

Indigenous technical knowledge of people on fodder tree management

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With a view to explore and document the existing indigenous knowledge on fodder tree management, the present study was carried out at Nirmal Pokhari Village Development of Kaski District through RRA and PRA. Species such as *Ficus lacucha*, *Ficus clavata*, *Premna integrifolia*, *Ficus semicordata*, *Ficus lacor*, *Litsea polyantha*, *Ficus roxburghii*, *Ficus glaberrima* are the main fodder trees planted at the upland of the study area. In the study site a household was found growing eight fodder trees on average. *Ficus lacucha*, *Ficus clavata*, *Premna integrifolia*, *Ficus semicordata*, *Litsea polyantha*, and *Ficus roxburghii*, are completely lopped whereas *Ficus lacor* and *Ficus glaberrima* are lopped leaving few top branches of the tree. Branch size is one of the major criteria for lopping of fodder trees. Lopping is done generally from November to mid June when there is a scarcity of green grasses for grazing.

Keywords : Fodder trees, *Ficus lacucha*, *Ficus clavata*, *Premna integrifolia*, *Ficus semicordata*, *Litsea polyantha*, *Ficus roxburghii*, *Ficus glaberrima*, fodder lopping, indigenous knowledge, midhills, Nepal.

Indigenous technical knowledge (ITK) for fodder tree management exists in areas where farmers are mostly dependent on fodder trees for their livestock. Farmers use this knowledge while planting and lopping fodder trees. Evidence of growth and survival of seedlings as well as foliage production indicate that the ITK has scientific validity

Fodder trees are important renewable natural resources used by the farmers in the midhills. It plays a vital role of cattle feed during dry season and the pre monsoon period. Leaves and thin branches are normally lopped for feeding cattles. There is a long tradition of growing fodder trees on the edge of terraces, around homesteads and marginal land in the midhills.

The hill people depend very much on fodder trees to feed their cattle. This dependency has influenced significantly the use and management of these resources. The people have been managing fodder trees using ITK since long ago when they learned the importance and value of fodder trees. Some Forest Users Groups (FUGs) are still technically good and can share their experience on fodder tree management to professional foresters (Ladely and Karki, 1994). Evidently, there is a need to tap on their ITK, which has been, in some cases, forgotten by a majority of people.

The main purpose of this paper is to explore and document the existing indigenous technical knowledge especially planning and lopping practices on fodder trees management.

Method

The study area, Nirmal Pokhari VDC, is located about 12 km south-east from the town of Pokhara. The altitude ranges from about 750 m to 1,134 m. The climate varies from tropical to subtropical. In the VDC there are 1,255 households with an average of six family members. The literacy (reading and writing Nepali) rate and population growth rate of the VDC is 69.68% and 2.56%, respectively, (Pokharel 1996). The area comprises diverse ethnic/caste including Brahmin, Chhetri, Magar, Gurung, Newar, Kami and Pariyar.

The major land use of the study area is composed of agriculture land which includes upland non-irrigated *bari* and low lying irrigated level terraces *khet*. The households are located in the hills and surrounded by homestead gardens consisting of many varieties of fruit and fodder trees. The forest type in the study area is dominated by *Schima-Castanopsis* (Chilaune-Katus).

An informal interview of Rapid Rural Appraisal (RRA) and various tools of Participatory Rural Appraisal (PRA) were used to obtain basic

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information for this study. The principle of triangulation, in order to verify the collected information (Grandstaff and Grandstaf 1987), was also used to confirm the information provided by informants.

Semi-structured interview (SSI), accidental interview, direct observation, seasonal calender and secondary information were used during data collection. The SSI was conducted with farmers in open group discussion using sub-topic as guidelines. Seasonal calender was prepared in group.

Results and discussion

Planting practices

The trees are planted to ensure a sustained fodder or firewood supply during scarce period. Campbell and Bhattarai (1984) estimated that an average household in Nepal owns about ten trees. In this study area too an average housenolds owns about 8-10 trees mostly foddors. The farmers have planted trees on non-irrigated land or marginal land. Most of the planting materials were obtained from their own source, mainly regenerated seedlings/saplings collected from the nearby forest.

The people in the area have been practicing fodder tree planting in thier own land by using their own source of seedling besides forest nursery. The planting material, specially seedlings were collected from nearby forest. A number of species such a gindari, kabro, pakhuri and bedulo are collected from fork trees of other species. These species often germinate on other trees, particularly the forked ones often being carried out by birds to the host trees where they germinate whereas khanayo is collected only from the forest floor.

Species such as pakhuri, kabro, gindari, bedulo etc. often begin their life as epiphytes. However, the seeds also germinate in the ground. The farmers seem to be very careful while uprooting the seedlings. They uproot the seedlings from the host tree without destroying the main roots. If needed, they even cut a piece of wood along with the seedling to safeguard roots. Such seedlings are planted along with the portion of wood which ultimately decomposes in due time and provides nutrient to seedling. Generally, the farmers collect the seedlings from the forest floor by removing all soil particles to make easy to carry it to their home. Such naked rooted seedlings are planted with compost. The seedlings are planted at a spacing of 10 haat (about 4 meters) from one plant to another. Mostly, the seedlings are planted in the terraces of

the marginal lands and pakho bari (non irrigated fields) of hill slopes.

It was learned that all seedlings are not safe while bringing them from the natural condition. Generally, the disturbed rooted seedlings are planted near the kitchen place for cleaning utensils where the seedlings are expected to get high moisture and nutrient. After one or more years such seedlings are transplanted to the desired area.

