the Visakhapatnam Forest Circle (VFC). The VFC covers the Srikakulam, Vizianagaram, and Visakhapatnam revenue districts of north coastal Andhra Pradesh. The forests of this region are mostly associated with the Eastern Ghats tracts and inhabited mostly by Scheduled Tribes. Eighteen study sites were selected for the study, as the sample sites for the two forest divisions. Of these, nine are from Narsipatnam division and nine belong to Paderu division. The villages selected from these two divisions show variations in various features like access to development, dependence on the forests; terrain features etc. The study villages were selected randomly in proportion to their distribution in the Ghats and the Sub-plains zones of the two divisions.

3. Findings of the study

The Scheduled Tribes (ST) are the dominant communities in most (15 of 18 VSSs) forested regions. About nine types of scheduled tribes are present in the VSSs studied, of which Konda Dora and Bhagathas are the dominant groups as they are present in 05 VSSs of each forest division. In scheduled areas, especially in Paderu, the habitations are usually small and homogenous in community composition, with the complete domination of a single tribe. 08 of the 18 VSSs are such homogenous villages. VSSs with tribal domination are large in number in both the divisions studied.

3a. Emergence of JFM

Andhra Pradesh is one of the 28 states in India to adopt JFM programme. It has taken up the challenging task of covering nearly 20, 00,000 ha of degraded forests through around 8,000 Forest Protection Committees, which are called Vana Samrakshana Samithies (VSSs). The JFM programme in Andhra Pradesh state has received financial support from the World Bank under the A.P. Forestry Project which supports nearly 5000 VSSs in 14 districts, including the study area. The JFM Programme was launched in the study area during 1994. The study area has 296 VSS in Narsipatnam division and 304 VSS in Paderu forest divisions (APFD, 2002).

3b. Enrolment of Women in the JFM project

The Andhra Pradesh CFM government order insists that a majority of the households of any inhabitation/village should be enrolled in the VSS. In most cases (16 of 18), all the households (in the village/cluster of villages forming the VSS) have joined the VSS. But the Govt. norm of enrolment of majority number of Hh has not been met by only two VSSs (Kinnerla and G. Venkatapuram) in the two divisions studied. The enrolment of households was found to be less than 50%in these two villages. It was found that the non-enrolled Hh generally belongs to either upper social caste or is an affluent person. The enrolment of Hh was relatively high in tribal dominated Paderu division than Narsipatnam division.

Women's enrolment was fairly good at all the VSSs, with the exception of one VSS (G. Venkatapuram) where

only 39 women from 400 Hh have joined the VSS. The sex ratio (Men/ Women) in the VSS has varied from one VSS to another even within the same division. The sex ratio was relatively high (1.04) in the Ghats zone when compared to the sub-plains zone (0.84). It also appeared to decrease with the increased size of the population and number of households of the village. The men: women ratio for the study sites ranged from 1: 0.37 to 1: 1.30.

3c. Participation of Women in JFM implementation

Information on the participation of women in the meetings of the management committee (MC) and general body (GB) and in other project plan activities was recorded from the signatories' lists and also through general interviews. Based on the attendance of individual groups, their participation levels were arbitrarily classified into 3 classes: (a) Regular, (b) Occasional, and (c) Poor.

Women's participation appeared to be good in most VSSs. The only exception was G. Venkatapuram VSS, where enrolment of women itself was very poor. Over 55.56% of the VSSs sampled had Regular participation of women in most activities. Women's representation in the Management committees is invariably >50%. No wonder their role in decision-making was found to be Poor in most VSSs.

Depending on the contribution made by women's participation in discussions, making resolutions, implementation of both village and forest development activities, their participation was classified as Active and Passive. The participation of women in VSS activities mentioned above at Paderu was found to be better than in Narsipatnam Division. The Active and Passive participation of women in Narispatnam was found to be 33.3% and 66.6% whereas in Paderu, it was 77.7% and 22.2% respectively. The overall participation of women was found to be Active in 55.5% and Passive in 44.4% of the total sampled VSSs.

