

Indicators for Measuring the Success of Nepal's Community Forestry Program: A Local Perspective

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Abstract

This paper explores locally agreed upon indicators to determine the success of Nepal's community forestry program. A workshop for community forest user groups (CFUGs) representatives and local forestry professionals was organized to develop the indicators. An interview schedule was developed to solicit CFUG members' views on the identified indicators. A stratified random sample of CFUG members was taken, and 487 members were randomly selected for personal interviews. Descriptive statistics were used to analyze data. Findings show that access to fuel wood, fodder and timber; amount of community funds; incidence of forest fire; use of compost; women's participation in forestry meetings; forest status; and quality of drinking water were the most often agreed-upon indicators to determine the success of the community forestry program. There tends to be congruency between the local people's perspectives and the views of scientific communities on many indicators of the success of the community forestry program.

Keywords: *community forestry, evaluation indicators, community forest user group, Nepal*

Background

Nepal adopted the community forestry program as a major strategy to manage the country's forests. The program expanded nationwide following the government's endorsement in 1989 of a 25-year master plan for the forestry sector. The program is based on policy that emphasizes local participation in the development and management of forest resources by transferring management responsibility from the

Forestry Department to the community forest user groups (CFUGs), who are willing and able to practice forest management. Community forestry, thus, has been the focus of forestry extension for several years and studies contend that the community forestry program has been successful in the mid-hills of Nepal in improving the socioeconomic conditions of the people (Agrawal and Ostrom 2001; Dongol et al. 2002) and the forests (Chakraborty 2001; Webb and Gautam 2001).

At present, the success of the community forestry program in Nepal is an issue for debate because the measure of success varies, depending on how "success" has been defined. One can argue about a given definition of success and put forward his/her own definition because success can be measured from different perspectives. Forestry professionals have established indicators for assessing forest condition. Success of community forestry can also involve the processes of community engagement in forest management in addition to forest condition. Success among forest user groups in Nepal is closely related to expression of user satisfaction with the result (Messerschmidt et al. 1994). User satisfaction is essential where users are invited to work voluntarily in the management of the community forests.

Indicator development has been one of the most popular research topics in natural resource management and conservation (Noss 1999). The use of indicators is common to assess the performance of a program (Conley and Moote 2003), resource condition (Belnap 1998), and environmental, social and economic sustainability (Farrell and Hart 1998). Indicators are variables, observable phenomena that reflect the situation or outcomes. They are pieces of information that indicate what is going on even though we cannot see the whole picture. An indicator provides useful information about a physical, social or economic system, usually in numerical

terms (Farrell and Hart 1998). Indicators are often used to measure changes, particularly when changes cannot be measured directly (WHO 1981).

Scientific knowledge is necessary for sound natural resource management, but it is not sufficient (Schusler et al. 2003). Local or indigenous knowledge could complement and/or supplement the scientific knowledge. Although several studies (such as Dongol et al. 2002; Messerschmidt et al. 1994; and Pokharel 2000) have focused on various aspects of the community forestry program, no attempts have been made to explore the local knowledge by inviting local actors to contribute to the development of indicators to measure the success of the program. It has been argued that local knowledge built out of what local people have experienced in their day-to-day life, seems to be practical and applicable in the field. The combination of local knowledge, with the expertise of outside specialists, is more accurate, more complex and more useful than knowledge produced and deployed by professionals alone (Jackson and Kassam 1998).

It has been argued that the success of the community forestry program as perceived by local people could vary with the scientific communities as perspective of success differs very much in the eyes of the beholder. O'Hara (2002) stresses that the local perspective is the key to success of community forestry programs as the local people are main stakeholders of the program. In this context, a commonly agreed-upon set of indicators as perceived by local people is essential to evaluate the community forestry program. This study is designed to answer the following research questions: What are the locally accepted indicators of a successful community forestry program? To what extent do CFUG members agree with success indicators identified by CFUG representatives and local technicians?

