

FORESTRY RESEARCH PAPER SERIES

Number 1

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PRIVATE PLANTING:
FORESTRY PRACTICES OUTSIDE THE FOREST BY RURAL PEOPLE

K. H. Gautam

HMG-USAID-GTZ-IDRC-FORD-WINROCK PROJECT

STRENGTHENING INSTITUTIONAL CAPACITY IN THE

FOOD AND AGRICULTURAL SECTOR IN NEPAL

FOREWORD

This Forestry Research Paper Series is funded through the project, "Strengthening Institutional Capacity in the Food and Agricultural Sector in Nepal," a cooperative effort by the Ministry of Agriculture (MOA) of His Majesty's Government of Nepal and the Winrock International Institute for Agricultural Development. This project has been made possible by substantial financial support from the U.S. Agency for International Development (USAID), the German Agency for Technical Cooperation (GTZ), the Canadian International Development Research Centre (IDRC), and the Ford Foundation.

One of the most important activities of this project is funding for problem oriented research by young professional staff of agricultural agencies of the MOA and related institutions, as well as for concerned individuals in the private sector. In particular, funding is provided by the Ford Foundation to support research activities related to the human aspects of natural resource management. This research is carried out with the active professional assistance of the Winrock staff.

The purpose of this Forestry Research Paper Series is to make the results of the research activities related to forestry available to a larger audience, and to acquaint younger staff and students with advanced methods of research and statistical analysis. It is also hoped that publication of the Series will stimulate discussion among policymakers and thereby assist in the formulation of policies which are suitable to the management of the natural resource systems upon which the development of Nepal's agriculture depends.

The views expressed in this Forestry Research Paper Series are those of the authors, and do not necessarily reflect the views of their parent institutions.

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PRIVATE PLANTING:

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K. H. Gautam*

INTRODUCTION

Background

Forests play an important role in the daily life of Nepali people, particularly in the rural areas. As about 96 percent of the population is rural, and more than 60 percent live in the hills, the importance of forest resources in Nepal cannot be overstated. Rural people use forest resources for fuelwood, fodder, poles, timber, wood fiber, medicine, fruits, and compost manure. An improved environment, and soil and water conservation are the indirect benefits gained from the forest.

Nepal's increasing population is encroaching on the forests to fulfill basic needs. Not only are Nepal's forests decreasing in area but the remaining forests are being degraded. Inadequate protection, ineffective management, insufficient land use planning, and the increasing human and cattle populations have led to the indiscriminate cutting of forests, encroachment on forest land, and increased arable land. Even steep mountain slopes are coming under shifting cultivation and suffering from overgrazing.

Forest area decreased between 1964 and 1975 by 1.5 million ha. If the indiscriminate destruction of forests continues, the accessible forest in the hills could disappear in 15 years and in Tarai within 25 years (FAO, 1978). Each year, 240 million cubic meters of soil are lost to the sea from Nepal's four major rivers and over 6000 tributaries. It is important to take measures to protect the remaining forest resources and create new forests, particularly in the hills.

The prevailing type of forest management must be replaced with a scientific management system firmly based on the principle of sustained yield and multiple use. However, a multiple use system of management for both forests and trees outside of the forest must be compatible with the aspirations of the local population if such a self sustaining forestry system is to succeed.

Since the early 1970s, community-based programs have been founded in most of the service sectors within Nepal. Community forestry is not a technology, it is a process of social change that requires the continuous participation of whole communities in planning and problem solving (Eckholm, 1979). The community involvement in forestry development is a practical necessity if rural forestry needs are to be met.

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The success of community forestry rests on individual motivation that occurs from the extension of a farm-level development program. Extension through private planting can bring education and motivation to the community. Thus, private planting programs are being carried out as a national campaign all over the country. All the forestry-related projects have set targets for private planting.

Integrated Hill Development Project (IHDP)

The Integrated Hill Development Project (IHDP) was begun in 1974 under the joint cooperation of His Majesty's Government of Nepal and the Swiss Association for Technical Assistance (SATA). The project area includes part of Sindhupalchowk (east of the Sunkosi river) and all of the Dolkha District. Phase One (the initial building of the project) and Phase Two (consolidation and extension to all of the project area) have been completed. Phase Three has just begun, during which the project will be handed over to Nepali Staff.

