

Locally identified criteria, indicators and verifiers for evaluating sustainable community based forestry: a case from Nepal

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Community based forestry is seen in many countries as a way to enhance sustainable forest management through close involvement of local people. This paper aims to develop understanding of local perspectives on criteria, indicators and verifiers for evaluating sustainable community based forest management practices. This study includes ten different forest user groups ranging from full autonomy to semi-autonomy in making decisions regarding forest management practices covering three districts from three physiographic (mid-hill, inner-tarai and tarai) regions of Nepal. A village to village approach was used to acquire the perspectives from male, female and different castes. The findings show that local people identified four criteria, 26 indicators and 60 verifiers for evaluating sustainable community based forest management practices. Three locally identified criteria were found to be identical with the institutional top-down criteria. The paper concludes that understanding local knowledge, local practice and associated institutions are important to manage forest resources in a sustainable manner. There is also a need to have continuous collaborative works between forest professionals and local people to enhance sustainable forest management.

Key words: Community based forestry, criteria and indicator, evaluation, local people, sustainable forest management

The paper contributes in developing an understanding of local perspectives on criteria, indicators and verifiers for evaluating sustainable community based forestry. It illustrates the people's perspectives from three different community based forest management practices ranging from full autonomy to semi-autonomy in making the decisions regarding forest management practices. This paper defines semi-autonomy and full autonomy as an executive body composed of local people with and without representation from the government officials, respectively. We assume that people make the decisions independently regarding forest management practices if there is no representation from the government official in the executive body. It is likely that representation from the government in the executive body may have some kind of influence in making the decisions, particularly in managing forest resource with an interest of the government officials rather than people's interests. Local people considered government officials as an expert in the respective

areas and often trust and accept their views accordingly (Kumar, 2000; Pokharel, 2000).

Managing forest resources in a sustainable way is a challenge in a country where people are dependent on forest resources for their livelihoods. People use forests for a number of things such as grazing for livestock, fuel wood for cooking, timber for construction of houses and agricultural tools, and NTFP collection, processing and sale. Munang *et al.* (2011) reported that about 410 million people are highly dependent on forests for subsistence needs and income. They also estimated that 1.6 billion people indirectly depend on forest goods and services for their livelihoods. Community based forestry is seen in many countries as a way to enhance sustainable forest management through close involvement of local people. Principally, community based forestry invites local people to join their hands in the management of forest resources and encourage them to involve in different levels of management. However, inviting

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people to involve in different levels of management varies from one place to another depending on the context. Around one-quarter of forests in developing countries is under the community based forestry (White and Martin, 2002 cited by Sikor, 2006; Shyamsundar and Ghate, 2011).

The concept of sustainable development was adopted at the United Nations Conference on Environment and Development (UNCED) in 1992 where sustainable forest management has been considered as an integral part of sustainable development (Bebarta, 2004). Sustainable forest management is the aim of Nepal's community forestry programme (Acharya, 2002) and adopted it as one of the models of community based forestry. Community forestry is a pioneer and well-established management form of community based forestry in Nepal (Pokharel, 2009) which is seen as a way to enhance sustainable forest management through direct involvement of local people. Evidences show that deforested and degraded forest lands under the community forestry have been reforested and improved in quality. Community forestry in Nepal has improved biophysical environment / tree generations (Gautam *et al.*, 2002; Yadav *et al.*, 2003; Gautam *et al.*, 2004; Nagendra *et al.*, 2008; Gautam, 2009; Tachibana and Adhikari, 2009).

Sustainability of community based forestry can be understood as the condition of utilization, development, and conservation of forest resources under which the social, economic, ecological, cultural and spiritual needs of present and future generation of the local people are maintained and enhanced. There is an increasing trend of transferring management responsibility of forests from the government to local community. Transferring the management responsibility to local people is seen as one way of making the forests sustainable. However, simply by transferring management responsibility to local people alone cannot guarantee the sustainability of community based forestry. A self-monitoring tool is essential that allows local people to track the progress of forest management towards the goal of sustainability. Criteria and indicators are being promoted internationally as a basis of user group self-monitoring (Louisa and Edwards, 1995). Although some studies (such as Pokharel, 2005; Pokharel and Larsen, 2007, 2009; Pokharel and Suvedi, 2007; Pokharel and

Tiwari, 2013; Pokharel *et al.*, 2015) have focused on local knowledge for developing criteria and indicators, little attempts have been made to make the evaluation system transparent. There is a trend of manipulating things by the people in power in favour of *afno manche* (relatives or friends) in Nepal (Pokharel and Larsen 2009) which makes transparency important to motivate forest users and to encourage people to join in the work being done. The paper identifies criteria, indicators, and verifiers for evaluating sustainable forest management practices as perceived by local people.