Study Procedure

This study was designed as a descriptive case study. It utilized both qualitative and quantitative data collection approaches. The qualitative approach included a day-long workshop of CFUG representatives and local forestry technicians to develop a list of indicators to measure the success of the community forestry program in the mid-hills of Nepal. The quantitative approach included a survey conducted by personal interview of 487 members from 50 CFUGs.

Qualitative Phase of Study: Indicator Development Workshop

This phase included a day-long workshop for CFUG representatives and forestry technicians. The authors organized a workshop in the Kaski district, a typical hill district with forests representative of most mid-hill districts of Nepal,

which is located in the western region of Nepal. The main purpose of the workshop was to solicit participants' opinion of locally agreed upon indicators for measuring the success of Nepal's community forestry program.

As of September 2002, 384 forest patches were managed by CFUGs in the Kaski district. The CFUGs were divided into two size categories: small (less than or equal to 5 hectares) and large (greater than 5 hectares). A total of 50 CFUGs (25 CFUGs in each category) were randomly selected and the list of 50 CFUGs were prepared in alphabetical order by the Village Development Committee. From this list, 15 CFUGs were randomly selected and their representatives were invited to a workshop on September 23, 2002. Thirteen people, four women and nine men including one *dalit* (lower caste member) representing 13 CFUGs, participated in the workshop. Three local forestry technicians were also invited to the workshop. The technicians were responsible for facilitating in small groups.

The workshop was conducted in an informal setting. Working together in small groups, as indicated by Schusler et al. (2003) provided an opportunity for dialogue among participants. After an explanation of the purpose and objective, participants were divided into two groups. Each participant's gender, education and ethnicity were considered in the formation of the groups. Each group was asked to answer the following questions: How do you view a successful community forestry program? What makes your community forest a success? What are the indicators of a successful community forestry program? How do you measure these success indicators?

During the small group discussion, each participant was asked to make his/her own assessment of what constitutes a successful community forestry program. To help the participants think about indicators, they were asked to assume that their own community forestry program was successful. They were encouraged to think about indicators that would be com-



Picture 1. Participants brainstorming in small group discussion



Figure 2. Participant presenting results of small group discussion

prehensive, practical and easy to use. The local term “sign” for indicator (McDuff 2001) was used to make sure all participants understood the meaning of an indicator in the same way.

Each group discussed what constitutes a successful community forestry program and what the indicators of that success are. They listed regularly fulfilling the demand of the forest products of local people from the forest and the physi-

cal conditions of the forest as basic factors for considering a program successful. They then discussed and developed a list of indicators based on these factors and suggested ways to measure them.

Each group spent about three hours discussing these questions. The facilitator paid special attention to women and *dalit* to get their opinions while discussing the questions. In the afternoon, participants met in a large group to present and discuss their findings. First, they arrived at a consensus on the definition of success. This was followed by discussion on the indicators and how to measure each indicator. Each indicator presented by the group was listed on a flip chart and read aloud so everyone could understand no matter what his or her educational level. The indicators that were endorsed by three-fourths or more of the participants were selected for field testing through personal interview of a larger sample of CFUG members of Kaski district, Nepal.

Table 1 shows the indicators that were agreed upon by at least three-fourths of the participants. Indicators consensus building was the hardest part of the workshop. Participants debated on the relevancy of the indicators to a program’s outcome before reaching consensus. The participants’ indicator debate was based on their relevancy to their own situations.

Table 1. Indicators for measuring success of community forestry program suggested by workshop participants and ways to measure them