Table 1: Type of seedlings source by using technical knowledge

Species	Seedlings collection
<i>Ficus clavata</i>	forest floor of forked trees
<i>Premmna integrifolia</i>	forked trees
<i>Ficus semicordata</i>	forest floor
<i>Ficus lacor</i>	forked trees
<i>Ficus glaberrima</i>	forest floor of forked trees

The majority of the farmers in the study area follow the above-mentioned planting technique. This insight of traditional technical knowledge is inherited by the villagers from their ancestors. The technique looks very old and traditional, but the evidence of survival and growth pattern shows that it has scientific validity.

Lopping practice

Lopping is done by farmers to obtain various outputs from trees. It is also important for fodder tree management. The time of lopping depends on species, fodder needs, and amount of foliage growth. In the Tarai, first lopping starts when the tree completes its third year of growth, (Pandey 1982, cited by Karki 1992). Branch size is often one of the criteria used to decide when to begin lopping.

Amatya (1990) reported that the lopping pattern of fodder trees depends on the altitude and season of that particular area. Wornald (1976) and Pradhan (1982) stated that the amount of branch materials cut from a tree is influenced by the weight, height, and availability from the individual tree.

In the study area, lopping is done very carefully to maximise the leaf production for the next year. Bad cutting practices reduce the amount of foliage and growth of the branch. The fodder trees are lopped by cutting off leaves and small branches with small sickle. However, Pandey, (1982) reported that there is a practice of de-leafing by hand to some of the species to avoid tree damage and enhance growth.

Table 2: Adoption of fodder lopping practice at Nirmal Pokhari VDC.

Species	Lopping practice
Badahar (<i>Ficus lacucha</i>)	complete defoliate
Bedulo (<i>Ficus clavata</i>)	complete defoliate
Khanayo (<i>F. semicordata</i>)	complete defoliate
Chinne (?)	complete defoliate
Gindari (<i>P. integrifolia</i>)	complete defoliate
Kabro (<i>Ficus lacor</i>)	leave a few branches on the top
Kutmiro (<i>L. polyantha</i>)	complete defoliate
Nimaro (<i>Ficus roxburghii</i>)	complete defoliate
Pakhuri (<i>Ficus glaberrima</i>)	leave a few branches on the top

Lopping technique differs from tree to tree depending on the thickness of the branches. In case of larger twigs and branches two-way cuts are made, one cut from the upper portion and the other from the bottom when one-way cut is not sufficient to sever the branches. This is done in order to protect the possibility of rupturing of bark from the cut places. Two nearly equal and opposite cuts are made at nearly equal angles in order to make fine cut. Within this cut a "down to up" cut is better than an "up to down" cut. However, the "up to down" cut is more familiar to the farmers due to its easiness.

Such lopping technique provides more tree fodder for the next year. If it could be cut at once, a slant cut is made. It is noticed that the farmers are very cautious during lopping because roughly lopped branches produce less fodder.

Table 2 shows that some of the fodder species such as badahar, bedulo, chinne, gindari, khanayo, kutmiro and nimaro are completely lopped where as a few branches on the top are left for kabro and pakhuri. The main reason for such complete lopping of these species is that they produce more fodder. Pakhuri and Kabro need a few branches left on the top to get more fodder production. It is widely believed that the farmers follow certain rules to decide on the frequency of lopping. In the study area the main factors such as immediate needs for fodder, the presence/absence of lactating animals in the household are known to influence lopping practices.

Fodder trees are needed to feed the cattle during the dry season. Because of unavailability green grasses, lopping is done during dry season to provide green stuff in the dry period. A number of authors (Van Swideren 1978, Fox 1983, Rusten 1989) noted that farmers use tree fodder throughout the year. However in the present study area the farmers were found to feed fodder only seven to eight months, from Kartik to Jestha (early November to mid June) (Table 3). The choice of the species depends upon the seasonal availability of fodder. The farmers have planted many species to stagger the fodder yield throughout dry season. A similar observation was also made by Nepali (1991) in Lahchok VDC, Kaski District.

The amount of fodder lopped during the day is used for the evening and the following day. Generally, the livestock were not fed with enough amount of fodder over a long period.

Conclusion

Feeding of fodder to livestock is a common traditional practice in the mid-hills of Nepal. The

Table 3 : Seasonal calender for fodder collection, Nirmal Pokhari VDC 1996.

Species	Seasonal Calender											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Ficus lacucha</i>											•	•
<i>Ficus clavata</i>										•	•	•
Chinne (?)								•	•	•		
<i>Premmna integrifolia</i>								•	•			
<i>Ficus semicordata</i>							•	•	•			
<i>Ficus lacor</i>	•	•	•									
<i>Litsea polyantha</i>								•	•	•		
<i>Ficus roxburghii</i>									•	•	•	
<i>Ficus glaberrima</i>										•	•	

majority of the farmers have planted fodder trees in their own land. Most of the planting materials i.e., seedlings are being collected from the nearby forests. They pay more attention towards fodder trees while walking in forests. Technique of transplanting seedlings in the area by the farmers seem very old and traditional but the evidence of seedling survival and growth indicates that the local knowledge has some scientific validity.

The aim of fodder tree management is to maintain the sustain fodder production for the dry season. One of the ways to achieve this is to plant more different species in the farm land which the farmers of this site are following. Since livestock raising is linked with farming system this may be primary reason why the farmers are planting more fodder species in their own land.

Lopping is important for fodder tree management. It requires good skills and knowledge. Proper lopping technique may maximise fodder production. The study indicated that the branch size is one of the criteria whether to follow one-way cut or two-way cut for lopping. Species such as badahar, bedulo, kutmiro, etc. produce more fodder if the branches are completely lopped. Increased scarcity of fodder may have forced the farmers to gain the experience with different lopping practices. The lopping skills and knowledge of people on existing tree reflect that it has also some silvicultural significance. Further research is needed on energy storage capacity of standing and completely lopped trees and its fodder production.

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