Progress of implementation of Sustainable Management of Dry Forests in Asia with special emphasis on Indian initiative*

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Abstract

The Criteria and Indicators for sustainable forest management offer best monitoring mechanism for measuring the direction of change. It may provide necessary feedback to forest managers, communities and other stakeholders to improve forest management conditions and lifestyle of dependent population. Dry zone forests provide sustenance to millions of forest dependent people. Due to increasing pressure, these forests are fast degrading, depriving the communities to get optimum benefits from products and services. The ecosystems are very fragile and need immediate action. Community participation in this region has been institutionalized. However, there has been no mechanism to monitor the progress towards different dimensions of sustainability. As a result, these countries are lagging behind in respect of development of C&I and its implementation. FAO has provided impetus through regional initiative on developing national level C&I for sustainable management of dry zone forests of Asia. This process has to be taken forward by organising further technical and financial assistance. Lack of political commitment has forced the action remain within the four-walls of academic institutions. This mindset has to be overcome through series of activities enumerated elsewhere in this presentation.

In India SFM initiatives started in 1998 with Bhopal-India Process with the development of 8 criteria and 43 related indicators at national level. The process has initiated a dialogue on SFM in the country and generated awareness about C&I and SFM across the country. The Government of India accepted adoption of SFM in the country as a follow-up of the report of the National Task Force on SFM and also recognised IIFM as the nodal agency for operationalising SFM in the country. A pilot project is being implemented at eight sites in representative forest types for development and implementation of C&I at FMU level involving local communities. Accordingly, a set of 8 criteria and 55 indicators has been developed for FMU level. This will help standardize the implementation mechanisms for replication in the whole country.

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Introduction

Management of the forest to provide a sustained timber yield is still what many foresters have in mind when they talk of Sustainable Forest Management (SFM). The mindset of managing forests for production of wood does not address the wider issues of ecological and social functions of the forests, with which timber production may only incidentally be compatible or may even be in conflict. Management of forests solely for wood production, over the past 4-5 decades, has led to a steadily growing concern about the loss of other benefits. The concept of SFM has, therefore, evolved to encompass these wider issues and values. It is now seen as the multipurpose management of the forest so that its overall capacity to provide products and services is not diminished.

SFM is not to be confined to areas where a sustained yield of forest products and services is, at last in principle, achievable. It also calls for drawing attention to huge areas of degraded and disappearing forests. It is precisely in these areas that the need for management of the remaining forests is the greatest. There is no prospect of an early end to the pressures causing the clearing of forests. The challenge is not, therefore, to prevent these activities, but to manage them. The aim must be to ensure effective participation of what were once considered as "biotic pressure"- the local communities. The participatory management should ensure that the forest products are harvested sustainably, that forests are harvested only in a planned and controlled manner and that the subsequent land uses are productive and sustainable.

In most parts of the Asian countries, participatory forest management has been introduced about a decade ago, although in many areas the community initiated forest management is much older. In India, this has been termed as Joint Forest Management. This term is used to describe the management of forest resources by government forest departments with the participation of local communities. This involves sharing of products, responsibilities, control and decision making authority over forestlands. The primary purpose of JFM is to give forest dependent communities a stake in forest benefits and a role in planning and management for the sustainable improvement of forest conditions and productivity. A second goal is to support an equitable distribution of forest products. These management innovations have worked very well in speedy restoration of degraded forest ecosystems in many dry zone forests of Asia. The participatory management is aimed at conserving and developing of the forest ecosystem for attaining ecological, socio-cultural and economic sustainability.