Materials and methods

Study area and data collection

This study covered ten different forest user groups from three community based forest management (CBFM) practices (community forestry, buffer zone community forestry and collaborative forest management) of three different districts (Tanahu, Chitwan and Bara) representing mid-hills, inner-tarai and tarai regions of Nepal (Fig. 1).



Fig. 1: Map of the study areas

Three different districts from three different physiographic regions (one district from each region) were chosen as study sites to observe the difference in perceptions and management practices. Among three districts, Tanahu represents mid-hills, Chitwan lies in inner-tarai region, and Bara represents tarai. Tarai is characterized as flat area which stretches from east to west of Nepal. Two forest user groups from community forestry were chosen from each district and two forest user groups each from buffer zone community forestry and collaborative forest management were chosen from Chitwan and Bara districts, respectively. Forest user groups

from different forest management models were selected by using three key criteria: i) user group managing natural *Shorea robusta* (sal), ii) user groups have less intra group conflicts, and iii) user groups are interested to share their ideas. *S. robusta* is a major timber species that generates high income and is considered one of the important aspects for sustainability of community based forestry (Pokharel *et al.*, 2015). A series of discussions were held with District Forest Offices of the respective districts on user group selection criteria.

Two community forest user groups (Sapankot Odare and Kyamin Hariyali) from Tanahu district, four forest user groups (two buffer zone community forest user groups – Bandevi Barandabhar, and Chitrasen and two community forest user groups – Dhudhakoshi and Jaldevi) from Chitwan district, and four forest user groups (two collaborative forest management user groups – Balkhoriya and Sahajnath and two community forest user groups – Pragatishil and Thanimai) from Bara district were selected as study sites.

A village to village approach suggested by Pokharel and Helle in 2009 was used for gathering information, particularly to cross check the information and acquire the perspectives from male, female and different castes. Ten meetings were conducted with ten different forest user groups (one meeting for each forest user group) individually. One of the meetings held with Thanimai Community Forest User Group (CFUG) is given in figure 2.



Fig. 2: Meeting with Thanimai CFUG

The participants for the meeting were selected with the assistance of the chair or secretary of the

executive committee. The duration of the meeting was from 2 to 4 hours. The meeting venue was office buildings mostly except in one forest user group (Kyamun Hariyali) as people from Kyamun Hariyali felt comfortable to hold meeting in an open place rather than in office building.

We directly approached forest users for small groups meetings since the authors were familiar with the local situation and the CFUGs. We first contacted a random individual in the field and requested him or her to take us to chair/secretary or invite a few more individuals for small group meeting including chair or secretary. The average group size of the meeting was 13.77 (± 7.21). During the meeting, they were asked to identify criteria, indicators and verifiers for a sustainable community based forest management. The criteria and indicators were listed by researcher on a flip chart until no criteria and indicators were suggested. After finishing the list of criteria and indicators, the researcher read out the list aloud and the participants discussed the relevance among themselves. The researcher encouraged especially women to voice their opinion during the discussions. An effort was made to include women for the meeting.

Results and discussion

Size of forest user groups and participants' characteristics

The size of households of ten forest user groups ranged from 210 to 27,121. They had managed forests in a range of 84 to 2,058 hectares of natural forests along with small areas of plantation. Among the participants in the meeting, one-fifth (20%) was female and the remaining (80%) were male. The average age of the participants was 44.09 years (± 11.59 years) and the average age of female and male found to be 37.68 years and 45.71 years, respectively. Getting involved women and poor in the meeting was challenging. Generally, women and poor feel comfortable relatively to attend a public meeting if they are invited by their relatives, neighbours or local leaders rather than an outsider. Although the researcher made the effort to include women for the meeting the result was not satisfactory. In few cases, women's presence in the meeting was nil. This may be due to their busy schedule as it was the season for rice harvesting.

