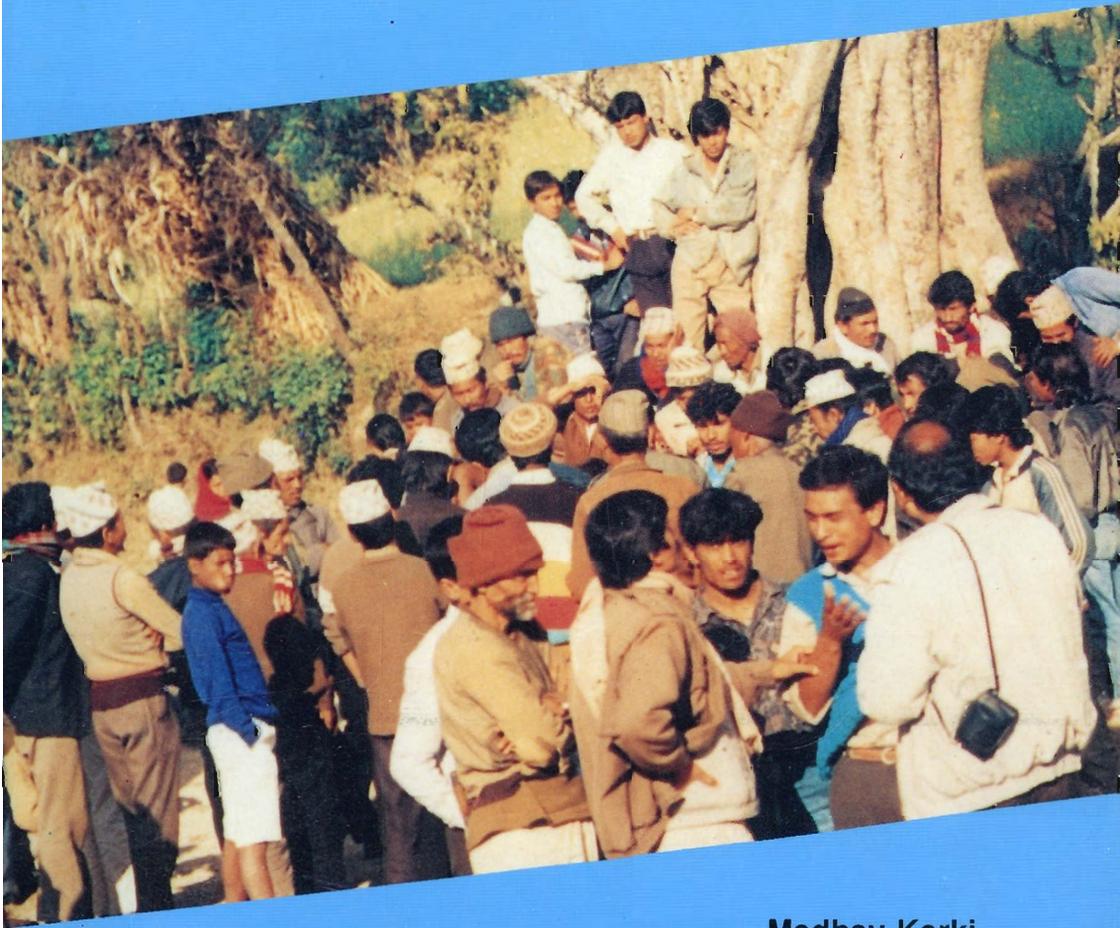




**SUSTAINABLE MANAGEMENT OF COMMON
FOREST RESOURCES: AN EVALUATION OF
SELECTED FOREST USER GROUPS IN
WESTERN NEPAL**



**Madhav Karki
Jay B.S. Karki
Neeta Karki**

SUSTAINABLE MANAGEMENT OF COMMON FOREST RESOURCES: AN EVALUATION OF SELECTED FOREST USER GROUPS IN WESTERN NEPAL

Foreword

(Case Studies of Palpa District and The Phewa Watershed)

Madhav Karki
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Foreword

This study is one in a series commissioned by ICIMOD to provide insights into community-managed forests. Continued access to forest resources is crucial for people living in mountainous regions, particularly those who have limited access to non-farm employment and markets.

The over-exploitation of limited resources and the sustainability or unsustainability of carrying capacities are matters of continual concern for all these who work for the betterment of living conditions in the Hindu Kush-Himalayas.

It is already becoming clear that the successes of user group forestry vary, and that much depends upon the clear-cut identity of the groups, clearly specified user rights, and the bases on which these are determined. Conflict resolution would appear to be another important issue that needs serious consideration.

At what point any given user group becomes or became, institutionalised is another important perspective. Some groups have existed, whether formally or informally, for quite long periods of time and have survived all manner of reform to emerge in the latter day as Forestry User Groups. User groups exist with varying degrees of success.

All this should indicate to us the overwhelming importance of the forests and their products to village dwellers throughout the mountainous regions.

What is becoming clearer as these studies emerge is that the indicators for successful management of a forest by a user group are not constant. Hence, ICIMOD's interest in looking for both the commonalities and the differences in User Group management.

ICIMOD organised these case studies on User Groups with a specific framework in mind; i.e., to identify key internal variables (those within the community); and to identify key external variables (those outside the community). It is hoped that eventually ICIMOD will be able to record the different typologies and their practical implications for planning and management of natural resource use at different spatial levels. At this time I am already confident that this document will serve as an important tool in sensitising and educating students of the Institute of Forestry, Pokhara, as well as many others about the importance of local level national resources' management. The authors of this particular book on User Groups have put in a lot of effort to complete it. They have acknowledged those who have helped them in doing so, but I would here like to reiterate those thanks in acknowledging the patience and enthusiasm of the forest users who helped with this study. I would like to thank the Ford Foundation (New Delhi) and more specifically Dr Jeffrey Campbell for the financial support provided to undertake this study and its publication. I should also like to thank Dr Mahesh Banskota, Director of Programmes, ICIMOD, for organising these studies and for the special attention he has given them.

Egbert Pelinck
Director General

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This work would not have been possible without the overwhelming response and cooperation shown by the forest users of Palpa district and the Phewa Watershed. We specially thank the User Group Committee officials as well as the Group members who shared their ingenuity, knowledge, and ideas with us. We sincerely acknowledge their intellectual contribution, of which this report forms a part.

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Madhav Karki

Table of Contents

	Page
1: STUDY OBJECTIVES, METHODOLOGY, AND FRAMEWORK	1
Objectives	1
Framework for Analysis	2
Primacy of Socioeconomic Variables	3
Conceptual Basis of Research	3
Measured Variables	4
Key Factors and Indicators	4
Effects and Impacts	5
Project Inputs	5
Data Collection Methods	6
<i>Historical Survey</i>	6
<i>Sample Survey</i>	6
<i>Rapid Vegetation Assessment (RVA)</i>	8
<i>Projection Techniques</i>	10
Women's Role in UG Forestry	10
<i>General Approach of the Study</i>	10
<i>Method of the Study</i>	11
Research Team	12
Forest User Groups under Study	12
User Group Selection	13
Key Questions for User Group Evaluation	13
Assessment of Sustainability	14
Methods of Measuring Sustainability	14
2: REVIEW OF COMMUNITY FORESTRY DEVELOPMENT	17
Evolution of Indigenous Forest Management Systems (IFMS)	17
Outstanding Issues	18
Pattern of Variation	19
<i>Issues under Investigation</i>	19

	Learning from Past Experiences	19
	Evolution of User Group Forestry in Nepal	20
	<i>Concepts and Practices</i>	20
	User Group Concepts	23
	<i>Definition of FUG</i>	24
	The UG as a Common Property Resource Institution (CPRI)	24
	<i>Challenges Faced by the CPRI</i>	25
	FUG as a Common Property Resource (CPR) Institution	26
	<i>CFRM Framework</i>	28
	<i>Forestry for Sustainable Development</i>	28
	<i>Case for User Group-based CF</i>	29
	<i>Issues</i>	31
3:	BACKGROUND OF THE STUDY AREA	33
	Palpa District	33
	<i>General Features</i>	33
	<i>Biophysical Description</i>	33
	<i>Demography</i>	33
	<i>Forestry</i>	35
	<i>Agriculture</i>	36
	<i>Other Development Activities</i>	36
	Phewa Tal Watershed	37
	<i>General Description</i>	37
	<i>Population</i>	37
	<i>Socioeconomics</i>	37
	<i>Fuelwood and Fodder Situation</i>	38
	<i>Soil Conservation Work</i>	38
	<i>Biophysical Description</i>	39
	<i>Geology and Landform</i>	40
	<i>Agriculture</i>	40
	<i>Livestock</i>	41
	<i>Horticulture</i>	41
	<i>History of Watershed Development</i>	41
	<i>Community Participation in Resource Management</i>	42
4:	INSTITUTIONAL DEVELOPMENT OF FOREST USER GROUPS	43
	A. Palpa District	43
	<i>Mulgaira Forest User Group,</i>	

	<i>Madanpokhara</i>	43
	<i>Shikhardanda Forest User Group,</i>	
	<i>Madanpokhara</i>	47
	<i>Bharkesh Forest User Group, Telgha</i>	49
	<i>Mahajir Salleri User Group,</i>	
	<i>Dhyakul-danda</i>	51
	<i>Khumdanda Forest User Group,</i>	
	<i>Chidipani</i>	54
	<i>Ramche Forest User Group, Rampur</i>	56
	<i>Hungi User Group Forest, Majuwa</i>	59
	<i>The Role of the District Forest Office</i>	61
	<i>The Ethnic Composition of the Users</i>	62
	B. Phewa Tal Watershed	62
	<i>Turung User Group Forest</i>	62
	<i>Dopahare User Group Forest,</i>	
	<i>Sarangkot</i>	66
5:	ANALYSIS OF EXTERNAL INPUTS AND VARIABLES	71
	Background of the Analysis	71
	Palpa District	71
	<i>Socioeconomic Background of the User Groups</i>	71
	Phewa Watershed	74
	<i>Socioeconomic Background of User Groups</i>	74
	Forest User Group Structure and Function	77
	Formation of User Groups	77
	Causes and Consequences of Deforesta- tion	78
	Types of Local Initiative	78
	Social Systems Adopted	78
	Resource Development Initiatives	80
	Forest Management System	80
	Animal Grazing and Product Removals	83
	Harvesting and Benefit Sharing	83
	Hypotheses Tested	84
6:	COMPARATIVE ANALYSIS OF THE TWO SITES	89
	Basis of Analysis	89
	Forest Resource Conditions	89

Social System Dynamics	89
<i>Characteristics of the Target Beneficiaries</i>	90
<i>Causes, Indicators, Effects, and Impact</i>	90
<i>Gender Issues</i>	91
<i>Participation Factors</i>	91
<i>Causes and Indicators of Perceived Impact</i>	93
<i>Importance of Monitoring and Evaluation (M&E) in UGF</i>	95
<i>Employers' Attributes</i>	95
<i>Evaluation of Professional Staff</i>	96
FUG Effectiveness	96
Gender Analysis	98
<i>Women's Role in UG Formation</i>	98
<i>Attributes of Women Members</i>	99
<i>Mode of Functioning of Women in the UGC</i>	100
<i>Motivating Factors</i>	100
<i>Decision-making Process</i>	101
<i>Project Implementation</i>	101
<i>Monitoring</i>	102
<i>Perceptions and Attitudes of Women</i>	102
<i>Women's Issues and Problems</i>	104
Equity Considerations	105
User Group Sustainability	106
<i>Characteristics of Sustainable User Groups</i>	106
<i>Community Attributes for Sustainability</i>	109
<i>Biophysical Characteristics</i>	109

7:	OBSERVATIONS AND DISCUSSION	111
	General Remarks	111
	Major Observations	111
	<i>Role of Technical Variables</i>	112
	<i>Institutional Variables</i>	113
	<i>Socioeconomic Factors</i>	113
	<i>Equity Issues</i>	114
	Institutional Development	114
	<i>Government's Role</i>	115
	Effect of Population Pressure	115
	Types of UGF Function	115

	Alternative Sources	116
	What This Case Study Explains?	118
8:	CONCLUSIONS AND RECOMMENDATIONS	123
	Conclusions	123
	<i>Policy Lessons</i>	123
	<i>Institutional Issues</i>	124
	<i>Social Lessons</i>	125
	<i>Technological Lessons</i>	126
	<i>Economic Lessons</i>	127
	<i>Emerging Issues</i>	127
	Recommendations	128
	<i>Future Direction of CF</i>	128
	<i>Training of User Members</i>	130
	<i>Policy and Legislation</i>	131
	<i>Gender and Tenure Issues</i>	133
	<i>Monitoring and Evaluation</i>	134
	<i>Strengthening the District Level Capability</i>	134
	Plates	135
	Annex	139
	References	147
	Topic Index	153

List of Tables

1:	Key Factors and Key Indicators Used in the Evaluation Method	7
2:	Factors and Indicators Used in Measuring Sustainable Forest User Groups	15
3:	Major Activities Performed by the FUG	45
4:	Ethnic Composition of Members in the Sampled User Group Villages in Numbers and Percentages	62
5:	Ethnic Composition of the Forestry Users and Executive Committee Members in Selected FUGs in the Phewa Watershed	68
6:	Socioeconomic Profile of the Forest User Group Village in Palpa	72

7:	Socioeconomic Profile of the Forest User Group Village in Phewa Watershed	75
8:	Summary Descriptions of the User Group Forests in Palpa District and Phewa Watershed	79
9:	Attributes of Selected Forest User Groups in the Palpa and Phewa Study Areas	81
10:	Forest Management Rules, Rights, and Sanctions in the Selected Forest User Groups in Palpa and Phewa	82
11:	Evaluation Criteria for Forest User Groups within the Palpa and Phewa Areas	97
12:	Women's Participation in UGC in the Study Areas	99
13:	The Motivations for User Group Forestry amongst Sampled Women Farmers	101
14:	Perceptions and Attitudes of Women User Group Members in Palpa	103
15:	Biostock and Community Attributes of the Successful and Unsuccessful Forest User Groups in Palpa and Phewa	106
16:	Sustainability Analysis of Fuelwood and Timber Supply from the UG Forests in Palpa and Phewa	108

Executive Summary

The evaluation study of User Group Forestry in Palpa district and the Phewa Tal Watershed near Pokhara revealed that both areas are gradually progressing towards full transfer of management authority and tree tenure rights to the users. Seven out of twenty-five Forest User Groups (FUGs) in Palpa and two out of four FUGs in Phewa were studied in terms of their structure, function, and performance. The major highlights of the findings are as follows.

1. FUGs in Palpa were in a more advanced stage of managerial skill, technical know-how, and group cohesion than those in the Phewa area. Although the groups in the Phewa area have been in existence for a much longer period than those in Palpa, due to inadequate addressal of long-term sustainability factors at the initial stages in the former, the users were found to lack the clear perception, forceful drive, and adequate group cohesion that were evident in Palpa. The research team concluded that, in general, Palpa FUGs were more successful, effective, and efficient than those in the Phewa Watershed.
2. Both external and internal forces were found to affect FUG effectiveness and functioning. The chief external factors were type and amount of subsidies, attitude of the District Forest Office (DFO) staff, extent of the market for forest products, nature of other development project activities, and approach of the donor agencies concerned. The major internal factors were ethnic composition; leadership quality; extent of fuelwood, water, and fodder scarcity; level of (especially female) literacy; availability of and/or potential of alternate energy sources; size of land/livestock holdings; and level of poverty. There was close interfacing between the internal and external forces and, depending upon the specific factor linkages, the association either multiplied the favourable effects leading to an improvement in the forest quality or altogether they combined with negative forces leading to degradation.

3. There was strong correlation between the quality and quantity of biological (biomass) resources and FUG effectiveness. Both in Palpa and Phewa, users were simultaneously using at least three different forest patches, both legally and illegally. The per capita forest area in Palpa was higher (0.28ha) than in Phewa (0.20ha). However, there were significant differences in the stocking rates of forests within each area. Under the current pattern of forest use, which is based on the harvesting and utilisation of 'lops, tops, and drops', a higher per capita forest acreage could lead to greater effectiveness of UGF (User Group Forestry) forest management.
4. The socio-psychological variables (knowledge, awareness, perception, attitude, skill, and participation) were highly important indicators of User Group (UG) functioning, effectiveness, and sustainability. These variables needed to be favourable (both in the case of the majority of the user members as well as the concerned government staff) for achieving improvement in community forestry outputs. Education, training, observations, visits, demonstrations, and participation were found to improve their indicative socioeconomic characteristics.
5. Tree and land tenure, although an important variable, was not found to be of great concern to the sampled users, perhaps due to the well publicised policy of User Group Forestry. The handing over of forests, through an officially approved operational plan, was found to adequately assure the users about their full ownership rights over trees. Land ownership, of course, rested with the Government but the users either did not think that it was an important issue or simply did not seem to care about it, at least for now.
6. Women's participation and attitude were crucial variables for an effective, well-functioning, and potentially sustainable FUG. The women, who were participating out of self-interest and self motivation, were educated, and had full family and community support, tended to contribute considerably in shaping and enforcing the FUG rules, resolving conflicts, and planning and implementing new technical programmes. However, the women, who had been nominated by the leaders and/or government officials, belonged to the backward castes, were poorly educated, and did not have full family/social backing, tended to

contribute less and behave as passive participants in the management of FUG affairs. The women's voice, if presented collectively, was found to win the support of the male majority to their cause.

7. The professional staff members in the study areas were poorly motivated, weakly organised, and inadequately trained. Their functioning tended to be highly dependent upon the style, philosophy, and temperament of the DFO or the Project Chief. While natural resource problems in the areas clearly demanded multi-disciplinary solutions, the approaches forwarded by the forestry staff were single-pronged and territorial in nature. During the evaluation period, both the Palpa and Phewa offices had good leadership and our evaluation of their work is favourable. Their understanding of, commitment to, and attitude towards the User Group community forestry approach was highly favourable. They were found to be largely successful in rallying their junior staff to support their own thinking and practices. However, the research team's concern was that there is no mechanism to guarantee that this tempo will be maintained in the future. Apart from the frequent transfers and absence of professional staff, the attitude, directive, and philosophy of regional and central level officials were also found to affect the working pattern of the district level staff.
8. Although UGF in both the study areas had the potential of leading to sustainable forestry, the Government's own material and technical commitments should not be diminishing at least at a time when this new community forestry approach has just taken root. So far the trend is to request hand over of the natural forests only. There is a profound need to encourage and support user group participation and investment in developing plantation forests as well. The recent trend of cutting down the budget allocated for travel, afforestation, and plant materials as well as reduction of staff strength should be stopped, if not reversed. Alternatively, more cost-effective afforestation techniques, such as the one attempted by the Palpa DFO, should be adopted.
9. The procedure for transferring forest ownership from the DFO to the FUGs has not yet been standardised. It needs further refinement based on the lessons learned from different parts of the country. The practice of rangers

writing the operational plans and getting them formalised from the 'users' does not seem to work well, as seen in Bharkesh FUG in Palpa. The committee should be formed after the draft operational plan has been formulated through all the users' involvement and approved by the general body meeting of the group. The rangers' involvement in organising meetings should be reduced to the final appraisal of the plan and monitoring of implementation only. The membership issue should not be finalised in haste and it should be resolved so as to minimise intra-group and inter-group conflicts.

10. Some of the successful FUGs should be developed as technology and information transfer centres. It was found that Mulgaira and Hungi FUGs in Palpa and Turung in Phewa had created 'chain effects' among the neighbouring communities and had successfully induced them to organise the users into similar groups. The DFOs should use such resources for extension purposes. While the picture of user group forestry in Palpa may appear rosy, there are still institutional, technical, and socioeconomic issues that need to be monitored continuously and resolved to truly sustainable forest management.
11. The sustainability of the FUG was concluded to be generally indicated by the increasing productivity of resources, a dynamic balance between the demand and supply of basic forestry products, a satisfactorily (as perceived by the users) functioning FUG committee, and continuous innovativeness in the institutional development approach.
12. With the rapid expansion of FUGs in each district, a well-organised monitoring and evaluation unit (M&EU) needs to be set up at the district and at the regional levels. Perhaps a monitoring unit at district level and an evaluation unit at regional level could be an ideal set-up. A member of the district-level FUG association, a network of all the FUGs in a district, could be one of the members of the monitoring unit. This unit will monitor the FUG activities, help transfer technology, address equity issues, and resolve inter-group conflicts.
13. User Group Forestry may not be the panacea for all the ills found in "conventional community forestry" but due to the lack of better alternatives at present, this approach is

indeed one of the best of all the available approaches. Further refinement of this approach may lead to sustainable community forestry. At least, this is all one can hope for now.

Chapter 1

STUDY OBJECTIVES, METHODOLOGY, AND FRAMEWORK

Objectives

The main objective of the study was to provide a comprehensive evaluation of selected forest user groups (FUGs) with particular reference to their structure, function, and performance. The study of the operational procedures and forest management activities of selected FUGs in Palpa and review of the performance and impact of the Phewa Tal Watershed Development Project's (PTWDP) activities in Kaski were planned in such a way as to emphasise sustainability, equity, and environmental soundness.

The specific objectives in evaluating FUGs in Palpa were as follows.

- a) Review of FUGs' structure, function, and sustainability in Palpa with special emphasis on a) the importance of local leadership; b) accessibility to forests; c) effect of socioeconomic fragmentation; d) incentive mechanisms; e) rule-enforcing mechanism; f) role of women in forest management; g) resource availability; h) ethnic composition; and i) the effect on people's knowledge, awareness, attitude, and participation.
- b) After discussions with the District Forest Officer of Palpa, the following objectives were added: a) reasons for less disputes; b) staff constraints and increasing demand for handing over forests; c) feasibility of reforestation through UGs; and d) the best way to phase out forest guards.

Among the specific objectives fixed for the evaluation of the Phewa Watershed area were the ones given below.

- c) Review of the watershed, placing special emphasis on a) the nature and approaches of project interventions; b) level of local participation; c) sustainability and replicability factors; d) problems and prospects for the future; and e) changes in people's awareness, knowledge, and attitude.
- d) Based on discussions with the Project Chief, the following objectives were added - a) performance evaluation of UG-based conservation activities; b) the effect of development work, e.g., road construction on lake sedimentation; c) the effect of project termination on watershed management; and d) UG forestry problems resulting from the heavy population and market pressures generated by Pokhara town.

By combining all four sets of objectives, the 'general thrust' of this study was framed. This 'general thrust' provided a direction towards which the evaluation was to be oriented in investigating changes in the biophysical and sociological variables under user group management of forest resources. These variables were then related to the project-led interventions to establish relationships if any and provide explanations. This strategy thus formed a 'framework' for the evaluation study.

Framework for Analysis

The description of the framework provides a detailed specification of the 'general thrust' of the study, including variables and processes used in the evaluation. The 'general thrust' of this study is based on the premise that the current orientation towards community forestry, in the form of user group forestry, can be a positive step towards providing full stewardship of natural resources to the respective communities. However, in order for this approach to be sustainable, there has to be a commensurate improvement in the individual, community, and resource attributes which can be monitored and evaluated easily. The Government should also recognise that the massive task of reforestation and forest management in the country is not possible

without changing the 'incentive' and 'tenure' structures in the natural resources' management system. Therefore, attitudinal changes in the thinking and decision-making processes of the Department of Forests (DOF) officials, as well as those of community dwellers, are needed if a long-term partnership between the two is to be established for better management of forest resources. Ultimately, if a permanent basis for a common property-based, forest resource management system is to be developed, both the community members and government officials have to increase and improve their participation in resource management activities.

The above description of the 'general thrust' of the UG forestry evaluation approach also implies that a well-defined UG, if given written authority to manage forest resources, could contain deforestation and appreciably increase fodder, fuelwood, timber, and leaf litter (FFTL) supplies in the concerned community. The basic premise of this approach is that, since people rely on natural resources' survival for their livelihood, there is a strong incentive to manage these resources sustainably.

Primacy of Socioeconomic Variables

Since FUGs in Palpa and Phewa have been organised primarily to improve the supplies of FFTL in order to meet the growing demand of users, and some time is required to make these forest products available in the required quantities, the performance of user groups cannot be evaluated in terms of physical parameters alone, at least, not for the present. Therefore, this study assumed that the real benefits or strengths of UGF could be better measured through people's knowledge, awareness, participation, attitudes, skills, and perceptions which, in summary, will hereafter be referred to as socio-psychological variables (PSVs). In the evaluation, an attempt has been made to measure the respective project's impact on the production and supply of 'basic forestry goods' (BFGs), including environmental services, wherever information was available.

Conceptual Basis of Research

The relatively new community forestry strategy, popularly called user group forestry (UGF), was evolved mainly to address the problem of people's reluctance to accept the responsibility of forest

management in their respective communities. The main reason for the failure of conventional community forestry (CF) was identified as the users' perception of "no change" in land and tree tenure structure in their favour. Therefore, the UGF approach attempts to demonstrate in writing the willingness of the Government to reverse the tenure system by handing over the task of forest management to a well-defined and formal UG (owner), accompanied by an officially approved document called the operational plan (OP). It is expected that, through this demonstration process, UGF will radically improve people's social awareness and skill levels, besides increasing the production and supply of BFGs and ensuring sustainable forest management in the mid-hills of Nepal.

Measured Variables

The evaluation study considered altogether thirteen 'causal factors' and 'indicators' as independent variables and 'effect' and 'impact' factors as dependent variables (Table 1). Some of the important causal factors were 1) exposure to UGF rules and regulations; 2) incentive mechanisms in forestry; 3) ethnic composition; 4) disputes related to rights' violation and trespassing rules; 5) participation in training and observation tours; 6) participation in FUG-sponsored activities; 7) steps followed in developing an operational plan; 8) the role of local leadership, etc.

Similarly the indicator variables were 1) gender; 2) education; 3) occupation; 4) ethnic/caste group; 5) age; 6) family size; 7) landholding; 8) livestock holding; 9) occupation, etc.

Key Factors and Indicators

The causal factors were measured through sample survey-based, personal interview schedules. The indicators were measured by discussing the basic socioeconomic characteristics with the respondents of the two study areas. The effect and impact factors were measured by questioning the respondents about their knowledge, awareness, participation, attitude, practice, and perception of the ongoing community forestry programmes in Palpa and the watershed management programmes in the Phewa Watershed.

The 'awareness' questions dealt with five separate issues - 1) District Forest Office or project functions; 2) recent government policies on UG forestry; 3) project objectives; 4) project implementing agencies; and 5) key personnel of the agencies. The 'knowledge' questions dealt with FUG formation, forest management, afforestation techniques, preferred species, lopping and thinning methods, protection systems, harvesting and distribution mechanisms, etc.

Effects and Impacts

The four effects were comprised of an increased level of - 1) knowledge, 2) awareness, 3) attitude, and 4) participation. The two impact variables were 1) improved forestry practices/skills and 2) improved perceptions of both the UG members and professional staff. Attitude was measured by asking the respondents how they felt towards 1) the project; 2) the two implementing agencies (i.e., District Forest Office, Palpa and Phewa Watershed Management Office, Pokhara); 3) the project personnel; 4) the handing over process; 5) the monitoring and extension methods employed; 6) and the structure, function, and effectiveness of the FUG committees.