IHDP, instead of expanding to a larger area, has tried to develop a limited region in an even and harmonious way. It attempts to integrate the development of many aspects of human life. Therefore, IHDP is involved in agriculture, forestry, water management, health, training and education, and alternative sources of income.

The first forest plantations were established within government forests during 1976. Three years after the community forestry legislation (the Panchayat Forest and Protected Panchayat Forest Rules 1978) were enacted, the IHDP forestry sector began a community forestry program. As the community forestry program of Sindhupalchowk district was handed over to the Nepal Australia Forestry Project (NAFP) in the beginning of Phase Three (1985), the program is concentrated only in Dolakha District.

Description of the Area

The study area, the Mati Village Panchayat of the Dolakha District is bounded by the Namdu Panchayat to the east, Katakuti and Phasku Panchayats to the south, Makai Bari Panchayat to the west, and Charikot Panchayat to the north. The Tamakosi, Charnawati, and Kaidale rivers are natural boundaries of the panchayat in the east, south, and west respectively. The area of the panchayat is approximately 15 sq. km. The terrain is rough with some folded slopes. Though the soil is fairly thick, in some areas the fertile topsoil has been washed away.

About 50 percent of the panchayat is covered with natural forests, which includes degraded forest land and shrub land. Though the forest area has not changed significantly in the last two decades, the forests are being drastically degraded. The forests along the rivers are mainly of chir pine (Pinus roxburghii Sarg.) and sal (Shorea robusta Gaertn.). Chir pine is the dominant species in the panchayat forest. Generally, the high altitude forests are degraded, where only thorny bushes, shrubs, and banamar are left.

The population of the panchayat is 4727 (1981). Chhetris are the dominant population, followed by Newars, and Brahmins. The other ethnic groups in the area are Damai, Sarki, Ghentí, Kami, and Tamang. Subsistence farming is the primary occupation of all the ethnic and caste groups.

Objectives

The study has the following objectives.

1. Evaluate traditional practices of tree maintenance on cropland.
2. Evaluate the IHDP input into private planting.
3. Evaluate the socioeconomic factors in private planting.
4. Evaluate the awareness of the private forest legislation.
5. Recommend the appropriate measures to be made toward improving the private planting program of community forestry development, through the participation of rural people.

Methodology

The study began with a review of the the relevant literature. Primary data were collected using observations, and both structured and unstructured interviews. Seedling distribution records were obtained from the IHDP forestry sector office at Charikot and the IHDP sub-center at Kirnati Chhap.

The most important source of information in this study was the interviews, conducted with a structured questionnaire. The subjects were the households who have planted seedlings on their own land. Interviews were conducted either at their residence or at the planted site. The questionnaire was primarily used as a basis for discussion--the respondents were not confined to giving only yes or no answers. The site visits were also used to determine the species' performance.

Members of the district panchayat, including the Pradhan Pancha, ward leaders and members, teachers, students, and forestry employees were interviewed and asked for their recommendations on how to improve the private planting program.

Limitations

1. Generally, the people do not keep records of how many trees they have on their land. The information in the study is, therefore, based upon the owners' best estimates.
2. A cadastral survey has not been carried out in the study area. Thus, recording the actual area that the individual farmer owned was difficult.

3. The seedling distribution register in the panchayat nursery had not been maintained properly. For example, the number of households that took seedlings as reported in the register was found in the field to be inaccurate; and members of the same household had been recorded as being from separate households.
4. The seedling distribution record from Kiranti Chhap for fiscal years 1982-1983 and 1983-1984 was not available.

EVALUATION OF TRADITIONAL PRACTICES

The main purposes of maintaining trees on cropland are fodder, fuelwood, and timber. A secondary aspect is the use of trees for soil and water conservation. Fodder production is the oldest practice for tree maintenance on cropland.

Of the 23 households surveyed, 91 percent have fodder on their land, while 57 percent and 61 percent have trees for fuelwood and timber, respectively (Table 1).