Criteria, indicators and verifiers

The Montreal Process (1995) defines a criterion as a category of conditions or processes by which sustainable forest management may be assessed. The process also defines indicator as a measurement of an aspect of the criterion. Prabhu *et al.* (1999) defines an indicator as any variable or component of the forest ecosystem or management system used to infer the status of a particular criterion. Indicators are often used to measure changes, particularly when changes cannot be measured directly (WHO, 1981). For this study, we defined criterion as an aspect of forest management that is considered important by which sustainable forest management may be assessed. Similarly, we defined an indicator as a quantitative, qualitative or descriptive attributes that indicates direction of change in a criterion when measured or monitored periodically. And verifiers are the data or specific information collected for assessing an indicator. Local people considered four aspects that are considered important in managing their forests and identified them as criteria which obviously helped them to assess or judge the sustainable forest management practices. They are i) extent of resources, ii) economic and social benefits, iii) forest management practices, and iv) institutional framework and governance. Similarly, ITTO (2005) stated that a total of seven criteria [(1) extent and condition of forests (2) biological diversity (3) forest ecosystems health (4) forest productions (5) soil and water protection (6) socio-economic benefits and needs and (7) legal, policy and institutional framework] were agreed globally for sustainable forest management which may be seen as institutional top-down criteria. These criteria are related to environmental, socio-economic, institutional, and social aspects.

The locally identified criteria are related to environmental, socio-economic, social and institutional aspects. The identified three criteria

(number 1, 2 and 4) found to be identical with other studies (FAO, 1999a, 1999b; UNDP, 1999; ITTO, 2005; CCFM, 2006; Pokharel and Larsen, 2007; Jalilova *et al.*, 2012). However, they are presented in a different way. The criteria number 3 is similar with the findings of Pokharel and Larsen (2007) and also matches with the criterion number 4 of institutional top-down criteria (such as UNDP, 1999; ITTO, 2005) as both focus on social aspect. However, it is presented differently in the institutional top-down criteria as forest production. Maintaining forest production requires management so it can be grouped as same i.e., forest management practices. Local people considered forest management practices as one of the criteria for sustainable forest management as it is the only way of legally fulfilling basic forestry needs of rural people in a community managed forests and also improving the forest health. Similarly, local people identified the total of 26 indicators and 60 verifiers for evaluating sustainable community based forest management practices. They identified six and eight indicators and 13 and 18 verifiers under the first and second criterion, respectively (Table 1). Similarly, they identified seven indicators and 11 verifiers for the third criterion. For the fourth criterion five indicators and 18 verifiers were generated locally (Table 1). While discussing, they related it with their day-to-day and identified criteria, indicators and verifiers.

People identified forest condition, forest growth and harvest, greenery, forest ground coverage, changed forest area over time, and wildlife in forest as indicators for the first criterion i.e., extent of forest resources. Status of tree species, regeneration status, trees with different classes, canopy cover, good shape trees, forest area with destructive weeds were identified as verifiers to determine forest condition. The findings of this study, particularly, verifiers to determine the forest condition are similar with other studies

Table 1 Locally identified criteria, indicators and verifiers for a sustainable CBFM

SN	Criteria	No. of indicators	No. of verifiers
1	Extent of forest resources	6	13
2	Economic and social benefits	8	18
3	Forest management practices	7	11
4	Institutional framework and governance	5	18
Total	4	26	60

(Pokharel and Larsen, 2007; Pokharel and Suvedi, 2007). Status of valuable tree species is important for motivating people towards management as people may require less walk to find timber for construction of their houses and furniture and also facilitate to maintain diversity in the forest. Higher diversity of tree species is likely to maintain resource level in forests leading to sustainability. Higher species diversity is associated with their long term stability, allowing for niche diversification and low extinction rates (Stebbins, 1974). Frequency of seedlings and tree distribution per unit area is considered as a major indicator of stand structure. And stand structure with capacity of supplying diverse products in a sustainable basis is an indicator of sustainable management.

Destructive weeds and climber were increasingly seen in the forest and people perceived it as verifier to determine forest condition. Destructive weeds and climber are the threat to tree species and may displace them as people explained during the discussion and they are in an increasing trend in their forests which may pose threat to the sustainability as well. People were conscious about how much forest products especially timber is being harvested from forest and put it as an indicator to determine whether forest management practice is sustainable or not. Determining the sustainable forest management practice requires knowing how much timber is available and how much being harvested and replanted each year (CCFM, 2006). Forest land conversion into other land-use is one of the problems in Nepal and people identified it as an indicator for the extent of forest resources. Higher the conversion of forest land into other land use is likely to make less availability of forest resources. Forest land conversion is driven primarily by the expansion of agriculture and urbanization. The construction of permanent roads has also converted the area of forest land into other land-use in Nepal. The number of verifiers varied from one to six for each single indicator under the extent of forest resources (Annex 1).