Participation was determined by asking the respondents if, how, and when they had participated in DFO/PTWDP organised training, observation visits, reforestation programmes, nursery development activities, and FUG seminars. Practice was measured by asking the respondents about their fuelwood, fodder, timber, pole, leaf litter, fruit and twig use pattern.

Finally, impact was determined by asking the respondents about their perception of the demand and supply of FCTL in the past, at present, and in the future.

Project Inputs

The important components of the systems that were facilitated through project inputs (funded through the Palpa Development Project and the Phewa Tal Watershed Development Project or PDP and PTWDP respectively) were 1) handing over the forests to the UGs; 2) reforestation of degraded areas; 3) information and extension; 4) training; 5) improved cooking stove distribution; and 6) technical and office support. Although the goals of the two

projects were different, the basic assumptions were identical in that the supply of forestry products (FFTL) could be increased through combined resource development and participatory community management activities consisting of 1) increasing the number of trees planted under agroforestry and community forestry programmes; 2) improving directly the technical and motivational skills of the project staff through training; 3) increasing people's participation through improved dissemination of information and extension; 4) increasing the forest area handed over to the UGs for management; 5) reducing fuelwood consumption and promoting its conservation; and 6) improving monitoring and evaluation of the project activities. These activities were evaluated through the measurement of several key factors and key indicators as given in Table 1.

Data Collection Methods

There were two dimensions to the information collected for this study. First of all, the 'intent' dimension of data collection was descriptive, comparative, and predictive. Secondly, the 'time' dimension of the information collected referred to the past, present, and future. In order to accommodate these two dimensions, four different data collection methods were employed to gather socioeconomic and biophysical data. Biostock information was collected by using Rapid Vegetation Assessment (RVA) techniques. A description of the methods is given below.

Historical Survey

Participatory Rural Appraisal (PRA) methods, particularly participatory mapping, historical transects, trend lines, and time line diagrams were drawn to depict and understand the pattern of historical changes, their spatial distribution, and major impacts thereof. In-depth interviews with community members and local forestry field staff enabled the team to reconstruct the changes in forest use and management over the past 30 to 50 years. The FUG level information sheet guided the team in developing an overview and a semi-structured interview schedule was followed.

Sample Survey

The main purpose of this survey was to collect demographic, sociological, and economic information at the household level.

Table 1: Key Factors and Key Indicators Used in the Evaluation Method

KEY FACTORS	KEY INDICATORS
<u>PALPA:</u>	
a. local leadership and user group identification	Attributes of the elected/selected leader, caste, education, age, occupation, party affiliation, service experiences, etc
b. accessibility to forests	No. of days the forest is opened for fuelwood, fodder, leaf litter collection
c. effect of socioeconomic fragmentation	Number of labourers contributed by rich/poor for protection
d. incentive mechanism	Type of benefit-sharing mechanism; privileges and penalties
e. mechanism of enforcing the rules	Penalties imposed on first/second/third time offenders
f. role of women in forest management	Number of women members in FUG/committee, women's preference, tasks, perception, attitude, knowledge, practice, etc
g. resource availability and utilisation patterns (dry as well as green products)	Current biostock/projected growth and yield in cu.m.; sustained yield in terms of year-wise biomass (tonnes) supply
h. ethnic composition	Ethnic composition of the members/committees/village
i. effect on people's knowledge, awareness, attitude, and participation	Number and type of forest/trees/FUG rules, project objectives and activities, feeling towards DOF/FUG personnel, extent of people's participation
j. reasons for less disputes and equity	Number of disputes before and after FUG mgmt., who gets what?
k. staff constraints and increasing demand for handling over forests	Work hours before and after FUG implementation, staff availability, time required to plan and monitor FUG activities
l. afforestation activities through UGs	Cost of afforestation through Government/FUG; survival counts, etc
m. the best way to phase out forest guards	Steps to be followed in removal of forest guards, time taken to plan local community protection measures, time required for FUG form action.
<u>PHEWA:</u>	
a. nature and approaches of project interventions	List of project inputs/outputs/activities and their extent
b. level of local participation	Number of HH participating, duration of participation, age, sex, and occupation of participant, activities
c. sustainability and replicability factors	Trends in the biophysical resource situation, social institution characteristics of watersheds to be replicated
d. problems and prospects for the future, needs/attitude/perception	Type of additional support needed, past experience, and future ideas,
e. change in people's awareness, knowledge, and attitude	Ideas about new projects, forest, soil conservation, etc, project objectives/outputs of the project
f. performance evaluation of UG based conservation activities	Outputs and effectiveness of the project activities, people's attitude towards and perception of project outputs
g. effect of road construction on lake sedimentation	Sedimentation rate of different road construction methods, length of road, and trend of sedimentation into the lake
h. effect of project termination on watershed management	Date of termination, Govt.'s plan for the future, anticipated effects on sedimentation, erosion, etc
i. UG forestry problems due to the heavy population and market pressure generated by Pokhara town	Type/source/extent of problems; nature of damage caused by the attitude of the people participating in destructive activities; and their perception of UG managed forests

Although no pre-project baseline survey data existed, a post-project baseline sample survey was used to collect information on the following categories: 1) demography; 2) land tenure and land use systems; 3) social organisation; 4) cultural attributes; and 5) incentive structures. The instrument used was close-ended and semi-structured, and pre-testing was carried out in the two study areas prior to administration. This information was compared with the small sample, pre-project surveys and case studies' database.

Rapid Vegetation Assessment (RVA)

This method is based on Rapid Rural Appraisal (RRA) techniques (Chambers 1991 and Nurse et al. 1992). RVA can be described as a method of collecting information on trees and other vegetation in order to analyse resource availability and resource conditions. The following method was used in both Palpa and Pokhara to prepare an inventory of tree vegetation and to assess the stock as well as project the future products.

Resource Availability Appraisal. This method consists of listing all the forest patches existing within the Village Development Committee and selecting the one managed by the study user group to prepare an intensive inventory. A sketch map of the forest was prepared and located on the base map of the village. The map was prepared by using the following procedure: first, the team drew ridge lines and drainage lines. Then roads, walking tracks, and locations of settlement houses and temples were added. Using this information, a preliminary land use map showing the forest boundary, forest type, agricultural land, grazing land, and settlements was prepared.

A combination of standard mensuration techniques and ecological assessment methods was used to assess the status of forest vegetation and its dynamics. The methods used differed from the conventional techniques, especially in terms of approach, timeline, and audience. These methods specifically aimed at generating a simple and rapid assessment of vegetation conditions, growth behaviour, and their potential in natural forests and shrub land. Rapid vegetation appraisal was carried out using rapid measurement and evaluation techniques (Nurse et al. 1992). Before field measurements were taken, discussions were held with both the UG members and DFO staff regarding forest

management conditions and problems. Resource persons were selected from among the UG members (village consultants) to participate in the team and they helped to identify appropriate study locations. The assessment attempts to reflect the impacts of existing forest use systems, protection interventions, and vegetation growth patterns.

Sample Plot/Quadrat. Sample plots were selected using two to three 10 metre radius (.05ha) randomly-selected plots and two to three 10 x 10 metre quadrants. After marking the plots and quadrat, species composition, stocking, and growth data were collected. Species' frequency was recorded for all sizes of plots falling inside the quadrat. However, diameter at breast height was recorded for saplings recording a DBH of 2.5cm and above only. Circular plots with a 10m radius or measuring 500sq.m in area were used due to its minimum error potential. The number of quadrants depends on the vegetation composition, condition, and distribution. For example, for each sub-type of forest (*sal*, *chilaune*, and *salla*), one quadrat was selected. The research team was interested in both the quality and stock of resources. Statistically, even a small number of quadrates can provide a good and accurate estimate if sampled properly. Therefore, replications of quadrates were carried out to capture variations in soil type, altitude, and topography.

Measurement Techniques. Trees were measured for trunk size (DBH), density of regeneration growth, and species' composition to estimate the standing biomass and productivity. This information was essential to the understanding of sustainability of biomass removal, spatial and temporal decisions regarding extraction, and possible mode of utilisation. Data on the standing biomass, productivity, and stump density were used to assess forest productivity. Shrubs and smaller trees with a DBH less than 2.5cm were not counted. Since the current tree density is directly correlated to the potential biomass production in the future, the assessment of regenerating seedlings is expected to facilitate decisions regarding the projected quantities of biomass removal for different uses at different time intervals.

Biomass Estimation. The standing biomass or biomass productivity of trees is the most important parameter for making management decisions regarding the quantity of sustainable tree biomass extraction. Biomass here refers to the wood and foliage

weight or volume of trees (including stems and branches) at a given (standing), or over a period of, time (productivity) in a prescribed area. Biomass was estimated using DBH and height which are indicators of tree volume or weight also. Several studies (Vega Condori 1985; Mohns *et al.* 1988; and Karki 1992) have established a quantitative relationship between the weight of certain trees and their DBH and height for Nepal's mid-hills.

Projection Techniques

Based on the data collected from primary and secondary sources, regression and extrapolation techniques were used to project the future biostock growth and yield, product demands, and cost and price indicators. Except for certain modifications in the phrasing of interview questions, schedules for gathering data in the Palpa and Phewa areas made use of the same questionnaire and checklist. Close-ended questions were asked in sample surveys and open-ended questionnaire schedules were used in Rapid Appraisal surveys.

Women's Role in UG Forestry

General Approach of the Study

In each of the seven FUGs, the study attempted to find out why and how women were participating in the FUG activities. The following key points were specifically focussed on during investigation.

- * Find out whether the inclusion of women in the user group committee (UGC) represents the genuine interest and purpose of the women members or were they there simply to fulfill the quota.
- * Study the structure of committees to find out specifically which women were included in the committee and understand the operational plan formulation, committee formation, and plan implementation processes.
- * Identify key areas of FUG functioning in which the women's role is indispensable, and analyse how this has been captured.
- * Determine the perception and attitude of male members of the UGC towards women.

- * Develop a strategy based on the findings of the study to effectively improve and expand the role of women in FUG-based forest management activities.
- * Analyse comparatively the benefits received by women and their responsibilities in UG-managed forests.

Method of the Study

Women members of the UGC were interviewed separately as the key informants. Although the methods adopted were used to study both the process and results of women's involvement in UGF, most of the information gathered was related to the process. General women users were visited in their homes, fields, and forests. The PRA team involved in exercises aimed at carrying out a general evaluation of FUG activities included women also. Women sociologists identified the following key points for investigation.

1. At what point in the UG formation process - user identification, conflict resolution, membership finalisation, operational plan development, etc, were women included?
2. How influential were women's opinions in committee formation?
3. How were women's problems and expectations accommodated in the operational plan?
4. How was the composition of the committee determined?
5. What attributes of women qualify them to be members of the executive committee?
6. Were women members in the committee elected democratically by women only or selected by the male elite?
7. How did women function within the UG committee? Was participation active or passive?
8. How effective did women members feel their role was in the FUG committee?
9. How did the general users, especially women, feel about the process, functioning, and effectiveness of women's involvement in the UGC ?
10. Which section of women (caste, ethnicity, economy, and geographic location) generally participated in FUG activities?

11. What were the motivating factors for women's participation and continued functioning?
12. What were the constraints to continuing/improving their functioning and effectiveness experienced by women?
13. What was the future outlook for women's involvement and how can women's participation in UGF be increased?
14. Did women receive benefits in proportion to their participation and contribution?

Research Team

An interdisciplinary research team, consisting of one Forest Resources' Management Specialist, one Social Forestry Specialist, one Silviculturist, one Human Resource Management Specialist, and one Sociologist (a woman), conducted this study. The expert services of several professional foresters, soil conservation specialists, and IOF lecturers were used also. The data collection team consisted of four B.Sc. forestry students.

Forest User Groups under Study

At the beginning of this study, altogether 25 forests had been handed over to recognised user groups by the DFO, Palpa, and four in the Phewa Watershed by the DFO, Kaski. In Palpa, 20 were purely natural growth forests (secondary growth forest) and five were partly or fully reforested (Annex, Table 1). The average area of forests in Palpa was around 35ha and most of them were handed over during the two years from 1990 to 1992. In Phewa, out of the four forests handed over, one was a plantation forest and the others were predominantly natural. The average forest size was 35ha and all of them were handed over in 1991. The forest user groups were selected for detailed evaluation based on the following criteria:

- a) the forest should be in the production stage;
- b) the forest should be representative of forests among the 'handed over' forests;
- c) the forest should be representative of both successes and failures in user group management and,
- d) if possible, both natural and planted forests should be selected.

User Group Selection

Seven forest user groups (FUGs) in Palpa and two in Phewa were selected for detailed investigation. In Palpa, the average size of forests was 41.8ha and the average size of FUG membership was 151. On an average, each member of the household had access to about 0.3ha of forest land. Six forests were natural and one was a mixture of plantation and natural stands. Three forests were formally handed over in 1990 whereas two each were handed over in 1991 and 1992. In Phewa, the average forest area and UG size were 26.5ha and 114 respectively. All the four forests were handed over in 1991. One of the selected forests was a plantation and the other was a secondary growth forest.

Key Questions for User Group Evaluation

The following sample key questions were used to evaluate the performance of user groups in Palpa and Phewa. A close-ended, structured questionnaire was used for formal surveys. An open-ended questionnaire and a checklist were used for rapid surveys.

- a. UG identification - whether the membership criteria were defined properly or not?
- b. Protection - whether a system of regular forest protection and compliance with the rules existed or not?
- c. Reforestation - whether forest development activities as specified in the operational plan were conducted and/or whether or not FUGs were formed primarily for the purpose of sustainable reforestation or not?
- d. Distribution and Utilisation - whether products were harvested, distributed, and utilised fairly, appropriately, and efficiently or not?
- e. Management - whether products, both dry and green, were removed as per the prescribed silviculture treatments or not?
- f. Decision-making - whether the decision-making power was decentralised and executed democratically or not?
- g. Conflicts - whether conflicts, both inter-group and intra-group, existed which hampered the smooth implementation of the operational plans (OPs) or not?
- h. Equity - whether all sections of the community, both the present and future generations, had equal opportunities to benefit from the UG forests or not?

- i. Gender and Class - whether the interests and needs of the weaker of the two genders, landless class, and occupation groups were addressed properly or not?
- j. Externalities - whether forest management has been possible at the cost of other common/national forests or not?
- k. Social/Environmental Benefits - whether people are adequately aware of the non-traditional values of forests such as maintaining the environmental quality, watershed protection, biodiversity, recreation, and aesthetics and have plans to exploit them in future?

Assessment of Sustainability

In the context of this study, the sustainability aspect was examined, based on the concept of sustainable growth and removal. According to this approach, emphasis was laid on the need for continued growth in resource productivity while maintaining the quality of forest resources. In community forestry, this view implied using forest resources at a rate less than the rate at which they can be regenerated continuously. Sustainable community forestry, therefore, must involve successful management of forest resources to satisfy changing agricultural and human needs while maintaining or enhancing the quality of the environment and conserving village forest resources. A simple demand and supply projection of the most basic need of the people, fuelwood, was prepared to indicate the sustainability of resource production and consumption under development practices.

Methods of Measuring Sustainability

Sustainability was assessed, based on the evaluation of biophysical, socioeconomic, and institutional attributes of the forests, user groups, and community respectively. The role of exogenous variables, such as marketing, tree and land tenure, incentive structures, etc, were considered also. Some of the key factors and indicators are described in Table 2.

Many data collection methods were employed to capture these dimensions of the forest management practices of FUGs.

Table 2: Factors and Indicators Used in Measuring Sustainable Forest User Groups

KEY FACTORS	KEY INDICATORS
1. Facilities of the UG	- Existence of a formal organisational infrastructure (e.g., an office)
2. Trained Manpower	- Number of members trained in forestry
3. Number of Committees	- Executive Committee - Secretariat Committee - Disciplinary Committee - Advisory Committee
4. Good Leadership	- Regular attendance at meetings - High frequency of meetings with visitors - Few or no complaints of unfairness - Good relationships with the DFO staff
5. User Group Income	- Evidence of bank account - Fair amount of deposits in the savings' account - Increasing trend in income received
6. Indigenous Management	- Existence of indigenous system - User group formation based on IM structure
7. Equity	- Fair system of products' distribution - Negligible number of disputes - No free-riding attempts by members
8. Participation	- High degree of participation in UG-sponsored activities by men and women - Regular attendance at UG/JGC meetings
9. Systems and Procedures	- Availability of meeting minutes and visitors' book - Availability of operational plan - List of UG members and committee members - A system of receiving and briefing visitors by UG members
10. Tenure	- Satisfactory tree tenure arrangements; legal codes and security provisions
11. Optimum Biomass Growth and Yield	- Optimally-managed forest resources with the potential of yielding an optimum biomass output for perpetuity
12. Other Development Activities	- Simultaneous occurrence of supportive development activities

Flexibility is the key feature of IFMSs.
Diversity in organisational forms is pervasive in IFMSs.
They vary and change over time, making them dynamic.

Chapter 2

REVIEW OF COMMUNITY FORESTRY DEVELOPMENT

Evolution of Indigenous Forest Management Systems (IFMS)

The basis of community forestry development in Nepal is undoubtedly the identification, understanding, and incorporation of the elements of indigenous forest management systems (IFMS) practised by the villagers throughout. Messerschmidt (1990a); Gilmour (1989); Fisher (1991); and Karki *et al.* (1993) have carried out extensive reviews of indigenous forest management systems (IFMS) in Nepal. Baral and Lamsal (1991) have discussed indigenous systems in Palpa. Some of their observations are quite relevant in terms of describing the genesis of user group (UG)-centred community forestry (CF) development in Nepal's mid-hills (Chhetri and Pandey 1992; Fisher 1991; Gilmour 1989).

- Most of the IFMSs have clear-cut user groups, although in an informal set-up rights are complex-consisting of primary, secondary, and tertiary ones - and they are not ambiguous. Disputes are common. However, user rights change and evolve. Lonely-net systems unable to regulate access are not good, indigenous management systems and such IFMSs have been weeded out.
- An element of consensus on forest management issues is the major strength of IFMSs. Sometimes, biologically unsound practices are also agreed upon through consensus if they are not perceived to affect the forest quality adversely (again according to their own definition). Flexibility is the key feature of IFMSs.
- Diversity in organisational forms is pervasive in IFMSs. They vary and change over time, making them dynamic.

All effective systems have an institutional sub-structure consisting of user rights and allocation rules at the first level and, at the second level, shared values, rules, and practices.

- An indigenous system with no institutional base is generally ineffective. Committees are characteristic of the formal system.
- Indigenous system descriptions are important only from two points of view: a) excluding outsiders and b) ensuring proper distribution of forest products. Biological goals are not well pronounced.
- The findings of several studies (Fisher 1991 and Karki 1991) tend to generally support Gilmour's (1987) scarcity theory of UG system evolution. However, this may be one of several factors.
- Effectiveness in forest management, as perceived by the people, relates to 1) effective protection and 2) acceptable distribution.

Outstanding Issues

- What is the contribution of indigenous systems to the effective management of common forest land even after the failure of a public resource policy such as that of the nationalisation of forests in 1957?
- Are IFMSs overly conservative and do they fail to make full and judicious use of biological resources?
- Is effective protection of community forests possible at the expense of other common and/or unprotected national forests?
- How important is grazing as a factor for achieving effective forest management?
- Maximisation of production - is it an indicator of effective forest management?
- Equity and gender issues - how important are they and how can they be included to achieve meaningful results?
- Unit and size of management - although the UG forests should be delinked from political boundaries, the unresolved issue is what level and size (of the UG forest) is the optimum for management?

Pattern of Variation

Molnar (1981) stated (as quoted by Fisher 1991) that in eastern Nepal, IFMSs are less developed than in Central Nepal due to the *kipat* (communal) system of land tenure. Several variables were identified that could explain the pattern of variation among IFMSs - 1) residence or lineage - which one defines user rights?; 2) exclusion or management - which is of prime concern to the users?; 3) communal and community management - can they be compared on the basis of ethnic homogeneity and how do they differ?; 4) can one classify IFMSs based on the types of harvesting practice?; 5) why are there no communal systems practised by non-Hindu ethnic groups?; and 6) can topologies based on geography be proposed?

Issues under Investigation

The following issues were identified for in-depth research and analysis.

1. The basis for defining user rights and composition of the user groups
2. The effect of ethnic homogeneity and heterogeneity factors on user group function and effectiveness
3. The harvesting practices and control measures used by the user groups
4. The structural condition of the forests under UG management
5. The nature of social arrangements (formal/informal and their features) of IFMSs
6. Resource availability and accessibility and their influence on the effectiveness of management
7. Goals of forest management in a subsistence economy dominated by agriculture

Learning from Past Experiences

It is generally recognised that the success of CF largely depends upon successful motivation of the users, mutual cooperation among the users, and productive involvement of the DOF staff. Community forestry must meet the aspirations of the local inhabitants as perceived by them. It should be emphasised that CF must take clues from the indigenous/ traditional systems of

forest management in the form of the following attributes - 1) the presence of a strong leader; 2) user rights to harvest necessary forest products; 3) provision of incentives and benefits; 4) effective enforcement of socially sanctioned rules against uncontrolled grazing and illicit tree cutting; 5) incorporation of women's views in the management system; 6) encouragement of private tree ownership and cultivation; and 7) maintenance of good inter-community relationships. However, traditional systems do not provide a model *per se* for CF since they do not conform to a single type, pattern, and structure.

Based on the above factors, the effectiveness of any community forest management system may be influenced by - i) the extent of the forest resources; ii) the extent of private landholdings; iii) caste and ethnic composition; iv) the degree and nature of local factionalism; v) proximity to local markets; vi) unit of management; vii) inter-community relations; viii) system of livestock management; ix) mode of distribution of benefits; x) government funded and/or community sanctioned forest watchers; xi) extent of ownership of private trees; and xii) the role of local forestry staff.

Evolution of User Group Forestry in Nepal

Concepts and Practices

The evolutionary background of user group forestry is closely linked to the existence of indigenous forest management systems and development of community forestry¹ (CF) work in Nepal (Chhetri and Pandey 1992; Baral and Lamsal 1991). The official CF programme in Nepal began in 1978 when a legislation was enacted enabling the Department of Forests (DOF) to hand over public forest lands to local communities. Initially, the DOF line agencies were willing to hand over only barren and degraded forest lands to the local people in the form of *Panchayat*²

¹ The term refers to a broad range of tree or forest-related activities that rural landowners and community groups undertake to provide products for their own use and to generate local income.

² The *Panchayat* System was Nepal's previous form of government. The lowest administrative level was the village *panchayat* or council. This system was replaced in 1991 with the introduction of a multi-party parliamentary system. The VDC (village development committee) is now responsible for village affairs.

Protected Forests. The reasons were two-fold - initially reforestation was the main CF programme and, secondly, the DFOs were hesitant to hand over natural forests to local communities. However, due to mounting public pressure, and as a result of their continuous failure in forest protection, natural forests were also handed over in selected districts such as Palpa. This otherwise bold CF strategy of the DOF did not go far enough in convincing the local communities to accept the responsibility of developing and managing forests to the anticipated extent. The major problem was the ambiguity of clauses regarding the security of traditional user rights, lack of freedom in decision-making, and absence of mechanisms to guarantee the anticipated benefits to investors. Moreover the implied politicisation of the process of community forestry, i.e., requiring the actual users to function under the umbrella of the *panchayat* structure, was not appreciated by the rural communities. For example, the forests could be handed over only to the *panchayat* officials within a politically defined geographical and demographical entity, e.g., a ward. However, the forest boundaries and the political boundaries did not usually coincide. Some forests were common to two *panchayats* (now Village Development Committees), others were jointly managed by two wards and/or villages. Therefore, sensitive issues related to forest ownership and recognition of actual user rights became major stumbling blocks in the speedy transfer of forest management to the user groups. In 1990, the policy was changed and forests could be handed over to forest user groups (FUGs). The current CF policies are heavily tilted in favour of managing the country's hill forests through FUGs and the following provisions are stipulated:

- accessible forests can be handed over to FUGs, irrespective of the political boundary and opinion of political office holders;
- an organised FUG can have some of its members trained in order to help it manage the forest as per the operational plan; and
- the DOF staff should be trained to change their traditional roles from those of law enforcement agents to those of extension workers.

Based on the policy changes, requests for handing over the forests are increasing rapidly and the process of handing over is also picking up (Pokharel *et al.* 1993) (Figure 1). However, several

factors, which are still not well identified and analysed, seem to influence the speed of the transfer process. Responding to the communities' overwhelming demand, His Majesty's Government of Nepal (HMG/N) has recently enacted a new Forest Act, 1993 (HMG/Nepal Gazette 1993), which, among other objectives, aims at facilitating the handing over of community forests to the actual users. The major features of the Act, addressing the issues raised by the slow rate of progress in community forestry, are given below.

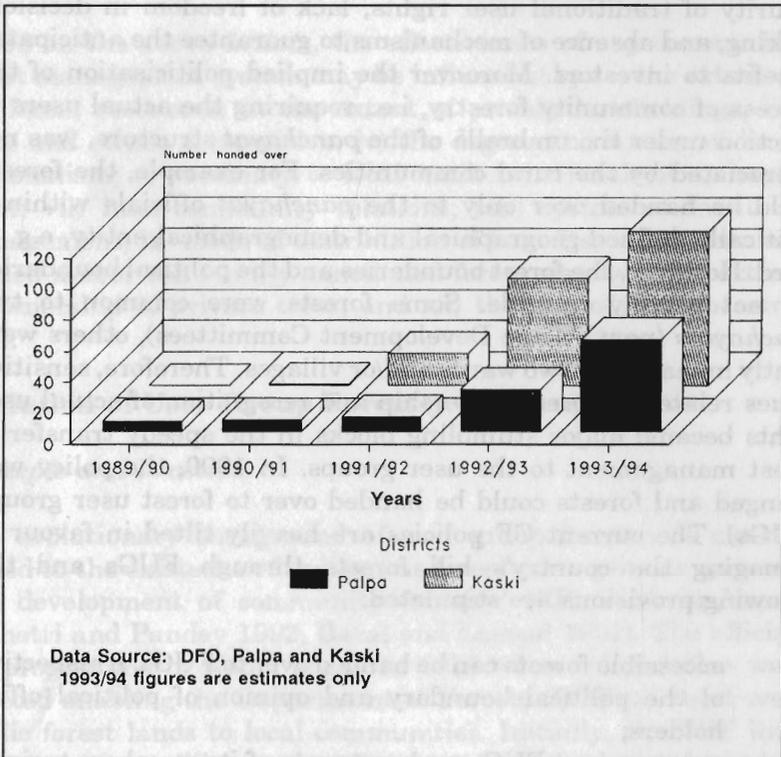


Figure 1: Transfer of Authority Trend of User Group Forests in the Palpa and Kaski Districts

- The District Forest Office can now hand over forests to the users (this used to be carried out at the Regional Director level only);
- the income earned by user groups can be used for purposes other than forest development work if so desired by the FUGs;

- the users have the freedom to make changes in the operational plans if democratic norms and procedures are followed;
- the users can fix the rate of forestry products irrespective of government royalty rates; and
- the FUG is an autonomous body with the status of a corporate agency.