Table 1. Trees for Each Forest Product

Use	No. of households (hh)	Total no. of trees	Percent of total households	Max. no. of trees/hh	Min. no. of trees/hh
Fuelwood	13	897	57.0	220	8
Fodder	21	761	91.0	140	2
Timber	14	853	61.0	150	5

Fodder, fuelwood, and timber production are so interlinked that sometimes one species produces all three forest products. Generally, fuelwood is gathered from twigs and branches of the fodder and timber species. Most of the trees provide an equal contribution to the soil conservation. Thus, the farmers are using multipurpose tree species in traditional tree maintenance on cropland.

Plant Species

The plant species (and their uses) that are grown on private cropland, as determined in the study, are given in Table 2.

Certain species are preferred on the basis of the amount and quality of their yield, and their effects on land and crops. Specifically, the root system, the provision of shade, means of propagation, and force of habit are all factors the farmers use to make their planting choices. Table 3 gives the species in order of the farmers' preferences, as revealed by interviews, discussions, and site visits.

Table 2. Species Maintained on Croplands

Local name	Botanical name	Type	Use
Bakaino	<u>Melia azedarach</u> Linn.	Tree	Fuel, fodder, timber
Bans	<u>Dendrocalamus</u> spp.	,,	Fuel, fodder, timber
Bhimsen pati	<u>Buddleja asiatica</u>	,,	Fodder, fuel
Chilaune	<u>Schima wallichii</u> Chois.	,,	Fuel, timber
Dar	<u>Buehmeria regulosa</u>	,,	Timber
Dudilo pati	<u>Ficus nemoralis</u> Wall.	,,	Fodder
Ginderi	<u>Proman</u> spp.	,,	Fodder
Harro	<u>Terminalia chebula</u> Retz.	,,	Fuel
Ipil Ipil	<u>Leucaena leucocephala</u>	,,	Fodder, fuel
Kalikhath	<u>Myrine semiserata</u>	,,	Fodder, fuel
Kalkiphul	<u>Callistemon viminalis</u> cheel.	,,	Fuel
Kaulo	<u>Machilus gamblei</u>	,,	Fodder, timber
Kavro	<u>Ficus lacor</u>	,,	Fodder
Khaniyo	<u>Ficus semicordata</u>	,,	Fodder
Khotesalla	<u>Pinus roxburghii</u> Sarg.	,,	Timber, fuel
Kutmiro	<u>Litsea polyantha</u>	,,	Fodder
Lahare pipal	<u>Populus</u> spp.	,,	Timber
Lankuri	<u>Fraxinus floribunda</u> Wall.	,,	Fuel, timber
Lapsi	<u>Choerospondias axillaris</u> Roxb.	,,	Timber, fuel
Masala	<u>Eucalyptus</u> spp. L. Hen.	,,	Timber, fuel
Mauwa	<u>Engelhardtia spicata</u> blume.	,,	Fuel
Nimaro	<u>Ficus roxburghii</u> Wall.	,,	Fodder
Ningalo	<u>Arundinaria</u> spp.	Smallbush	Fodder
Odal		Tree	Fodder
Paingyo	<u>Prunus cerasoides</u> D. Don.	,,	Fodder
Patula Salla	<u>Pinus patula</u> Schlecht.	,,	Fuel
Saj	<u>Terminalia tomentosa</u> Arn	,,	Timber, fuel
Sal	<u>Shorea robusta</u> Gaertn.	,,	Timber, fodder, fuel
Syalphusro	<u>Grewia tiliifolia</u>	,,	Fodder
Tanki	<u>Bauhinia purpurea</u> Linn.	,,	Fodder, fuel
Tooni	<u>Cedrela toona</u> Roem.	,,	Timber, fodder, fuel
Utis	<u>Alnus nepalensis</u> D. Don.	,,	Fuel, timber

Table 3. Species Preferences

Fodder	Fuelwood	Timber
Kutmiro	Saj	Sal
Khaniyo	Chilaune	Saj
Dudilo pati	Utis	Chilaune
Nimaro	Sal	Khotesalla
Ginderi	Guras	Utis
Kavro	Mauwa	Tooni
Syalphusro	Bakaino	Dar
Odal	Khotesalla	Bakaino
Bans	Ginderi	Bans
Piangyo	Tooni	Lankuri

Tree Growing Sites

Trees are grown on terrace edges and between terraces of both bari (nonirrigated land) and khet (irrigated land), kharbari (where thatching grass is grown), and private forest land.