The involvement of women in microplan preparation was classified into 3 classes: (a) Fully, (b) Partially, and (c) Not Involved based on the responses recorded from the women stakeholders. The involvement of women in microplan preparation was found to be better in Paderu than in Narsipatnam Division. The involvement of women in both the study sites was either Partial or Not involved at all. Women were never really Fully involved in the microplan preparation in either of the study sites.

4. Conclusion

The incidental findings of the short study expose a worrying trend in the men to women ratio in the study villages, which is a reflection of the global trend of changing men-women ratio. It was found that men to women ratio was better among the less developed communities of the Ghats than among the advanced communities of the plains.

The execution of activities under the project plan was found to better in the tribal dominated Paderu forest division than in Narispatnam where the communities were found to be more dependent on the forest for livelihood and survival. The enrolment and participation of women stakeholders was also found to be better in Paderu than in Narsipatnam division. However, the participation of women in decision-making was found to be poor in both the sites, undermining the very essence of their participation in the general body meetings. More alarming was the fact that women in both the study sites were either partially involved or not involved at all in the microplan preparation. This certainly is not a healthy sign for the progress and implementation of the project.

Hence, all the stakeholders, especially forest department personnel and facilitating NGOs, should take adequate and effective measures to ensure women's participation in decision making while local men should make an extra effort to seek their suggestions and provide them an opportunity to voice their concerns while taking decisions related to the development of the forest and the village. A collective effort of all stakeholders is clearly the need of the hour.

The fact that enrolment and participation of women was better in Paderu than in Narsipatnam division can be attributed to the fact that communities here are more marginalized and hence, depend on

forest a lot more than the agriculturally advanced communities of Narsipatnam division who are better exposed and literate. The participation of communities (both men and women; even worse in case of women) was found to be poor among the agriculturally advanced and literate communities of the plain areas i.e Narsipatnam. This could be attributed to limited their dependence on forest (except the marginalized sections of the village) for livelihood. Limited dependence, coupled with the cultural aspects of the communities at Narsipatnam, does not encourage women here to take interest in the project. The present study therefore raises two questions. The first: how far is it viable to promote JFM in areas where communities are not dependent on the forest? And the second: should we look at JFM with the local cultural and traditional perspectives? We are confident that answers to these questions would not only be quite interesting, but would even help the policy makers of JFM in revising their current approaches if they are so desirous.

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Proceedings of the State-level Consultation on New approaches in Bio-resources Governance: Climate Resilient Agriculture in Tribal Areas

A one day workshop was organised on 'New approaches in bio-resource governance - Climate resilient agriculture in tribal areas' on 12th Dec 2011 at CYSD - DRTC, Bhubaneswar by Regional Centre for Development Cooperation (RCDC) in technical collaboration with OUAT (Odisha University for Agriculture and Technology) and entral Tuber Crops Research Institute (CTCRI), Bhubaneswar.

Inaugural Session

Mr. Bikash Rath, Senior Program Manager, RCDC formally welcomed the guests on the dais and the representatives from 6 districts to the day long consultation on climate resilient agriculture in tribal areas. Sharing the objectives of Bio-resource governance program that has been operational in 112 villages of 5 GPs in 4 districts - namely-Kalahandi, Gajapati, Rayagada and Koraput - since 3 years, he said that the aim of the project was to help in the overall development of bio-resources of the target villages by empowering the community. He then went on to share his concern over the unusual changes in climate and the effect of the same on the life of marginalised communities who are directly dependent on agriculture for their living. He said agriculture is the

sector worst affected by climate change as there is no certainty of time and duration of seasons, especially rain, anymore. Moreover, temperatures have been constantly on the rise and this too has affected agriculture. In tribal areas where irrigation has remained a crucial issue, the problem has been aggravated in the recent years by the uncertainty of rain. As RCDC doesn't favour resolving this issue through intensive chemical farming or use of the controversial genetically modified planting materials, the consultation sought to provide an opportunity to both the scientists as well as tribal farmers to interact and discuss some solutions that would sustain despite lack of irrigation, would not involve intensive or chemical farming and would be still useful in ensuring food and nutritional security, he clarified.

He said that the organisation is obliged to have with them senior scientists, both from OUAT and CTCRI, and community representatives from 6 districts, most of whom are farmers. He requested the participants to have direct interaction with the scientists and try to clarify their issues directly from them. 'This is not a lecture session but a direct interaction of specialists with beneficiaries, an opportunity that needs to be properly cashed,' he emphasised.