However, since the bye-laws and rules required for implementing this Act have not yet been approved and, unless these rules are framed in line with the spirit of the Act, the otherwise bold legislative action may not serve its purpose.

User Group Concepts

The user group (UG) - centred approach in forestry is a relatively new concept in forestry development literature. However, the concept of the user group itself is well described in irrigation management (Ostrom 1992 and Tang 1992). Thompson (1992) provided a framework for analysing community forestry issues in an institutional context. The forest UG concept itself has gained a prominent place in community forestry literature, partly due to the ineffectiveness of what Cornea (1989) calls the wholesale community approach of the conventional CF. UG is an evolution of an alternative type of group which is more cohesive and purposeful than the loosely defined 'community'. Since the UGs are generally smaller than the 'communities' defined in the erstwhile *panchayat* or community forestry, a common necessity that links the members of the UG can be pursued more successfully. Such small groups can enforce rules through peer pressure and mutual control so as to minimise the 'free rider' behaviour of its members. Members of such small groups are in regular contact simultaneously as users, producers, and enforcers. The irrigation systems practised by Nepal's farmers through small UGs have been quite effective in managing the water resources (Shivakoti 1991). It is conceivable that such a small UG could also operate a village woodlot/ fodder lot more effectively without the conflicts that have arisen in community plantation management. The problem with the large group-centred or community forestry approach is the fact that the existence of rights for a large number of individuals to participate in the production and benefit-sharing system has increased the costs of resource management. Therefore, the major obstacles to the successful implementation

of community forestry are social (specifically institutional and organisational) rather than technical (silvicultural and managerial) in nature.

Definition of FUG

Although the Forest Act (Nepal Gazette 1993) defines a user group as a registered group of "concerned forest users desirous of developing and conserving the forest and using the products for collective benefits", a more practical definition can be forwarded as a "functional group of undisputed users of a community forest which is generally free from inner conflicts and generates synergy through its strong group cohesion and life-supporting purpose".

The UG as a Common Property Resource Institution (CPRI)

Improved planning and management of Nepal's forest resources, especially those managed by the community, are not possible without understanding the different property regimes. Currently most forests are being managed under the open access property regime (OAPR), i.e., user rights are ill-defined and, therefore, the situation can be compared to what Hardin (1968) called the "tragedy of the commons". Forest land under parks and reserves can be said to fall under the state property regime (SPR). Forests managed by local communities under indigenous systems fall under common property regimes (CPRs). It is conventional wisdom to equate OAPRs with CPRs and assume (Wallace 1981 and Mahat *et al.* 1986 and 1987) that forest resource degradation (deforestation) is inevitable unless the common property nature of forest lands is converted into private property or government regulations are forcefully instituted. This conventional wisdom, which often leads to unregulated use, has of late been successfully challenged. Many case studies in the irrigation, fishery, and forestry sectors have shown (Berkes *et al.* 1989) that successful resource management can be achieved by ways other than privatisation and government control. Communities dependent on common property resources have adopted various institutional arrangements to manage these resources - with varying degrees of success in achieving sustainable use. In forestry, therefore, a new branch of Common Property Research Management (CPRM) can be implemented, such as Common Forest Resource Management or CFRM. The successful examples of local level

forest resource management, however, often depend on timely legitimisation by the Government. It is also argued that sustainable forest resource management may not be intrinsically associated with any particular property rights' regime (Messerschmidt *et al.* 1993). Successes and failures are found in private, State, and common property systems alike, depending upon the suitability of the governing institutions.

Challenges Faced by the CPRI

In Nepal's context, the large-scale destruction of forest resources over the last 40 years was largely due to ever-changing and ill-defined property rights, flawed government policies, and lack of proper management. The solution, i.e., controlling unregulated use, should be oriented in either of two directions - a) one is to make the "common property" forest resources in question the private property of individuals or groups of resource users. Alternatively, the problem could be solved by government interventions through institutional mechanisms designed to balance private and social costs. Since, in a newly emerging democratic society constrained by lack of adequate funds, government intervention is neither desirable nor practical, the only course left, therefore, is to change the forest resources property rights' regime so that a number of users (owners) are made co-partners (equal) regarding their rights to use the forest resources. Based on this argument, the user group forestry (UGF) approach to community forestry development being implemented by the Government of Nepal is justifiable and appropriate.

With the change in the forest policy in favour of UGF, the handing over process has picked up remarkably in most parts of the country. Since the process is independent of the elected officials of Village Development Committees (VDCs) and does not follow political boundaries, traditional users have unquestionable rights to the forests. The FUGs are thus organised endogenously and are given legal status. The forests are handed over as per the needs of the community. The only authority exercised by the DFOs relates to the inclusion of provisions for including any users who were excluded when the FUG was first organised. The draft of a written operational plan is another prerequisite which users themselves are very keen on. They consider it not only as a reference manual for forest management but also prize it as a legal certificate of their ownership rights to the forest. At present,

the pace of the process is dependent on several factors - most important of all being the philosophy, style, attitude, actions, and efficiency of the District Forest Office (DFO). It is perhaps due to this reason that some districts are much ahead of others in handing over the forests to local users.

The major challenges faced by UGF in Nepal are as follows.

- 1) Although 61 per cent of the forest land is potentially suitable for handing over to UGs, less than two per cent has been handed over so far. At the current pace, placing the management of all potential CF land under actual users might take another 400 years (Joshi 1993).
- 2) As requests for handing over forests to the actual users increase, the responsibilities of the DFOs, AFOs, rangers, and Asst. rangers also increase proportionately. On the other hand, the Government has recently made a drastic cut in the manpower of the DOFs. This contradictory situation is not favourable to the progress of UGF.
- 3) Perhaps because of an unannounced policy of the DOF, the performance of its staff is expected to be evaluated based on the number of forests handed over annually. This may create competition among the DFOs in handing over the maximum number of forests, and it may affect the handing over process itself with serious implications for sustainable forest management.
- 4) The current increase in requests for handing over forests is mostly for natural forest plots where not much investment is required for resource development. This may de-emphasise the vast afforestation task which should be the first priority of CF.

FUG as a Common Property Resource (CPR) Institution

Institutions based on the concept of 'common property' have played a socially beneficial role in natural resource management in Nepal for a long time. The examples of successful management of small irrigation systems and grazing lands are cases in point (Shivakoti 1991 and Acharya 1989). The failure in the past, on the part of the Government, to recognise their potential and to allow the Department of Forests (DOF) to declare the ownership of forests over which it did not and could not have control, made many of the traditional institutions extinct or non-functional.

However, today there is a growing realisation that only the institutions with grassroots' support can solve the growing resource scarcity problem, especially in the mountains of Nepal. This premise has historic precedence and justification (Wallace 1989; Mahat *et al.* 1986; and Fisher 1988). Prior to the enactment of a series of legislations aimed at transferring the authority over forests from the people to the Government, most of the forests were managed under what are today known as CPRM regimes. However, often legislative measures were implemented and the Government Forest Department was expanded, community ownership was contested, and was legitimised. It is, therefore, appropriate to state that the property regime of Nepal's forest resources changed from a common property regime (CPR) to an open access regime (OAR) in the early sixties, primarily due to the unplanned enforcement of the so-called forest protection rules by the DOF (Mahat 1987 and Gilmour 1989)³. Although the consequent forest degradation may not be due to the open access property regime only, this factor, combined with the historical build-up of population pressure and other causal factors, such as malaria eradication, population shifts, democratisation of the society, and opening of road networks, accelerated the deterioration in forests and environmental balance.

It is, therefore, argued that the term common property has been used in the past in a way that is often at odds with the intended meaning of the concept. In Nepal's forestry sector, the term should be used to refer to the distribution of property rights over forest resources so that a number of owners are co-partners (equal) in terms of user rights. Transfer of these rights should not be allowed. This concept is well established in informal, institutional arrangements based on customs, traditions, kinship, and social mores. Common forest property, contrary to conventional wisdom, is not everybody's property. The concept implies that potential resource users who are not members of a group of co- or equal owners are excluded. However, under the UGF system of forest management, the State, through the DFOs, takes care of the interests of those excluded by making surplus forest products available to them at prices set by the FUGs.

³ The theory of forest degradation in the Himalayas has been widely debated. The traditional view of linking the rise in population with reduced landholdings, increasing poverty, and massive deforestation (Eckholm 1976) has been termed a *myth* (Thompson *et al.* 1986; Griffin 1988; Fisher 1988; and Karki 1991)

CFRM Framework

In the forestry institutions currently operating in Nepal, three levels of hierarchical decision-making system exist - a) operational or the FUG and DFO level; b) institutional or the department level; and c) the policy or ministerial level. Performance can be analysed at all three levels but, for the purpose of analysis, the institutional level is the most crucial. Two important performance variables are used to determine institutional success. They are - a) equity and b) transaction costs. Figure 2 provides a schematic framework for FUG analysis, focussing on the situation, structure, and performance (Ostrom et al. 1988). Structure is a more static variable than performance and situation. The analysis aims at identifying and correlating variables representing situation and performance. While performance can be judged on the basis of the socioeconomic and physical attributes of the users and resource conditions, the situation variables are types of governance, transaction costs, and availability of alternative resources. Markets that might alleviate these problems are either imperfect or non-existent. The consequences of CPR problems are compounded by external effects, such as floods, soil erosion, fires, and road construction, which have accompanied overuse of forest resources. Common owners or user members are also likely to consume the wrong mixture of resources even if their total consumption level is efficient. Also, they may use inefficient methods to harvest resources. Externality aggravates CP-related problems since a host of external factors contributes to make resources a common property. Nepal's forests, therefore, face four problems - a) no or under-investment in the replenishment of forests (true in the case of UGFs); b) overuse due to the open access nature of the resources (national forests); c) no tradition of successful forest management at the Government level; and d) inefficient administrative and legal systems.

Forestry for Sustainable Development

Forestry-related problems in Nepal are not technical but are symptoms of social, political, and economic inequalities in a community. Therefore, new forest management strategies must be incorporated within the process of equitable redistribution of local resource ownership, management, and access rights. In other words, an effective CF programme should be part of the larger process of community development and change. Through the

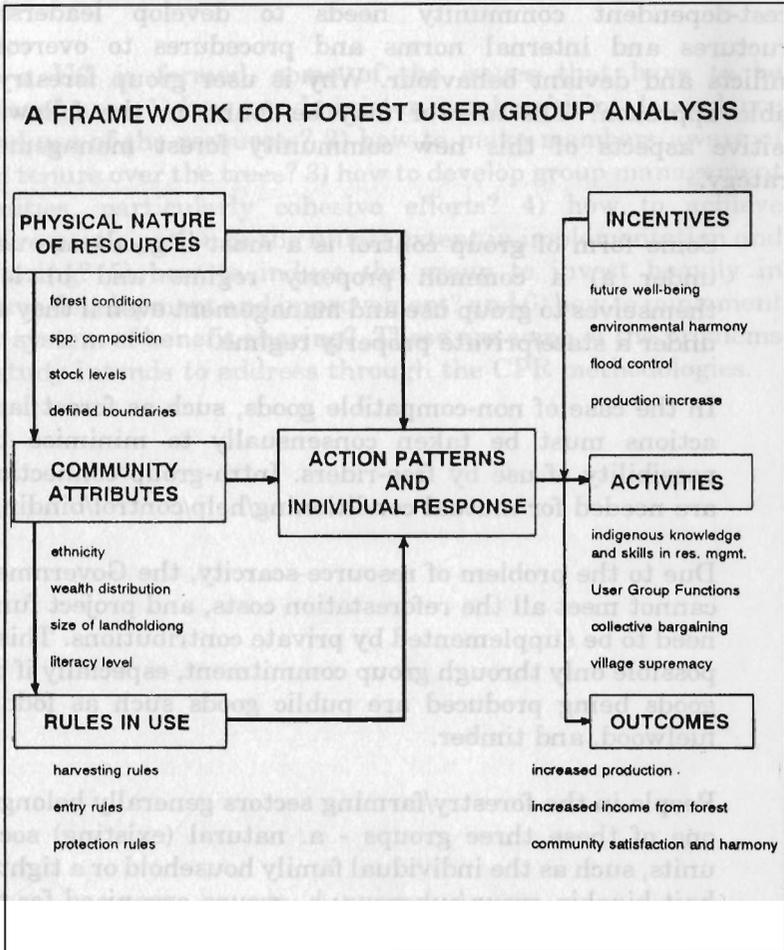


Figure 2: A Conceptual Framework for Institutional Analysis of Forest User Groups

process of awareness-raising, UG formation, identification of better CF management processes, and understanding the needs and dynamics of UGs, the capacity for other sustainable development work can be enhanced. In summary, the emerging issue of socioeconomic requirement is that forest management must promote sustainable development and vice-versa.

Case for User Group-based CF

Cornea (1989) analysed the merits of organising user groups as producers, managers, and consumers of rural forest resources. A

forest-dependent community needs to develop leadership structures and internal norms and procedures to overcome conflicts and deviant behaviour. Why is user group forestry a viable approach? The answer may be found in the following positive aspects of this new community forest management strategy.

1. Some form of group control is a must if goods are used under a) a common property regime and b) lend themselves to group use and management even if they are under a state/private property regime.
2. In the case of non-compatible goods, such as forest land, actions must be taken consensually to minimise the possibility of use by free-riders. Intra-group connections are needed for mutual conditioning/help/control/binding.
3. Due to the problem of resource-scarcity, the Government cannot meet all the reforestation costs, and project funds need to be supplemented by private contributions. This is possible only through group commitment, especially if the goods being produced are public goods such as fodder, fuelwood, and timber.
4. People in the forestry/farming sectors generally belong to one of these three groups - a. natural (existing) social units, such as the individual family household or a tightly-knit kinship group/subgroup; b. groups organised for the purpose of planting, protecting, and cultivating trees; and c. groups established for purposes other than forestry but able to undertake forestry-related activities as well.

Fisher (1990) argued that the slow rate of progress in CF was partially due to the overemphasis on formal and politically-sanctioned institutions such as the *panchayat*-based protection committees. This approach was contrary to the indigenous system of decision-making by rural communities in which flexibility and face-to-face discussions are the norm. Moreover, political groups are conflict-ridden, whereas effective resource management must be based on at least a reasonable level of consensus. User groups are relatively small, face-to-face units and, as effective resource management is in the vested interest of users, achievement of consensus within a user group is not uncommon.

Issues

Once a UG is formed, some of the issues that have to be addressed are - 1) how to administer members' joint dependence on and use of the resources? 2) how to make members aware of group tenure over the trees? 3) how to develop group management modalities, particularly cohesive efforts? 4) how to achieve effective participation to the fullest extent in implementation and monitoring? 5) how to induce the group to invest heavily in resource development and improvement? and 6) how to implement a fair system of benefit-sharing? These are some of the problems this study intends to address through the CPR methodologies.

General Features

Palpa, a mid-hill district in western Nepal, is a rectangular piece of land covering 1,35,800ha in area (Figure 3). The Siddhartha Rajmarg (SEM) passes through the district and the major town of Tansen is accessible by a branch road. Several district points are well connected by fair weather roads as well.

Biophysical Description

The topography is characterised by steep southern Himalayan ranges running east to west. Several valleys of considerable size are also found. To the north, two-thirds of the district fall within the Mahabharat Range and the southern one-third is within the Siwaliks. The monsoon, as elsewhere, is erratic in Palpa. The annual rainfall varies from 1,000-2,000mm with mean rainfall at Tansen recording 1,870.3mm during 1979-84. The normal maximum summer temperature exceeds 30°C and in winter it is 7°C.

The geology is characterised by a very complex mixture of phyllites, schists, quartzites, granites, and limestones of varying ages and weathering stages in the Mahabharat Range. The Siwaliks is comprised of sandstones, sandy limestones, clays, and conglomerates. The soil is generally poor with a low fertility index, median P^2 , and low organic matter content.

Demography

The estimated population of Palpa is around 250,000. The majority consists of Magar followed numerically by Brahmins and

Chapter 3

BACKGROUND OF THE STUDY AREA

Palpa District

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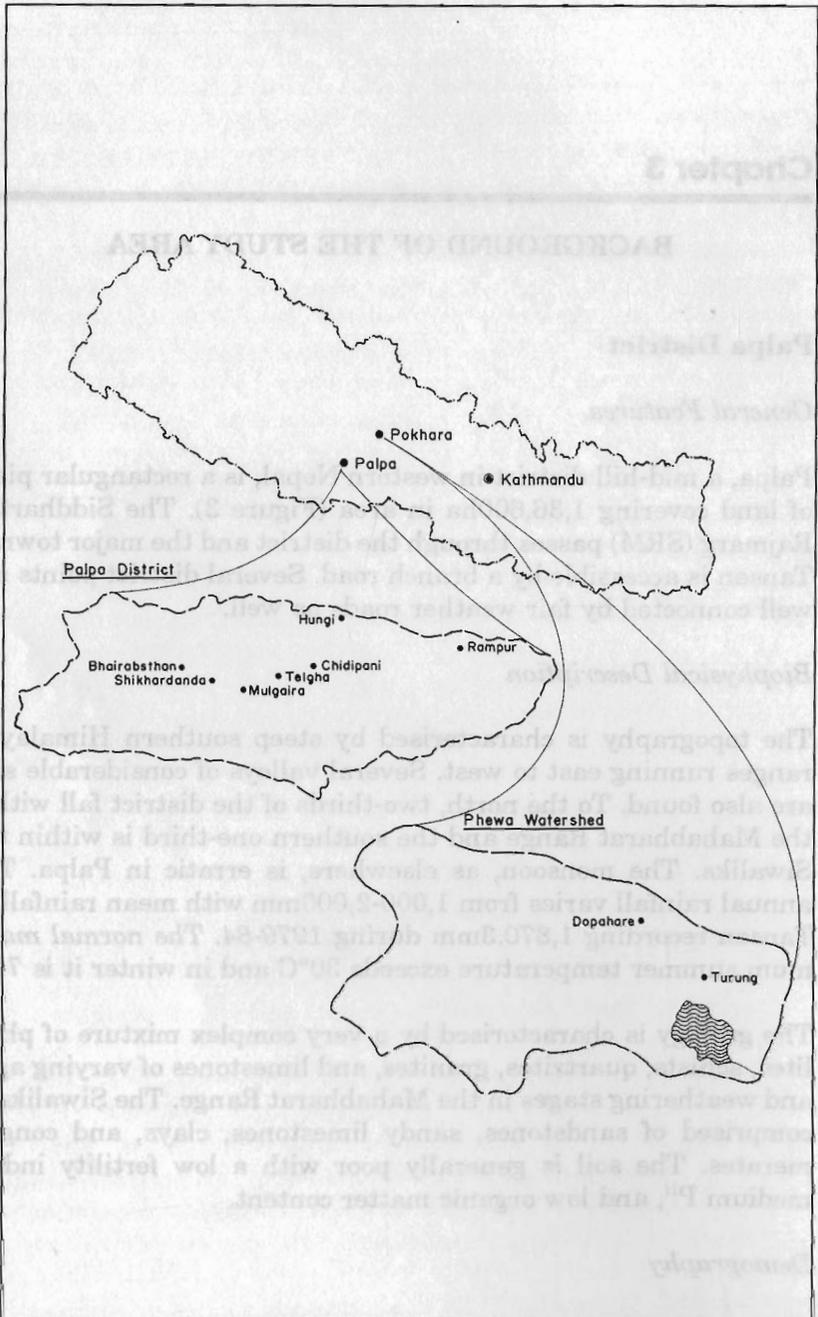


Figure 3: Location Map of Palpa District and Phewa Watershed in Western Nepal

Chhetri. There are small groups of *Newar* and occupational castes (*Sarki, Damai, Majhi, and Kami*).

Forestry

Forests cover 52 per cent of the total area of Palpa (71,172ha). This, however, includes all areas that have 10 per cent or more land covered by trees, shrubs, and grasses. The potential community forest area is estimated at 32,000ha. The shrubland amounts to 17,000ha (Fonzen 1986). In the Siwaliks, the forest cover, estimated to be around 20,000ha, is not as bad as in the mid-hills. On an average, the total volume per hectare is between 50-100 cubic metres. Regeneration is regularly affected by human activities, livestock grazing, and fires. In the northern two-thirds of the district, within the Mahabharat Range, the forests are scattered patches intermixed with human settlements or are on almost inaccessible slopes. In the southern (one-third) area, although the tropical/subtropical, mixed deciduous forests are of good density and quality, because of the illicit cutting of trees for firewood, the forest cover is decreasing rapidly. The main types of forest vegetation, as described by Stainton (1972), are as follows.

1. Sal forest. The dominant tree species is *sal* (*Shorea robusta*), normally found at elevations below 1,100m and, with some exceptions, up to 1,500m. It is more common in the Siwaliks and river valleys, mainly on the southern slopes.
2. Katus/Chilaune Forest. *Katus* (*Castanopsis indica*) and *chilaune* (*Schima wallichii*) are the main tree species; *laligurans* (*Rhododendron arboretum*) is predominant in some parts, and it is normally found from 750 to 1,800m on moist slopes in the mid-hills.
3. Salla Forest. *Khote salla* (*Pinus roxburghii*) is the characteristic tree species found from between 900 to 2,000m in arid conditions (southern slopes and rounded hills).
4. Mixed Forest. No dominant tree species can be identified. Vegetation is partly deciduous during the dry period at elevations of up to 1,200m in the Siwaliks and river valleys.

5. Shrubland. The vegetation is dominated by heavily degraded forests, mainly shrubs and young saplings. Some areas are almost devoid of tree species. Systematic forestry development in Palpa began in the late 1960s. Pine forests were planted in and around Tansen town (Shrinagar afforestation site). Tinau Watershed Project (TWP), a joint HMG/SATA/GTZ venture, which started in 1981, helped to introduce community forestry (*Panchayat Forest*) in Palpa. Some 660ha. of forest plantations were established during the next five years (Fonzen 1986). After 1985, the Project inputs were continued; however, more tasks were handled by the District Forest Office. Due to the gravity of the problem, most of the community forestry plantations and related activities have been concentrated in the mid-hills. In these areas, people are very much aware of the deteriorating state of the forests. Through their contacts with various outside agencies and experts, many villagers have improved the community-managed forests. The recent changes in forest legislation and rapid handing over of the forests to forest user groups have greatly increased the interest and participation of the people in carrying out successful forest development and management activities.

Agriculture

Around 47 per cent of the total land area is under agriculture in Palpa, and the bulk of it is characterised by sloping terraces. The average landholding is around 1.0ha, 35 per cent of which is estimated to be *khet* land. Paddy, maize, and wheat are the major food crops. Ginger, vegetables, and fruits are cash crops also. Livestock is an important and integral part of the agricultural and forestry sectors. Agricultural production is inadequate, and the district has a net food deficit. The over-exploitation of natural resources has had a negative impact on agricultural production.

Other Development Activities

Since 1981, the Tinau Watershed Project (later renamed the Palpa Development Project [PDP] to cover the entire district) has been carrying out major development activities in the district. In

addition, several other donor-assisted projects as well as regular government-funded development works are being carried out in the district. Helvetas is coordinating the funding on behalf of GTZ and the District Development Secretariat is the coordinating agency for HMG/N. The communication and education infrastructures of the district are fairly well developed, partly due to inputs from the PDP. In recent years, the relationship between the Project officials and the DFO staff has deteriorated to the extent that it has started to affect forestry activities. The basic problem is a lack of understanding of each other's approach and absence of functional coordination. The impact of the PDP on people's lives, however, is positive, mainly due to the establishment of road networks.

Phewa Tal Watershed

General Description

The Phewa Tal Watershed is located in Kaski district in western Nepal. It covers an area of about 123 square kilometres. Six village development committees (VDCs) fall fully or partially within the watershed. They are Sarangkot, Kaskikot, Dhikur Pokhari, Bhadaure Tamagi, Chapakot, and Pumdi Bhumdi. A part of the Pokhara municipality is also included in the watershed area (Figure 3).

Population

The current population is estimated at 34,050, consisting of about 5,570 households (HH). The majority of households are engaged in farming about 3,462ha of agricultural land. Upper caste *Brahmin* are predominant (47%) in the population, followed by occupational castes (*Damai*, *Kami*, and *Sarki* - 27%) and *Gurung* (14%). The average family size is 5.6 members with almost an equal male-female ratio.

Socioeconomics

The average landholding by household is estimated at 0.65ha and six per cent of the households are reported to be landless. The population density is 260/km² and the number of persons per ha of agricultural and forest land is nine and six respectively. The majority of the farmers practise subsistence agriculture. About

47.7 per cent are literate, out of which 17.3 per cent are female. The watershed is deficient in foodgrain production for more than six months a year. Over 79 per cent of the households suffer from food deficit (HMG/FINNIDA 1992).

Livestock farming is a major source of cash income. The livestock population is estimated at 22,670 head or 13,400 livestock units. At the current supply rate, only 59 per cent of the total digestive nutrients (TDN) are available for consumption by livestock.

Fuelwood and Fodder Situation

At the present level of fodder and fuelwood consumption and continuing forest degradation, it is estimated that all accessible forests will be depleted by the year 2006. This projection is based on the assumptions that the forests are not under scientific management and that the level of fuelwood and fodder consumption will remain at one cubic metre/person/year and 2.8kg of total digestive nutrients (TDN) per livestock unit/year respectively. However, under appropriate management (including improved user group-based management), the current forest area is expected to sustain the demand for a much longer period. It is believed that it is possible to manage the forests under sustained yield conditions (Karki 1982).

Soil Conservation Work

The siltation survey carried out during 1990 and 1991 indicated that the estimated annual sediment yield in the watershed was about 147,000 tonnes or an average hectare of the watershed land yields over 12 tonnes of silt annually. The main reasons for siltation in the watershed are - a) cultivation of marginal and sloping lands; b) illicit cutting down of trees for fodder, fuelwood, and timber; c) general degradation of the land resources; d) severe soil erosion and drying up of the water sources; e) low agricultural productivity; and f) poor animal health. Overgrazed lands are estimated to yield up to 36 tonnes of sediment, followed by dry terraces (12 to 20 tonnes/ha). The recent Baglung Road construction activities increased the siltation yield also.

People, especially women, are reported to be spending an increasing amount of time fetching water and collecting fuelwood

and fodder as well as leaf litter for animal bedding and farmyard manure. The subsistence economy of the majority of farmers is barely being maintained against the usual ups and downs, mainly due to the fluctuating production and environmental disturbances.

Various watershed protection and management programmes have been launched since the late seventies to reverse the trend of ecological deterioration. The emphasis has been on prescribing a land use practice for sustained economic productivity. Due to the importance of the area as a national tourism site, its protection is a national priority. The central and local governments also accord high priority to the protection and management of the watershed. However, the supply of basic commodities, such as food, fodder, and fuelwood, for the growing population and generating employment opportunities are issues which have to be addressed first.