ITTO's set of C&I universally apply to all producer member tropical countries. Many Asian countries are party to Objective 2000 of ITTO, which stipulated that every forest products from the member producer countries should come from sustainably managed forests by the year 2000. However, this deadline does not seem realistic in many Asian countries, some of which are yet to formally initiate the concept of Sustainable Forest Management. Some countries like China is member of ITTO and has also joined Montreal Process. Helsinki and Montreal Process address to the temperate and boreal forests of the respective regions. Tarapoto was initiated for humid tropics. Dry zone Africa, as the very name suggests, addresses to the need of dry forests of the African countries.. There was no commonly agreed set of National level C&I for SFM for dry zone forests of Asia till the initiative was jointly launched by FAO, UNEP, ITTO, USFS and Indian Institute of Forest Management, at Bhopal (India) during November-December, 1999. This initiative adopted a set of 08 National level criteria and 48 indicators. India has about 70% of its forests categorized as dry zone forests. With varying agro-climatic conditions and rich cultural

and biological diversity, India initiated its own action to evolve C&I for SFM and named it as Bhopal-India Process (Prasad *et al*., 1999; IIFM, 2000).

It would be interesting to note that almost all the countries of Asia have experimented community participation in forest conservation and sustainable management. However, there appears to be no formal mechanism or tool to measure the impact of community management in terms of sustainability. This paper reports the status of forest management in different countries, particularly with reference to application of C&I tool for measuring sustainable forest management.

Present Status of Dry Zone Forest of Asia

The tropical dry forest of Asia occurs in areas with rainfall ranging from 500 to 1,000 mm/yr. These forests are relatively open. The people living in and around these forests depend heavily on them for livestock grazing as well as for fuel wood, building poles, bamboo and a range of other products and services. Many of these forests are fragile, and unsustainable harvests, even if light, can lead to severe damage. Large areas have degenerated into grass and scrub land. Dry forest in these areas often merge into arid or even desert margin zones where the natural tree cover becomes increasingly spare. Currently 15 per cent of the dry forest zone in Asia is forested (FAO, 1993)

Table 1: Deforestation in the Dry Zones of Asia

Region	Total Land Area under the Zone (Million Hertare)	Total Forested Area in 1990		Annual Deforestation (1981-1990)	
		Million ha	% of Zone	Million ha	% of Zone
Asia	280.6	41.1	15	0.5	1.1
World Total	1,249.1	238.3	19	2.2	0.9

Source: FAO, 1993

The dry tropical forests pose management challenges very different from those of the moist tropics. Most of the native tree species are slow growing and drought tolerant. During hot dry spells, biological activity is reduced to a minimum as a means of survival. Fire is an important hazard (Prasad, 1999).

Regeneration from seeds and coppice shoots is very common. Regeneration from seeds and coppice shoots is very common. Regeneration also relies on grazing animals, particularly the goats and sheep, consuming the leguminous pods and excreting the seeds; otherwise the seeds are able to survive for years in the soil due to hard seed coats and similar other morphological characteristics. A high proportion of the tree species is a profuse coppice, producing vigorous new growth after harvesting the main stem. Many of the species are fire resistant when larger than pole size. Wildlife is a significant element in the management of these areas. It is extremely important for generating local employment through eco-tourism and collection of variety of non-wood forest products i.e., gums, honey, roots, leaves, flowers, fruits, barks etc.

Where rainfall is scarce but reliable, sustained yield management is technically feasible. This is usually based on replacement or enrichment planting. The drier the area or the more erratic the rainfall, the poorer the record of replacement planting tend to be. In some areas, studies have shown that the yield from exotic species may be less than that of the indigenous forest cleared to make place for them.

The management emphasis in the drier areas has consequently been shifting towards the regeneration management of existing forests with indigenous and endemic species and the afforestation of degraded or even completely barren areas. In a number of countries, demo plots in which cutting and grazing have been forbidden and fire has been excluded for a number of years have shown a remarkable ability to regenerate both from coppice and from seed that lain dormant in the soil (Prasad, 1988). A very common example is of a scheme called ***Rehabilitation of Degraded Forests*** **(RDF)** in India, which places great reliance on this phenomenon. This suggests a method of management capable of restoring and sustaining the productive capacities of large areas of forest in these areas where the rootstock is still intact (MoEF, 1999).