This was followed by a round of introduction by the participants.

Professor Sankarshan Nanda, Dean, Extension, OUAT and Chief Guest on the occasion, then requested the participants to give a brief idea about the main issues faced by them in the context of their agricultural activities. Most of the participants saw drought as the most crucial issue faced by them in the current agricultural season. It emerged that lack of good seeds was an issue in the Gumma Block of Gajapati district whereas in the Bandhugaon Block of Koraput district, where most of the fertile land has been diverted for non-food crops like lemon grass, soil erosion in the hills followed by siltation/ inundation of the low land (agricultural) was reported to be a matter of grave concern. In Bhutigarh GP (Kalahandi), much of the low land has been left fallow as people say such land is not viable for agriculture and hence they prefer hill cultivation.

Sri Dillip Pradhan, Programme Officer from Nabarangpur district expressed his anguish over the repeated negligence of the agricultural sector by the government. He said that despite its claims, investments and programmes for the development of farmers and agriculture, the government had not been sincere and keen enough for sustainable development of this sector; rather, it had consciously promoted other sectors like mining & industry. He cited an example of an indigenous variety of paddy, satka dhan that is harvested in a 60-day period and is suitable for relatively dry areas, which is hurtling towards extinction with the increasing dominance of maize in the district. This is happening because the government has neglected indigenous practices and has promoted practices that are costlier, environmentally degrading and - more worryingly - against the interests of the local farmers.

Technical Session-I

The technical session started with an address by Dr. Nanda, Dean, Extension, OUAT. To begin with, he congratulated RCDC for having created an opportunity wherein scientists can directly interact with the beneficiaries. He said that the fact that the climate is changing has now been accepted by one and all and its impact is being felt at all levels throughout the world. He opined that a one day workshop is not sufficient to address all issues concerning impact of climate change on agriculture, but such an exercise nonetheless would give an opportunity to both the participants and the scientists to discuss some of the major immediate issues concerning both. He then went on to give a brief idea of the agricultural pattern of the state, area of land under paddy cultivation and how Koraput has become one of the genetic hotspots of wild rice leading to the establishment of the MS Swaminathan Foundation Research Centre in that region. Referring to the huge loss of food grains due to the impact of climate change, he said that although we can't totally mitigate the ffects of climate change, we can definitely adopt practices that would help us withstand the impact of this change to a great extent.

Expressing his concern over the decreasing trend of paddy production in the state, Prof. Nanda said that if the same was owing to climate change only, then how was it possible that Chhattisgarh, a nearby state, was still able to go in for record production of paddy. He felt that it was owing to the political will that Chhattisgarh had been able to consistently maintain its production level. Even in case of the Nuapada district, an entrepreneur from Uttarakhand, who has settled there, has demonstrated excellent farming practices and that too with a diversity of crops, whereas local farm-

ers have been reeling under the impact of the diminishing returns from their land. Hence, it is not simply a matter of the impact of climate change, but also of lack of proper entrepreneurship, knowhow and facilities that is aggravating the plight of the farmers. Huge inflow of rice from other states is one of the causes that deprives the local farmers of the advantages of the support price system. The state government is yet to establish an organic certification agency which is why KASAM, which is facilitating organic cultivation in about 11400 hectares of land in Kandhamal district, has to depend on an external certification agency. Water is available only in about 33% of the total agricultural land of 61.8 lakh hectares in the state. Rain water harvesting, vermin-compost and vermin-wash, and proper crop planning (for instance, in low rainfall areas, the farmers should opt for the Vandana and Khandagiri varieties of paddy and not for Swarna), etc. can be some of the key tools that can help improve the situation, he emphasised. He advised farmers to make optimum use of the various schemes/support systems provided by the government and other agencies like NABARD. He further said that chemical fertilizers and chemical pesticides are not so essential if farmers can meticulously plan use of locally available resources like ash from the reject banana plant (and other plants too), which contains good amount of potassium that helps the plant grow better, require less water and also yields more. Similarly, vermin-compost can be prepared from forest weeds. Millet cultivation is gradually gaining commercial importance, particularly with growing interest of the high class people in raggi. This, he said, can be a good alternative. The flower business in the state has an annual turnover of about Rs. 20 crores, but most of the supply comes from other states. This despite the fact that flowers like marigold are not water-intensive and can thus be grown in areas where food crops are not viable.

