

Silviculture in community forestry: conceptual and practical issues emerging from the Middle hills of Nepal

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The present study assesses the silvicultural practices in community forestry in the Middle hills of Nepal. Two forest user groups (FUGs) - Gokhureshwor Community Forest and Paire-Salla Community Forest were selected for in-depth case studies. Focus was given to characterise the silvicultural practices and assess their linkages with FUG livelihoods. Over 10 silvicultural treatments were identified in the groups studied, and they were found to be uniquely determined by multiple objectives of members of FUGs, elite-dominated political structure of the hills communities, community-specific perceptions and indigenous knowledge, and to some extent the scientific knowledge shared by formally trained forestry staff. Because of such a multiplicity of causal factors, silvicultural systems in community forestry were found more complex than generally considered. Several issues and challenges in the interface between silvicultural practices in community forestry and rural livelihoods are identified and discussed. Based on these findings, implications are drawn on the principle and practice of silviculture in community forestry. The study concludes that silviculture in community forestry should be based on new conceptual and methodological elements. The new silvicultural approach, participatory silviculture, may help improve dynamic linkages between forest management and rural livelihoods in the community forests in the Middle hills of Nepal.

Keywords : Silviculture, Community forestry, forestry products, rural livelihood, forest management, Nepal.

Silviculture - an art and science of cultivating trees, is the foundation of forest management. Silvicultural practice here is meant to any deliberate human action (related to regeneration, tending and harvesting of forest crops) to influence the structure and processes of forest stands (followed from Smith, 1989). The traditional science of silviculture is more about timber, particularly under government-managed or private forestry regimes. But little is understood with respect to the way silvicultural actions in community forests are planned and implemented. Campbell *et al.* (1997) have suggested a 'new silviculture' for community forestry by highlighting some underlying principles and characteristics. But more inductive understanding of the thought and perceptions that influence silvicultural activities in the community-managed forests are yet to be analysed and shared. This study was therefore, an attempt to understand the patterns and processes of silviculture within the prevailing socio-economic contexts of community forestry in the Middle hills of Nepal.

The study adopted an approach of answering questions by making an attempt to make an in-depth understanding of the silvicultural phenomena in a few selected cases rather than extensive survey. The two study sites are - Gaukhureshwor

Community Forest, Dhading District (30 km west) and Paire Sal-Salla, Kavrepalanchok District (25 km east) away from Kathmandu valley. Both the FUGs and the community forests are within one km from the all weather highway that links Kathmandu city. Both groups are relatively small and less heterogeneous in terms of ethnicity, both comprising of Brahmin-Chhetri (a dominant caste group under Hindu System). These cases were considered typical in the Middle hills of Nepal, and shared some characteristics and contexts that may deepen the understanding of silvicultural practices: a) both have easy access to roads and near the big city (Kathmandu); b) both have been identified (by the supporting organisations) as the active groups in terms of forest management so that the sphere of analysis is broadened, c) both are relatively small FUGs to facilitate rapid and thorough analysis, but d) the two FUGs were different in terms of forest types. These groups offer a good opportunity to look into the emerging patterns and processes of rural livelihood as they are closely linked to big city like Kathmandu.

Silvicultural practices adopted by the two CFs are first discussed, and issues and observations relating to overall forest management and user livelihood are then briefly outlined. Based on these findings,

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implications are drawn on the principle and practice of silviculture in community forestry, followed by some recommendations for improved silvicultural interventions for the effective and sustainable management of community forests in the Middle hills of Nepal.