| Indicators | Ways to measure the indicators |
|---|---|
| Access to fuel wood | <ul style="list-style-type: none"> Percentage of users obtaining fuel wood Amount of fuel wood collected in a year |
| Access to fodder | <ul style="list-style-type: none"> Percentage of users obtaining fodder Frequency of fodder collection in a year |
| Access to timber | <ul style="list-style-type: none"> Percentage of users obtaining timber (cubic feet or number of logs) Volume of timber collected in a year (cubic feet) |
| Use of compost | <ul style="list-style-type: none"> Percentage of users collecting leaf litter in a year Amount of compost used on farmland (weight) |
| Incidence of forest fires | <ul style="list-style-type: none"> Number of forest fires occurring in a year |
| Amount of community fund | <ul style="list-style-type: none"> Annual income from the community forest |
| Women’s participation in forestry meetings | <ul style="list-style-type: none"> Percentage of women in the forest management committee Percentage of women participating in users’ assembly and committee meetings |
| Trees on private land | <ul style="list-style-type: none"> Number of trees on private land |
| Forest condition | <ul style="list-style-type: none"> Level regeneration in a forest Tree canopy in a forest The shapes of trees in a forest |
| Diversity plant species | <ul style="list-style-type: none"> Types of plant species available in the forest |
| Availability of wildlife | <ul style="list-style-type: none"> Frequency of wildlife appearance in the area Number of livestock killings/attacks by wildlife in a year |
| Availability of non-timber forest products (NTFP) | <ul style="list-style-type: none"> Percentage of users collecting non-timber forest products (NTFP) Frequency of collecting NTFP |
| Greenery in the area | <ul style="list-style-type: none"> Percentage of formerly denuded hills and barren area covered by vegetation |
| Occurrence of landslides | <ul style="list-style-type: none"> Frequency of landslides in a year |
| Availability of water sources | <ul style="list-style-type: none"> Number of springs/volume of water available in the area Travel time for fetching drinking water Use of water for irrigation |
| Water availability | <ul style="list-style-type: none"> Duration of water availability in the area |
| Taste of drinking water | <ul style="list-style-type: none"> Cleanliness and chilliness of water |

Forest fire has been an important variable in the forest ecosystem. According to Piuissi and Farrell (2000) frequent forest fires have resulted in the degradation of vegetation cover. The participants in this workshop also perceived that forest fire was the biggest threat to the success of community forests. However, they also believed that, in some instances, fire enhances forest growth if the forest is burned in a controlled way. They recognized that women play an important role in the program's success as they pass on their knowledge to younger generations. It was also felt women take care of the forest in a better way than do men. This finding is consistent with those of Agrawal (1994) and Shiva (1989).

The participants perceived leaf litter as an important product from the community forest. Leaf litter is used to produce compost as fertilizer and is one of the major sources of soil nutrients in the hills of Nepal (Oli and Manandhar 2002). The workshop participants perceived trees on private farmland to be an important indicator of the program success because they reduce pressure on public forests. Awareness of tree planting on private land was increased after the community forestry program because of a restriction imposed by the CFUG for local people to enter into the community forest area for forest protection purposes. Similarly, the availability of tree species for private plantation through community forestry programs also helped to increase the awareness. The participants believed that trees on private land have helped people to comply with CFUG rules by making the forest products available, also facilitating improved the forest conditions. Access to fuel wood, fodder and timber, improvement in forest condition, increased plant species and wildlife in the forest, and availability of non-timber forest products had been experienced by most of the participants. Consensus was reached with ease to include these as indicators of program success.

The participants strongly felt that implementation of the community forestry program had improved forest conditions in their area. They had experienced changes in natural regeneration, tree shape and tree canopy in the community forests. Most of the participants recalled experiences and shared in the discussions. Many participants spoke of how they used to be able to see people walking in the forest from their houses but with increased forest canopy that it is almost impossible to see them now. They said that it had been difficult in the past to find good tree shape (i.e., straight and tall trees that could be used for house construction purposes) in the forest because people used to cut illegally when they saw a tree with good shape. Now it is possible to see such trees in the community forests.

As shown in Table 1, participants felt that the greenery in the area, the occurrence of landslides, the availability of water sources, and the taste of drinking water indicated the success or failure of a community forestry program. The participants strongly felt that the quality of drinking water had also improved after the improvement of forest conditions. It was clean and better for drinking, and needed to also be considered as an indicator of program success.

Several indicators were not agreed upon by three-fourths of the participants. These indicators are shown in Table 2. The use of improved stoves and availability of CFUG facilities such as office buildings, were not included in the field test. Similarly, increased managerial skills and systematic forest management practices, such as a list of indicators for regular trimming and pruning were debated, but no consensus was reached because most of the participants had not experienced such changes in their own community forests and did not agree to include them as indicators for measuring the program success.