To conclude, Mr. Nanda said that the geographical condition of the state is such that it cannot leave agriculture and hence there is a need to find out feasible ways to address the issues faced by agriculture. Maintaining that a 1% growth in the agricultural sector is equal to 3% growth in the industrial sector, he said this is why agriculture holds a great potential. He said that Krushi Vigyan Kendra also provides mobile service to the farmers and the same needs to be used by the people to their benefit. He even assured that farmers can even call him and the OUAT scientists present on the occasion for any technical consultation.

This was followed by a presentation by Dr. Subash Chandra Sahoo, Deputy Director, Extension, OUAT, on Profitable utilization of uplands for economic upliftment of tribal poor.

'We treat ourselves lowly, think we are inferior and hence are poor; the day we acknowledge our strength and learn to use it efficiently, we will no longer be poor,' Dr. Sahoo began his views with these profound words. He said that we are lucky that we have good weather and environmental conditions important for good agricultural produce. All that we lack is self confidence and the ability to use appropriately all that we have. We labour hard, but more physically than mentally which is why we do not get the best results of our labour and investments, he said. For instance, we plough only once before sowing. But if we also plough just after the paddy harvest, it would help the remnants of paddy plants mix with the soil and increase its fertility, in addition to destroying the eggs of pests. Doing this for 4 to 5 years will increase the productivity of the land. He then went on to share some of the statistics on the use and pattern of use of hilly lands. He felt that these lands are not used in a proper manner and there is a general misunderstanding that these lands are not viable properties for a poor farmer. Some of the other highlights of his presentation included:

- Paddy with arhar as an intercrop will be more useful for tribal areas because arhar is relatively more capable of withstanding drought. Maize can also be added as another intercrop.
- If the leaves that fall off the trees after winter are dried and turned into compost, it can be applied to the soil for increasing fertility. He felt that since there is little scope for the people to use cow dung as manure owing to the insignificant number of cattle found in these areas, this can be adequately compensated by using the compost or left over of the crops in the field.
- He requested the participants to identify at least 100 people who could form a team in each of 5 operational districts of the program. These teams could work out a plan to increase their income by a minimum of 1 lakh rupees within the next one year time period. Thereafter, they can develop a plan and work accordingly. He felt that if the target of 5 lakhs rupees could be achieved, then the next phase would see a good

increase in this target as this would motivate many more people to get into the process.

» To address the problem of water shortage, he advised farmers to go in for modern techniques like drip irrigation, sprinkling method, etc.

Dr. AK Mohapatra supplemented Dr .Sahoo's responses with the success story of the TRUPTI Orchard formed in the district of Keonjhar that is spread over an area of 270 acres of land. The farmer has been awarded the Krushak Shiromani award by Government of India for his initiative.

Mr. Bikash felt that we all have to make genuine efforts to overcome the problems faced by us instead of putting the blame on one another. Moreover, the organisation would try to act as a bridge to ensure that the benefits of various schemes of the government reach the poor and the marginalised farmers. He said if collaborative efforts are made, the scenario would definitely improve for the better.

On a query by a participant with regard to the cultivation of crops that can be taken up by the farmers of coastal districts, especially in areas affected by recurring floods, Mr. Sahoo suggested cultivation of crops like baby corn and sweet corn in the winter season. For summer, he suggested crops like water-melon, vegetables, flowers etc. He felt that the farmers of the areas should not be afraid of marketing as they are located close to two potential markets, namely Cuttack and Bhubaneswar. Referring particularly to baby corn, he said it can fetch Rs.100/ kg as baby corn soup is popular. He also referred to kolatha (horse gram) as a crop that can withstand even saline water.

A few more farmers went on to ask questions to the scientists. Some of the queries raised included:

Q. Why do kandula flowers shed off or not bloom properly if the weather is cloudy?

A. This may be due to certain pests. If chemical pesticide Imedacloprid is not to be used, then Nimajal or neem oil can be used in its place. The ratio is 5 ml oil per litre of water (one acre requires about 200 litres water).