People feel that socio-economic issues are important and need to be addressed to motivate rural people towards forest management and its sustainability as well. Community based forestry is essential about sustainable management of both people and forest resources which may lead

resource degradation if it is not managed properly. Social sustainable is important to consider for sustainable management in community based forestry. The management system in a common property like forest is likely to break down if it is not socially sustainable resulting in environmental degradation (Arnold and Steward, 1998). The distribution of costs and benefits are equally important to make people adhere to rules and regulations. If costs and benefits are equally distributed among the members, adherence to regulation is more likely (Singh, 2002). Awareness of people towards the importance of forestry, participation of people in forestry works, access to benefits, distribution of benefits, motivational works towards forestry, employment through forestry, generating common funds through forestry, and mobilization of forestry funds are identified as indicators to decide economic and social benefits. Benefit sharing is considered as an important indicator for the sustainable management of community based forestry (Hobley, 1996; Pietrowicz, 2000; James and Karan, 1997). For each indicator, the number of verifiers varies from one to four under the criteria of economic and social benefits (Annex 1).

Local people perceived forest management practices as an important activity that allows extraction of forests products legally from the forest and considered it as one criterion for sustainable forest management. Pokharel and Tiwari (2013) argue that forest management is an essential activity that not only makes the forest healthy and productive but also allows local people to extract forest products legally by ensuring their participation in the management practices being applied. Operational plan at community forestry is a required document which explains the ways of managing the forests focusing to different activities such as real forest condition, forest protection systems, and forest product extraction and distribution. Mismatch between the real forest conditions and adopted management plan is likely to lead ineffective management practices. Studies (such as Pietrowicz, 2000; Hobley, 1996) argue that most of the failure cases in resource management are because of mismatch between the real condition of the resource and adopted management plan. Local people identified silvicultural operations, plantation activity, incidence of forest fires, block divisions, wetland in forest, grassland in forest, and

recreation area in forest as indicators to determine forest management practices. Although forest fire is considered as essential element of forest management, it is often seen by local people as destructive in Nepal's community based forestry and identified forest fire as indicator to determine forest management practices. Forest fires are an essential element of forest renewal as they help control insect and disease damage and eliminate litter that has accumulated on forest floors (CCFM, 2006). Some species of trees actually require the intense heat generated by forest fires to release their seeds (*ibid*).

Local people see institutional aspect as important criteria for evaluating sustainable community based forestry. An institutional framework and governance is essential to put the policy into practices and also sharing the benefits. A favourable community based forest management policy is likely to attract people in the management. During the discussion, local people reflected that a favourable government policy made them to get involved in community based forestry. They realized the necessity of local institution in order to manage forest resources for a long run and also emphasized the need of good governance. Good governance is considered necessary in realizing the full potential of community forestry in contributing towards the goal of poverty reduction (Pokharel and Tiwari, 2013a). Local people think that governance is equally important for effective forest management and also giving the continuity to the management for long run by involving local people. Local people identified policy, leadership, composition of executive body, transparency and office management as indicators for tracking the progress on institutional aspect of forest management towards the goal of sustainability. Organizational leadership behaviors have a direct influence on actions in the work environment that enable change (Drucker, 1999; Gilley, 2005; Howkins, 2001). The verifiers ranged from two to six for different indicators under institutional framework and governance (Annex 1).

Wetland, grassland, recreation area in forest, motivational works towards forestry and office management are new indicators suggested by this study for a sustainable CBFM. Wetland and grassland indicators were reported only by forest user groups from buffer zone community forestry. Local people think wetland is important for

wildlife. Loss of wetland in a forest may indicate loss of habitat, food, and shelter for wildlife. Wetland is important as it provides essential habitat to a myriad of wildlife species including migratory birds (CCFM, 2006). The report also states that forest wetlands are major sources of recharge for ground water and also for regulating flows of surface water.