Biophysical Description

The Phewa Lake is situated at 793masl. The highest point of the watershed is the Panchase Ridge at 2,589m. The terrain, in general, is rugged and is comprised of several folds of steeply sloping hills. A number of streams and rivers criss-cross the watershed, the major ones being the Harpan and Andheri *Khola*.

The climate is monsoonal. More than two-thirds of the estimated annual rainfall (4,000mm) occurs during the June to September period. Hailstorms are quite common during summer and they damage agricultural, forest, and fruit crops.

Forestry. The forestry situation in the watershed is vital for both the sustenance of Phewa Lake and the subsistence farming of the population. At present, the forest cover is estimated to be 44 per cent of the total land use. There has been an overall improvement in forest quality, largely due to the gradual popularity of the community-based management system. Since 1990, user group forestry (UGF) has been implemented in the Phewa Watershed and various forest user groups (FUGs) are currently operating with varying degrees of success. Still, the Phewa Watershed suffers from a net deficit in terms of fuelwood, fodder, and timber products. The current deficit is estimated at 9,000 cubic metres per year. It is estimated that only 70 per cent of the total fodder needs are met from all the sources. Great disparities also exist in the percentage of forest area in each VDC. While Chapakot is 50

per cent forested, Sarangkot and Kaskikot are only seven per cent forested.

The Phewa Tal Watershed (PTW) occupies a special place on the national tourism map in that the survival of the lake and the quality of the lake's water are closely related, not only to the economy of Pokhara but also to the development of nature tourism in the country. National attention is being focussed on the socioeconomic factors affecting the watershed, as a result of the threat posed to the lake's environment.

Geology and Landform

Geology. The main parent material throughout the watershed is grey phyllitic schist. The rock dip in the watershed is mainly south-facing, except for the lower parts of the northern mountain slopes which have a north-facing rock dip.

Landform. The watershed represents the landform found in the Mahabharat Range. Alluvial plains and fans constitute about eight per cent of the watershed and river terraces constitute another three per cent.

Nine per cent of the watershed area is too steep (slopes above 60%) for intensive cultivation and should be used for perennial vegetation cover, e.g., forests. About 55 per cent of the watershed area is in the slope class, 30-60 per cent is under cultivation, and the forestry sector needs intensive attention for sustainable human use. Only 13 per cent of the area is on slopes of less than 15 per cent where rice terraces are found.

Agriculture

The agricultural sector includes crop farming, horticulture, and livestock-raising. The average landholding per household is 0.65ha. Half of the land is *khet*¹ (51%), a quarter is *bari*², and 13.3 per cent is under *kharbari*, or thatch grasses. The remainder is fallow land. *Brahmin* families own the largest landholdings (0.91ha), followed by the *Newar* and *Chhetri*. The *Tamang* are the

¹ irrigated rice land

² rainfed cultivated land

smallest landholders. Paddy and maize are the predominant crops. The yields of major crops are lower than national yield levels.

Livestock

Every household in the watershed keeps livestock. The average per household (HH) holding of cattle, buffalo, sheep/goats, pigs, and poultry is 0.68, 1.92, 1.41, 0.17, and 2.39 respectively. Improved breeds are negligible. More than 80 per cent of the households face a fodder deficit.

Horticulture

More than half (57%) of the farmers cultivate some kind of fruit tree. The average holding of fruit plants is seven trees per household. People in the watershed are generally more interested in planting fruit trees along with other multipurpose tree species, grasses, and food crops.

History of Watershed Development

Phewa Tal is one of the important lakes of Nepal. The catchment area of this lake is known as Phewa Tal Watershed (PTW). Historically, the Phewa Watershed has been used intensively for agriculture. Out of the six major watersheds in Nepal, Phewa Tal has the highest percentage of agricultural land (48.3%), the highest population density, the lowest amount of arable land per capita, and the highest grazing pressure. Prior to malaria eradication, the valley bottom and the lakeside areas were not settled, although rice cultivation was practised in these areas. The ridge tops were used for settlements, the hill slopes for maize/millet cultivation, and the valley bottom was forested. However, until about 50 years ago, more than 50 per cent of the watershed was forested. As a result of the rapid population growth after 1950, as well as the rapid urbanisation of Pokhara nearby, the deciduous forests of the watershed were destroyed rapidly. The need for more food forced the people to cultivate higher and more fragile slopes. The livestock population growth was also commensurate to that of the human population and, due to uncontrolled grazing, the rangelands also deteriorated. It was not until the late 1970s that the Government intervened and launched preventive and rehabilitative measures, primarily to protect the Phewa Lake from increasing sedimentation.

Planned development and management of the watershed began in 1974 with initial funding from His Majesty's Government (HMG) of Nepal. It was a pilot project of the newly-established Department of Soil and Water Conservation. Later, assistance from the UNDP/FAO was obtained, and this continued until 1986. Since 1986, the soil conservation and watershed management programme activities in the PTW have been supported by the Finnish International Development Agency (FINNIDA).

Community Participation in Resource Management

Forests in the PTW have been managed traditionally by the local communities. Even under changing government rules and socioeconomic pressure, forests continued to be managed by the local communities under indigenous management systems. *Adhikari Ban*, *Paudyal Ban*, and *Kunwar Ban* are among the examples of traditionally-managed communal forests. Forests in Sarangkot, Chapakot, and Bhadaure Tamangi are under well-documented, endogenously-managed forest systems (Messerschmidt 1990a and 1990b).

The Government introduced community-based, forest management systems in the PTW in 1974/75 when the Phewa Tal Watershed Development Project (PTWDP) commenced its activities. However, community involvement was mainly sought in the afforestation and protection of degraded forests and rangelands. Later, these new forests were handed over to the concerned communities under the *Panchayat Protected Forests*. In 1988, when the erstwhile *Panchayat Forests* were converted into community forests, user group-based ownership and management of forests were legalised. Since then, forests are being handed over to the local communities at a rapid pace. Evaluation of forest conditions, management and sustainability of resources, and user group-based management of two types of representative forest (one natural and one plantation) will be discussed in the next chapter.

Chapter 4

INSTITUTIONAL DEVELOPMENT OF FOREST USER GROUPS

A. Palpa District

Seven forest user groups (FUGs) were selected for detailed study. First the internal factors - both socioeconomic and biophysical, were analysed, i.e., for each group, its historical evolution, structural attributes, and functional variables were analysed. The analysis was carried out for each UG separately (Figure 3). Annex Table 1 lists the forest user groups formed by 1992 in Palpa and Pokhara.

Mulgaira Forest User Group, Madanpokhara

a. Location. The forest is located within the Madanpokhara Village Development Committee in the central part of Palpa district. The residents of Mulgaira Village (Ward. No. 9) have been the traditional users of this forest. The estimated area is eight hectares. The village is reachable by a fair weather road from the nearest bus stand.

b. History. Due to heavy population pressure, degradation of the forest began after 1958. By the year 1965, the forest condition became poor and soil erosion problems surfaced. Mainly due to the drying up of the drinking water spring in 1957, a forest protection drive was initiated under the leadership of Mr. Ghant Prasad Aryal (see Box 1). People were barred from using the forest and complete protection was enforced. Later, the Tinau Watershed Project (TWP) formalised the forest management committee in the form of a *Panchayat* forest protection committee in 1986. For the next four years, under a management plan jointly developed by the villagers and the Ranger, firewood was removed four times a year. The major tree species are *Shorea robusta*, *Schima wallichii*,

Box 1: Ghant P. Aryal - A Model UGF Leader

Mr. Aryal is a key figure who has played an important role in achieving successful forest protection and management in Mulgaira village. He was born in 1984 B.S. in Ward No. 9 of Shrawadi village where he says 16 past generations of his family had lived. He received informal education in Gulmi. He has two sons and three daughters, all of whom are educated and independently settled. In 1955, the age-old water source (spring) in his village suddenly dried up. Mr. Aryal contends that the reason for this was the cutting down and removal of forest vegetation around the spring by the villagers. Mr. Aryal, upon agreement with the other village leaders, started protecting the trees around the spring by camping there during the night. In a marriage ceremony the same year, where most of the villagers had gathered, he proposed that anyone caught cutting a tree should be fined Rs 10 by the village. During the first year of this arrangement, one person was caught cutting down a tree, but he refused to pay the fine. The villagers petitioned the then bada hakim, Mr. Digambar Jha, stationed in Butwal. The offender was caught and jailed and detained until he agreed to pay the fine of Rs 10 to the villagers. The money was donated to the village school. This system was thus sanctioned, both by the society and the Government, and has been enforced until this date with the same seriousness and authority. The only difference is that the fine has been increased from Rs 10 to Rs 50 per offence. The water spring re-emerged after the vegetation around it was restored and has not dried up ever since. It supplies water to all the eighty households in Ward No 9 of Madanpokhara. Throughout a period of over 30 years, Mr. Aryal has always led his community in fighting for different causes. He was elected *pradhan panch* unopposed in 1962. In 1964, when the forest was being destroyed due to the abolition of the *birta* system, Mr. Aryal once again mobilised popular support to protect the forest. In 1971, Mr. Aryal was again elected the *pradhan panch*. This time he inspired people in all the wards to start protecting their forests as in his own ward. The system refined in Mulgaira has been replicated in other villages with minor changes. Over time, the system has become so well-entrenched in the local sociocultural settings that even during the *laissez faire* period from 1980-1990 nobody dared to challenge the system. The people of Madanpokhara have always been vigilant and have protected the forests day and night even during periods of national turmoil. The reason for the stability of this system is the time-tested nature of institutional evolution and its acceptance by all the villagers.

Castanopsis sp. In 1989, the committee was converted into the Mulgaira forest user committee. Currently there are 79 user HHs for this forest which originally had 50 members. The user committee has 15 members, out of which four are women. The majority of the members are small landholders.

c. Protection and Management Practices. The official Operation Plan was developed in 1989. The District Forest Office (DFO) and the rangers concerned appraised the users belonging to Ward Nos 6, 7, and 9 with the new rules under which the forest could be handed over to them. A general meeting of all the users was called and discussions were held on the major provisions the operation plan was required to have. Through consultation with the DFO staff, the operational plan was finalised and the (FUGC) forest user group committee was also formed through a general meeting of all the users.

Table 3: Major Activities Performed by the FUG

Activities	Year	Site
Plantation	1988	landslide area
Training	every year in the month of January	one compartment out of five
Grazing	controlled grazing	throughout the forest

d. Management Objectives. The objectives of the forest management work carried out by the UG are as follows - 1) to supply firewood; 2) to improve soil conservation; 3) to protect water sources; 4) to supply timber needs in the future; 5) to achieve an improvement in the local environment; and 6) to protect the forests and wild animals.

e. Characteristics of the Current User Group. Under the initiatives taken by the UG committee, afforestation work in the landslide area and open spaces around water sources has been carried out. The meetings and other operating procedures are described as follows - 1) over 80 per cent of the users as well as FUG committee officials belonged to the upper *Brahmin* caste, thus creating an overall homogeneous ethnic composition; 2) the general meeting of all user group members is held at least once a year in order to evaluate the annual report and to make major

decisions; 3) a 15-member user group committee (UGC) has been formed to enforce and implement the rules and plans passed by the general body; and 4) the UGC is also responsible for establishing communications with the general users as well as for maintaining links with the District Forest Office; and visitors who request forest visits and briefing on the management system are charged Rs 100 per briefing, out of which Rs 50 is deposited in the general fund and Rs 50 is awarded to the briefer/s. Some of the other regulations are as follows.

1. All the users are supposed to participate in firewood cutting on the date and time fixed by the committee.
2. The forest is divided into six compartments and all the users are asked to collect and prepare one *bhari** (25kg) of firewood.
3. All the *bhari* are numbered and allocation is carried out through a lottery system so as to avoid cheating by the forest users.
4. Only one person per household is allowed to participate in firewood cutting.
5. Only dead, dying, and crooked trees are to be removed, no *Shorea robusta* branches are to be cut and no green trees/plants from erosion/landslide prone areas, or from around the water sources, are to be removed.
6. To cut a *Shorea robusta* tree, only a saw is to be used. The rights and responsibilities are as follows.
 - i) All the households permanently settled within the boundary established by the FUG are automatically included in the user group.
 - ii) Current members who regularly abide by the rules and regulations stipulated in the management plan automatically sustain the membership.
 - iii) Anyone violating the rules is to be fined Rs 50, out of which Rs 25 is awarded to the informer/cooperator.
 - iv) A second time offender is fined Rs 100 and the informer gets Rs 50.

* One *bhari* is the term usually used to denote a full load contained in traditional handwoven Nepalese baskets. The weight varies according to the size of the basket and type of wood.

- v) A third time offender is sent to the DFO for legal action.
- vi) All the damages are assessed and charged to the offenders by the user group committee (UGC) and endorsed by the general meeting of the FUG.
- vii) Fallen leaves and weeds can be removed free of charge by needy users, provided they do not leave the ground bare in the process.
- viii) Anyone found cutting down a live tree is charged Rs 100/tree.
- ix) Hunting of birds and other animals results in a fine of Rs 100/person, in addition to referring the case to the DFO for further legal action.
- x) Anyone causing fire in the forest is prosecuted if caught.
- xi) No grazing is allowed in the newly planted areas
- xii) Picnickers and other users are also charged nominally.

Shikhardanda Forest User Group, Madanpokhara

a. Location. The forest borders Mulgaira village in central Palpa and is located in the Madanpokhara VDC of Palpa district. Most of the trees are second growth *Pinus roxburghii* and *Shorea robusta* forests. The Pokhara highway passes along the western side of the forest.

b. History. The villagers reported that, prior to 1963, the forest was dense and of good quality. There was even one informal committee to protect the forest in 1962. However, forest destruction is said to have started after the opening of the road to Pokhara. Illegal cutting down of trees to sell fuelwood and timber in Butwal and Tansen were the major causes for forest destruction. People from adjoining villages also started using the forest for grazing, fodder and fuelwood harvesting, and farming, once outsiders moved in. By 1975, the forest was completely destroyed and the whole area had turned into barren slopes. In 1976, the people of Shikhardanda appointed one *heralo* by collecting *manapathi* (grain) contributions from every resident of Ward No 5. There was one formal committee, but this committee was not able to conduct its work properly. In 1978, another committee was formed to protect the local forest. This committee

was partially successful in conserving the local forest. It helped establish the plantation of pine seedlings in the year 1978/79. In 1985, through the initiative of the District Forest Office, Palpa (DFOP), the forest was placed into the *Panchayat* Protected Forest category. The forest was formally handed over to the *panchayat* in 1986, but a forest guard was kept on the payroll of the DOFP. The present users' committee was constituted in 1990 B.S. The committee has 11 executive members, nine of whom are male. The users number 140 HH, eighty per cent of which belong to the small and medium farmers' group.

c. Protection and Management Practices. A committee was formed before the forest was handed over to the FUG by the DFO, Palpa. The committee wrote the operational plan and negotiated with the DFO. Management operations, such as pruning, thinning, and singling, are carried out in January in each year. The users' group has a plan to replace *Pinus roxburghii* with *Shorea robusta* forest in due course of time as they feel a greater need for fuelwood and fodder than for timber.

No paid watchers exist now. The DOFP removed one they had during the last fiscal year (FY). Volunteers among the users have now been assigned to protection duty on a rotational basis. Fuelwood from the forest is sufficient only for five months. The rest of their supplies comes from their own farm sources. Fuelwood is distributed using a standard measuring rope and through a lottery system.

d. Management Objectives. The management objectives are as follows: 1) to develop the forest until it recovers its pristine beauty and ecology; 2) to gradually replace the *Pinus roxburghii* dominated section of the forest with *Shorea robusta* forest; 3) to meet the fuelwood, fodder, timber, and leaf litter needs of the villagers; and 4) to conserve soil and prevent damage to the farms and houses.

e. Characteristics of the Current User Group. To be a member of the user group, one must be a native or inheritant resident of the UG village. He/she needs to produce a legal document of property ownership (by inheritance) or ownership of newly-purchased land in the village. Secondary users are not entertained in this UG. Fuelwood collection is allowed once in a fortnight if approved by the UGC. Only dead and dying trees can be collected. Dry leaf

litter collection is allowed every Saturday during *Chaitra* (March-April) to *Ashad* (June-July). *Shorea robusta* leaf collection for home consumption is allowed. It is also permitted to collect tree fodder and cut grasses as per the directives of the committee.

The villagers also reported that elements of the operation plan were drawn from other collective schemes, such as irrigation canals, school buildings, and drinking water schemes, which were also found to be successfully running in the villages. This factor was considered to be one of the stronger variables that could be associated with the success or failure of a particular FUG.

Bharkesh Forest User Group, Telgha

a. Location. The forest is located on the southeast side of Tansen Bazaar in Telgha VDC. The Pokhara road forms a boundary between the Telgha and Madanpokhara VDCs. The forest is of a fairly large size and contains mainly *Shorea robusta* and *Pinus roxburghii* species.

b. History. The forest was densely stocked until 1962. Pine was the major tree species. Large-scale encroachment started in 1964/65. About 10 per cent of the local people still practice a variant of shifting cultivation in the forest. Most of the inhabitants belong to occupational castes, such as *Damai*, *Kami*, and *Sarki*, who have very little agricultural land and are, therefore, subsistence farmers. Accelerated deforestation started during and after the completion of the Pokhara road. Charcoal-making was also started by the blacksmiths residing in Ward No. 3. People from Tansen and other neighbouring villages also participated in the rapid destruction of the forest. By 1981/82, the forest was left with only young saplings of *Shorea robusta* trees. Conversion of forest land into agricultural land also continued. In 1982, locally-elected leaders and youth club members planned some measures to protect the forest. They initiated day- and night-time vigils to catch illegal forest users, including the charcoal-makers. In 1984, Tinnau Watershed Project (TWP) hired two forest guards to protect the forest on two opposite ends of the boundary. These measures were of significant help in protecting the forest and the quality of the forest improved appreciably. However, the lucrative fuelwood market in Tansen contributed towards continued use of the Bharkesh forest for fuelwood

collection for regular marketing by both locals and outsiders. Even though the forest was handed over in 1989, as a result of the faulty and hasty handing over procedures adopted by the Project (PDP) Ranger in constituting the UGC, the group has remained non-functional. The general committee has 31 members and the executive committee 11 members, but both are in disarray. The total number of users identified is 331. Although the operational plan for this forest has been signed by the DFO, the forest has not been formally received by the committee due to land tenure disputes. The problems identified by this study team are largely related to the large size of the forest and its user group. Due to the traditional practice of fuelwood collection adopted by the local people, the natural forest has been a regular source of livelihood. This issue has not been addressed by either the DOF or by the UGC. However, the local people have expressed their interest in managing the forest. A temple trust (*guthi*) is understood to have recently registered a large portion of forest in its name. This religious organisation may have a better chance of saving this valuable forest.

c. Protection and Management Practices. According to the OP approved by the DFO, the forest is to be managed primarily for fuelwood, fodder, and leaf litter production. The forest has been divided into five compartments. It is supposed to be opened for fuelwood collection only during two Saturdays in a month. However, during these regular days only dead wood and fallen wood are to be collected. The committee fix a few days during the December-February period every year for thinning and pruning operations through which more fuelwood can be obtained by the members. Leaf litter is collected every Saturday. A representative of the DOF is present during major forest operations, if possible. In addition, the district office is to be informed well in advance of all the planned activities of the UGC.

The penalties fixed are similar to the ones fixed by the FUGs of the Madanpokhara VDC. However, due to the rather relaxed attitude of the UGC, illicit users are never caught and, even if caught, are let free due to social and political interference. For example, at one time the DOF officials caught some illegal fuelwood sellers on their way to Tansen Bazaar. This created shortages and/or a rise in the price of fuelwood at the district headquarters. In a few days, the local leaders pressurised the DOF officials to relax their activities.

d. Management Objectives. This UG has not been able to set any clear-cut objectives because of the organisational, structural, and inherent institutional weaknesses and failure to address equity and gender issues.

e. Characteristics of the Current User Group. The rules and procedures followed by the FUG are similar to the ones described for other FUGs above. This FUG is one of the most ineffective groups among the seven included in the current study. Based on Participatory Rapid Appraisal techniques, the Baseline Socioeconomic Sample Survey, and the Key-informant Survey, the following problems have been identified,

- * The forest is too large and geographically disadvantaged by being located near the district headquarters of Tansen. The existence of a perennial fuelwood market around the forest, coupled with the traditional system of fuelwood collection adopted by a section of the FUG members, are key factors contributing towards lack of agreement on protection needs amongst the members.
- * The FUG itself is quite large and unmanageable (331 members). More importantly, the group is ethnically and economically heterogeneous and divergent. The majority of members are small farmers and/or landless, as well as people belonging to occupational castes. The average landholding is only 0.55ha per HH and most of it is rainfed *bari*. Therefore, members' dependency on the forest is high.
- * The number of educated persons is quite low - the percentage of college educated persons is less than one.

Mahajir Salleri User Group, Dhyakuldanda

a. Location. This UG forest is located in Bhairabsthan VDC of western Palpa. It is one of the first ever recognised UG forests and is regarded as one of the most successful as well. A fair weather road links Tansen to Bhairabsthan VDC and the forest is frequently used as a training and observation site by the District Forest Office.

b. History. This FUG manages the *Dhyakuldanda Mahajir Salleri Ban* located in Ward No 5 of Bhairabsthan VDC. This is the biggest of all the forests studied and has a history of traditional management spanning over 30 years. The villagers claim to have been managing the forest since 1960. Beginning in 1970, its protection included the forests around the water spring and surrounding forest patches. During the 1975/76 cadastral survey period, some land grabbers were successful in including a section of the forest as their private land on the topographic map. The villagers collectively filed a legal suit in the regional court, won the case against those individuals, and retrieved the forest. Plantation was carried out where necessary. They formulated rules to fine misusers of the forest. This is a predominantly pine forest and has an area of about 84 ha. The total number of FUG members is only 68. The executive committee consists of 19 members, out of which six are female. All are medium-scale farmers and most of them belong to the upper and middle caste *Chhetri* and *Newar* group. Prior to being formally handed over in 1990, this natural forest was becoming degraded.

c. Protection and Management Practices. The motivation process started in 1960 itself, but the formal handing over took place only in 1990. An informal committee was formed before the forest was handed over to the FUG by the DFO. The committee wrote the operational plan and negotiated with the DFO.

d. Forest Management Objectives. The major objectives of the forest management are as follows: 1) to protect the water sources and 2) to meet the needs for fodder, fuelwood, leaf litter, and timber. Fuelwood collection from dead trees and fallen branches is allowed throughout the year. The annual fuelwood harvesting schedules, beginning with the thinning and pruning operations, are fixed by the executive committee. The forest has been divided into five compartments and each year, in the month of February, one of the compartments is designated for silvicultural operations.

e. Characteristics of the Current User Group. While harvesting fuelwood, certain guidelines are to be followed. They are: 1) shrubs and dense saplings are to be removed first; 2) pine is to be removed in areas mixed with *Schima* and *Castanopsis*; 3) only one member from each HH is to be allowed to collect fuelwood; 4) all collection is to be pooled and equally divided; and 5) each *bhari* of fuelwood (1m x 1.5m) is to be deposited in the common fund. Ten

rupees is charged for each log (2.5' round and 1.5' long) used for timber purposes.

The penalties are similar to the ones described for the previous forests. However, this FUG is very dynamic and progressive in framing the rules and enforcing them (Box 2).

Box 2. User Group Dynamics, Mahajir Salleri User Group

Mahajir Salleri forest user group (FUG) is one of the oldest and most active groups in Palpa. The Research Team observed the decision-making process adopted by the FUG at its general body meeting. The agenda set for the day was as follows: 1) raising the prices of forest products; 2) utilisation of cash funds; 3) fixing the dates for thinning and harvesting; 4) deciding on applications for full membership by associate members; 5) establishment of a furniture industry; and 6) appointing a Secretariat Committee. Out of these, raising the prices of logs and decisions on additional memberships received the highest and most critical response. For every issue under discussion, the whole group split into three separate interest blocks: 1) women's group, 2) senior citizens' group, and 3) youth group. The chairman, being a young man, was supported by the third group. It was observed that he attempted to force the mass to support the decisions of his group. The women were initially passive participants. However, when an issue in which they were interested was raised, women took over the discussion. They were highly reluctant to allow households from other villages to acquire full membership rights, chiefly because the applicants had not helped them in protecting the forest during the past. The applicants had also charged the womenfolk NRs five for each load of clay (domestic soil) from their locality. The older members were highly reluctant to raise the price of logs as most of them had recently retired and had plans to build houses. Therefore, they strongly opposed a proposal to raise the price of logs. However, the women supported the proposal since they perceived it to be a deterrent to forest destruction. The women's group also supported heavier penalties for violators of UGF rules. At the end, it was observed that the group generally attempted to arrive at decisions through consensus. However, on issues where two of the three groups had similar views, decisions were taken on the basis of the majority vote. On the whole, the group was found to be highly dynamic and had the potential to improve its decision-making process.

Self restraint and volunteerism are the measures adopted for protection. Grass collection is allowed, but open grazing is prohibited. Offenders are severely penalised and informants are given half of the fine charged as a reward.

Khumdanda Forest User Group, Chidipani

a. Location. The *Khumdanda* forest is located in Chidipani VDC in eastern Palpa district. Out of the several FUG forests in the VDC, the *Khumdanda* forest is quite well managed. The forest is bordered on the north by the Pokhara road. A fair weather road links the forest to eastern Palpa. The forest is also bordered by the rapidly growing *Are Bhanjyang Bazaar* which has been adding additional pressure to and causing protection problems for the user group.

b. History. Although, during the Rana period, each household from this village was required to supply charcoal to the Rana administrator stationed in Tansen, until the opening of the Siddhartha Rajmarg (SRM), the forest was in good condition. Massive tree cutting was carried out for road construction work by Indian contractors. After the road opened, people became rather reckless and destruction accelerated. Only after most of the big trees had been cut down was protection initiated in 1983. A formal group has been in existence since then. The management committee was established in 1985, but the official FUG was registered during 1989. At first, this forest was used by the residents of ward No 2. Two types of committee are functioning currently; a main committee with 11 members and a secondary committee with 12 members. Altogether 133 households (90, 33, and 10 households from Ward Nos 2, 3, and 4 respectively) are general members of the forest group. No female members are included on the executive committee, but two females are included on the secondary committee. The majority of the executive committee members (7) belong to the small farmers' group and the rest are from the medium farmers' group. No rich farmers are included on the executive committee.

c. Protection and Management Practices. A committee was formed through consensus before the forest was handed over in *Mangsir*, 1989, to the users' group. The management plan was developed with the full participation of the users. Suggestions

were collected from different wards and presented in the general meeting for approval. The plan was developed with the active involvement of the Ranger. The secondary committee was formed to improve communications between the FUG and the UGC. It was also to advise the UGC in resolving disputes. Seven executive meetings and one general meeting have been held during 1989/90. The committee has now decided to meet twice a month to discuss problems and improve planning.

d. Characteristics of the Users. The criteria for entry are as follows: 1. inheritant/permanent resident of the village; 2. migrants who own land in the village; and 3. temporary residents with low economic status are considered to be secondary users and are allowed to collect only 50 per cent of the forest products collected by primary users.