Q. What are the reasons of the failure of the Lalata variety of paddy, despite using bio- manures?

A. Unless the biological materials are rotten properly, they can't serve as manure. Instead, such materials, in the process of getting rotten in the soil itself, may pull on the nutrients from adjoining materials, thereby acting adversely. The failure of Lalata crop may be

due to lack of potash in the soil. Lack of Boron and Zinc can also be one of the reasons. Increasing the potassium content of the soil is required, besides measures to improve soil fertility.

Q. Why can't we have cabbage seeds in Odisha?

A. Because our state doesn't have a longer duration of winter required for production of such seed. There are some other limitations too.

With that note the session was closed for lunch.

Technical Session-II

Mr. Bikash welcomed the participants to the post-lunch session. He requested Dr. AP Kanungo, Joint Director (Information), Extension, OUAT, to present his views on Subsidiary vocation for livelihood security.

Dr. Kanungo initiated his discussion by briefing the participants on Rural Livelihood System (RLS). He said that the system depends on attributes like knowledge and available resources, attitude, market scenario, need of the family and the socio-economic scenario of the area. Vocation, on the other hand depends on -

- Cost
- Availability
- Visibility
- Compatibility
- Simplicity
- Utility
- Marketability
- Group action.

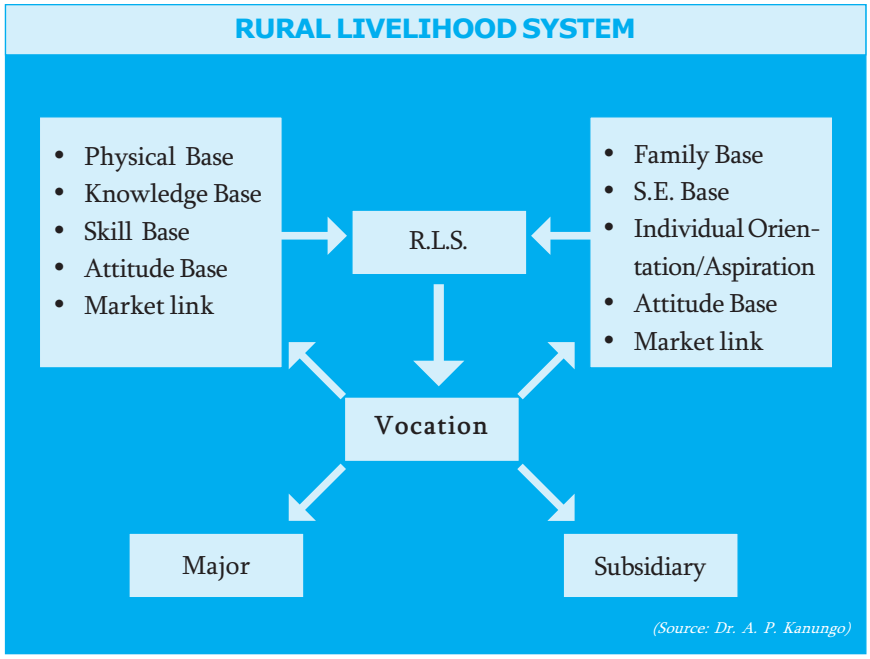
Thereafter, he shared in detail the pattern of production and the marketing behaviour usually observed, especially in a rural scenario.

The marketing behaviour highlighted by him included -

- Little to sell or buy
- Sell less and buy more
- Sell more and buy less
- Buy to sell
- Resource poor and buy all
- Resource rich and buy more

He then went on to talk about some of the important viable subsidiary vocations that can be adopted by farmers to augment their income from agricultural activities. The vocations suggested by him included mushroom cultivation, goatery, duckery, apiary, pisciculture, and floriculture, etc.. He dwelt at some length on the financial implication of these vocations, giving a clear idea to the participants on the range of profit margin that is achievable by following these vocations and the important risk factors as well. Participants had a few queries with regard to some of the vocations like - significance of rearing combination of fishes in pisciculture, type of goats to be reared, etc. These were adequately addressed by the resource person.