Mostly fodder trees are raised on terrace edges and between terraces of the bari land. Chilaune is also grown on bari, but to a lesser extent. Very few trees are grown on terrace edges and between terraces of the khet, most of which is utis. In the lower elevations (in Katiko, Busti, and Karanti Chhap), sal, khote salla, and saj are grown on khet.

The fuelwood and timber trees are mostly grown on kharbari. However, only households with large landholdings own kharbari. Thus, tree cultivation on kharbari is limited to a very small percentage of the households.

Only 17 percent of the households kept land as forest to grow the trees to meet their forestry needs. These were all large landholders.

Methods of Forest Establishment

Natural regeneration accounts for most of the new fuelwood and timber trees, and about two-thirds of the fodder trees maintained by each household. Transplanting natural regenerated seedlings from other sites on household land is the next most important means for planting these tree species, as well as bamboo. A very limited number of species, such as kavro (Ficus lacor), are propagated by cutting and planting.

Protection from grazing cattle is the primary limitation for growing trees on cropland. Thorny shrubs and bushes are common means to protect the seedlings from livestock. Bamboo is also used to protect the grown trees in early stages by splitting and netting.

The harvesting period varies with the product and species. Fodder trees are harvested from Marga to Ashad (December to June). Fuelwood harvesting has no fixed period, but is generally done during the fodder tree harvest. Timber is generally felled from Kartik to Marga (November-December). The harvesting periods of the main fodder species are listed in Table 4.

Pattern of Harvesting

Most of the fodder tree are harvested annually. Timber species are harvested when necessary. Fuelwood species are harvested mostly in April-May to store for the planting season. The intensity of harvesting increases with succeeding years. The main shoot is not lopped till the tree matures. When the tree is fully mature, no leaves are left on the tree at the time of the lopping. The local villagers have discovered that the tree starts sprouting side branches once the lopping is started. So they start lopping in the early stages of the tree's life.

Table 4. Harvesting Period

Species local name	Harvesting from	Period to	Age of first harvesting (year)
Bans	March	April	6
Bhimsen pati	December	April	3
Dudilo	May	July	8
Ginderi	March	April	6
Kavro	June	July	5
Khaniyo	February	April	6
Kutmiro	February	April	6
Nimaro	February	April	7
Odal	January	April	4
Paingyo	April	May	3
Syalphusro	January	April	4

Forestry Needs

Of the sample households, 83 percent have a shortage of fuelwood, 87 percent have a shortage of fodder and all experience timber shortages.

The average number of fodder trees per livestock was 3.6. The maximum number of fodder trees per livestock was 18.8--this was seen in only five percent of the surveyed households. The minimum number of fodder trees per livestock was 0.23. Even the households who had more than seven fodder trees per livestock had just enough fodder. The rest of the households depend on government forest for grazing.

The fuelwood problem is severe in Wards One, Two, Three, Four, and Seven, where residents have begun using the banamar stem for fuelwood. They depend on the government forest to fulfill their fuelwood requirements.

All the households surveyed experienced timber shortages, relying on government forests. This need is particularly acute when a new house is built.

IHDP INPUTS TO PRIVATE PLANTING

The community forestry program began in Mati with the establishment of a panchayat forest nursery in 1981. The main objective of the nursery is to produce seedlings for planting in the panchayat forest and panchayat protected forest, and for the local population to plant on their own lands. Plantations are maintained annually from the seedlings raised in the panchayat nursery. Seedlings are also being distributed free of charge for private planting.

Two trained nursery foremen are working in the nursery. One plantation watcher per 10 ha. is employed to guard the plantation. A assistant ranger supervises the activities in Mati and five other panchayats.