The main problem in implementing forest management scheme in most of the dry forest areas is the intensity of existing land use. Even in badly degraded areas, people may rely completely on what is left of the forests for browse and fuel. Closing off areas for regeneration, even though it will produce long-term gains, can impose intolerable short-term burdens upon people. Where lands are in common ownership, there may also be difficulties in arriving at satisfactory methods of sharing out the various benefits and costs involved.

Plantation Forestry is a well-established form of intensive forest use. However, in tropical areas plantation forestry needs much improvement in various aspects. A review of tropical plantation by Pandey (1992) observed that planting is generally poor, particularly in relation to vital issues such as the matching of species to the site.

Considering the eco-fragility of dry areas and recognising the fact that the "policing" approach of conservation and protection has not succeeded, greater emphasis has to be given to people's participation in forest management decision making and benefit sharing. Management of dry forests should, therefore, aim at the application of practices and ways that are "ecologically sound, economically viable, socially responsible and environmentally acceptable; and which do not reduce the sustainable capacity of resources to deliver multiple benefits" (Hardcastle, 1999). Some of these broad principles should guide developing national level C&I for sustainable forest management and development of dry zone forests of Asia.

Regional Initiative for the Development of National Level C&I for the Sustainable Management of Dry Forests in Asia

The regional initiative for the development of " National Level Criteria and Indicators for Sustainable Forest Management of Dry Zone Forests of Asia was organised at Indian Institute of Forest Management, Bhopal in collaboration with FAO, UNEP, ITTO and USFS in Nov.-Dec. 1999. Participants from different Asian countries namely Bhutan, China, Mongolia, Myanmar, Nepal, Bangladesh, Thailand, Sri Lanka, and India participated in the workshop. The deliberation led to identification of 8 National Level Criteria and 48 Indicators (C&I) for Sustainable Forest Management of Dry Forests in Asia. The agreed set of C&I is as given in Table 3.

Recommended Plan of Action and Strategy at regional level

The workshop recommended following steps and outlined strategy and action plan for promoting SFM at regional and national level.

- Identify a national-level nodal agency/focal action point;

Table 2:National Level C&I for Sustainable Management of Dry Zone Forests of Asia

Sl. No.	Criterion	No. of Indicators
1	Extent of Forest and Tree Cover	5
2	Maintenance of Ecosystem, Health and Vitality	4
3	Maintenance and Enhancement of Bio-Diversity	6
4	Conservation and Enhancement of Soil and Water Resources and other Environmental Functions	6
5	Maintenance and Enhancement of Forest Productivity	6
6	Extent of Forest Resource Utilization	3
7	Socio-economic, Cultural and Spiritual Needs	6
8	Policy, Legal and Institutional Framework	12
Total	**8 Criteria and 48 Indicators**	

Source : Development of National Level C&I for the Sustainable Management of Dry Forest of Asia: Workshop Report, Bhopal India, FAO/IIFM 30Nov-03 Dec., 1999.

- Assess the financial requirements and possible funding source to hold National and Sub-regional workshops in order to;
  - Continue raising national awareness that criteria and indicators are good tools for achieving sustainable forest management
  - Continue developing the set of criteria and indicators according to national needs;
  - Harmonize and converge criteria and indicators with other region/national initiatives; and
  - Identify research and training needs for enhancing the capacity of stakeholders to apply the criteria and indicators in the field.

Problems in implementation of SFM in the region

The problems of implementation of SFM in this region are as follows:

1) Members committed to Objective 2000 of ITTO, but no concrete action visible at government level for compliance
2) Political commitment of governments - not demonstrated by action
3) Most of the actions have been initiated by academic/research institutions
4) Donor projects promote participatory management, but are often silent about C&I framework
5) World Bank-WWF Alliance has initiated by different nomenclature trying for convergence with C&I
6) Lack of financial resources for promoting action
7) Lack of trained personnel to handle the research and development projects
8) Unknown apprehension about outcome due to people's heavy dependence on forests
9) Economic growth often conflicts with such monitoring mechanism
10) International agencies have not paid adequate attention in this part.