Responding to a question raised by Mr. Bikash regarding the impact on bio diverisity of using the Italian variety of honey bee in apiary, Dr. Kanungo said that even the local variety saptapheni can be successfully used though it is relatively costlier.

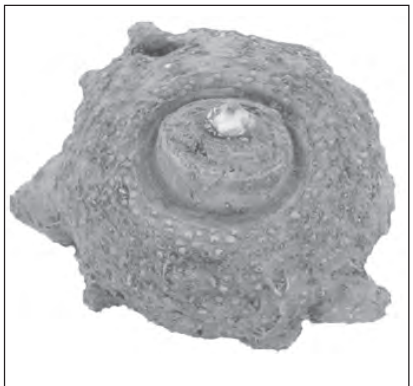


This was followed by a presentation by Dr. Rajsekhar Misra, Head and Principal Scientist, CTCRI. He made his presentation on 'Commercial cultivation, seed production and post harvest management of tropical tuber crops'.

Mr. Misra started his presentation by giving a brief idea of the activities being undertaken by CTCRI, the major tuber crops on which it has been working and the need for it. CTCRI has developed improved varieties of many such crops, like Gajendra Oluo. He said that the climate of the state, particularly in the tribal areas, is suitable for the production of these crops. The other reasons cited by him as to why these crops need to be promoted included -

- They ensure food security.
- Capable of withstanding drought
- These are cash crops.
- Many are used as raw materials by industry.
- Good quality animal feed.
- Medicinal properties in the products.

Some of the important crops that he talked about included cassava, sweet potato, greater yam, white yam, elephant foot, colocasia and arrow root. He talked in detail about the financial implication of growing these crops and the average profit that can be obtained by their cultivation. Arum or saroo, he said, is supplied from Odisha to Delhi and other parts of North India. Oluo has a bid demand in the Kolkata market but not in Odisha. On the other hand, yam has a good demand in our state, but a part of its supply comes from Andhra Pradesh. Odisha is, however,



Elephant yam (Gajendra variety). Photo courtesy: Dr. B.Behera (OUAT)

the highest producer of sweet potato and CTCRI has developed a Vitamin-A rich variety of the same. He went on to describe the pattern of cultivation of these crops; the care that needs to be taken during its production stage, the major diseases that affect it, the process that needs to be followed to store it and finally the utility of these crops.

On a query from the participants Dr. Misra informed that the planting materials of these tuber crops can be obtained directly from their office at Bhubaneswar by paying the required amount for it. On a request from Mr. Bikash to work collaboratively, he said that it would be a great opportunity for the organisation. To begin with, CTCRI would expect RCDC to immediately collect information about tuber crops available in their operational areas and other details about it and share it with them. The organisation would do the relevant research and share its findings with them. With regard to the use of tuber crop pattern in tribal areas, he said that unfortunately people are not aware that many tuber crops are not healthy for consumption and there are cases where particular tribes are now on the verge of extinction owing to the impact of some tuber crop on their fertility. Also, the stress is on consumption and hardly any attempt is made to replant the crop as a result of which their quantity and even variety has been on a steady decline.

His colleague and senior scientist at CTCRI Dr. M. Nedunchezhiyan responded to a query on the value addition and processing of tuber crops and showed pictures of products made from cassava. He later informed about

a saline-water resistant variety of sweet potato suitable for coastal areas.

This was followed by a presentation on 'Agronomic measures suitable for soil and moisture conservation' by Dr. J. Sahoo, Joint Director, Extension (Video project), OUAT.

Dr. Sahoo started his presentation by explaining that agronomic measures help to increase infiltration rates and thereby reduce run off and overland flow, reduce the impact of raindrops through interception and reduce splash erosion. Reduction in runoff and soil losses could be achieved through land management practices and associated agronomic practices. However, these measures are effective on gentle slopes, he clarified.