In order to implement the policies, rules, and regulations passed by the FUG, an executive committee has been formed. The committee functions based on the democratic basis of a majority vote, but the presence of three officials - Chairman, Vice-chairman, and Secretary - is a must for making major decisions. This is a small committee which facilitates the work to be carried out by the UGC. It also helps carry out forest development work.

The functions of this committee are to oversee the work performed by the above two committees and to investigate any problems and difficulties faced by general users and suggest remedies for them. The duration of all committees has been fixed at three years.

All officials can be relieved of their posts if a) they tender their resignations or b) the majority of the members are not satisfied with their work.

Plantation was carried out on 0.8ha of degraded forest area by the villagers during 1986. The planted species were pine (mostly *Pinus roxburghii*) and a 100 per cent survival rate was achieved. A second plantation was carried out during 1990 on an open patch of forest land. The survival rate was only 15 per cent. Plantation was carried out mainly to protect the degraded forest areas from erosion as well as to create more wood lots to meet future needs. Presently there is no forest guard. The DOF removed the official forest guard last year due to a budget shortage. Since then, the FUG members have introduced a rotational guarding system.

Each day the scheduled members report to a central location where an attendance register is maintained, and they note down the time of entry and exit to and from the forest.

Fallen leaves and weeds can be removed free of charge according to need, provided the ground is not left bare in the process. Controlled grazing is allowed in such areas where trees are out of reach of animals. But in the plantation areas, grazing is strictly prohibited. Ropes approximately 2.5' (width) and 4' (length) long are used to measure the firewood. Users are allowed to enter the forest for fuelwood collection for a month during the January-February period. No specific rules have been framed by the committee to ensure the equal distribution of fuelwood. Members can enter the forest with their family members and are allowed to collect one headload of firewood according to the measuring rope. All silvicultural and other operations are carried out during the winter season as well.

Ramche Forest User Group, Rampur

a. Location. The forest is located near the valley of Rampur in the eastern part of Palpa. Residents of the Rampur VDC, Ward No. 4, are the users of this forest. A fair-weather road links Pokhara highway to the nearby VDC from where the forest can be reached after a day's walk. The forest is completely hilly and is dominated by mixed *Shorea robusta* dominated trees on the east and south slopes and by *Schima/Castanopsis* trees on the west and north slopes. Some *Pinus roxburghii* trees can also be found.

b. History. Based on the PRA study conducted by the research team, it was revealed that, until 1970, the forest was in good condition. However, by 1973 almost all the mature trees had been cut down. The main reason stated was the abolition of the *birta* system of land tenure. Prior to this, the forests were protected by a *lalmohariya* (or empowered) family belonging to the Bhattarai clan. Partly due to the authoritarian system of government and partly due to the strict control the Bhattarais imposed on the forest, the use was strictly regulated prior to 1970. However, by 1980, the natural forest vegetation was completely destroyed and, according to the villagers, they could "literally see birds walking on the denuded terrain". In 1981, the local *panchayat* appointed one Mr. Hark Bahadur Nepali (see Box 3) as the forest guard and as an incentive instituted an annual award of Rs 300 for good

protection work. In 1983, a Range Office was established in the Ward and the Palpa Development Project (PDP) started to support one *heralo* (forest guard) in that year as well. In 1990, the DFO office informed the FUG committee that, beginning in the FY 1992/93, this support would be discontinued. Therefore, once again the *heralo* is being supported by the FUGC. The same *heralo* has been retained, although the salary given by the committee is half that paid by the DFO.

c. Protection and Management Practices. The protection of the forest is carried out by a very devoted *heralo* (see Box 3) who is actively supported by his wife, an equally dedicated lady. The *heralo* has been empowered by the committee to regulate access to the forest, to check the products removed, and to apprehend illegal users and submit them to the committee. This old couple maintains a 24 hour vigil on the forest and is actively supported by the UG committee. They, in fact, have lived inside the forest throughout their lives.

Management of the forest is carried out by dividing the forest into five compartments, and fuelwood removal is carried out every winter through a 'lottery system' of distribution. Committee members supervise the harvesting and are therefore given 18 *bhari* of fuelwood free. The UGC also collects fuelwood from its members as a management fee and sells the same to meet protection expenses. No poles or sawn timber have been removed so far, as the forest is still not mature enough. The future plans are to sell roundwood and sawn wood to the local market, and this appears to have good potential.

e. Characteristics of the Current User Group. The FUG consists of 212 members and has an executive committee of 13 working as its permanent committee. The FUG was established by an erstwhile *panchayat* leader with the active support of a Ranger. Since the informal group was formed during the *Panchayat* system, all the households belonging to Ward No. 4, where the forest is located, were automatically included in the FUG membership list. The main reason was that, under the old rules of *Panchayat* Forestry, forests could be handed over only to the *panchayats*, which in turn could authorise a Ward to manage the forest through an informal UG. Due to this provision, a few traditional users and claimers were excluded from membership, although they were never denied partial access to the forest. Since

Box 3: Hark B. Nepali - A *Ban Heralo*

Hark is over 50 years old. He has two wives, three sons, and one daughter. According to him, the *Ramche Ban* originally belonged to the clan of Mr. Tirth Raj Bhattarai who claimed that the forest was gifted to his ancestors by the then *jimual/talukdar* during the Rana regime. After Mr. Tirth Raj's death, his son, Dibakar Bhattarai, controlled the forest. The Bhattarais were very strict in enforcing the communal forest rules. Without the permission of the Bhattarai brothers, nobody could enter into the forest. Felling of big trees was allowed only in cases of dire need such as fire damage to homes and other destruction wrought by natural calamities. When news of the nationalisation of forests, abolition of the *talukdari* system, and introduction of a cadastral mapping system reached this village, the Bhattarai family lost control of the forests. All the people of Rampur and the adjoining villages started encroaching upon the forest. By 1969, the original forest cover was completely destroyed. Some settlers also moved inside the forest area. The whole landscape looked deserted and only undesirable shrubs were left to grow. The naturally regenerating vegetation was also harvested quickly. By 1982, one could see birds walking on the terrain, as Hark puts it.

During the time when Mr. Dev Raj Dhakal was the *pradhan panch*, he raised the issue of deforestation in *panchayat* meetings. Mr. Hark Bahadur Nepali, who was the peon of Ward No 3, was given the assignment of protecting the forest. A salary of Rs 300 per month was fixed if he was successful in controlling illegal cutting. Hark really took the job to heart. He strictly checked all encroachment. He was warned, he was threatened, and even manhandled by many poachers but he did not waver in his resolve to check forest destruction. So much so that, in order to maintain round-the-clock vigilance, he hired bullock pairs and labourers to carry out his own farm work. However, the salary of merely Rs 300 was not paid regularly. He worked without pay also for some time. In the early 80s, the Palpa Development Project put Hark on its regular payroll at Rs 540 per month. However, this was also withdrawn last year. Hark is back again to his original salary of Rs 300 per month, but he is not ready to quit the job of protecting the *Ramche Ban* because the forest is Hark's life as his wife likes to say and she herself is no less a devoted *heralo*.

Questioned about the problems and nature of this work Hark says that women, children, and small and landless farmers are the most frequent users of the forest. Women usually hide firewood and timber inside their fodder load. Any women tending to violate the rules and regulations, or those trying to override the guards, are referred to the committee. Hark is also invited to every meeting and contributes towards the decision-making process of the committee which supports his efforts.

1989 when the FUG system was legalised, the HHs belonging to Ward No 3 have been demanding inclusion in the FUG. However, the FUG has not been able to make any decision as there is no agreement among the members on the amount of entry fee or equivalent contribution for forest protection that the new members ought to pay. This has even precluded the inclusion of HHs within Ward No 4 who should automatically be included.

The executive committee is made up of eight *Brahmin*, five *Chhetri*, and one *Newar* - almost in proportion to the membership structure of the FUG. The operational plan was developed by a provisional committee, which was later converted into the executive committee. All the members of the FUG were involved in framing the rules, and this may be the reason why there is almost a 100 per cent compliance with these rules.

This FUG is currently confronting a very atypical problem. The ex-chairman (Mr. Bhola Nath Regmi) of the executive committee, who also happens to be the *ex-pradhan panch*, was found stealing a live *Shorea robusta* pole (locally called *linga* and used for religious ceremonies). The *linga* has been confiscated and kept at the Range Office to show the ex-chairman's defiance. He was fined Rs 50 for the offence. In addition, this person had used Rs 5,000 from the common fund to meet personal expenses and had not paid it back in full. The current Chairman, Mr. Hari Prasad Regmi, who used to be the deputy, is having a hard time collecting the dues from the ex-chairman as he seems to be related to him and still has some regard for his former boss. However, the majority of the members are quite agitated over the issue and are ready to use force or to take legal action.

Hungi User Group Forest, Majuwa

a. Location. The forest is located in the northwestern part of Palpa in Hungi VDC. It is bordered on the north by the Kali Gandaki River. The forest is generally slopy and northeast facing. The vegetation is dominated by mixed *Shorea robusta*/*Michelia* sp/*Castanopsis* sp forest. The forest can be reached in a day's walk from the nearest point on the Pokhara highway.

b. History. The Hungi user group forest has a special topographic feature as most of the forest area lies on steep, north-facing slopes

along the bank of the Kali Gandaki River. The forest is located above the Majuwa village on sloped terrain. Most of the flat and gently sloping lands are under agricultural use. The forest is very scenic due to the several waterfalls scattered throughout it. *Simal Chhango* is the most well-known waterfall. The forest is quite lush and rich in vegetation.

Forest destruction started after the opening of the Siddhartha Rajmarg highway in the early seventies. Purely for quick economic gains, people started to cut down the trees for sale to markets in Pokhara, and Butwal.

The total area of the forest is 35 hectares. The major tree species found in the forest are: *Shorea robusta*, *Terminalia alata*, *Bauhinia variegata*, *Syzygium cuminii*, and *Schima wallichii*.

c. Protection and Management Practices. The FUG has the following provisions in their forest management plan - 1) dry fuelwood collections allowed twice a year - for 15 days in the month of October and for a month in February- and allowances are based on family size. The entry fees per season are: family size (1-5): Rs 4; family size (6-10): Rs 8; and family size (>10): Rs 10 (during the month of September/October only half of the above fees are charged); 2) anyone caught illegally collecting fuelwood during off-season is charged Rs 20 the first time and Rs 40 the second time (if caught a third time for the same offence, he/she is referred to the District Forest Office); 3) anyone found cutting down trees for timber, receives first and second fines of Rs 50 and 100 respectively; and 4) if the violators are not members of the user group, the fines are doubled.

Thinning, singling, and opening operations are carried out during the month of December-January. The forest has been divided into five compartments and each year one of the compartments is thinned of crooked, stunted, and deformed trees. Even during thinning operations, if some members intentionally cut pole-sized trees, they are fined Rs 5, 10, and 15 for first second, and third offences. Leaf litter is free except for *Castanopsis* leaves for which there is a charge. Grass cutting is allowed any time, except during July and August. Poles and timber can be cut if permitted by the committee (which happens in the event of house destruction due to natural and/or man-made calamities). However, some species, such as *Shorea robusta*, *Terminalia* sp, and fodder

trees, are banned for logging purposes. Charcoal-making is permitted if approved by the committee and if only dead and dying logs are used. Wood cutting is prohibited during the months from May to September.

Grazing is prohibited in the forest. Wood for agricultural operations is made available on payment of a small fee. Anyone causing fire damage is punished as per the government regulations. All the users are responsible for putting out a fire if one occurs. Up to two *ban heralo* can be hired by the UG executive committee as per the salaries fixed by the UG meeting. The current salary is fixed at Rs 100 per month, which is paid through raising a HH tax of Rs 3 each and through the revenue earned from the forest.

The users have planned to plant valuable species such as *Acacia catechu*, *Michelia* sp, *Dalbergia sissoo*, and *Pinus roxburghii*. Thinning, singling, pruning, and harvesting operation schedules are decided by the general body meeting of the users, and this is also an occasion for modifying and/or establishing new rules and regulations. However, in changing the rules, the basic tenets of the operational plan and the state of the forest will not be changed.

d. Forest Management Objectives. 1. To meet the supply needs for fuel-wood, fodder, bedding materials, and timber; 2) to control floods, landslides, and soil erosion; 3) to check the illegal conversion of forest land into agri-cultural land; and 4) to conserve wildlife and improve forest productivity.

e. Characteristics of the Current User Group. One of the key features of this FUG is its role in spreading the message of forest conservation to neighbouring villages. Due to a chain reaction generated by the activities of this FUG, several successful FUGs are emerging in the area with little effort on the part of the DOFP. This experience is valuable for purposes of replication.

The Role of the District Forest Office

1. To monitor the activities of FUGs as per their operational plans; 2. to provide technical assistance and supervision; and 3. to organise training/visits and other support for forest users.

The Ethnic Composition of the Users

As shown in Table 4, *Brahmin* and *Chhetri* constitute the largest ethnic group (54%) among the users in the seven FUGs evaluated in Palpa. They are followed by the *Magar* (23%).

Table 4: Ethnic Composition of Members in the Sampled User Group Villages in Numbers and Percentages

Village	Ethnic Group/Caste								Total
	<i>Brahmin</i>	<i>Chhetri</i>	<i>Magar</i>	<i>Sarki</i>	<i>Kami</i>	<i>Newar</i>	<i>Gharti</i>	Others	
PALPA									
Mulgaira	52 (79)	5 (6)	-	-	-	-	4 (5)	8 (10)	69 (100)
Shikar	58 (45)	32 (25)	30 (23)	-	1 (1)	-	3 (2)	6 (5)	130 (100)
Bharkesh	110 (33)	76 (23)	68 (21)	34 (10)	31 (9)	2 (91)	5 (2)	6 (2)	332 (100)
Majihar	9 (13)	32 (47)	10 (15)	-	2 (3)	4 (6)	7 (10)	4 (6)	68 (100)
Khumdanda	9 (8)	1 (1)	96 (81)	-	4 (3)	1 (1)	1 (1)	6 (5)	118 (100)
Ramche	90 (43)	12 (6)	17 (8)	14 (7)	9 (4)	58 (27)	1 (1)	11 (5)	212 (100)
Majuwa	26 (49)	11 (21)	9 (17)	-	3 (6)	1 (2)	2 (4)	1 (2)	53 (100)
All Sites	354	169	230	48	50	66	23	42	982

Figures in parentheses denote percentages

B. Phewa Tal Watershed

Turung User Group Forest

a. Location. Turung forest is located in Sarangkot VDC, Ward Nos 7 and 8, within the Phewa Tal Watershed. It lies on the south-facing slope of the watershed and extends from the base of the Phewa Lake to the middle of the Sarangkot Ridge. The total area of the forest is 30 hectares. The total number of current UG members is 122.

The largely second-growth natural forest area covers 30ha and is dominated by *Schima wallichii*, *Castanopsis indica*, *Bombax ceiba*, *Lyonia ovalifolia*, and *Alnus nepalensis*. The forest area has steep slopes, a narrower shape towards the east, and gradually broadens towards the south. This forest has been under user group management since 1983. However, the formal handing over based on an operational plan was carried out only during the FY 1990/91.

b. History. According to the user group chairman - Mr. Raman Bahadur Thapa, about 300 years ago the present forest was put under a trust of the goddess Bhumikali by the *Magar* community of Turung village, which currently falls in Ward No 7. This forest was strictly kept for collecting firewood (*charu*) for *Hom Puja* and for other religious purposes, and no other use of the fuelwood and timber was allowed by the trustees. The forest protection task was mainly handled by the *Magar* community, especially by two brothers, Tamare and Harke, who made the forest their permanent home until their death. Because of it being a trust land, the forest was in good condition. But, after the death of the two brothers, nobody took the same interest or showed equal devotion to guarding this valuable forest. Ultimately, due to heavy population pressure, immigration, and encroachment by local as well as outside users, the forest started to degrade. Nationalisation of forest land in 1957 and the cadastral survey in the late sixties accelerated forest destruction. Ultimately, the *Magar* communities alone were left with the sole responsibility of forest protection, while other communities kept on destroying it. In 1979, a gathering of concerned social leaders formed a new committee and, after mutual agreement, one guard was appointed by the committee at a salary of Rs 150 per month. The salary was to be borne through the *manapathi* system and was to be shared by all the households of the villages who claimed usufruct rights to the forest.

c. Protection and Management Practices. The initiative to protect the forest was taken in connection with the need to support a primary school which had also started in 1979. The chairman, Mr. Thapa, was the key figure in organising the drive to protect the forest and fortunately still fulfills that role. The school board also took up the task of protecting the forest to earn revenue for the school. The committee subsequently applied for recognition and authority to the Phewa Tal Watershed Development Project

(PTWDP). The Project, after holding several discussions with the villagers, agreed to assign an additional forest guard at a salary of Rs 150 per month. The newly-formed school committee realised that the control of the forest was not possible merely by appointing additional guards. With this in mind, they made another request to the PTWDP to demarcate and fence off the forest to protect it from outsiders; mainly from fuelwood collectors from the nearby Baidam area of Pokhara. The PTWDP made a survey and appointed one more guard for the forest. During the FY 1983/84, the forest area was fenced and several checkdams were constructed to contain the heavy siltation which was sedimenting the lake system. When the new approach to community forestry was implemented by the Government in 1989, whereby forests could be handed over to user groups, the people of Sarangkot VDC, Ward Nos 7 and 8 called a general meeting and formed a user committee with the encouragement of the PTWDP. Finally, the official user group (UG) was formed in 1990 and, with the help of these UG members, an operational plan was formulated. Of the total income generated through the sale of grasses and fuelwood from the forest, it has been decided that 75 per cent will be spent on development work, such as school maintenance, and 25 per cent on protecting, developing, and managing the forest. At present, there are 12 members on the user group committee (UGC). All the members are male, no female members were selected for this committee, apparently due to lack of initiative on the part of the male members, as well as the non-availability of women volunteers. All the members are medium-class farmers.

d. Management Objectives. The villagers are quite aware of the consequences of forest destruction and have been planning and managing the forest systematically with the following objectives: 1) to restore the forest to its pristine productivity and ecology; 2) to fulfill the growing demands of fuelwood, fodder, timber, and leaf litter; 3) to protect farms and property from landslides and flood havoc; and 4) to earn, if possible, cash income to meet other village level development needs.

e. Characteristics of the Current User Group

i. **Management Prescriptions:** The following directives are included in the operational plan being followed by the Turung FUG.

- Carry out thinning, singling, improvement cuttings, and enrichment plantations as per the technical and scientific needs of the forest. Prior consultation with the PTWDP is recommended.

- Forest products can be marketed as per the following rules: a. thatch and fodder grass @ Rs 1/*bhari*; dry branches @ Rs 2/*bhari*; firewood @ Rs 5/*bhari*, and dead and fallen tree trunks and limbs @ Rs 20-50/*bhari*, depending on the tree size.

- Floor grasses and animal bedding materials can be collected during the time period fixed by the UGC.

- In case of an emergency event, such as death in a family, natural calamities, and fire, the UGC can approve up to 10 *bhari* of firewood as indicated by a user group member.

- Social and religious organisations, such as schools, temples, community shelters, and others, can be given wood and firewood without harming the health of the forest, i.e., collection of dead and dying trees can be sanctioned by the committee in such instances.

ii. Forest Management Rules:

- Cutting and removal of timber and firewood without following the rules stipulated in the operational plan are strictly prohibited.

- Grazing is completely restricted in the demarcated forest.

- No acts contributing to fire hazards are allowed in the forest.

- Hunting of wild animals and birds is not allowed in the forest.

- No stone and soil mining is allowed in the demarcated forest.

iii. Penalties: Any person/s carrying out an act or acts which are against the rules agreed and stipulated in the operation plan will be first reprimanded; if the same person repeats the offence and the damage is under Rs 100, the products will be impounded and penalties levied as per the rules. Should the damage be more than Rs 100, he/she will be referred to the District Forest Office in consultation with the PTWDP office. The UC is authorised to determine the extent of the damage as well as the process for disposing of the impounded products.

iv. Creation of a Common Fund: All the earnings acquired by the user committee are to be deposited in a Bank Account. Two persons selected by the general body of the FUG (generally the Chairman and the Secretary) are authorised to withdraw the money from the bank as per the guidelines set by the general FUG body.

v. Current Condition of the Forest: At present the quality of the forest is quite good in that both the tree size and density are growing satisfactorily. The user group has decided to permit grass removal two to three times a year. However, the forest suffers from lack of timely application of scientific management prescriptions. For example, the regeneration and plant density are considered high but, due to non-practise of timely management prescriptions, optimal tree growth and development are lacking.

The total recorded number of registered users is 112, but presently 122 HHs are actually using the forest. The new members applied for membership in the Users' Group after the current operational plan was approved. Tables 3, 4, and 5 detail the inventory and management information of the forest as well as the ethnic composition of the FUG members.

Dopahare User Group Forest, Sarangkot

a. Location. The forest is located in the Sarangkot VDC in Kaski district. The entire forest falls within the boundary of the Phewa Tal Watershed. The forest can be reached from Pokhara in a two-hour trek. An all-weather road from Pokhara is also under construction.

b. History. This forest is a 15-year old plantation forest. The forest was developed on overgrazed and highly erodible hill slopes with the active cooperation of the people of Ward Nos three and five under the Sarangkot Village Development Committee (VDC). The major species planted are *Prunus cerosoides* and *Alnus nepalensis*. The total area of the forest is 15 hectares and 106 users have been registered so far. Prior to the reforestation work, the site had been used as open access grazing land for a long period of time. However, the natural vegetation of the village is believed to be deciduous forest. The immediate effect of the forest clearance was increasing siltation, which started damaging valuable farmland. During 1974/75, under the PTWDP, checkdams and fencing were constructed, after which plantation work commenced. Although one forest guard was employed by the project to protect the new plantation, all the villagers cooperated in safeguarding the project. They formed one informal users' committee to carry out this task effectively. Under the *Panchayat* system the forest was being managed as *Panchayat* Protected Forests (PPF).

c. Protection and Management Practices. One of the reasons for the successful maintenance of the forest was the existence of a system of creating awareness among all the users as well as of the equitable distribution of forage grasses from the plantations. Since the initial goal was simply to develop dense vegetative cover in the area, no forest management plans were implemented until recently. As a result of effective protection, natural regeneration also took place and, apart from the planted species, other tree species also flourished. The main tree species that have been planted and which have regenerated are: 1. *Alnus nepalensis*; 2. *Prunus cerosoides*; 3. *Schima wallichii*; 4. *Litsea monopetala*; 5. *Litsea cubeba*; and 6. *Ficus glaberrima*.

Marketing of forest products is still poor in both Palpa and Phewa, primarily because of the lack of adequate supply. All the UGFs studied were being managed mainly for fuelwood, fodder, and composting litter. However, one of the strongest incentives for protecting the forest, according to the majority of users, was the scope for market surplus in future. Already two user groups - Telgha in Palpa and Turung in Phewa were reporting the existence of an insatiable demand for fuelwood in nearby Tansen (Palpa) and Pokhara (Phewa). Mahajir FUG in Palpa was also planning to set up a furniture factory to sell furniture in Tansen. Similarly, the remaining FUGs were also planning to sell both

timber and non-timber products after the maturity of the full secondary growth forest. Mulgaira forest was also selling recreational services (picnic spots, nature treks, etc) to adventure tourists and others. There is, however, a need to develop marketing institutions for the benefit of all the FUGs. The DFO should develop a cost effective and efficient market system for each district.

d. Management Objectives. The current operational plan stipulates the following management objectives.

1. To increase the affinity of the local people to the forests by supplying an optimum amount of forest products.
2. To discourage the poaching and stealing of forestry products through locally designed rules and peer pressures.
3. To help protect Phewa Lake conservation through effective protection of the forest.
4. To improve forest conditions and forest productivity.
5. To improve the quality of arable land as well as its productivity through forest development efforts.
6. To begin a system of local level management of forest resources.

e. Characteristics of the Current User Group. The executive committee (EC) of the FUG represents the desires and opinions of the entire user community. The general body of the users can dissolve the EC any time if it so desires. The table below indicates the ethnic composition of the FUG and the UGC.

Table 5: Ethnic Composition of the Forestry Users and Executive Committee Members in Selected FUGs in the Phewa Watershed

Caste	TURUNG				DOPAHARE			
	General Users'		Executive Committee		General Users'		Executive Committee	
	Number	%	Number	%	Number	%	Number	%
<i>Brahmin</i>	14	13	3	25	77	72	7	78
<i>Chhetri</i>	80	71	8	67	23	22	2	22
<i>Newar</i>	13	12	1	8	6	6	-	-
<i>Sarki</i>	5	4	-	-	-	-	-	-
	112	100	12	100	106	100	9	100

Apart from organising regular meetings, the EC is also responsible for preventing any actions that harm the forests. By agreement with the DFO, the EC is empowered to market forest products through consultation with the PTWDP office. It is also required to carry out improvements and development work related to the forest resources of user-managed forests.

Any defaulters to the community-enforced rules are first fined nominally. However, repeated offenders are referred to the District Forest Office. The EC has full authority to levy fines and to award other punishments to the offenders, depending upon the nature of the offences.

The PTWDP has retained the role of facilitator and supervisor. It has been given authority to oversee the implementation of the operational plans. If unsatisfied with the functioning of the UGs, it can recommend that the DFO dissolve the UG. It is also responsible for providing assistance to the user groups if the latter request the same in writing.

Chapter 5

ANALYSIS OF EXTERNAL INPUTS AND VARIABLES

Background of the Analysis

The general findings of this study are described in two parts: Part I (Chapter I) covers the nature of the resources and their extent and the socioeconomic characteristics of the users (external factors) in the Palpa and Phewa watersheds. Since the major focus of the study was on user group structure, function, and performance and their effects and impacts on equity, sustainability, and socioenvironmental soundness, Part II (Chapter VI) deals with an assessment of changes in knowledge, awareness, perceptions, attitudes, skills, and participation (socio-psychological variables) in the target beneficiaries through comparative analysis of the two sites.

Palpa District

Socioeconomic Background of the User Groups

Demography. Table 6 describes the basic demographic, economic, and agriculture-related information of the sampled forest user group (FUG) households. The average family size was 7.0, with a maximum of 8.3 members in Madanpokhara and a minimum of 6.2 in Bharkesh VDC. Males outnumbered females in all the villages. Approximately, 71 per cent of the population belonged to the economically active group (10-60-year age group) and half of the population was illiterate. Only about five per cent of the respondents had college education. The majority of the people were farmers but only 40 per cent were employed all year round in farming activities. The estimated average landholding was 0.87ha/HH, out of which about 0.25ha was irrigated *khet* and 0.55ha was rainfed *pakho*. The average number of livestock units

was 4.25, with a maximum of 6.57 livestock units found in Khumdanda and a minimum of 2.98 in Shikhar-danda. Buffaloes were the most commonly-raised animals (Table 6).