Strategy and Future Plan of Action

Dry zone forests are most fragile ecosystem among the forest types of the world. These forests provide sustenance to millions of people living in developing countries. Due to excessive pressure on extraction, the rate of forest degradation and deforestation in the region is alarmingly high, requiring urgent global action. The forest information system is not only weak, but also unreliable. Very attractive forest policies with laudable objectives have failed to address to these malaise because there have been no compliance mechanism available. Community participation is the key word in entire dry zone Asian forests. However, there again has been no mechanism to monitor the progress towards sustainability. In respect of development of set of C&I for SFM, this region has been lagging behind with ITTO Objective 2000 providing some ray of hope, but without much concrete action. Countries like China have joined Montreal Process for their temperate and boreal forests. India, because of its bio-cultural diversity, choose to have its own **Bhopal-India Process** for evolving C&I for SFM to improve forest management conditions for well-being of people and ecosystem. Other countries of the region have not formally initiated any concrete action in this direction. FAO mandated to promote and proliferate the concept of C&I framework, provided some impetus through a regional workshop for these countries at Bhopal, India (1999), as discussed above. However, this initiative has to be taken forward so that the countries of the region are able to catch up with the development in other parts of the world. Some of the specific actions proposed are as follows:

1) Political commitment of participating governments - FAO should facilitate at least 3 high power inter-governmental consultation meetings, preferably in Bhopal/Delhi, Bangkok and Beijing (2001-2002).
2) FAO should facilitate setting up of a National Task Force in each country to organize a series of meetings to sensitize different stakeholders (2001-2002).
3) Each country should be assisted to identify Focal National Institution for SFM (2001).
4) Regional SFM Secretariat should be established. Indian Institute of Forest Management, Bhopal can be considered as regional secretariat (2001-2002).
5) Different processes and initiatives must converge to make it universally understood (2001-2003)).
6) Develop national/sub-national and FMU level C&I (2001-2003).
7) Experimental testing in community managed natural forests/plantations (2002-2004).
8) Develop mechanism for participatory assessment (2005).
9) FAO should help develop field-based research projects to collect benchmark data and monitor progress towards SFM (2001-2004).
10) FAO should help capacity building of trainers and researchers by exposing them to different SFM related projects in the world (2001-2005).
11) FAO should assess the financial requirement for implementing SFM in different countries and source donors for the same (2001-2003).
12) FAO should impress upon donor agencies to incorporate SFM as part of development assistance in forestry (2001-2002).

13) Dry zone forests of Asia also happen to be co-terminus with poverty and hunger. Forests are fragile and therefore need immediate attention. Consortium of donor agencies must help promote SFM (2002-2005).

14) Develop web site on C&I and its measurement (2003-2005).

15) Set time frame for adoption to all forest types (upto 2005).

Indian-Initiative for Sustainable Forest Management

India's early forest management policies supported agricultural and timber production as top priority, but have gradually evolved to ensure environmental stability and ecological balance. At present, actual forest cover of India is 63.34 million ha (19.27%). Some current issues and constraints facing India include deforestation and degradation, increasing demand for forest products, and insufficient financial support. On positive side, 62,890 Joint Forest Management Committees jointly with government forest departments, are protecting and managing about 22% (14.25 m ha) of the total forest area (GoI, 2001). However, the mechanism to monitor the impact of community management is not in place. India is a member of ITTO and a party to its objective, 2000.