Silvicultural practices in community forests

The study revealed that users of the both CFs have adopted diverse and specialised types of silvicultural treatments. Over 10 such treatments were identified in both the groups studied. These include: **Selective Felling** (occasional cutting of trees for special use), **Thinning** (of poles in dense stands), **Pruning** (of mature trees roughly up to half of the tree height for obtaining firewood), **Cleaning** (of ferns and other less useful herb and shrub from spring water source, plantation areas and other parts of the forests along with thinning and singling operations), **Leaf litter collection** (from the forest floor usually in the morning for 7-8 months a year), **Grass collection** (from the faces of the gullies in forests where grasses are available), **Grazing** (controlled on all parts of the forests), **Planting** (of preferred multi-purpose species), **Nursery** (for private and community planting and sale), **Cultivation of cash crops** (such as Argeli, which is used in making high quality paper for currency notes), **Dry twigs collection** (allowed to the people of neighbouring villages free of charge after all other forestry operations are over), **Singling** (of multiple coppice are done in 3-2-1 system in the three rotation along with thinning), **Trial plots** (established to observe the effect of thinning intensity on the growth and yield of the forest crops), **Water sources protection** (in the forest from where forest users obtain water are specially protected, and **Wildlife habitat improvement** (for common wild animals such as Deer).

Many of the silvicultural operations are directed towards generating products and services that fulfill users' current requirement. For example, pruning in both the CFs is done for meeting fuelwood requirements. Pruning and thinning are considered intermediate operations in classical silviculture, but forest users regard them as very much close to harvesting. Except nursery and plantation, all treatments result in some form of immediate benefits as by-products, and the users accord high priority to such instantaneous benefits.

Subsistence as well as commercial objectives are addressed through diverse silvicultural operations. Leaf litter collection, collection of bedding materials are done to meet the users' own requirements. Argeli cultivation and felling mature trees have been

done as part of increasing FUG funds. Many of the silvicultural operations involve removal of live or dead biomass. Cutting of live materials from forests is avoided as far as possible as the users fear the degradation of the forest. The prime need of the users appear to be the leaf litter and fuelwood in both CFs.

Most of the operations (such as thinning, pruning, felling) are carried out during the winter. This represents a suitable season from various points of view: a) dormancy of the forest at the time of being cut followed by growing season that enhances the growth, b) slack season with little or no work in crop fields. Activities such as grazing, grass collection, Fodder collection are carried out mainly during the monsoon. This indicates the continuous silvicultural actions in the forest round the year but with varying degree of intensity and purpose.

There is a great difference between men and women in relation to forest management and silvicultural practices. For example, men are the decision-makers of silvicultural options and they engage themselves in felling, thinning and pruning activities while women are involved more in forage and leaf litter collection, and other minor activities. In the long run men's such excessive dominance over women in decision making could prove to be an obstacle in producing forage from community forests.

Operations are not generally carried out one by one. A set of operations are carried out in a single patch. In P-FUG, thinning, pruning, cleaning and similar operations are done at a time, and they regard such operations collectively as *Kantchhant* or *Godmel*. These operations are carried out to meet a variety of needs (fuelwood, bedding materials, and others). In the same FUG, parts of community forests adjoining the private land of users are informally given for use and management to the concerned individuals. This form of property right arrangement is locally known as *Sandhisarpan*. The intensity of silvicultural operations was higher in this part of the community forest than the core part owned communally. This means that there is less chance of uniform silvicultural operations throughout the forest.

Ecological responses of silvicultural practices are observable in both the FUGs. While the stocking level in terms of wood volume is apparently increasing in the two community forests, the diversity of species is compromised with the wood volume of the select timber species. This is consistent with Branney and Yadav's (1998) observation (*Schima-Castanopsis* forests showed significant increase in basal area) in the change in community forest condition in the Koshi hills.

Analysis and discussions

Forestry operations carried out by FUGs are modest in many aspects, whereas, at places they are destructive (conflicting with the ecological processes) also. Thinning, felling, singling are cautious and modest, whereas sweeping forest floors (without any limit in quantity and space) and pruning (beyond the limit of minimum crown required to maintain the tree vigor) may degrade forest productivity. This indicates that the methodological element of silviculture is not well developed to maintain a good balance between extraction and conservation.