Table 6: Socioeconomic Profile of the Forest User Group Village in Palpa

Attributes	Madan-pokhara	Shikhar-danda	Barkesh	Khum-danda	Bhairab-sathan	Ramche	Hungi	Total/Ave
FAMILY DETAILS								
Family size	8.29	6.63	6.18	8.50	6.40	6.67	6.67	7.05
-Male	4.57	3.38	3.21	5.40	3.60	3.62	3.50	3.90
-Female	3.71	3.25	2.97	3.10	2.80	3.05	3.17	3.15
<10 years	21.55	25.50	25.49	24.50	26.40	23.57	24.10	24.31
10-60 years	74.15	71.08	71.08	71.30	70.00	72.17	72.50	71.29
>60 years	4.30	3.42	3.43	4.20	3.60	4.29	3.40	4.40
Literacy rate (%)								
-Male	56.90	61.15	38.59	31.82	57.81	50.71	45.00	48.85
-Female	36.50	40.00	27.50	38.40	31.11	29.10	33.30	31.70
College Ed.	14.66	10.38	0.98	0.91	2.50	6.43	2.50	5.48
OCCUPATION (%)								
Farming	47.41	48.11	46.57	50.90	40.60	50.71	45.00	40.27
Off-farming	15.52	7.55	12.25	19.10	25.00	7.86	17.50	14.97
Service	12.93	8.22	1.47	6.50	14.40	7.14	15.00	9.38
Others/unemploy	24.14	36.12	39.71	23.50	20.00	34.29	22.50	35.38
AGRICULTURE								
Land Type:								
- Total (ropani)	16.09	20.00	11.06	30.60	11.80	20.81	11.10	17.38
- Irrigated	3.50	5.38	1.36	10.20	2.30	9.79	1.40	4.85
- Non-irrigated	9.60	12.63	7.97	20.40	9.50	10.71	8.00	11.26
- Kharbari	3.00	2.19	1.73	-	-	0.31	1.70	1.28
Livestock (LU/HH)								
Total	3.41	2.98	3.47	6.57	3.97	4.53	4.90	4.25
- Cow	0.60	0.55	0.63	1.25	0.56	1.07	0.53	0.74
- Oxen	0.61	0.58	0.75	1.94	0.79	0.97	1.42	1.01
- Buffaloes	1.93	1.69	1.33	2.38	2.00	2.38	2.83	2.08
- Goat	0.27	0.16	0.76	1.00	0.53	0.11	0.12	0.42
- Sheep	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00
FORESTRY								
Per capita forest land	0.11	0.06	0.19	0.76	0.26	0.28	0.66	0.28
Year when protection was initiated	1957	1980	1981	1983	1960	1981	1980	

* denotes year when the villagers endogenously initiated protection measures

The average forest land availability per HH was 0.28ha. The maximum (0.76ha) per capita forest land was found in *Khumdanda* and the minimum (.11ha) in Madanpokhara.

The estimated per capita fuelwood requirement was over one cubic metre (700kg) per capita per year. The average HH was estimated to require 102kg of green forage per day¹. On an average each HH in the study area raised 72 trees, two thirds of which were classified as fodder trees (Annex, Table 2). The estimated forest land availability per household was two hectares which is lower than the estimate of three hectares made by Wyatt-Smith (1982). However, the user group household on an average had access to a minimum of two other forests, besides using their private tree resources. Kerosene was used by more than three-fourths of the population surveyed. Biogas was found to be used increasingly by the farmers in Madanpokhara and surrounding VDCs.

The fuelwood situation in the study villages was found to be satisfactory. While the reported requirement is 7.5 tonnes/HH/year, the reported supply is 7.3 tonnes/HH/year. While four villages - Mulgaira, Mahajir, *Khumdanda*, and Ramche - reported surplus fuelwood, *Shikhardanda*, *Bharkesh*, and *Hungi* were in deficit (Annex, Tables 3 and 4).

Both fruit trees and fuelwood trees were found growing in equal number. Among the fodder trees grown, *Garuga pinnata*, *Ficus lacor*, *Ficus semicordata*, and *Artocarpus lakoocha* were the most common. Oranges, lemons, and mangoes were the common fruits and *Castanopsis* sp and *Schima wallichii* the common fuelwood trees. The fodder requirements and supplies have been estimated based on the standard feed requirement reported by Karki (1992) and adjusted to the reported supply by the sampled respondents. Accordingly, there is a daily requirement of 24kg of green fodder per animal unit. However, assuming an 80 per cent digestive factor, the supply is only 20kg/day. Thus, on an average, the estimated fodder deficit found is only 10 per cent, which is better than the national average of a 25 per cent deficit. However, the situations in individual villages are not similar (Annex, Table 5).

¹ This finding casts doubt on the per capita forest acreage requirement of over 3ha estimated by Wyatt-Smith (1982). In this study, the average forest holding was estimated at 1.96 and 1.28ha in Palpa and Phewa respectively.

Phewa Watershed

The FUGs selected in the Phewa Watershed had an average of 22.5ha of forest area and 114 members made up an average UG. The per capita forest land availability was 0.20ha which was less than that found in Palpa. Based on the information provided in Table 7, brief descriptions on important headings are provided below.

Socioeconomic Background of User Groups

A 10 percent sample survey of the forest user households was carried out using simple random sampling techniques. The sample frame included all the forest users listed in the operational plan. The purpose of the sample survey was to find out the most recent socio-economic information on the members of the concerned forest user groups. The results are summarised in Table 7.

Demography. The upper caste *Brahmin* were dominant in Dopahare village. In Turung village, *Thapa Magar* constituted the major caste. Although females accounted for half of the total population in the two villages, their representation in the user groups as well as in the user committees was low.

Landholdings. Most of the villagers (73.8%) in the user group community had less than 0.75ha of land. A little over 10 per cent of the population had land exceeding 1.35ha. This indicated the subsistence nature of the local agriculture in the area. The average operational landholding was 0.9ha in Dopahare and 0.50ha in Turung village. The total *khet* was much less (33%) than *bari* in both villages.

The cropping intensity was much higher in Turung (218%) than in Dopahare (144%). This was perhaps due to the higher elevations of farmland in the former (1,400-2,000m) compared to the latter (800-1,000m). The average grain yield was 879kg/ha in Dopahare and 1,312kg/ha in Turung. The prevalence of better irrigation facilities, lower elevations, and the existence of more forest area in Turung were the apparent reasons.

Livestock Holdings. Buffaloes were the most commonly-raised livestock in the study area and accounted for 76 per cent of the total livestock units (LUs). There has been a gradual replacement

of cattle by buffaloes in almost all the watershed villages. Cattle are kept only for draught power. Goats and sheep were found in small numbers, but are they among the primary sources of cash income.

Table 7: Socioeconomic Profile of the Forest User Group Village in Phewa Watershed

Attributes	Dopahare	Turung	Total
<u>FAMILY DETAILS</u>			
Family size	6.04	6.80	6.42
-Male	3.24	3.60	3.42
-Female	2.80	3.40	3.10
<10 years	19.50	22.50	21.00
10-60 years	78.24	75.28	76.76
>60 years	2.26	2.28	2.25
Literacy rate(%)	52.80	43.60	47.70
Female literacy(%)	.30	12.30	17.30
College Ed.	11.55	07.42	9.49
<u>OCCUPATION (%)</u>			
Farming	42.40	43.34	42.87
Off-farming	18.50	17.55	18.02
Service	13.82	14.52	13.67
Others/unemployed	25.28	24.59	24.44
<u>AGRICULTURE</u>			
Land type:			
- Total (<i>ropani</i>)	18.00	11.00	14.50
- Irrigated	6.00	5.00	5.50
- Non-irrigated	12.00	6.00	20.00
- <i>Kharbari</i>	1.00	0.00	0.50
<u>Livestock (LU/HH)</u>			
Total	3.38	2.89	3.14
- Cows	0.50	0.35	0.42
- Oxen	1.20	1.08	1.14
- Buffaloes	1.50	1.28	1.39
- Goat	0.15	0.18	0.17
- Sheep	0.03	0.00	0.02
<u>FORESTRY</u>			
Per capita forest land	0.25	0.14	0.19
- Year when protection was initiated	1979	1983	--

* denotes year when the villagers endogenously initiated protection measures

Stall-feeding is the most common method of feeding livestock in the watershed. Over the years, this practice has gradually replaced grazing as more and more scrub and wastelands have been brought under forest plantation. Only supervised grazing is practised in the upper elevations of the watershed.

Fodder Supply. Farmland produced more than 60 per cent of the fodder supply. Turung is currently receiving more forest products than Dopahare, apparently due to the heavier restrictions imposed on the user group forests in the former. The estimated fodder deficit, based on the standard feed requirement of 1,052kg TDN/LU, is about 28 per cent. Dopahare village has higher deficits due to the strict control imposed by the villagers on fodder removal from the forests. The time taken for collecting fodder and fuelwood by the sampled households was higher in Dopahare than in Turung (Table 8). The reasons may be the close proximity of the forests and farms as well as the relatively flat terrain in the latter village.

Fuelwood Supply. On an average 9.38kg. of fuelwood are consumed in an average HH each day. The quantity is slightly higher in Dopahare than in Turung, apparently due to the higher number of livestock units raised in Dopahare. The study area has a net fuelwood deficiency. An average household in Dopahare village reported a shortage of 1.68kg/day or a supply deficit for 0.8 months a year. In Turung the shortage is for only 0.6 months, or there is a shortfall of about 0.36kg/day. Once again the reasons are perhaps due to the higher per capita forest area available in Turung compared to Dopahare (Annex, Table 1).

Major Problems. The major problems of the watershed are: a) cultivation of marginal and sloping land; b) illicit cutting down of trees for fodder, fuelwood, and timber; c) general degradation of land resources; d) severe soil erosion and drying up of the water sources; e) low agricultural productivity; and f) poor animal health. People, especially women, are reported to be spending more and more time fetching water and collecting fuelwood and fodder as well as leaf litter for animal bedding/farmyard manure.

Current Forest Inventory. The forest in Palpa was dominated by *sal* (*Shorea robusta*)-based mixed tree vegetation (68% spp were *sal*), whereas in Pokhara the dominant species was *katus* (*Castanopsis indica*) which accounted for 59 per cent of the total

stand. The average height and DBH of the trees belonging to the sampled FUGs were 7.8m and 11.2cm respectively. The average tree density was 1770/ha and the estimated total standing biomass was 84 tonnes/ha. The individual UGF stock situation is provided in Annex Tables 6 - 8.

Forest User Group Structure and Function

The forest user groups (FUGs) were examined for various attributes, including the year when some elements of an indigenous management system had reportedly begun, source of initiation, and type of system adopted. Tables 7 and 8 describe the findings in detail. All the forest management initiatives have an average history of 20 years or less, although a forest in Phewa did claim to have had some sort of indigenous management dating back 300 years. Almost all the forests have reported experiencing a system breakdown due to conversion of the forest into an open access system and/or liquidation of resources after over-exploitation. The construction of the Pokhara Highway is claimed to have led to a breakdown of indigenous systems in half of the forests studied in Palpa.

Formation of User Groups

In general, FUG formation in Palpa was found to have started through the encouragement of community forestry activities by the then Tinau Watershed Project (TWP), which has now been expanded and renamed the Palpa Development Project (PDP). Due to the target-oriented nature of the community forestry practised by the TWP, efforts were made to bind as many *Panchayat* Protected Forests (PPFs) as possible in some sort of written management plan. The project did manage to establish a number of PPFs, but only a few managed to function as per the plans, due to lack of full tenurial and investment securities. In fact, the ones which functioned successfully were the first few communities which organised themselves into FUGs, and they are functioning well. Tables 8 and 9 provide a brief summary of the FUGs selected for the evaluation. Table 8 describes a resource situation and the type of protection systems in existence. Except for one forest, namely Bharkesh in the Telgha VDC, all the forests have similar biophysical and institutional attributes.

Table 8 provides the institutional characteristics of the selected FUGs. As this information is based on the historical sketching of individual case studies, the authenticity of the information is accepted. For example, the memories of older users were solicited to sketch the spatial and temporal changes in the characteristics of each individual forest. Except for one FUG, all the forests have had some sort of indigenous management. However, the reasons behind forest destruction were found to be varied. Some of the major generalisations are given in the following passages.

Causes and Consequences of Deforestation

Based on the case studies of the UG-managed forests in Palpa and Pokhara, the following cases and their most commonly-known consequences are given: 1) indiscriminate cutting down of trees led to drying up of springs which supplied water to the villagers; 2) wanton destruction of the forests by road contractors gave wrong signals to the people vis-a-vis cutting down trees; 3) charcoal-making at the behest of the government weakened the indigenous control over resources; 4) population growth, due both to natural causes and to migration from the hills to the valleys, accelerated deforestation; and 5) urbanisation and the opening up of fuelwood and timber markets provided additional incentives.

Types of Local Initiative

In most of the cases, the initiative came through an informal group in which a clearly-defined leadership did not exist. However, in some villages an individual leader was found to have initiated forest protection and his socially accepted status and/or leadership quality appeared to have contributed towards effective protection of the forest resources. In one village, the entire village successfully fought a legal battle against an encroacher who had acquired an ownership certificate for forest land through illegal means. However, in other villages the elected community officials were found to have taken the lead in rejuvenating the forests. In one village, one youth club was found to have made an attempt to save the forests.

Social Systems Adopted

Under an indigenous system of management, social institutions are found to be more informal and flexible. Therefore, conforming

Table 8: Summary Descriptions of the User Group Forests in Palpa District and Phewa Watershed

S.No.	Location	Estimated Area (ha)	No of Members	Year Handed Over	Protection System	Operational Plan Exists	Rules	Major spp
1.	Mulgaira Madanpokhara - 6,7,9	8.4	79	2047	Collective watching	yes	Written	Shorea/Castanopsis Schima wallichii
2.	Shikhardanda Madanpokhara - 5	8.0	140	2046	Collective watching	yes	Written	Pinus roxburghii Shorea robusta
3.	Bharkesh Teigha - 1	62.0	331	2046	Open access	no	Unwritten	Shorea/Pinus
4.	Mahajir Ban Bhairabsthan - 3	84.0	111	2048	manapathi collection	yes	Written	Pinus roxburghii Quercus spp
5.	Khumdanda Chhidipani - 2	35.0	133	2047	Collective watching	yes	Written	Pinus roxburghii Schima wallichii
6.	Ramche Ban Rampur - 4	60.0	212	2046	Collective/ban heralo	yes	Written	Shorea/Castanopsis Schima wallichii
7.	Majuwa Hungi -	35.0	53	2048	Collective/ban heralo	yes	Written	Shorea/Michelia Schima wallichii
PHEWA								
1.	Turung - 7,8	30.0	122	2048	Collective/ban heralo	yes	Written	Schima wallichii Castanopsis sp
2.	Dopahare - 3	14.0	106	2048	ban heralo	yes	Written	Alnus/Schima
	All Forests Ave.	41.5	151	-	-	-	-	-

Source: Survey Team

to earlier findings on both study sites, the social systems which emerged in response to wide-scale deforestation remained informal until the *Panchayat* Forest Rules were imposed on the villagers by the government and/or projects. The system's key strength lay more in informal discussion and flexibility in day to day operations.

Resource Development Initiatives

Surprisingly, the indigenous approach to resource development in most of the forests studied was not through reforestation. Complete protection from grazing and fuelwood collectors was the most commonly-practised resource development strategy. In fact the reforestation technology, as we know it today, was unknown to the local population until extension materials regarding community forestry and free seedlings' distribution were widely disseminated during the early eighties. This is more so in Palpa than in Phewa because of increased emphasis on community forestry in the former. In Phewa Watershed, the emphasis being on watershed management, conservation-oriented plantations were major strategies. Nevertheless, plantation by the community *per se* was not commonly carried out in Phewa because of subsidised plantations.

Forest Management System

The forest management system developed for most of the FUGs is a mixture of indigenous and traditional systems. While compartmentalisation of the forest and definition of the thinning and harvesting regimes are the contributions of professional foresters, the harvesting schedules, product distribution systems, and enforcement mechanisms for rules are drawn from a pool of indigenous knowledge and practices (Tables 8, 9, and 10). The penalty structure and access rules were also largely borrowed from indigenous management systems as the UG members were confident of their success. Forest protection was the most critical aspect of user group Forestry, and it was found that the rules and provisions adopted were those which had been in practice before and that the villagers were confident of success.

Hiring a guard through common funds (cash or grains, locally called the *manapathi* system) was the usual system of protection

Table 9: Attributes of Selected Forest User Groups in the Palpa and Phewa Study Areas

Name of FUG	Years Under Indig. Mgmt.	Causes/Result of Deforestation	Mgmt. Initiative by and Who Particip.	Social System Adopted	Committee or Op. Plan First	Major Activities Undertaken So Far
PALPA DISTRICT						
Mulgaira	37 Years	Open access spring dried	Individual social fencing	Informal Group	Operational Plan	Reforestation around Spring
Shikhar	30 Years	Open access, denuded slopes	Group <i>heralo</i>	Formal Group	Protection Committee	Reforestation with pines
Bharkesh	Irregular Attempts	Open access, mass cutting	Group social fencing	Informal	Operational Plan imposed	None
Mahajir	35 years	Cadastral survey encroachment	Group I legal actions	Informal	Operational Plan	Reforestation in gaps
Khum-danda	10 years	Highway construction/charcoal-making	Group <i>heralo</i>	Formal	Committee came first	Reforestation was carried out in 1986/87
Ramche	23 years	Birta Abolition Land Reforms Act	Group <i>heralo</i>	Formal	Committee came first	Only protection has been accepted
Hungi	12 years	Fuelwood cutting after highway	Group	Formal	Committee	Only protection has been assigned.
PHEWA WATERSHED						
Turung	13 years	Open access, nationalisation, cadastral survey	Group and Individual	Informal <i>heralo</i>	Committee School Mgmt.	Only protection through fencing
Dopahare	10 years	Open access, grazing, conversion	Govt./Group	Informal	Committee	All the area was reforested

Source: Survey Team

Table 10: Forest Management Rules, Rights, and Sanctions in the Selected Forest User Groups in Palpa and Phewa

User Group Name	Unit and No of Mgmt.	Harvesting Period/Dur.	Penalty Amount	Access to Fodder Coll.	Access to Leaf Litter	Access to Grazing	Protection System
PALPA DISTRICT							
Mulgaira	Compartment (6)	Jan./Feb.	Rs 50	Regulated	Regulated fencing	Not allowed	Social
Shikhardanda	Compartment (5)	February	Rs 50	Regulated	Regulated guards	Allowed	Volunteer
Bharkesh	None	Not defined	None	Open access	Open access	Uncontrolled	None
Mahajir	Compartment (5)	January	Rs 50	Open to members only	Allowed to members only	Regulated fencing	Social
Khumdanda	Compartment (4)	January	Rs 50	Regulated	Regulated guarding	Restricted	Rotational
Ramche	Compartment (5)	Jan./Feb.	Rs 50	Restricted	Regulated	Restricted	heralo
Hungi	Compartment (3)	February	Rs 25	Restricted	Restricted	Not allowed	heralo
PHEWA WATERSHED							
Turung	Compartment	Feb./March	Variable	Regulated	Regulated	Not allowed	heralo
Dopahare	Compartment	Jan./Feb.	Variable	Not allowed	Not allowed	Not allowed	heralo

Source: Survey Team

used. However, in two forests, there were no guards hired, and protection was carried out through 'social fencing', i.e., each and every user had the responsibility for restraining himself/herself and for bringing violators to book.

Animal Grazing and Product Removals

The FUG management committee is very sensitive to the basic needs of the users which in most cases consist of fuelwood, tree fodder, leaf litter, and grasses. The UGF rules and regulations were therefore found to be well defined.

The user members were also well informed and knowledgeable about these rules. Typical rules did not permit grazing in the forests; fuelwood cutting was strictly regulated with well-defined timing and procedures; and tree fodder collection was also restricted. The rules were found to be flexible as well as liberal regarding collection of leaf litter and fresh herbage, which are used both as fodder and bedding materials and are converted into compost.

Harvesting and Benefit Sharing

Harvesting includes the annual operation of applying management prescriptions such as thinning, singling, and selective logging. These are the most important, sensitive, and far-reaching operations and both the FUGs and the DFO were found to be concerned about their proper execution. Since the forests being managed generally consisted of relatively young stock, the most commonly-practised operation was thinning and singling. In one of the forests - Mahajir Salleri - the team did find selective logging operations in progress but, in the team's judgement, this was also carried out outside the scope of the approved management plan. In fact the concerned Ranger and the DFO did not know of this operation and the Chairman of the UG was visibly embarrassed to admit this. However, it is a truism that any such and all operations are carried out based on the judgement and the decision of the executive committee. In product distribution aspects, all the FUGs were found to have an elaborate arrangement. The most commonly practised system was collecting the products, submitting them to a pool, and randomly distributing them to all the members participating in the operation. The system was fair and equitable in that a number of collectors were allowed from each HH in proportion to the size of

HH, and only those who actually participated were eligible for a share.

Hypotheses Tested

Working hypotheses were set up to examine specific variables which could be monitored over a certain period of user group functioning. Some of the hypotheses were descriptive and others were quantitative. The testing of the hypotheses was carried out using appropriate statistical tools, such as the X^2 and t tests, especially in quantitative hypotheses.

Hypothesis # 1. The bulk of the basic needs of the people, such as fuelwood, fodder, leaf litter, and timber, are fulfilled from sources other than UG-managed forests.

Based on the survey of sample users, 71 per cent and 68 per cent of the total supply of fuelwood and fodder in Palpa and 68 per cent and 60 per cent in Phewa respectively were met through on-farm sources. The fulfillment ratios of the private sources were significantly different ($p=0.05$) to the ratio from public sources. It was therefore determined that the majority of farmers in Palpa and Phewa obtained their basic goods from private sources. In Mulgaira village, the members were found to have switched from fuelwood to biogas, and a few members had already waived their rights to harvest fuelwood from the UG forest. It is therefore concluded that given the proper motivation and incentives, people can meet their basic needs from private sources, at least on a short-term basis.

Hypothesis # 2. Continuous use and overexploitation (fodder, fuel and litter collection, indiscriminate burning, uncontrolled grazing, illegal felling, and timber theft) are not the principal agents in the degradation of forests in the mid-hills.

Out of the 139 households surveyed, 87 households reported that the main causes of forest exploitation were population pressure (97 reported so), poor performance of the DOF staff (76), construction of roads (56), growing fuelwood markets in the urban centres (45), and lack of clear-cut management authority among the local people (34). Illegal use of the forest for non-timber products scored only 32. It was claimed that lack of control by the

DFOs and abuse of rules by the politically and economically powerful in society led to forest degradation. It was, therefore, concluded that traditionally-recognised forest uses such as fodder and fuelwood collection were not the principal causes of forest degradation in the study area. A closer analysis of the resources indicated that the perception of local people regarding the causes of deforestation were different than those of 'outsiders'. The reason for this situation is perhaps due to their increased involvement in and understanding of their forest system. For example, although population expansion was blamed as the leading cause of deforestation, this was invariably associated with the authoritarian and alienating attitudes of rangers and malpractices by land surveyers and other government staff whose conflicting dictums had undermined their traditional respect for the forest.

Hypothesis # 3. There is no difference in the attitudes of people from different ethnic groups towards the role of the forest.

The sample respondents were grouped into four broad ethnic groups and were questioned about their knowledge, awareness, perceptions, and attitudes towards different forest activities. The X^2 test conducted indicated that the response did not differ significantly ($P=0.01$) along ethnic lines. It was therefore concluded that the attitude of the people regarding the role of the forest was similar across social groupings.

Hypothesis # 4. Locally planned, implemented, and managed reforestation projects are more cost effective and sustainable than outside managed plantation projects.

Local people were found to be quite interested in reforestation work, provided they were properly motivated. One of the key factors that was found to induce local participation was the prior guarantee of tree ownership. Formation of user groups prior to the plantation work was an appropriate institutional mechanism to ensure popular support. Four reforested areas reportedly planted through people's participation (planning, implementing, and managing) were examined against the standard norms of the traditional plantation methods. The survival count of the four patches was 70 per cent, which is also higher than the national average (60%) reported for CF projects. Using the cost estimates

made by the respective DFOs, it was found that the participatory plantation cost was Rs 1,490/ha compared to Rs 14,159/ha for a plantation established by contractors. The two mean amounts were significantly ($p=0.01$) different from each other and, therefore, it was concluded that reforestation work could be planned and implemented by the local people in a more cost-effective manner provided an appropriate institution was created beforehand.

Hypothesis # 5. Degraded land is suitable for broadleaf-based multiple use forestry (silvipasture, horti-pasture, etc) practices.

This hypothesis attempts to refute an often repeated statement that the degraded sites were suitable only for conifers and other hardy species. Over 90 per cent of the degraded land in the study area reforested by the community was planted with multipurpose trees and grasses. Despite hostile biophysical conditions, especially poor soil profiles and steep slopes, these lands had a history of maintaining deciduous forest cover. Since most of the UG-managed forests had also gone through different stages of degradation and rehabilitation, leading to the current state of sustainable forest management, it was concluded that technically most of the degraded land was suitable for implementing broadleaf-based multi-storey forestry practices. On questioning whether reforestation work would lead to the development of multiple forestry, about 83 per cent replied in the affirmative. The chi-square test conducted showed that community reforestation work was closely related ($p=0.05$) to multiple use forestry.

Hypothesis # 6. Forest management strategies built upon indigenous management techniques lead to sustainable forestry.

All the successful FUGs in the study area had a history of an indigenous forest management system in one or other form. The very concept of user group management was based on indigenous technical knowledge and skills. Since it has been realised by the government, in its policy statements, that the management of community forest land is not possible without day to day participation by the community, it is concluded that forest management plans which have incorporated indigenous knowledge and skills have greater chances of succeeding. Out of nine FUGs

examined in the case studies, one FUG each - Telgha in Palpa and Dopahare in Phewa did not have any history of indigenous management, i.e., 80 per cent of the FUGs which were successful had an indigenous association. As the success factor was significantly ($p=0.05$) correlated to the indigenous element, the hypothesis was not rejected.

Hypothesis # 7. Improved resource condition (indicated by tree density and standing biomass volume) is indicative of effective forest user group management.

Forest areas with over 70 per cent crown cover, rapidly regenerating trees, existence of forest litter, rejuvenating springs, presence of wildlife, and increased soil fertility and reduced sediment yield generally indicated good forest management. These attributes of course are associated with management indicators such as the presence of an effective FUG structure, an equitable distribution system, community-managed reforestation schemes, and absence of fencing. In almost all the FUGs in which these factors were found to be positive, superior management of user group forests was noticed. Out of the nine FUGs studied, seven had a strong association of these variables. The biometric variables (growth and yield) were significantly correlated to the group attributes such as enforcement of rules and fair distribution of forest products.

Hypothesis # 8. Forest user groups are more effective where successful parallel institutions exist to manage other natural resources.