Bhopal-India Process

In response to India's commitment to ITTO's Objective 2000 and in view of globalization of forest issues, the Indian Institute of Forest Management, Bhopal *suo motto* initiated action on development of C&I for sustainable forest management. In order to translate these concerns into action, **Bhopal-India Process** of SFM was launched in 1998 to develop a practical and measurable set of C&I for monitoring the progress of forest management in the country. A series of national technical workshops and consultation meetings were held to sensitize communities, forest managers, NGOs and researchers about the need for developing a national and sub-national set of C&I. A set of national level C&I has been evolved, refined and adopted.

Table 3:National Level C&I for Sustainable Management under Bhopal-India Process

Sl. No.	Criterion	No . of Indicators Year 1999	No . of Indicators Year 2000
1	Increase in the extent of forest and tree cover	7	5
2	Maintenance, conservation and enhancement of bio-diversity	6	7
3	Maintenance and enhancement of ecosystem function and vitality	5	3
4	Conservation and maintenance of soil and water resources	10	4
5	Maintenance and enhancement of forest resource productivity	7	5
6	Optimisation of forest resource utilisation	5	7
7	Maintenance and enhancement of social, cultural and spiritual benefits	4	5
8	Adequacy of Policy, legal and institutional framework	7	7
Total	**8 Criteria**	**51 Indicators**	**43 Indicators**

Source: Prasad *et al.,* 1999; IIFM, 2000

Follow-up of Bhopal-India Process

A brief follow-up progress and success of **Bhopal-India Process** in the form of different activities are summarized below:

1. Setting-up of a National Level Task Force on SFM in India

The Government of India set-up a **National Task Force for SFM** in November 1999, and appointed IIFM as the **Nodal Agency** (GoI 4-16/99-FPD, dated 09/11/99). The committee reviewed and modified draft set of C&I and finally adopted **Bhopal-India Process** with 8 criteria and 43 indicators at national level. The Task Force also identified strategy for adoption and operationalising of C&I for SFM, stakeholder participation and measures for field-testing of indicators. The Govt. of India has accepted the recommendations of the Task Force and has assigned the task of taking the process forward to Indian Institute of Forest Management, Bhopal.

2. Workshops: National, Regional and FMU level

Two regional level and three national level workshops were organized for awareness building and sensitization of various stakeholders. Besides a series of village–level workshops were organized involving FMU level actors that included local communities, field foresters and other line departments and NGO's. The workshops initiated a dialogue on SFM at the very grassroots level and resulted in a draft set of C&I for community managed forests.

3. Field testing of C & I in community managed forests

IIFM implemented a ITTO sponsored Pre-Project on "Sustainable Tropical Forest Management through Community Participation in India". Three major tropical dry deciduous forest ecosystems namely, Sal (*Shorea rubusta*), Teak (*Tectona grandis*) and Miscellaneous forests were selected in Central India, where FMU level testing was done with the involvement of communities, foresters and Non Governmental Organisations (NGOs). Twelve Forest Protection Committees in three different forest types were involved in use of C&I for assessing the impact of joint forest management. Field level assessment was made on natural regeneration in 275 ha treated under Assisted Natural Regeneration (ANR) scheme started in 1996. There were only 1500 plants/ha in the formation year. However, under the protection from grazing and fire, the regeneration status has improved substantially to 4,971plants/ha in 1999 (Figure 1). These village level workshops also identified sets of measurable people's indicators for sustainable forest management (Kotwal *et al.*, 2000).

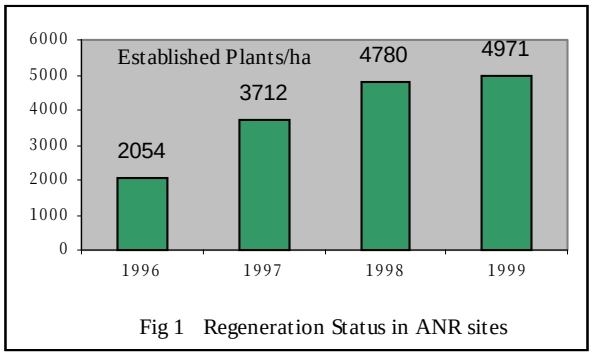

Fig 1 Regeneration Status in ANR sites

IIFM, Bhopal in collaboration with Kerela Forest Research Institute (KFRI), Peechi and CIFOR also field tested C&I in teak forest plantations in central India.