Conclusions

Understanding local knowledge, practice, and associated institutions are important to manage forest resources in a sustainable manner. There is a need to have continuous collaborative works between local people and forestry professionals for sustainable management. There is also a need to develop self-monitoring tool that allows local people to track the progress of forest management towards the goal of sustainability. Criteria, indicators, and verifiers are considered as self-monitoring tool to evaluate a sustainable community based forest management practices. Local people identified four criteria, 26 indicators and 60 verifiers for evaluating sustainable community based forest management. The identified criteria are found to be identical with the institutional top-down criteria. Similarly, wetland, grassland, recreation area in forest, motivational works towards forestry, and office management are new indicators suggested by local people to evaluate a sustainable community based forest management practices. Locally developed criteria, indicators and verifiers for sustainable community forest management can provide a local picture of what to consider for assessing a sustainable CBFM. Since the identified indicators are common mostly in buffer zone community forestry, community forestry and collaborative forestry they can be combined together to develop a single set of C&I and verifiers as a monitoring tool for evaluating a sustainable community based forest management practices.

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Annex 1: Locally identified criteria, indicators and verifiers

Criteria and indicators	Verifiers
Criterion 1. Extent of forest resources	
<ul style="list-style-type: none"> Forest condition 	<ul style="list-style-type: none"> Composition of tree species Regeneration status Trees with different age classes Canopy cover of forest Good shape trees in forest Forest area covered by destructive weeds and climber
<ul style="list-style-type: none"> Forest growth and harvest 	<ul style="list-style-type: none"> Amount of timber and fuel wood harvested from forest in a year
<ul style="list-style-type: none"> Presence of greenery 	<ul style="list-style-type: none"> Area covered by vegetation Number of springs in forest
<ul style="list-style-type: none"> Forest ground coverage 	<ul style="list-style-type: none"> Open area in forest floor
<ul style="list-style-type: none"> Changes in forest areas over time 	<ul style="list-style-type: none"> Changed forest area into other land use over time
<ul style="list-style-type: none"> Wildlife in forest 	<ul style="list-style-type: none"> Occurrence of wildlife in the area Livestock killed/attacked by wildlife in the area
Criterion 2. Economic and social benefits	
<ul style="list-style-type: none"> Awareness of people towards the importance of forestry 	<ul style="list-style-type: none"> Households showed up voluntarily to participate in forest related works Number of meeting conducted for awareness Trees on private land
<ul style="list-style-type: none"> Participation of people in forestry activities 	<ul style="list-style-type: none"> Households showed up in general assembly Households showed up in forest management activities
<ul style="list-style-type: none"> Access to benefits 	<ul style="list-style-type: none"> Households obtained benefits
<ul style="list-style-type: none"> Distribution of benefits 	<ul style="list-style-type: none"> Poor/marginalized households received benefits Wood received by forest dependent people
<ul style="list-style-type: none"> Motivation works towards forestry 	<ul style="list-style-type: none"> Welfare funds/allowance through forestry funds Financial support through forestry funds to forest dependent people for Income Generation Activities (IGA) Subsidy received through forestry funds for alternative energy Scholarship through forestry funds
<ul style="list-style-type: none"> Employment through forestry 	<ul style="list-style-type: none"> Local people hired as labour or staffs Received skill oriented training Households involved in IGA through forestry funds
<ul style="list-style-type: none"> Generating common funds through forestry 	<ul style="list-style-type: none"> Amount of income generated through forest products Amount of income generated through other sources such as recreation and tourism
<ul style="list-style-type: none"> Mobilizing of forestry funds 	<ul style="list-style-type: none"> Investment through forestry funds
Criterion 3. Forest management practices	
<ul style="list-style-type: none"> Silvicultural operations (<i>ban godne</i>) 	<ul style="list-style-type: none"> Silvicultural operations (<i>ban godne</i>) conducted regularly Promoting valuable tree species
<ul style="list-style-type: none"> Plantation activity 	<ul style="list-style-type: none"> Conducted plantation activity
<ul style="list-style-type: none"> Incidence of forest fires 	<ul style="list-style-type: none"> Occurrence of forest fires in forest areas Fire lines in forest

• Block divisions	• Block divisions in the forest
• Wetland in forest	• Prevalence of wetland in the forest • Ponds created artificially
• Grassland in forest	• Prevalence of grassland in the forest • Grassland created artificially
• Recreation area in forest	• Forest area allocated or created for recreation
Criterion 4. Institutional framework and governance	
• Policy	• Existence of national policy • Rules exist for forest products collection
• Leadership	• Punctuality in pre-determined programmes • Democratic mindset • Performed activities • Knowledge on forest policy • Sensitive on forest operational plan and CFUG constitution • Healthy
• Nature of the executive committee	• Inclusive (gender and marginalized people)
• Transparency	• Citizen charter • Public notice • Public hearing • Performed activities • Sub-committee
• Office management	• Office building • Office outlook • Office assistant • Meeting held