Seedling Distribution

The total number of seedlings distributed during the four years 1981-1982 to 1984-1985 of nursery operation is 3793, of which 2921 were distributed within the panchayat and 872 to other panchayats. The species distributed were mainly Pinus roxburghii Sarg., Prunus cerasoides D. Don., Alnus nepalensis D. Don., Melia azedarach Linn., Fraxinus floribunda Wall., Eucalyptus spp. L. Hen., Chaerospondias axillaris Roxb., Dendrocalamus strictus, and Litsea polyantha. Details of the seedling distribution are given in Table 5.

Table 5. Seedling Distribution

Fiscal year	No. of seedlings distributed		No. of household seedlings taken	
	Panchayat	Outside	Panchayat	Outside
1981-1982	2159	143	23	10
1982-1983	110	34	5	2
1983-1984	180	370	3	7
1984-1985	472	325	9	6
Total	2921	872	40	25

The distribution was at a maximum in the first year of operation. The average number of seedlings distributed per household from 1981-85 is 73 in the panchayat and 35 in the other panchayats. The seedling distribution program, instead of expanding, is concentrating on a few households.

Survival Rates

Twenty-four households who collected seedlings for private planting were interviewed and their plantation sites visited. The number of seedlings surviving were counted and the survival rate was calculated. The survival rates by species are given in Table 6.

Generally, the survival of the seedling can be evaluated only after one year of planting as the seedling passes through all the weather extremes of the year. Mortality is high during winter and just before monsoon. The survival rates shown in Table 6 include the seedling planted in fiscal year 1984/85 which have not faced the critical season. So the actual survival rates after one year of plantation are less.

The main reasons for seedling mortality and frequency of responses are given in Table 7. From Table 7 it is clear that the principle reason for seedling mortality is livestock damage. Goats are the most destructive of the livestock.

Protective measures are not adopted effectively so the seedlings are mostly browsed in the period when the land is not being farmed. People who took the seedlings from nursery do not make much effort to protect the seedlings, because they believe the supply is almost

unlimited. In addition, when seedlings were taken and planted by one member of the family, this was not communicated to other members of the family.

 Table 6. Survival rates

Species local name	Planted no.	Surviving no.	Survival percentage
Bakaino	181	14	7.7
Utis	256	75	29.3
Lankuri	40	40	100.0
Dhupi	12	0	0.0
Siris	8	1	12.2
Painyu	139	18	12.9
Khotesallo	302	90	29.8
Kalkiphul	55	14	25.4
Patula salla	30	25	83.3
Masala	29	3	10.3
Lahare pipal	57	27	47.4
Lapsi	25	2	8.0
Bans	2	1	50.0
Badahar	98	68	69.3
Ipil Ipil	102	38	37.2
Tanki	32	19	59.4
Kutmiro	30	30	100.0
Total	1398	465	33.3

 Table 7. Main Reasons for Seedling Mortality

Reasons	No. of response
Livestock damage	12
Planting site unsuitable	2
Selection of wrong species	2
Negligence in grass cutting	2
Seedling not weeded	2
Insect damage	2
Landslide	2
Wrong time of planting	1
Improper planting method	1
Unhealthy seedling	1
Inappropriate size of seedling	1
Theft	1
Other (frost, fire, drought)	3
Don't Know	3

 Appropriateness of Species

People's preference, survival rate, growth characteristics, planting schemes, and propagation methods must be considered in determining the appropriateness of the species. It is too early to make real conclusions about the newly introduced species in the area. Nevertheless, as the gap between supply and requirement is widening day by day, fast-growing species need to be introduced. The species should

not adversely affect the crop yield by casting shadows on the field. Lastly, a fodder tree has to be palatable to the livestock.

The list of most widely planted species should not be understood as a list of people's preferences, but as a combinations of those that were available that people were willing to plant (Campbell and Bhattarai, 1983).

Considering all these factors, Litsea spp., Artocarpus lakoocha Roxb., Bauhunia purpurea Linn., and Leucaena leucocephala for fodder, and Alnus nepalensis D.Don., Melia azedarach Linn., Fraxinus floribunda Wall., Pinus roxburghii Sarg., and Pinus patula Schlecht for fuelwood and timber, were found to be the most appropriate species for private planting in the Mati Panchayat.