4. Training of Forest Managers and other stakeholders

One training workshop for Protected Area (PA) managers for measuring success of sustainable protected area management and three other training to 75 foresters and other stakeholders to equip them for measuring the success of sustainable community forestry management have been organized, which were sponsored by World Bank-WWF Global Alliance. Two sets of ToTs have already been completed and rest is expected to complete by February 2001. Similar ToT sponsored by the same donors is planned for other countries of South Asia.

5. Operationaising C&I: The IIFM-ITTO Project

The main task of operationalising C&I for SFM, ensuring stakeholder participation, field-testing of indicators has been initiated in the country through a research project sanctioned by ITTO to Government of India, for execution by IIFM. The project "Operational strategy for sustainable Forestry development with Community Participation in India", is envisioned to operationalize the C&I developed through the Bhopal-India process at national, state and FMU following the guidelines outlined in ITTO Criteria and Indicators (ITTO, 1999). The project has stemmed from the pre-project "Sustainable Tropical Forest Management through community participation in India" which was also sponsored by ITTO in consonance of the national policy directives of peoples' participation in management of forests and their resources. Involvement of local communities and other stakeholder in development, implementation and monitoring process is the adopted strategy.

With the overall objective of creating conditions for; and to achieve Sustainable Forest Development (SFD) in India with participation of the communities living in and around forests, the specific objectives of the project are:

- To develop and operationalise a functioning system of C&I for SFD with community participation.
- To establish institutional capability for implementing C&I for SFD.

A two pronged strategy of participatory development of C&I system and creation of capacities for its implementation, is being adopted for the project. The project builds on the B-I Process and envisages refining the national set C&I of B-I Process following the guidelines in the ITTO C&I.

The project is designed for a period of four years, which will form the first phase of implementing SFM/SFD at eight pilot sites. It is envisioned in the pilot phase that:

- There would be increased commitment for SFM/SFD at the national and state level.
- A well-defined C&I system would be in place in the project sites and in central Indian state of Madhya Pradesh (MP), along with the implementation plans and related guidelines for operationalising the system.
- A web-based expert forest management system particularly for the use of C&I is in place.
- There would be sufficient individual and institutional capacities for implementation and expansion of the C&I system across the country.
- There would be strengthened institutional structures, organized and functioning participatory arrangements for SFM/SFD
- There would be a operational for assessing gaps and weaknesses in C&I related research and for enhancement of C&I system

Project sites

The project is being implemented in the central-Indian states of Madhya Pradesh (MP) and Chhattisgarh (Erstwhile Madhya Pradesh). Eight Forest Management Units (FMU), that are representative of the Natural Tropical Forest Types in India, have been selected as the project sites. Six of these sites are in MP namely Harda, Jhabua, Seoni, Mandla, Sheopur and Obedullahganj and two are in Chhattisgarh; Dhamtari and Bilaspur. All the major forest types get represented in the sites. The sites have been selected after the Steering Committee meeting, after deliberations on the attributes of the candidate sites. In each of the project site, five JFM committees have been selected for implementation of the project. During the project the committees will be developed as model sites for C&I implementation and facilitate cross learning during and after the project. The committees represent the status and spread of JFM in India

during the last decade and hence, age of the JFM committees varies from four years to 10 years, the very beginning of JFM in India. Table 4 gives a brief description of the forest types and the selected JFM committees.