Table 2. Less agreed-upon indicators for measuring the success of community forestry program by workshop participants

| Indicators | Ways to measure the indicators |
|--|--|
| Use of improved stoves | • Number of improved stoves adopted by forest users |
| Availability of user facilities | • Number of public facilities such as roads and schools constructed through CFUG funds |
| Relationship with non-governmental organizations | • Number of collaborative works carried out by CFUG |
| Awareness about forest regulations | • Number of meetings conducted related to forestry in a year • Percentage of users participating in the users' assembly |
| Awareness about important species such as Sal | • Number and types of species used for thakra to support climbing plants |
| Change in managerial skills | • Availability of CFUG records • Number of people aware of the records |
| Systematic management; regular thinning and pruning activity in forest | • Number of thinning and pruning activities conducted by the CFUG • Percentage of forest users who obtained training on silvicultural operations • Number of trained people available during thinning and pruning activities |
| Soil fertility | • Darkening of soil cover • Amount of compost application in a year • Amount of grain produced in a year |
| Occurrence of rainfall | • Frequency and amount of rainfall in a year |

Quantitative Phase: Survey of CFUG members

The workshop paved the way for the quantitative phase of this study. The extensive discussion on the definition, criteria and indicators for measuring the success of the community forestry program served as the basis for survey instrument development to verify indicators among local populations.

Instrument Development

Based on the recommendations of the workshop and an extensive review of literature, an interview schedule was developed to measure the success of the community forestry program. The interview schedule consisted of indicators suggested by the workshop participants. Respondents were asked to indicate their agreement or disagreement on a Likert-type scale (i.e., 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, and 5 = strongly agree).

Validity and reliability are the benchmark criteria for assessing the quality of such instruments (Mueller 1986). To validate the interview schedule, a half-day meeting of a panel of experts consisting of four members was organized. Members of the panel were the deputy regional director of forest, district forest officer, and Institute of Forestry faculty members. The panel reviewed the survey's content, format and audience appropriateness.

The instrument was prepared in English and then translated into Nepali, the national language. The translated version was reviewed by a linguist at the Institute of Forestry, Tribuvan University for translation validity before printing.

The researchers hired three enumerators and trained them to conduct interviews with CFUG members to field-test the instrument's reliability. The field test was conducted with 14 members of the Phedipatan Community Forest User Group in the Kaski district. The data were entered into the Statistical Package for the Social Sciences (SPSS), and Cronbach's alpha reliability was computed. The alpha coefficient was 0.74 for scales with 17 statements, and it was determined that the scale had an acceptable level of reliability for an exploratory study.

Data Collection

The population of this study consisted of all CFUGs in the Kaski district, a representative mid-hill district of Nepal. As indicated earlier, this district has 384 forests maintained by CFUGs. Of these forests, 64 (16.6%) were considered small and the remaining (83.4%) were considered large. A total of 50 CFUGs representing both small and large community forests were randomly selected, and 10 member households from each CFUG were randomly selected for interview. The head of the CFUG member household or an adult of 18 years of age or older was interviewed. A total of 487 house-

hold heads/adults were interviewed during October-December 2002.

Data Analysis

Data collected from the respondents were coded for processing and analysis. The SPSS software version 11 was used to perform the data analysis. Descriptive statistics were used to summarize the data. Frequency counts and percentage were calculated for the descriptive data.

Demographic Characteristics of the Respondents

A total of 487 respondents from 50 CFUGs were interviewed during house-to-house visits. The gender breakdown of the survey population sample was 204 (42%) female and 283 (58%) male. The survey population ranged in age from 18 years old to 79 years; the average age was 44.8 years. As shown in Table 3, the age of 36 to 55 years represents 40% of the surveyed population, followed by age of 18 to 35 years (33%) and age of 56 years and older (27%). Over half of the respondents (52%) were *Brahmin*, followed by *Gurung/Magari* (21%), *Chhetri/Thakuri* (19%), and *Dalit* (8%).