SOCIOECONOMIC FACTORS IN PRIVATE PLANTING

Awareness

The establishment of the nursery made a great contribution to public awareness of the community forestry program. As the seedlings are distributed to the villagers, the knowledge about the program is spread. The people who receive the seedlings from the nursery know about the program. However, by evaluating the number of household seedlings used and their location in the panchayat, it appears that the social awareness of the program has not been communicated effectively.

The members of the district panchayat, the Pradhan Pancha, the ward leaders, teachers, students, and office employees are all aware of the program.

The most effective means of making the people aware of the program in the Mati Panchayat is through the people who come with their cattle to the area where the forest nursery is located.

Ethnic/Caste Group

Different ethnic and caste groups have varying degrees of acceptance of the program. Table 8 presents the population breakdown by ethnic and caste group and the number of seedlings taken by each group.

Table 8. Ethnic Caste Group Planting

Ethnic/Caste group	Population composition (percent)	Seedling recipient (percent)
Chhetris	50	72
Newars	25	8
Brahmins	20	17
Ghartis	3	-
Other (Damai, Kami, Sarki)	2	3

Landholding

A cadastral survey has not been carried out in the area, so the landholding size is only an estimation. Table 9 shows the large size landholding households are the majority who plant trees on their own land. The people with small landholdings have not yet started planting on their own land.

Planting Time

Planting time is another important factor to be considered in the private planting program. Fifty percent of the households cannot collect and plant seedlings at the correct time, as they are engaged in planting the agricultural crops. This factor is also related to the high seedling mortality because of late planting. The households give first priority to agricultural crop planting. This is also the case with small landholding households, as they get employment in the planting season.

Table 9. Landholding and Planting

Landholding size	Total population (percent)	Seedling recipients (percent)
0 - 5 ropani	46	-
5 - 10 ropani	32	10
10 - 20 ropani	20	15
20 ropani and over	2	75

Note: One ropani equals .126 acres.

PEOPLE'S AWARENESS OF PRIVATE FORESTRY LEGISLATION

All people contacted were aware of the enactment of the private forest rules. Most of them do not know when it was enacted but they at least know they have to submit an application to register their private forest.

Very few people understood the type and magnitude of the support they can expect from the government. Generally, people know that the government supplies a limited number of seedlings. But none of them know that government provides some financial support to the private forest owner. As expected, no one knew what conditions had to be fulfilled by the owner to get this support.

There is a good deal of confusion among the local people about the private forest legislation. The locals feel that they can claim communal land as their own private forest land. People are still reluctant to use their trees freely without the written permission either of panchayat or a forestry offices. Particularly when the people have to sell some forest produce, they hesitate to do so without consulting the respective authority. Even people engaged in forestry extension activities do not know the legal provisions to their full extent.

CONCLUSION

On the basis of this study, the following measures are recommended to expand and develop forestry practices outside the forest through the participation of rural people.

1. Intensive research needs to be conducted on the effect of different tree species on crop yields.
2. The private planting program needs to be expanded, and rewards given for increased private production.
3. The mortality rates of the seedlings can be reduced by charging a nominal fee for them.
4. Loan facilities for large scale private planting are needed to attract people to participate actively in the private planting program.
5. An effective extension program must be begun to improve the seedling survival rates, and should address the problems of improper sites, improper planting time and methods, insufficient weeding, and transport mishandling.
6. Before seedlings are distributed, the nursery should find out the past performance of the person who is collecting the seedlings, should know about the site and protective measures to be taken, before the appropriate species are provided.
7. Regular follow-up visits should be conducted by the extension worker.
8. The ethnic and caste groups who are not participating in the program need to be motivated and educated to encourage them.
9. Winter planting of appropriate species has to be carried out on a trial scale to fit the planting time with people's convenience.
10. The people as well as the extension staff have to be thoroughly aware of all the features of the private forest legislation.
11. Finally, an effective motivation program as well as technical support must be implemented.

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