Table 4: Description of the sites

Site	State	No. of JFM committees	Forest area (Ha)	JFMC Members	Forest type (Champion and Seth, 1965)
Harda	Madhya Pradesh	5	6145.755	885	Southern Tropical Dry Deciduous Teak Forests
Jhabua	Madhya Pradesh	5	2777.0	1178	Southern Tropical Dry Deciduous Teak Forests
Seoni	Madhya Pradesh	5	1708.600	1317	Southern Tropical Dry Deciduous Teak Forests
Mandla	Madhya Pradesh	5	1768.000	328	Southern Tropical Moist Peninsular Sal Forests
Sheopur	Madhya Pradesh	5	3883.347	588	Nothern Tropical Dry Deciduous Mixed Forests, Nothern Tropical Thorn Forests
Obedullahganj	Madhya Pradesh	5	10352.9	341	Southern Tropical Dry Deciduous Teak Forest
Dhamtari	Chhattisgarh	5	3191.338	958	Southern Tropical Dry Peninsular Sal Forest, Moist Peninsular Low Level Sal Forest
Bilaspur	Chhattisgarh	5	3357.805	2830	Northern Tropical Dry Mixed Forest

The climate is monsoon type in the sites and hence maximum precipitation is received during the southeastern monsoon (June to September). The average annual rainfall varies from 860mm (Jhabua) to 1400 mm (Bilaspur). Also, the area forms catchments of two important river-systems of India namely Narmada and Tapti. Majority of the people populating the sites are the tribals and forest dwelling. Agriculture is subsistence and rainfed. Forest plays a very important role in the livelihoods systems of these communities.

Development of FMU level C&I

Under the aegis of the project and first step toward C&I implementation at the project sites, C&I for the eight FMU's have been developed through participatory process. At all the eight field sites, field-training workshops were organized at the project sites. The objectives of the workshops was to sensitize the FMU level stakeholders about the concepts and practice of SFM; and to evolve FMU level C&I with stakeholder participation. The eight workshops were participated by representatives of 52 JFM committees along with the frontline forest department staff, local Non-Government Organization representative and members of locally relevant institutions. Participatory methodologies were the hallmark of the workshop that facilitated stakeholder participation in the process. The workshops resulted in development of relevant and applicable set of C&I for the FMU level. The developed C&I set has 8 criteria and 55 indicators (Table 5). With this the process of operationalising C&I at FMU level has been initiated.

Table 5: Developed set of FMU level C&I

Criterion	Indicators
1. Increase in the extent of forest and tree cover	▪ Area of Forests ▪ Area under open and dense forests ▪ Trees outside forests ▪ Per capita forest area and trees outside forests ▪ Diversion of forestland to non-forestry purposes: Encroachment, submergence, mining ▪ Plantations
2. Maintenance, conservation and enhancement of bio-diversity	▪ Varity of plant species ▪ Variety of animal and bird species ▪ Pure patches of certain species (specific habitats) ▪ Waterbodies/waterholes
3. Maintenance and enhancement of ecosystem function and vitality	▪ Malformed, dried and deformed trees ▪ Incidents of fire ▪ Regeneration status ▪ Incidence of pests ▪ Incidence of weeds ▪ Incidence of diseases ▪ All age class trees
4. Conservation and maintenance of soil and water resources	▪ Number of gullies ▪ Duration of streamflow in and around forest area ▪ Decaying leaf litter ▪ Water level in wells ▪ Exposed roots and uprooted trees ▪ Soil and water conservation measures ▪ Perception about water availability
5. Maintenance and enhancement of forest resource productivity	▪ Production of fuelwood ▪ Production of timber and poles ▪ Basal area ▪ Stem density ▪ Number of NWFP yielding trees per hectare ▪ Number of other species per hectare ▪ Total NWFP production ▪ Use of quality seeds in plantations
6. Optimization of forest resource utilisation	▪ Per household consumption of timber, poles ▪ Per household consumption of fuelwood ▪ Availability and utilisation of grass and fuelwood ▪ Efforts to increase efficiency of fuelwood ▪ Level of sustainable harvest of NWFP ▪ Value addition
7. Maintenance and enhancement of social, cultural and spiritual benefits	▪ Year of formation ▪ Number of meetings per year ▪ Average attendance in meetings ▪ Average women attendance in meetings ▪ Agenda and minutes ▪ Fund available with JFMC ▪ Proportion of household income from forests ▪ Trees, plants and patches protected for cultural reasons ▪ Application of indigenous knowledge in management and use
8. Adequacy of Policy, legal and institutional framework	▪ Financial transparency ▪ Capacity building ▪ Conflict resolution mechanism ▪ Adequacy of rules and regulations ▪ Efforts to reduce pressure on forests ▪ Mechanism for protection, management and benefit sharing ▪ Empowerment of JFMC for the above ▪ Powers of Forest Officials devolved to JFMC