Table 3. Demographic and social characteristics of the respondents (N = 487)

| Characteristics | Number | Percent | |
|----------------------|--------------------|---------|------|
| Gender | Female | 204 | 41.9 |
| | Male | 283 | 58.1 |
| Age groups | 18 – 35 years | 160 | 32.9 |
| | 36 – 55 years | 196 | 40.2 |
| | 56 years and above | 131 | 26.9 |
| Castes/ethnic groups | Brahmin | 252 | 51.7 |
| | Chhetri/Thakuri | 94 | 19.3 |
| | Gurung/Newar | 104 | 21.4 |
| | Dalit* | 37 | 7.6 |

* *Dalit* includes *damai*, *kami*, and *sarkee*

Perceptions of Forest User Group Members of the Indicators

Forest user group members were asked to indicate their agreement or disagreement on a Likert-type of scale (i.e., SD = strongly disagree, D = disagree, NO = no opinion, A = agree, and SA = strongly agree) on all indicator statements. Of the 17 statements, respondents rated eight statements very high i.e., they "agreed" or "strongly agreed" with these indicators (Table 4).

As shown in Table 4, the overwhelming majority (over 75%) of the respondents indicated that they either "agree" or "strongly agree" with the statements pertaining to greenery in the area, incidence of forest fire, forest status, women's participation in forestry meetings, access to fuel wood, occur-

Table 4. Most agreed-upon indicators for measuring success of community forestry program (N = 487)

| Statements | Responses (in percentages) | | |
|---|-----------------------------------|---------------|-----------------------------|
| | Disagree/ strongly disagree | No opinion | Agree/ strongly agree |
| Access to fuel wood has increased after community forestry program | 4.9 | 3.9 | 91.2 |
| Access to timber has increased after community forestry program | 8.2 | 6.6 | 85.2 |
| Incidence of forest fire has decreased in the forest after community forestry program | 2.7 | 2.7 | 94.6 |
| Women are actively taking part in forestry meetings after community forestry program | 3.3 | 6.6 | 90.1 |
| Forest status such as regeneration has improved after community forestry program | 0.4 | 1.4 | 98.1 |
| Number of wildlife has increased in the forest after community forestry program | 6.6 | 15.0 | 78.5 |
| Greenery has increased in the area after community forestry program | 0 | 0 | 100 |
| Occurrence of landslides has decreased in this area after community forestry program | 6.4 | 8.4 | 85.2 |

rence of landslides, access to timber, and availability of wildlife. Similarly, over half of the survey population either “agree” or “strongly agree” on the eight indicator statements (Table 5). Only about one-quarter (26.5%) of the survey population either “agree” or “strongly agree” on the statement i.e., availability of non-timber forest product (NTFP) has increased after the community forestry program. It was noticed during data collection that many respondents were not aware of the NTFP.

Discussion

A commonly agreed-upon set of indicators, as perceived by local people, is desirable to evaluate the community forestry program because local people are its major stakeholders. Access to fuel wood, fodder and timber; amount of community funds; greenery in the area; and availability of water sources are commonly agreed-upon indicators for measuring the success of the community forestry program. Although, needs of the forest products such as fuel wood, fodder and timber depends on family size, number of livestock, agricultural land, caste, educational status and so on. It is important to identify the households who are in need of such forest products and to measure the quantity they receive, or

Table 5. Agreed-upon indicators for measuring success of community forestry program (N = 487)

| Statements | Responses (in percentages) | | |
|--|-----------------------------------|---------------|-----------------------------|
| | Disagree/ strongly disagree | No opinion | Agree/ strongly agree |
| Access to fodder has increased after community forestry program | 28.7 | 16.2 | 55.0 |
| Amount of community funds has increased after community forestry program | 2.1 | 30.6 | 67.4 |
| Use of compost through leaf litter collection has increased after community forestry program | 17.4 | 20.9 | 61.6 |
| Tree on private land has increased after community forestry program | 17.9 | 20.1 | 62.0 |
| Types of plant species have increased in the forest after community forestry program | 6.5 | 18.5 | 75.0 |
| Availability of NTFP has increased in the forest after community forestry program | 10.1 | 63.4 | 26.5 |
| Water sources have increased with the improvement of forest condition | 11.5 | 23.2 | 65.3 |
| Water availability for longer period has increased with the improvement of forest condition | 10.7 | 26.7 | 62.6 |
| Taste of drinking water has improved as it is clean and cold after the improvement of forest condition | 7.4 | 34.7 | 57.9 |

the proportion of daily needs met, from the community forests to fully measure the success of the community forestry program. The identified indicators are consistent with past studies (Dongol et al. 2002; Pokharel 2000; Upad-hayaya 1999). There appears to be congruency between the perceptions of local people and those of the scientific communities on these indicators.