The major agronomic practices for soil and water conservation according to him are:

i) Contour cultivation/farming
ii) Land preparation
iii) Choice of crops (like, erosion resistant or soil conserving corps such as cowpea, groundnut, green gram, black gram etc. provide better cover and protection to soil by way of minimizing the impact of raindrop and acting as an obstruction to runoff than erosion permitting crops such as Sorghum, Maize, Pearl millet etc.)
iv) Crop geometry
v) Crop residue management
vi) Cropping systems (for instance, legumes like cowpea, green gram, horse gram, black gram are effective soil conservers due to their smothering affect, but they should be sown in time to develop adequate canopy by the time runoff reaches its peak.)

vii) Use of organic manures and fertilizers
viii) Mulching (for example, crop residues like wheat/paddy straw / maize stalks are left on the soil surface as stubble mulch to check evaporation loss)
ix) Strip cropping that involves growing of few rows of erosion resisting crops and erosion permitting crops in alternate strips on contour with the objective of breaking long strips to prevent soil loss and runoff.

The next item on the day's proceedings was a presentation on 'Agro-forestry to mitigate ill-effects of climate change' by Dr. AK Mohapatra, OUAT. Dr. Mohapatra began by explaining to the participants the concept of agro-forestry, the need for it and how the same could help to not only reduce the impact of climate change but also strengthen the economic position of the poor and vulnerable farmers. He said that agriculture should be such that it satisfies 7 Fs (food, fodder, fertilizer, fibre, fuel, flower and fish) for a family. He then went on to share some of the innovative practices followed by farmers to achieve maximum profit from their agricultural practices.

He stressed on agro-forestry (like, Arum+Guava+Rosewood or Dalbergia sissoo; Cedar or Gambhari +turmeric) and agri-horti-silvipastoral systems (like, mango+groundnut). He cited the examples of banana with brinjal as an intercrop, which has shown a decreased vulnerability to disease in the latter. Similarly, apiary with sunflower cultivation increases the productivity of the latter by facilitating better pollination. According to him, the species suitable for afforestation in Odisha include the following:

*Cassia siamea *Anacardium occidentale *Acacia auriculiformis *Eugenia jambolana *Acacia nilotica *Artocarpus integrifolia *Acacia catechu *Aegle mamelos *Termenalia arjuna *Annona sqamosa *Bombax malabaricum *Emblica officinalis *Prosopis juliflora * Shorea robusta *Dalbergia sissoo *Tamarindus indica

*Eucaltptus hybrid *Leucaena leucocephala *Azadirachta indica *Albizia lebbek *Sesbania grandiflora.

Dr. Mohapatra provided a lot of interesting statistics relating to the causes of climate change. For instance, he quoted a report[9] that indicated that enteric fermentation has the single largest share (59%) among the various sectors of agriculture in India that contribute to climate change, followed by rice cultivation (23%) and emissions from soil (12%). On the other hand, among the sources of green house gases in India, the energy sector has the lion's share (61%), followed by agriculture (28%) and industrial processes(8%). Agro-forestry can be an important tool in mitigating climate change while taking care of food and livelihood security, he stressed; and ended his presentation on this remarkable note: Let the farmers not do different things, let them do things differently.

Mr. Bikash raised the important issue of calling plantations 'forests', that too even eucalyptus plantations; and asked for the opinion of the scientists regarding the promotion of pulpwood plantations and other such commercial plantations in the name of forestry though the plantations are for short duration harvesting and have many problems. Dr. Mohapatra responded to this by clarifying that they don't recommend species like jatropha, eucalyptus, or and Acacia auriculiformis in agro-forestry. Because these species have certain ill effects on soil (the alkaloid content of eucalyptus leaf, for example, has an adverse impact). However, a nitrogen fixing variety of eucalyptus has been developed that can be considered, he said. On the issue of the shadowing effect caused by trees raised in agricultural fields, he said that when the trees grow, one has to gradually cut off the lower branches so as to reduce this effect. Those already having eucalyptus plantations can have turmeric as an intercrop, he suggested.

Finally, Dr. B. Behera, Professor, Department of Agronomy, OUAT, talked about 'Livelihood options for tribal farmers'.