After the development of C&I for FMU level, the next task is to collect base-line information on the current status of the indicators. Benchmarks for sustainability also are to be setup and due to gaps in current information systems and research, it is a Herculean task. Also, the methodologies for assessment of the indicators have been developed. What remains is testing of the methodologies for applicability, which will be done in the near future.

Future directions

Although some progress has been towards the goals of SFM, the road ahead is full of challenges and issues that need attention. Some of the immediate challenges are addressed here:

1. Scaling-up

Implementation of C&I has been initiated on a very pilot basis, both at the FMU and state level. The first and foremost task is to upscale the process to cover firstly the states of Madhya Pradesh and Chattisgarh. Based on the experiences and learnings, the replication and expansion of the system to the whole country over the next few years is imperative. The learnings of the current project will form the basis for this scaling-up and improvising the system.

2. Capacity building

The present awareness and capacities warrant a large-scale capacity building initiatives across the nation. Whereas popularizing the concept will be one of the objectives, the concurrent achievements will be in terms of competent human resource for implementation of C&I and SFM. Further, the capacity building initiatives need to address all the stakeholders and the diverse needs of the target audiences. This becomes of immense significance in cognizance with the participatory forest management regime.

3. Information dissemination

Networking of the various FMU's in the provinces and across the provinces is necessary for experience sharing and learning. State-level and national-level working groups will also facilitate information dissemination in the country. Networking with international agencies and nations involved in similar endeavors is also one of the prerequisite to augment learning process.

4. Model Forests and adaptive management

The field sites where the project is being implemented are to be developed as model forests with adaptive management. In this regard networking with the Model Forest Network and other such initiatives will be of critical importance. The experiences around the world would provide constructive inputs for the endeavour.

5. Research

The implementation of the C&I will lead to new, second-generation issues and opportunities. Research henceforth plays a very significant role in the process of operationalising C&I. Initiatives have to be taken in the direction of identification of C&I related research needs and undertake the researches for betterment of the systems.

Collaborations

Institutionalization of SFM concepts, methodologies and activities in the country would be a daunting task. This requires massive investment of time, commitment, energy, skilled manpower and money from National and State Governments, private Sector, Communities, NGOs and bilateral and multi-lateral Development and Funding Agencies. With the goal of SFM clearly

identified and nationally recognized, the primary need of the country in the prevailing scenario pertain to technical and financial assistance.

1. *Technical Assistance* is required for systematic technology transfer in terms of methods, techniques and information on C&I testing and SFM implementation. For technical guidance, India (as well as other countries in the Asian region) would look forward to assistance from FAO, ITTO, UNDP and CIFOR.
2. *Financial Assitance* It is estimated that India would need around US$ 2-3 million for carrying out the preliminary activities (like sensitizing and ratification of C&I) and another US$ 5-6 million for subsequent stages of data collection, field testing, operationalization and implementation of SFM on a country wide basis. Thus, financial assistance has to be sought from international donor agencies. Apex agency for promoting SFM like FAO can help the funds for speedy plan of action to improve forest management in different countries of the region, as paucity of funds may not allow progress.

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