Forest user groups were found to be more effective in the presence of parallel systems of organisation (e.g., irrigation user groups, livestock user groups, etc). It was noted that FUGs that had included certain pre-existing and contemporary technical solutions in the management plans were having less disputes and more effective protection than groups which ignored the existing knowledge and skills. A case in point is Mulgaira FUG. The villagers here have a well organised user group in a several natural resources' sector. On the other hand, in Dopahare area, the FUG was not found to be successful due to ignorance of the functioning and structure of sister user groups. As there was a strong association between the existence of user groups in other sectors and successful FUGs, the hypothesis was not rejected.

Hypothesis # 9. Management plans must be understandable by, and appropriate to, the local community, for effective management.

A typical management plan follows a standard format with the general rules and technical prescriptions being written with the aid of the Ranger. Those FUGs that were closely involved in writing the OPs were having no or few complaints regarding the lack of knowledge of the provisions of the plan. In such FUGs, compliance to rules was high. However, in those FUGs which had been simply handed over through imposed OPs, the members were largely unaware of the rules and did not understand the UGF concepts, procedures, and practices. This hypothesis was examined by testing the knowledge and awareness of the members regarding the key provisions of the operational plan. It was found that out of 109 respondents in Palpa, 91 (83%) had knowledge of harvesting time, penalty amounts, and major tree species as provided for in the OP. However, in Phewa only 16 out of 30 (53%) had knowledge of the same items. It was therefore concluded that members of the successful FUGs were heavily involved in the preparation of operational plans as well as having a thorough knowledge of them.

Chapter 6

COMPARATIVE ANALYSIS OF THE TWO SITES

Basis of Analysis

Based on the above findings, the two study sites were compared in terms of the following aspects: a) Forest Resource Conditions; b) Social Dynamics; c) FUG Effectiveness; d) Gender and Equity Considerations; and e) FUG Sustainability in Resource Management.

Forest Resource Conditions

Although the Palpa users were better off in terms of the per capita forest area availability than Phewa (0.28ha per capita versus 0.19ha), the average density of trees with a DBH of 2.5cm and above was better in the latter. The tree density and the estimated average biomass reserve were 1,744 and 71.2MT/ha in Palpa and 2,170 trees/ha and 79.6MT/ha in Phewa respectively. In terms of quality, however, forests in Palpa district were better because of the greater number of *sal* species. In the Phewa Watershed, the forest resources protected by the Government (*Rani Ban*) were not included in the comparative analysis as they were not accessible to the people, both legally and practically. In Palpa also, the Siwalik Hill forests were not taken into account as they were being currently managed without community participation.

Social System Dynamics

Both areas were found to be vibrant and dynamic. In terms of self-organisation, as far as being able to face natural calamities, social crises, and economic hardships was concerned, FUG members in Palpa were generally more active,

knowledgeable, and innovative than those in Phewa. Although the general literacy rates among the user households were comparable (49% and 48% respectively), the female literacy rate, however, was much lower in the Phewa area (17%) than in Palpa (32%). Perhaps due to the adoption of different forest and related resource development strategies, the socio-psychological effects and impacts differed between the two sites. The specific variables that were compared are given below.

The projects - the Tinau Watershed or Palpa Development Project in Palpa and the Phewa Tal Watershed Development Project in Kaski - supplied inputs, carried out activities, and produced outputs in the study areas. Although the effects were partially biophysical in nature, a large proportion of the project-generated effects and impacts were socio-psychological. The second part of the findings attempts to describe them.

Characteristics of the Target Beneficiaries

The characteristics of respondents are critical for judging the effect and impact of any project. For example, if the respondents in the distantly located Palpa and Phewa sites share virtually the same characteristics, any significant difference in their knowledge, awareness, participation, and attitude levels is most likely to be the result of the different levels, nature, and quality of the project activities, inputs, and outputs. The evaluation detected the following differences in these attributes.

Causes, Indicators, Effects, and Impact

As mentioned earlier, the main thrust of this study was to discover the effect of the project inputs on the knowledge, awareness, attitude, and perception levels of the common people. The evaluation of their skills and participation measured the impact of the project on the rural people of the two study areas. Awareness was measured in terms of several aspects, namely i) awareness of the UGF provisions; ii) knowledge of the project objectives; iii) knowledge of forest protection rules; iv) awareness of community forestry/watershed management objectives; v) awareness of the role the people needed to play to meet these objectives; and vi) awareness of the assistance provided by the project.

The data revealed that a consistently high number of respondents from both the Palpa and Phewa areas were aware of the different dimensions of the project as well as UGF activities (65% and 54% respectively). Palpa's respondents were not aware of the nature of the forestry-related work carried out by the Palpa Development Project (30%). Similarly, Pokhara's respondents revealed a poor awareness of DOF activities (43%), perhaps because the PTWDP was mainly responsible for carrying out watershed management activities. However, they did not critically affect the community forestry projects as these agencies were supplementary in nature. The findings suggest that the Project's effectiveness in generating awareness among the target beneficiaries was satisfactory (76%).

Training courses and observation of successful demonstration sites were found to be among the most effective tools in creating awareness of the different dimensions of UG forestry among the users. In both the study areas, a large number of those who had received training and had participated in the observation tours were aware of the community forestry projects, their objectives, and the most recent policy and legislative decisions (such as the Community Forestry [CF] provisions under which forests were handed over to FUGs) taken by the Government to attain the objectives.

Gender Issues

Gender was not a reliable indicator of awareness of UG forestry. Compared to women, men showed greater awareness of community forestry activities, the name of the FUG of their village, its chairman, and its functioning. However, women were more aware of the appropriate species for different uses; the time that the forests were open to users; the amount of fodder and fuelwood allowed to be harvested; the prices of the products; and the penalty structure for different types of offences and offenders.

Participation Factors

Maximum participation of the people in planting trees on farmlands along with the development, protection, and management of forests were among the intermediate objectives of CF as well as watershed management projects in Palpa and Phewa respectively. Participation was directly related to skill-

oriented training, observation visits, and a number of other factors. The majority of those who had participated in tree planting and forest protection had also participated in training programmes organised by the DFO. Gender and educational status were good indicators of participation in tree planting programmes. Visuals were the most effective training aids, followed by lectures and method demonstration by the field. Whereas it was found that more people in Phewa had participated in tree planting activities than in Palpa, their respective rates were still low (37% and 24% of the total participation potential in the two districts). More men than women, and more literates than illiterates, had participated in the training programmes.

Suitable Planting Sites. Tree planting programmes in the study areas had four components, including plantation. i) around homesteads; ii) on poorly-used barren commons; iii) under agroforestry schemes; and iv) in understocked UG-managed forests. Tree planting on poorly-used barren commons was the most popular (66%), followed by planting around homesteads. About 70 per cent of the respondents in Palpa and 56 per cent in Phewa indicated their interest in continued participation in this activity.

Training and Visits. Training in basic forestry practices was one of the factors leading to increased participation in the user group forest committees. In fact, one of the criteria for being elected on to the committee was prior participation in training programmes and comprehensive knowledge of forest management as well as skills.

The most commonly given reasons for participation in user group forestry were that the "*forest belongs to us*" (*hamro ban*); "*we will have more fuelwood in future*"; and "*improved forest management will control floods and erosion*".

Motivation. In order to improve the farmers' socio-psychological literacy level, more emphasis was placed on awareness-raising, better communication, and motivation schemes. The evaluation examined the impact of these activities on the target beneficiaries. The most effective method of training, according to the majority of Palpa's and Phewa's respondents, was the 'on-site practical exercise' in which the training participants carried out skill-oriented activities. The most popular exercises were making holes

in plastic bags; filling the bags with soil; seed planting in the bags; preparing root/shoot cuttings; and planting seedlings.

One of the primary objectives of training and motivation programmes in community forestry was to establish and/or strengthen rapport between the forestry staff and target beneficiaries. Whether or not this objective was achieved can be measured by studying the knowledge, attitude, perception, awareness, skill, and participation of the people.

Participation. Group participation was preferred by the majority of the respondents. Nine out of ten beneficiaries in Palpa and eight out of ten in Phewa favoured participation through user groups. The main reason was that group participation was 'more practical for forest protection'; 'encouraged greater cooperation'; and 'made better use of the meagre resources'. Only 12 per cent of the total respondents had participated in training programmes and observation tours organised by the DFO in Palpa. In Phewa, the percentage was higher (14%) because of the longer duration of the Project.

Causes and Indicators of Perceived Impact

While the actual impact of UGF may not be felt in a short period of less than five years, its perceived impact among the target beneficiaries can be measured. This perception is indicative of the people's expectations from UGF projects and their participation in them.

Giving due importance to the impact of the project as perceived by the people, the respondents in Palpa and Phewa were asked to describe the present and future trends under the following topics: i) the number of UGs in which they participated; ii) areas on their farms and common lands in which trees were planted; iii) supply of fodder, fuelwood, and timber; iv) the number of trees planted; and v) the number of trees in the production stage.

Perception. The Palpa respondents' perceptions were more encouraging than those of their counterparts in Phewa, suggesting a more favourable project impact on the former than on the latter site. On an average, each respondent in Palpa participated in three UGs, whereas in Pokhara it was only two. Seventy-six per

cent of the users participated in the general UG meetings in Palpa as opposed to only 56 per cent in Phewa. Asked about their perception of the changes in forest cover, almost all the respondents said that the forest cover had increased. However, on the question of forest products' supply, only 46 per cent in Palpa and 35 per cent in Phewa said that the supply had increased at present, although around 90 per cent thought that it would increase in the future.

Problems, Needs, and Aspirations. A development project is usually successful in achieving true people's participation among the target beneficiaries if it meaningfully addresses their problems, needs, and aspirations as well as the benefits that may accrue to them.

Perceived Benefits. A high percentage (93%) of the respondents in Palpa indicated that they were benefitting from the trees they had planted or protected on their farmlands. Similar feelings were echoed by users in Turung village in Kaski. However, a section of the users in Dopahare village, Phewa Watershed, were sceptical about the benefits from the forest their UG was managing. Here, only 52 per cent stated that they were benefitting from the forest.

In general, fodder, fuelwood, and the future prospects of timber represented the benefits which the UGF target beneficiaries either obtained or expected to obtain. In the Phewa Watershed, the people also referred to tourism as a potential source of benefit, although they lamented that most of the benefits did not accrue to them.

Knowledge of Important Variables. Respondents in both Palpa and Phewa knew the topic of the training they had participated in and the places they had visited. However, six out of ten respondents did not know the name of the trainer from outside the district. The trained farmers were also knowledgeable about the specific management prescriptions on which they had received training.

The respondents in Palpa and Phewa differed in their perceptions about the objectives for the Project, in that the majority in Palpa stated that the objective was to "popularise community forestry" and the majority in Phewa mentioned that the objective was to control siltation and erosion.

Knowledge of Prerequisites for the Project's Success. The two groups did not differ in the perceived prerequisites for the success of the project. Eighty per cent of Palpa and 85 per cent of Phewa respondents stated that 'awareness among the people' about the projects' goals and objectives was a prerequisite for success. Another prerequisite mentioned by almost all the respondents was "training" of both the farmers and the staff.

Knowledge of Constraints. Two types of constraint to the project's success were reported. The first was that the lack of awareness' on the part of the people was posing problems to their full participation. The socioeconomic conditions of the farmers, i.e., 'limited cultivated land', 'lack of concern for the community', 'mass poverty', and 'illiteracy' were reported under the second type of constraint. The managerial level staff also mentioned staff shortage; the recent government decision regarding early retirement and freeze on hiring; lack of vehicles; budget cuts, especially in travel; and non-cooperation by the funding agencies as other constraints.

Knowledge of the Benefits of CF Projects. The two groups of respondents gave identical responses regarding the perceived benefits of the community forestry project, i.e., that they will check deforestation and improve the environment. Their perception of the benefits of UGF was negative, i.e., unequal distribution of the forest wealth among the communities.

Importance of Monitoring and Evaluation (M&E) in UGF

All the FUG committee members, as well as the professional staff in both Palpa and Phewa, considered M&E important to local forestry. They also indicated that at present their training lacked this aspect. They also felt that the current staffing situation at the district level did not permit the functioning of good M&E mechanisms.

Employers' Attributes

All the staff in Palpa belonged to the Department of Forests and those in Phewa to the Soil Conservation and Watershed

Management Department. All the professional staff in Palpa were men and in Phewa only one staff member of the "Improved Cookstove Scheme" was a woman.

Attitude towards the Technical Capabilities of the User Group. A generally favourable opinion of the target beneficiaries' capabilities was expressed by the majority of professional staff. Asked for the basis of their assessment, most of the staff said that the farmers were "willing to learn" and they had been "managing trees on their homesteads and farms for generations". However, some professionals felt that the users might need help in applying management prescriptions.

Attitude towards Free Distribution of Seedlings. About 80 per cent of the Palpa and 70 per cent of the Phewa staff said that the free distribution of seedlings' scheme followed by the community forestry (CF) project was 'good'. The reason given by them was that it was a 'traditional' incentive and must not be stopped now. In addition, they also felt that the scheme 'encouraged' people to plant trees by showing the Government's 'commitment'. Those who were not in favour of free seedling distribution said that it "*discouraged protection*", "*people were already buying fodder trees*", and that the Government should give other "*incentives such as secure tenure*".

Evaluation of Professional Staff

Professional staff play a key role in bringing about the desired socio-psychological changes in the knowledge and awareness levels of the respondents. Surveys on the professional staff were conducted to find out their knowledge, skill, attitude, and perception levels. It was found that the staff at both the sites generally possessed adequate knowledge of the technical aspects required of the job and were optimistic regarding the potential for success of FUG management. However, they clearly lacked skills in planning, organising groups, and communication. There was no marked difference between the two groups of staff.

FUG Effectiveness

The effectiveness of the user group was evaluated on the basis of how successfully the group carried out its designated functions, how effective the members were in mobilising people's

participation, and how good the quality of the outcome therefrom was. The basic requirement for any user group's effectiveness was that the group should function and implement its activities; in particular the functions related to proper identification of the users, effective protection of the forests, implementing an equitable distribution system, and a transparent decision-making process. In Table 11, the findings regarding the nine FUGs under study are presented.

Table 11: Evaluation Criteria for Forest User Groups within the Palpa and Phewa Areas

User Group Name	Proper User Identification	Effective Protection	Afforestation Work	Dry Products' Utilisation	Green Products' Utilisation	Decision-making Rules	Effectiveness Rating
PALPA DISTRICT							
Mulgaira, Madanpokhara	Yes	Yes	No	Yes	Yes	Unsatisfactory	5
Shikhardanda, Madanpokhara	Yes	Yes	Reported	Partially	Yes	Unsatisfactory	3
Bharkesh, Telgha	No	No	None	N/A	N/A	Unsatisfactory	1
Mahajir Salleri, Ghykuldanda	Yes	Yes	Reported	Yes	Yes	Satisfactory	4
Khumdanda, Chhidipani	Yes	Yes	None	Yes	Yes	Satisfactory	4
Ramche, Rampur	No	Yes	None	Some	Yes	Satisfactory	3
Hungi, Majuwa	Yes	Yes	None	Yes	Yes	Satisfactory	4
PHEWA WATERSHED							
Turung	Yes	Yes	None	Yes	Yes	Satisfactory	4
Dopahare	No	No	Yes	N/A	N/A	Unsatisfactory	2

Source: Survey Team

Note: Effectiveness rating code: 1. Poor; 2. Fair; 3. Good; 4. Very Good; and 5. Excellent

One of the additional factors not shown in the above-mentioned table was the role of conflict - both internal and external. For a UG to be highly effective, absence of both types of conflict was necessary. From Table 11, it can be observed that only one UG,

Mulgaira in Palpa, out of nine could be rated excellent in terms of its effectiveness. Bharkesh FUG in Palpa was rated poor because of the complete lack of any structure and function. The rest of the FUGs either had a weak structure or were plagued by conflicts; they were ranked mediocre in effectiveness.

Gender Analysis

Based on the information collected from key informants, mostly women, on important questions related to women's role in forestry, the major findings and analyses are presented as follows.

Women's Role in UG Formation

In all the nine UGs, the initiative to form the UGs was taken by the DFO or the PDP staff. In Madanpokhara, Mahajir Salleri, Turung, and Ramche, women were involved from the very beginning. Spontaneous participation by women was noticed when the rangers organised group meetings, neighbourhood gatherings, and individual contacts. These 'accidental contacts' also included women as they did not shy away from admitting to rangers that "*only male members knew what was involved*".

Naturally, in these villages, the percentage of women members in the UGC was higher. Women members who were among the first to show interest and were involved in UG formation and OP development had retained their membership in the UGC (Table 12).

Mulgaira and Mahajir Salleri UGs were found to have around 30 per cent of women on their committees. However, the reasons were slightly different. In Mulgaira, the higher level of education had motivated women to use their rights and, thus, they had been able to muster strength and recognition. However, in Mahajir, due to a higher proportion of men being employed outside, women were motivated because they were compelled to protect the forest. They had thus willingly occupied important positions in the UGC. In these UGs, the women had been early starters, willing and active participants, and equal partners in development of the UGF. In Bharkesh and Khumdanda, due to the low education level and lack of proper motivating factors, women were found to be late starters, passive participants, and unequal partners. In the remaining UGs, the situation was somewhere in between these two extremes.

Table 12: Women's Participation in UGC in the Study Areas

User Group	Yr. of handing over to the UG	Total No. of User HH	No. of Members in the UGC	No. of Female Members	Duration of Membership
PALPA					
Mulgaira	1989	79	15	5	2 yrs.
Shikhar	1988	140	11	2	3 *
Bharkesh	1988	331	31/11*	3/2	1
Mahajir	1990	111	19	6	1
Khumdanda	1989	133	11/12*	0/2	2
Ramche	1988	212	13	2	2
Hungi	1990	53	9/6	2/2	1
PHEWA					
Turung	1990	122	12	0	-
Dopahare	1990	106	9	2	2

* Existence of general and executive committees

Attributes of Women Members

Caste. Generally *Brahmin* and *Chhetri* women dominated the UGCs in all the villages, except in *Khumdanda* where *Magar* women were in the majority. Women were poorly represented in all the FUGs. However, lower caste women were included on the committees more frequently, mostly because the village leaders felt that it looked 'nice' rather than because they thought it was 'necessary'.

Marital Status. Almost all the committee members were married. The society generally preferred the inclusion of married women on the committee because of their acceptability, maturity, and stability.

Age Group. More than 80 per cent of the committee members were 35 years or older. Those over 40 were reported to be more

mature, self-confident, and to have made meaningful contributions to committee work.

Education. Most of the UGC members were found to be literate. Some members had a high school diploma. However, the literacy factor did not hinder participation in that most of the rules and management prescriptions were discussed thoroughly at the meetings.

Economic Status. Relatively well-off women participated, more because of the freedom from household chores. Most of the poor women were too busy to even attend the general meeting, let alone participate in the managing committee's affairs.

Mode of Functioning of Women in the UGC

Women were generally encouraged by their husbands to attend the meetings regularly. They collected the information and materials for setting the agenda through interactions with other women at work places, water springs, and casual meetings. The degree of women's participation depended on the type of meeting as well as on their socioeconomic status, e.g., educational level and family background.

Motivating Factors

Women were motivated by several factors. Usually, the men in the HH played a vital role in disseminating relevant information, e.g., in Mulgaira. However, in Mahajir Salleri FUG, women were motivated because of the absence of men from the village as well as by listening to the rangers and the DFO. Training and observation tours were found to be good motivating factors for women. Most of the women also reported themselves to have been motivated simply by experiencing the gradual decline in forest harvests and by their desire for better management in the future. In fact, women were more willing to and active in protecting forests than men, because they were the ones who needed the forests the most. In Rampur, women were motivated by the dedicated protection work of the women *heralo* (Table 13).

Table 13: The Motivations for User Group Forestry amongst Sampled Women Farmers

Item	Brahmin	Chhetri	Magar/ Gurung	Sarki/ Kami	Others	Total
- Self-interest	30	2	0	0	2	34 (38)
- Husband's advice	1	2	7	1	2	13 (14)
- Training/Workshop	4	8	2	2	0	16 (18)
- Demonstration	0	0	0	0	1	1 (1)
- Radio programmes	2	2	0	0	0	4 (5)
- Villagers' request	1	1	1	1	0	4 (4)
- Govt. officials' advice	2	2	5	1	2	12 (13)
- Absence of men	0	3	0	3	0	6 (7)
	40	20	15	8	7	90 (100)

Decision-making Process

The number of men and women attending the meetings was usually equal. Since they were the main users, they often expressed the view that they had a larger stake in forest management than men. In addition, they were very sensitive to the decisions made by the FUGs regarding the time and duration of forest opening, inclusion of new members in the UGs, the type of penalty and the amount of fine to be borne by the defaulters, and the price of forest products. They also had better communications with users because of regular contacts with them. It was, therefore, observed that women at both sites significantly participated in and contributed to the decision-making process, and this factor played a major role in enhancing FUG effectiveness.

Project Implementation

Women committee members in all the FUGs were heavily involved in implementing the project and enforcing the rules. In Mulgaira, the women members also took part in briefing outsiders

about forest management activities. In Mahajir, women were exclusively involved in protecting the forest and carrying out management activities. In Bharkesh, women were the main collectors of fuelwood and fodder. Many of them illegally marketed fuelwood also. They were also the ones who indicated their concern regarding the need to protect the forests.

Monitoring

Monitoring of the FUG-managed forests involves checking on the *heralo*, follow-up of thinning/harvesting schedules, supervising silvicultural operations, and record-keeping. In Khumdanda, a register was maintained to log the daily duty records of the group members. A women member monitored the records. In Mahajir, women reported any incidence of theft, violation of rules, and encroachment. In Mulgaira, women members collected information on grievances and reported to the committee. In Hungi, women were involved in the disciplinary committee.

Perceptions and Attitudes of Women

Women's perceptions and attitudes were assessed by interviewing committee members in a group. The approach was to compare the responses across the UGs. Table 14 provides a summary of the responses. The table indicates that most of the women interviewed had positive attitudes and perceptions. In Telgha VDC, the responses were opposite to those obtained elsewhere. This was due to the complete failure of the system existing there. The women were quite knowledgeable about the problems since they often pointed them out to the chairman of the committee who was not performing his duty well and was involved in illegal activities.

Women's Typical Perceptions. Before user group control, fodder and fuelwood collection was easy. However, free access led to forest destruction and control through the UGC was established to regulate misuse. Therefore, relatively speaking, women's work is easier today than in the past as more durable practices are followed. Some of the often repeated views are given below.

Table 14: Perceptions and Attitudes of Women User Group Members in Palpa

FUG Name	Quality of the forests			Time taken for collection			Future of the forests			Quality of women's life			Men's attitude towards women		
	B	W	N	B	W	N	B	W	N	B	W	N	B	W	N
PALPA															
Mulgaira	9	1	-	2	8	-	10	-	-	5	4	1	8	-	2
Shikhardanda	10	-	-	4	6	-	9	-	1	2	5	3	7	2	1
Telgha	-	10	-	8	-	2	-	7	3	8	1	1	2	8	-
Mahajir	8	-	2	-	9	1	7	3	-	4	5	1	8	-	2
Khumdanda	10	-	-	8	2	-	8	-	2	6	4	-	6	-	4
Ramche	10	-	-	7	3	-	9	-	1	5	5	-	6	3	1
Hungi	8	-	2	6	3	1	6	-	4	4	2	4	6	4	-
POKHARA															
Turung	10	-	0	2	6	2	6	-	4	5	0	5	6	1	3
Dopahare	9	-	1	1	5	4	5	1	4	4	4	2	2	5	3
Total	74	11	5	38	42	10	60	11	19	43	30	17	51	23	16

Notations: B - Better; W - Worse; N - Neutral

- * Women's issues are raised by women themselves, and some of the issues are resolved but not all.
- * Fodder and fuelwood collection was easier in the past, but forest protection is needed.
- * Women feel more inclined to protect forests as they are the ones who need fuelwood.
- * Women and children are more involved in fodder/fuelwood (F&F) collection, but, in farming, both men and women are equally involved.
- * Under economic stress, both boys and girls suffer from poor schooling or lack of schooling.
- * Women prefer *Ficus semicordata*, *Litsea monopetala*, and *Ficus hispida*. In addition, mangoes and litchis are also preferred.
- * Both husbands and wives collect fuelwood but more often it is the women who perform this task.
- * The main reason for felling trees is the very lucrative returns from the sale of fuelwood in Palpa.
- * The committee is not very active - it has recently been organised, and maybe they will do something now.

- * Since most of the men go out of the village to work, women have to take full responsibility for protecting and managing the forest.
- * Women voice more strongly the need to protect forests, but illegal activities still continue due to the greed of some persons.
- * It was easier to collect fodder in the past, but, due to the expectation that in the future the same if not a better situation will prevail, people are undergoing hardship and protecting the forest.

Women's Issues and Problems

1. Most UG forests do not have adequate fodder, fuelwood, and bedding materials. Therefore, women have to go to distant places from where they manage to bring only one *bhari* a day.
2. Daughters (including children) and mothers are the ones who collect the fuelwood and fodder. One woman (Jethi Subedi of Telgha) said that both herself and her daughter had to be fully engaged in collection as her husband was living with his second wife.
3. In general, the poor, illiterate, and disadvantaged women are ignorant of the UGF activities and, therefore, have a poor opinion of forest management. Such women attend the meetings but exchange no opinions.
4. Although the state of the forests is somewhat better at present than a few years ago, it is not as easy to collect forest products as in the past as the forest quality has decreased.
5. Forest products are stolen mainly by the village toughs who sell fuelwood and timber in the nearby Tansen and Butwal markets. If caught, they either challenge the informer, more so if the informer is a woman, or make a payment for their release if sent to the VDC.
6. As such, there is no discrimination between men and women. However, due to the poor economic conditions, women whose husbands have left them fear that their children, especially daughters, will have to drop out after primary school education.
7. Asked why they had not become members of the UGC, a typical reply was "when there are men, why do women

need to become members". Most of the women do not attend the meetings as they do not believe that their problems will be attended to.

8. Women's lives were better in the past as the forest cover was dense. Even today, if illegal use of forest products can be controlled, the situation in the forestry sector could be improved.

Equity Considerations

Community forestry projects in Palpa and Phewa have been planned primarily to address the shortage of basic necessities, soil erosion, and deforestation-related problems. As such, there is no objective to reduce socioeconomic inequality and general impoverishment and achieve social justice. However, through its programmes for improving the development of local natural resources, infrastructure, and environmental quality, both monetary and consequential benefits have started reaching the common people. However, both the projects have targetted their programmes more on environmental needs than on socioeconomic ones. As a result, the opportunities created have reached only those sections of society who are educated, powerful, and enterprising. In general, people from the lower castes (*Magar, Kami, Sarki, and Damai*) and women have benefitted less than those belonging to the elite classes (*Brahmin, Chhetri, and Newar*). In recent years, programmes such as road construction, women's training, bee-keeping, and other income-generating activities have been launched to address the equity issue. Nevertheless, in the context of the on-going activities and the present flow of goods and services, it can be concluded that the community forestry projects have the potential to reduce the hitherto existing gaps in resource accessibility and benefit-sharing among the different socioeconomic groups. However, the goal of creating an equitable system of resource distribution may be possible only within a group and not across the groups. The unequal distribution of forest resources has created 'haves' and 'have nots' in terms of forest resource endowment, and this may be the biggest challenge to achieving equity. A typical example is the existence of forest product surplus and deficit villages adjoining each other - *Khumdanda* FUG in Palpa and *Turung* in Phewa. In both these cases, the per capita forest area was among the highest in the district. However, the district towns were net deficit in fuelwood and the major source of illicit users for these

forests. Yet, there was no possibility of equitable sharing of surplus fuelwood between the individual UGF and the outside community. This, of course, created friction between the communities concerned.