While local knowledge has made valuable contributions to silvicultural technology, some apprehensions regarding forest resource use and management are becoming the source of inefficiency. For example, excessive negation of fire and inability of the FUG members to recognise it as a tool when used under control, has triggered the ecological processes not exactly desired by the group. Similarly, the local concept of *Kath* (superior wood) and *Kukath* (inferior wood), and its effect on the creation of monoculture through removal of inferior species is another example of the conflicting situation between the sound forest ecological system and community need. The inference is that in community forestry, silviculture is largely dictated by local perceptions and knowledge that is not always realistic. This raises a fundamental question as to how the practice of silviculture in community forestry can be based on more accurate understanding of the ecological phenomena.

Forest management planning is inadequate in both the CFs. The objectives of forest management in terms of products and quantities are less clearly articulated with the growth and yield estimate. The timing of final felling is not recognised in the management system. The bi-products of intermediate cuttings are used as forest products, while there is no supply-driven final harvest. The division of blocks for regulation of sustained yield by area control has taken into account the major products like fuelwood and timber, while ignoring the wide range of other products. And, there is only an intermediate horizon of fulfilling demands, without having a distant vision of forest and livelihood scenario.

The inadequate confidence over forest ownership in majority of the users is partly responsible to their low interest and participation on the planning and implementation of more appropriate silvicultural systems. The domination and capture of decision-making forum by men has led to strong favour for timber, whereas a range of non timber forest

products that contribute to their own livelihood system have been ignored. The women, who are mostly responsible for livestock care and many other household activities, are under increasing work load with respect to collecting certain products. The availability of fuelwood, poles and other wood products has, however, become more abundant due to the protection and management of forests.

Cash crops such as vegetables are replacing the traditional food crops due to better returns realised through the growing market opportunities. This has brought about the changes in the types and relative proportion of products and services expected by users from the forest. Bean stakes are a good example of the new forest product requirement emanating from the livelihood response to market opportunities (people have started producing more beans than maize). Grasses and fodder are required in increased proportions as the scope of livestock has enhanced due to increasing milk demands.

The overall strategy of forest management is to produce timber as the main forestry product. All other are treated to be the bi-products coming out of intermediate cuttings. Whereas the present study revealed that the two user groups have the timber as the third priority after fuelwood, leaf litter or even grasses. The aggregate dry matter consumed annually in the form of timber is far below that consumed as fuelwood or leaf litter. Also, the discounted sum of financial value of long rotation product like timber may be less than the non-marketed contribution of leaf litter and fuelwood.

Lessons and implications

The two case studies reveal that the process of community forest management and silvicultural manipulations are more complex and dynamic than generally believed by foresters. Multiple livelihood objectives, local perceptions and knowledge systems, community power structure and decision-making systems are some of the factors that make silviculture and community forest management more complex. Although innovative and specialised silvicultural operations have been carried out by FUGs to generate required outputs, under limited interaction with formally trained foresters, there are still tremendous untapped opportunities for improved forest management. This may be harnessed by an innovative approach to silviculture that consists of new conceptual, methodological and substantive elements to give rise to practices that better satisfy ecological, economic and social standards, challenging the classical timber-oriented silvicultural theory.

This is possible only when the foresters supporting

community forestry start recognising the need for such an innovative approach to silviculture. Silviculture in community forestry needs to be handled with a different paradigm. Campbell *et al.* (1997) have suggested a New Silviculture for participatory forestry. This study reinforces the need for a new silviculture that appreciates the complex community needs, local perceptions and community contexts, and this may better be regarded as Participatory Silviculture that is essentially characterised by a new set of conceptual and methodological elements as shown below:

Participatory silviculture in community forestry

Conceptual elements	Methodological elements
Multiple objectives and multiple time horizons – timber, grasses, etc. all such end products guiding silvicultural treatments.	Participatory and interactive
Strong influence of local perceptions	Iterative and adaptive
Site specificity – absence of uniform treatments through the forest	Qualitative approach to be combined with quantitative assessment
Context specificity – ownership feeling, power structure, markets	

Under this approach, FUGs may be supported in better planning of forest management by clear identification of objectives and identifying suitable silvicultural options. This may involve building on local knowledge and rectifying local misperceptions. Participatory action research may be designed to identify suitable silvicultural technologies for meeting appropriate mix of subsistence as well as commercial needs.

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