He started his presentation by sharing the concept of livelihood, need for its security and various livelihood options available in rural Odisha. He said that in tribal areas, agriculture is the predominant mode of livelihood options. He listed some of the important problems related to tribal agriculture as follows:

- Cultivation of less remunerative crops - most of the crops grown by tribals are low yielding varieties and are of local genotype. The solution is crop diversification, and varietal substitution.
- Consistent problem of drought, animal invasion (particularly monkey menace) etc. The solution is tuber crops.
- Poor soil health management leading to soil erosion and acidity problem of the soil, inadequate and imbalanced use of fertilisers etc. The solution is soil health management through balanced application of fertilizer, use of paper mill sludge with farm yard manure in deserving areas etc.
- On-farm water harvesting structures to tide over the problem of high run-off loss.
- Lack of farm mechanization. As part of the solution, farmers can be provided with farmer-friendly and convenient machines on rental basis by the agricultural institutions since they can't always afford to purchase the same.

He then talked about problems seen in these areas in the animal husbandry sectors as well. He said that much viable business can be easily taken up by the residents of these areas and the same would contribute a great deal to reducing the vulnerability of the tribal people. Some of the businesses mentioned by him included - value added Minor Forest Produces, mushroom cultivation, etc.

Mr. Suresh Bisoyi, RCDC, thanked the scientists from OUAT and CTCRI and the participants for having been a part of the workshop and for having contributed positively to the program. He hoped that the informative interaction that happened during the day would benefit both the scientists and the community members equally. He reiterated RCDC's commitment to work in collaboration with organisations for the benefit of the poor and marginalised farmers.

The workshop came to an end with the vote of thanks.

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[9] India's Initial National Communication on Climate Change, 2004

Excerpts from the **Proceedings of The National Workshop on Protocol Development for Sustainable Governance of NTFP Resources** (full proceedings available on RCDC website)

While introducing NTFP management protocols in the national workshop, Sri Bikash Rath, Sr. Programme Manager, RCDC has defined and categorised protocols as under :

- Protocol is a set of rules which works as a tool of governance.
- Protocol, when a component of governance, asserts ownership. This may be called governance protocol.
- When not associated with ownership, protocol may be just a suggestion or a methodology. This is the category of non-governance protocols.
- A logical, socio-economically justified, multi-beneficial, and effective protocol is one of the important indicators of good governance.

Factors influencing governance protocols

- Socio-religious: These are taboos more or less unconsciously followed without understanding their practical implications for resources and resource-dependent people. Like, restriction on entry in sacred groves.
- Socio-economic: Like, for conflict resolution
- Commercial: Differential commercial value may influence differential protocols
- Scientific: Like, tapping methodology.

Basic norms for Protocol development

- Sustainability of dependency (livelihood) implying to sustainability of the resource.
- Social justice
- Legal consistency
- Multi-beneficial and integrated approach.
- Flexibility to change with the needs of time.

Steps in protocol development for sustainable governance of NTFP resources

- Step-1: Resource mapping and identification of vulnerable species
- Step-2: Identifying resource dependency in respect of various socio-economic groups, women, etc.
- Step-3: Understanding the linkage between resource vulnerability and resource dependency
- Step-4: Stakeholder consultation on possible solutions(phase-wise)
- Step-5: Protocol formulation keeping in view the socio-economic factors, local-, national-, and international utilities of the vulnerable resources
- Step-6: Periodic review of the impact of protocols both on resources and the dependent groups and necessary modification in the protocols, when required.

All these should be clearly documented.

Protocol diversity

Governance protocols may vary from place to place according to differences in species distribution, socio-economic profile and dependency, etc. Non-governance protocols usually remain same at all places.

As the Planning Commission's latest report on the development of NTFP sector in the 12th Plan recognizes, "Most of the NTFPs are collected and used/sold by women, so it has a strong linkage to women's financial empowerment in the forest-fringe areas." Both government- and non-government agencies have focused on the institution building and capacity building of the women primary gatherers alongwith other kinds of support like market linkages. While it is also understood that women tend to be least destructive than men during harvesting, organizations like RCDC have been trying to systematically develop this natural tendency of women by training them in using sustainable harvesting protocols. Collectivization has given a new confidence and power to these women to protect their stake in the market. The Mahila Kisan Sashaktikaran Pariyojna (MKSP) under the National Rural Livelihood Mission provides special support to exclusively women-led NTFP farming/business. RCDC emphasises on the fact that while farming/collection may or may not be done by the women for particular NTFP, entrepreneurship is something that can be done by women even for man-handled NTFP; and this women's entrepreneurship has to be given due importance.

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