Overall, the agreed-upon indicators for measuring the success of the community forestry program are acceptable to the forest user group members. Among the 17 statements, the eight statements pertaining to greenery in the area, incidence of forest fire, forest status, women’s participation in forestry meetings, access to fuel wood, occurrence of landslides, access to timber, and availability of wildlife are strongly acceptable as indicators to determine the program’s success. They were highly rated and also acceptable by more than three-fourths of the survey population. It seems that most of the people in the area have experienced the changes in such activities. There has been a major change in women’s participation in forest management. It was interesting to learn that the majority of the CFUGs are represented by women in the

management committees. It was reflected in the discussion that women were ignored earlier while making decisions regarding forest management. Now, they are consulted and also encouraged to hold a post in the executive body of CFUG, which is a major change in this male dominated society, especially in a society where the literacy rate is low.

Respondents in this study agreed that forest condition, use of compost by CFUG member households, women's participation in forestry meetings, trees on private lands, availability of various plant species and wildlife, occurrence of landslides, and taste of drinking water should serve as indicators for measuring the success of the community forestry program. Some of these indicators, for example, improvement of the forest condition are consistent with indicators suggested by Webb and Gautam (2001). Indicators such as taste of drinking water, women's participation in forestry meetings, trees on private land and use of compost on farm land are suggested as new indicators for measuring the success of the community forestry program. Although Gilmour and Fisher (1991) mention increased numbers of trees on private land and women's participation, these are not used as indicators to measure the program's success in Nepal. Respondents in this study agreed that increased presence of trees on private land is an important reason for declaring the program successful because it facilitates the improvement of the community forest conditions by reducing pressure on them.

Similarly, respondents strongly felt that the quality of drinking water (clean and chilly) improved after the improvement of forest conditions. They also felt that clean and chilly water has a better taste for drinking than unclean and warm water, which gives more satisfaction in drinking when someone is thirsty. Such improvement in water may also help reduce waterborne diseases in the area. Messerschmidt et al. (1994) and Upadhyaya (1999) also reported the increase in water sources and water availability for a long period after the community forestry program as perceived by local people.

It was noted that the CFUG members whose settlement was located below the community forest tended to agree on the increase of water sources and the water availability for lengthy periods and changes in water taste after the improvement in forest condition. However, the users whose settlement was located above the community forest tended to disagree. This indicates that the perception of the forest users on the increase of water sources and the water availability for longer periods may vary depending on the location and distance of their settlement from the forest. It was also noted that the water was used for irrigation in some cases in the study areas.

Conclusions

This study recommends eight indicators pertaining to greenery in the area, incidence of forest fire, forest status, women's participation in forestry meetings, access to fuel wood, occurrence of landslides, access to timber, and availability of wildlife as indicators for measuring the success of a community forestry program in the mid-hills of Nepal. The forest users perceived that the community forestry program has brought changes in the environment by improving the local forest condition. The findings of this study suggest that there is some congruency between the local people's perspectives and the literature on indicators to measure the success of the community forestry programs.

At the same time, this study found some incongruence. For example, it had been suggested that use of improved stoves (Manandhar 1981), relationships with NGOs, and awareness about forests and forest regulations (Messerschmidt et al. 1994) be used for measuring program success. However, the local people tended to disagree with the use of such indicators. This study has advanced new indicators based on local peoples' perspectives to assess the long-term impact of the community forestry program. These could serve as areas for collaborative work between the scientific community and the local people to verify the indicators in evaluating the community forestry program. These indicators could be further tested at other locations so that generalizations could be made to a larger population.

Endnotes

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