User Group Sustainability

Sustainability was assessed by analysing the following variables: i) demography; ii) forest biomass availability; iii) patterns of energy use and demand; and iv) traditional supply and demand analysis. Sustainable forestry is both an ecological and economical concept. While ecological sustainability was examined through the traditional demand and supply analysis of forest products, socioeconomic sustainability was examined by analysing the users' attitudes, perceptions, and practices.

Characteristics of Sustainable User Groups

Sustainable FUGs in Palpa and Phewa, according to our findings, have attributes that can be grouped under a) socioeconomic indicators; b) biophysical indicators; and c) equity indicators (Table 15).

Table 15: Biostock and Community Attributes of the Successful and Unsuccessful Forest User Groups in Palpa and Phewa

FUG Name	Rule conformance	Adequacy of Boundary Rules	Acceptance of Allocation Rules	Resource Availability	Ethnic Homogeneity	Performance Rating
PALPA						
Mulgaira	High	Yes	High	Poor	High	Excellent
Shikhar	High	Yes	High	Poor	Medium	Good
Bharkesh	Low	No	Low	High	Low	Poor
Mahajir	Medium	Yes	Medium	High	High	Good
Khumdanda	High	Yes	High	High	High	Good
Ramche	High	No	Medium	High	Medium	Fair
Hungi	High	Yes	High	Poor	Medium	Good
PHEWA						
Turung	High	Yes	High	Good	High	Good
Dopahare	Medium	No	Low	Poor	Low	Fair

Source: Survey Team

Socioeconomic Indicators. It was assumed that a successful UG can be defined as a group with a) well-protected and well-stocked forests; b) absence of disputes; c) self-sufficiency in forest products; d) non-dependence on common forests for fuelwood and fodder; e) existence of a common fund; e) an indigenous forest management system; f) sufficient provisions for achieving equity; g) a high degree of participation; and h) maximum user satisfaction. Based on these criteria, the successful UGs were listed as having the attributes mentioned below.

According to the above analysis, a successful FUG was found to have a high degree of rule conformance; adequate boundary rules; universally accepted allocation rules; and a high level of ethnic homogeneity. If these conditions were met even when the resource base was poor, the FUG was functioning effectively and could be termed sustainable. On the basis of these criteria, one UG forest in each study area was found to be unsustainable. Besides, the above-mentioned socioeconomic indicators, the successful FUGs also had a high rate of female literacy (around 40%); a high number of on-farm trees; a high percentage of college educated persons; a low livestock population; lower dependence on farming; lower dependence on fuelwood from forests; a smoothly functioning and structured UG; a high degree of participation by the users in developing the OP; and a high off-farm income. In terms of such criteria, Mulgaira, Shikhardanda, Mahajir, Khumdanda, and Hungi in Palpa and Turung in Phewa were found to be successful FUGs although the degree of success varied. While all the criteria are important, two - acceptance of allocation rules and adequacy of resources - are crucial. In some forests (Ramche in Palpa), although most of the conditions were met, due to boundary disputes and refusal to accept the allocation rules, the UGs were termed unsuccessful.

Biophysical Indicators. Sustainability was also examined on the basis of the sustained-yield concept. Sustained yield is a deeply entrenched principle in the forest community. However, sustained yield is not the same as sustainable development. Sustained yield mainly concerns a perpetual or annual flow of timber, fuelwood, and fodder. But the concept of sustainable development of forests is much broader and is concerned with integrated forest management, maintaining the ecological integrity of the forest environment, and keeping future options open. The formulation of approaches to sustainable forest development requires

harmonisation of human activities with the biological and physical aspects of forest ecosystems. Sustainable forest development means recognising the limits of forest ecosystems to withstand environmental change, individually and collectively, and managing human activities to produce the maximum level of benefits obtainable within these limits. Sustainable harvesting practices require that extraction of forest products must not exceed the capacity of the system to regenerate itself. Based on the concept of sustained yield, the sustainability of the UGFs in Palpa and Phewa was analysed (Table 16).

Table 16: Sustainability Analysis of Fuelwood and Timber Supply from the UG Forests in Palpa and Phewa

Year	Population Estimate*	Demand		Supply (cubic metres)					
		Timber	Fuelwood	UG Forest	Shrubland	Pvt. Sources			
1992	284	23	304	98 (30.0)	26.0 (8.6)	156 (51.3)		(89.9)	
1993	289	23	310	115 (34.5)	25.5 (8.2)	160 (51.6)		(94.3)	
1994	295	24	316	131 (38.5)	25.0 (7.9)	165 (52.2)		(98.6)	
1995	300	27	322	148 (42.4)	24.5 (7.6)	166 (51.6)		(101.6)	
1996	305	27	327	164 (46.3)	23.8 (7.3)	172 (52.6)		(106.2)	
1997	309	28	331	180 (50.1)	23.0 (7.0)	175 (52.9)		(110.0)	
1998	314	28	337	188 (51.5)	22.4 (6.7)	180 (53.4)		(111.6)	
1999	319	29	342	196 (52.8)	21.7 (6.4)	183 (53.5)		(112.7)	
2000	324	33	347	204 (53.7)	21.0 (6.1)	187 (53.9)		(113.7)	
2001	328	36	352	213 (54.9)	20.2 (5.7)	191 (54.3)		(114.9)	
2002	331	36	355	221 (56.5)	19.4 (5.5)	194 (54.7)		(116.7)	
2003	335	37	359	229 (57.8)	18.6 (5.2)	196 (54.6)		(117.6)	
2004	339	37	363	237 (59.3)	17.9 (4.9)	200 (55.1)		(119.3)	
2005	343	38	368	245 (60.3)	17.2 (4.7)	204 (55.4)		(120.4)	

Assumptions:

* the population is projected to grow at 1.84 per cent annually till 1995; at 1.53 per cent till 2000; and at 1.2 per cent thereafter.

** The per capita fuelwood requirement is 1.072 cubic metres per annum; the total wood production is between 3 to 6.5cu.m./ha from 1992-2000; and 7.5 cubic metres thereafter. Production from private sources is kept at a constant ratio; production from shrubland is assumed to be 1.5 cu.m/ha and is projected to decrease by two to four per cent as a result of reforestation.

Time-series projections of timber and fuelwood supply and demand in the study area are given in the table. Timber requirements were assumed to vary between 0.07 to 0.11 cubic metres per capita. Although the figures may not be exact, the concept of sustainability presented indicates that forests under user management are capable of providing a significantly higher wood output than that currently obtained at present under government 'management'.

Fodder production in the forests is assumed to grow five per cent, 2.5 per cent, and 1.25 per cent annually for each of the five-year periods till the year 2005 respectively under UG management. Since at present 70 per cent of the fodder comes from private sources, sustainable fodder production was projected to be feasible under UG forestry.

Community Attributes for Sustainability

- * In most of the communities, the impetus for starting a local management system came from either an individual or a group with strong community leadership.
- * Most of the leaders were either ex-political officials or ex-army personnel.
- * While local leaders played an important role in initiating the project, people's eventual recognition of the benefits they could receive ensured their sustained participation.
- * The type of forest was another factor in successful management. *Sal*, *katus*, and *chilaune* were considered to be more valuable than other species and their predominance aided protection.
- * The existence of large private holdings, especially *khet*, which is invariably associated with the higher *Brahmin* and *Chhetri* castes, was found to lead to better forest protection and management.
- * Proximity to local markets was found to deter effective enforcement of CF management rules.

Biophysical Characteristics

- The size of the forest as well as that of the user group was important for successful forest management. Large-sized forests were generally associated with lesser allocation

problems and conflicts. Similarly, smaller-sized UGs were generally found to exhibit a higher level of conformity to rules. They also had less serious conflicts.

- Inter-community relations had a strong bearing on the quality of forest management. Two VDCs/wards usually claimed user rights to the same patch of a national forest and this usually led to unsustainable forest management.
- The most effective system of forest management was one in which the forests were closed to grazing and animals were stall-fed.
- One important requirement for achieving community participation in forestry was identified as relatively easy access for the users to fuelwood and fodder. This usually motivated villagers to manage and rehabilitate forests until the trees were big enough for harvesting.
- The effectiveness of the forest guard depended upon the strength of the social sanctions against forest encroachment. Where social sanctions were not strong, the forest guard could not control livestock grazing and fuelwood/fodder collection.
- Women posed problems as well as provided solutions to the management of UG forests. Women, if mobilised, can protect and manage forests effectively. However, because of lack of proper education as well as sheer compulsion, they practice harmful and illicit uses of forests also.

Chapter 7

OBSERVATIONS AND DISCUSSION

General Remarks

The evaluation of user group forestry in Palpa district and the Phewa Watershed revealed that the majority of the 139 randomly-selected project beneficiaries interviewed believed that user group-managed community forestry has improved the quality and quantity of the forest biomass considerably and has yielded positive results in terms of livelihood and the agro-ecosystem. User group forestry was perceived as a much better approach than conventional community forestry, which, until recently, was better known as *Panchayat* Forestry. According to the old approach, the villagers were made to participate in the Government's programme, i.e., all the decisions pertaining to site selection, choice of species, and planting methods were taken by the rangers and a select group of villagers were made to participate as wage labourers and/or 'sponsored participants'.

The development of UGF in Palpa was the result of CF projects funded by the GTZ/SATA-aided Tinau Watershed Project and later by the Palpa Development Project for over the last 15 years. The community forestry component was the major focus of the Phewa Watershed Development Project which has been receiving external funds for the last 15 years.

Major Observations

This evaluation study was carried out to achieve several objectives. The most important objective was to gain a better understanding of the process of user group forestry so as to better equip planners and field professionals to accelerate the process of community management of forest resources. It was postulated

that the important lessons learned in the study area could improve forest policy at the national level, implement efficiency at the district level, and facilitate management decisions at the user level. The major secondary objectives were: a) to measure changes in the beneficiaries' socio-psychological attributes such as knowledge, awareness, perception, attitude, skill, and participation; and b) to examine both the qualitative and quantitative changes in biophysical resources as a result of the users' own management inputs.

It was revealed that the projects - community forestry in Palpa and watershed management in the Phewa Watershed - had been successful in creating awareness of the project activities among the target beneficiaries; had improved their knowledge and perception of the different aspects of forestry practices and rules; promoted favourable attitudes towards forest protection; and, above all, improved their skills and level of participation in most of the important forest management activities. In general, the beneficiaries in Pokhara had less favourable attitudes, poor knowledge and awareness, and a lower level of participation than their counterparts in Palpa. This was partly due to the greater emphasis given by the succeeding projects to physical rather than institutional development in Phewa. Perhaps, because of this factor, the biostock resource quality and resource potential were also found to be inferior in Phewa to those in Palpa. This is partly due to the plantation of exotic species (e.g., pine) in the former and induced regeneration of native species (e.g., *sal*) in the latter area. The following section presents the major observations and discussions on user group forestry activities in the study areas. The findings are based on analysis of the successes and failures in improving the knowledge, awareness, perception, attitude, skill, and participation (socio-psychological variables) of both the forest farmers and forestry staff.

Role of Technical Variables

User groups in Palpa were at a much advanced stage of social awareness and technical knowledge than those in the Phewa Watershed. The reasons identified were a higher literacy rate, especially among women; an initial self-reliant approach in project implementation; a higher degree of knowledge and participation; and positive attitudes and clear perceptions. For example, the female literacy rate was higher and the ethnic composition was

more homogeneous in Palpa than in Phewa. The user group members were also found to be more knowledgeable and skilful in Palpa. It was concluded that the initial approach adopted by the CF projects in Palpa induced the people to affirm their commitment and participate, thereby creating a 'self-reliance syndrome' whereas the projects in Phewa were highly subsidised and thereby created a 'dependency syndrome'.

Institutional Variables

The forest user group process in both the study areas was a well-established institution. User rights and responsibilities were generally clear to the members, thereby ensuring their participation in the preparation of their respective operational plans. This information was found to be useful for the decision-makers to expedite the 'handing over' process elsewhere in the country.

Socioeconomic Factors

Both Palpa and Phewa were found to have a history of strong, indigenous forest management systems. This was concluded to be one of the causes of successful user group forestry in both areas. Some of the plausible reasons for success or failure are given below.

- Ethnic Homogeneity. In Palpa, the overwhelming majority of the UG committee members were upper caste Brahmin families. In one case, Magar families were predominant but the group was homogeneous. A UG forest, therefore, had a better chance of success under communal ownership.
- High Literacy Rate. The literacy rate in the user group community was around 47 per cent, which is much higher than the national average. One of the UG Village Development Committees also had several schools and one college and this feature was associated with successful UGFs.
- Successful Agriculture. Due to favourable locations (altitude-wise, the area falls in the subtropical/tropical zone) and good quality farmlands, the villages had been consistently increasing agricultural production, and this is helping them to decrease pressure on the forests.
- Availability of Alternative Forests. The members of the majority of the FUGs are simultaneously members of at

least two other forest user groups in the locality. In addition, they also maintain their own private forests. This has indeed helped them to protect the user group forests successfully.

- Development of Alternate Energy Sources. The progressive nature of the villagers has led to gradual diversification of their fodder and energy sources. For example, the villagers have installed biogas plants in their houses, using both animal and human waste. This has relieved the pressure on the forests, resulting in a sustainable system of resource utilisation.
- Small Size. Smaller FUGs were found to be more successful. One such FUG - Mulgaira - started with only 50 members in 1985, and this has now grown to 79. Compared to Bharkesh Telgha FUG (an example of an unsuccessful FUG) whose membership is 331, it is one-fourth in size. It can, therefore, be concluded that smaller FUGs (less than 100 members) have a higher chance of success than large-sized FUGs.

Equity Issues

Exclusion of a section of the population, especially those from the lower castes, disadvantaged groups, and occupational classes, from forest user groups, was found to create an equity problem for both the Government and the society. This problem was more pronounced in Phewa than in Palpa. Inter-village disputes in defining user rights were reported in one place each in Palpa and Phewa. The urban and suburban population, who either earn their living by selling forest products or are dependent on fuelwood for domestic energy, were increasingly found to be attempting to enter formal groups. This is one of the ethical as well as equity issues which should be addressed to ensure the overall sustainability of UGF. This challenge opens up new opportunities and entails new responsibilities for the DFOs. Conceivably, the solution lies in making the surplus forest areas and/or products available to these people without usufruct rights.

Institutional Development

Clearly-defined rules and regulations and well-organised local groups and committees are essential for successful implementation of community forest management. Although the

structure of the committee may vary, strong and cohesive organisation is essential for effective discharge of functions (Messerschmidt *et al.* 1993). In short, the following areas need special emphasis.

Government's Role

The DFOs' unplanned and high-handed interventions usually disrupt indigenous systems. Introduction of forest guards, establishment of a range office, patronising selected politicians, and unilateral issue of permits are the different forms of intervention which affect the degree of user participation.

The Department of Forests is not yet well organised and strong enough to cope with the increasing demand for handing over the mid-hill forests to the respective users. There is a danger of using a few successful UGFs while deciding to hasten the pace of handing over the forests to the respective communities. In Palpa, the number of forests handed over during the fiscal year 1992/93 was 28, which was more than double the combined figures of the previous three years. The process should be unimpeded, but it must be accomplished with the improved understanding and participation of the community.

Effect of Population Pressure

The increasing population growth is exerting additional pressure on the forest resources. However, the responses of the people differed in Palpa and Phewa. The close proximity to Pokhara, a major tourist destination, has enabled absorption of a portion of the labour force from Phewa in the tourism sector. In Palpa, the tradition of male members' seeking employment in the police and military services (including the Indian and British armies) is continuing. Nevertheless, the increasing food demand is resulting in the gradual conversion of forest lands into agroforestry use, thus reducing the common property resources.

Types of UGF Function

Forest protection and enforcement of use regulations are two of the most important functions of the UGs. Religious fencing, sociocultural sanctions, monetary penalties, and legal action are some of the methods used to carry out their functions. Arriving at

an agreement to restrict access to the forest by the majority of UG members is the first step towards converting open access resources to common property resources.

Alternative Sources

The existence of alternative sources of fuelwood, fodder, and grazing resources is believed to help in the protection of forest resources in a more sustainable manner. In all the seven UGs studied, on an average each member had access to two other forests. Depending upon the size, quality, and stage of the forests, the amount of products harvested varied greatly.

In order to deduce UGF principles, the following general indicators may be useful.

- a. In almost all the cases studied, the basis of the emergence of successful UGF was the existence of indigenous knowledge and traditional methods of forest protection and management. The knowledge may have been gained either by watching the water sources decrease or dry up; occurrence of landslides or soil erosion; and increasing difficulty in fuelwood and fodder collection as well as an increase in the time taken for collection. Management skills were mastered through practice and mutual learning.
- b. The spontaneous emergence of social worker(s) or leader(s), who either had the ability to convince the masses or had taken the risk of challenging the forest authority, also indicated successful UG-based management. The local leadership may have functioned within the framework of various socially-sanctioned positions such as chairperson of the School Management Committee, priest of a temple, *talukdar*, senior citizen, informal village head, or the community leader. Although such leadership roles were largely taken up by male members belonging to the upper castes, given the opportunity, females and members from the lower castes are also found to have shown equal leadership qualities. Leaders occasionally may have abused their authority, either by making political gains or by reaping a few privileges. In such instances, the UGF has not survived

well. The example of Bharkesh is a case in point. Here the committee members are either enjoying privileges or are not sincerely discharging their duties. The result has been a complete breakdown of the management structure.

c. The type of structure in the community is another factor making or breaking the UGF. In general, small, homogeneous, communally evolved, relatively educated, and disciplined communities appear to be managing their resources in a more sustainable manner than big, impoverished, and ethnically-mixed communities. In the first category of communities, the rules are more thorough, members are sensitive and aware of their rights, and forest management goals are clearly understood.

d. The fourth indicator is the issue of property rights or, more specifically, tree and land tenure security. The forest policies pursued by successive governments, right from the time of King Prithvi Narayan Shah (the first king of a unified Nepal), have been so unstable and their implementation so destructive to both forests and indigenous systems that people are thoroughly suspicious of the Government's motives. Nothing less than a written certificate of tree and land ownership rights seems to convince them that the forests they have been using for generations will finally be theirs. Only after the formal handing over of the forest by the DFO, through a written and stamped certificate and through the actual exercise of use rights by the villagers, does there appear to be an increase in the affinity of the community to the forest, and it results in subsequent protection and management. Therefore, it is prudent to differentiate community/traditional forestry from UG forestry in that the latter is community, traditional, and indigenous all at the same time and the former is only community in name but open and freely useable in practice.

e. The excessive cost of forest management also seems to be leading towards UGF. In the larger community-based forestry, all the new and potential users simply by virtue of living within the *panchayat* boundaries had power to create costs for the management. This weakened the power of the actual users (in reality the owners) since they

had to bear the huge costs of the people who did not invest anything in development of the resources.

- f. The existence of locally-evolved institutions and the degree to which they are well designed also seem to work in favour of the UGF. Institutions here refer to both the organisations and norms, rules and regulations governing them. The operational plan developed by the Ranger of the Tinau Watershed Project is so general and vague that it is more or less a useless document for the users.
- g. Lastly, the conservation of the forest and the quality of its management depend on the level of scarcity suffered by the community concerned. Only disastrous suffering and unforgettable hardship appear to be leading to the spontaneous emergence of group/community-based forest protection drives. However, this last factor is not crucial now since the stories and case studies of neighbouring villages/communities/districts, or even regions, if spread properly through well-designed extension programmes to communities in other parts of the country, will ensure that others will not need to go through a period of scarcity and hardship before they take over a user group forest for themselves. This is where the role of government and non-government agencies will be found to be lacking.

What This Case Study Explains?

Based on the study findings and the aforementioned observations, this study adds the following new dimensions towards improving user group forestry policies and practices in Nepal.

1. On the question of the adequacy of legal provisions to promote the accelerated handing-over of community forests to the FUGs, the Forest Act (1993) provisions do meet the current needs. The only precaution suggested here is that the clauses pertaining to the final authority of the DFO should be used only in exceptional cases. The clauses contained under Chapter 13, Miscellaneous, are especially referred to here. In the name of priority projects, HMG has retained the right to use any forest in the country, and this can still be used by unscrupulous officials to disrupt

the infrastructure of the UGF. In addition, the Bill is not yet effective and lacks bye-laws.

2. Regarding the tremendous increase in the demand for handing over forests and District Forest offices, as the limited staff and resources are not able to cope with the increased work load; innovative and efficient methods, such as the ones successfully implemented by the DFO, Palpa, can be replicated elsewhere in Nepal. The practice used hitherto of requiring each and every FUG meeting to have a Ranger/Asst. Ranger present should be discontinued. Instead these officials can be asked to be present only in the final meeting when the FUG structure and OP contents are to be finalised. Yet another approach (forwarded by the then DFO, Palpa, Mr. Baral) is to do away with the requirement for a fully-fledged operational plan prior to handing over the forest. Instead, a provisional certificate of ownership could be issued to immediately initiate forest conservation measures. After all, the bulk of the country's mid-hill forests are not in a state for immediate harvesting/thinning/pruning operations but are in greater need of protection, and this is not happening currently due to lack of tenurial guarantee to the actual users. The provisional certificate has the potential to provide this guarantee.
3. Regarding the issue of lack of interest on the part of the community in afforestation work, thereby resulting in a failure to meet the forest development needs of the country, once again the approach implemented by the DFO, Palpa, is worth trying elsewhere in the country. In this particular approach, the DFO first of all asked the potential communities to indicate their interest in establishing new plantations on common land. Once the interest and initiatives arose in a community, the DFO staff formed UGs and UG committees and issued certificates assuring tree and land ownership to the users. The species' preferences were collected by the UGC. Supplies of necessary seedlings were assured by the DFO. However, a condition was proposed, i.e., all the expenses, apart from the seedling transportation, were to be borne by the FUGs themselves. The community, in most instances, agreed, and the DFO informed them of the

arrival of seedlings to the district office or nearest road point from where the concerned users had to transport them themselves to the planting site. After carrying out plantation under the supervision of the DFO staff, each community was personally visited either by the DFO or his senior staff, and transportation costs were paid to members of the UGC. Through this process, the DFO claimed he carried out plantation in 47 locations (covering an area of about 160ha) at 10 per cent of normal cost. The Research Team Leader visited several of these plantation sites and found that the quality of plantation was good and that the survival rate was more than 80 per cent. This new approach to forest resource development is cost-effective and sustainable and, therefore, is recommended in other districts as well.

4. Regarding the sustainability of the user group forestry approach itself, the author feels that in Nepal's forestry sector the most important requirement for sustainability is the immediate institution of cost-effective and efficient methods of forest resource conservation. Our studies in Palpa and Pokhara have concluded that nothing institutionalises sustainable conservation more than granting full recognition of locally-evolved socioeconomic institutions and organisations. The FUG concept meets this end by changing the whole attitude of the users, from that of exploiters to that of resource managers, simply by granting a certificate which says that the forest that was the "government's" yesterday is "theirs" today. It seems that these users change their practices quite rapidly from those of liberal consumers to these of conservative savers. This change of attitude augurs well for the sustainable balance of the country's precarious forest resource use equation.

5. Finally, regarding the aspects of equity, justice, and efficiency, the FUG concepts and practices have created issues that may create problems for local and national governments in the near future. The first and foremost concern is that, after all the accessible forests have been handed over to the recognisable and *de facto* users/owners, a section of the society will be excluded from vital and sensitive resources. The State has a responsibility to meet

their basic needs as well. To solve this problem, the Department of Forests should review the current Master Plan critically so that a significant number of forests can be managed as national forests to meet the basic needs of those excluded. In this context, the *terai* forest should not be handed over to users in the same way as in the mid-hills.

6. As far as the system's efficiency is concerned, predictably the FUGs will not implement operational plans based on economic criteria alone, thus compromising the profit motive. However, the social and economic benefits of more conservative management will, in the long run be greater than the short-term financial losses incurred by not capturing market opportunities.

Policy Lessons

1. The Government still lacks clear policies regarding appropriate allocation of land resources for different forest uses (e.g., protection forestry, conservation forestry, production forestry, and community forestry). This has resulted in poor implementation of the forest development programmes, misallocation of scarce resources, and unsustainable management of forests at the national level. According to this study, despite the overall successful functioning of UGFs, the users are dictating the pace and nature of forest management and not the Government. The concerned agencies must formulate a long-term policy and be consulted to it.
2. The DOF staff generally still have the 'foresters know best' attitude and 'dictate' to rather than 'consult' with the users. Some of the prescriptions and rules included in the operational plans by the rangers were found to be based on what they perceived as good for the members rather than on shared ideas and opportunities for equal partnerships in collaborative forest management.

Chapter 8

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The findings from this study can be summarised under five different headings in the form of lessons learned. They are 1) policy lessons; 2) institutional lessons; 3) social lessons; 4) technological lessons; and 5) economic lessons. In addition, some of the emerging issues are also discussed in this section.

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3. Secure tree tenure, unhindered access to markets, uncontrolled pricing policies, and unrestricted movement of forest products within the country are necessary elements for full and fair participation by the users. This will also create synergy in the groups, thereby making them more effective than the sum total of their members.
4. Although the Government has the stated policy of 'handing over' the forests to the people, the question of tenurial rights is not yet settled. The users have usufruct rights over the trees but no ownership rights over the land. Since the DOF still retains a considerable amount of discretionary authority over the forests, actual 'handing over' of forest properties to and acceptance of management responsibility by the people may still not take place. This factor may not be critical at present, as the users are more concerned with acquiring whatever rights are available, but, once the value of the forests increases, the tenurial problem may affect sustainable management.

Institutional Issues

1. The DOF staff still do not and/or poorly understand how local communities interact internally and externally. Perhaps, because of this reason, they do not develop and implement programmes that are responsive to the communities' social and resource environments. The pace of handing over the forests can be hastened by staff who are better trained in group organisation and forest planning.
2. Government institutions entrusted with promoting community forestry often ignore indigenous management capabilities. Their authoritarian and unaccommodating behaviour further alienates and undermines local communities. Non-government organisations (NGOs) are sometimes effective in interfacing these two groups.
3. Bureaucrats and technicians are not encouraged to take risky decisions and are often unwilling to take innovative steps, because traditional institutions expect conformity to the *status quo* and do not reward innovations. The system

more often is concentrated on penalising failures than rewarding successes.

4. Although the Forest Act of 1993 provides both a solid legal foundation and a badly needed legitimacy to user group forestry, due to the lack of necessary bye-laws, it is not as yet effective. The concept of decentralisation and provisions of the Act should be implemented by the DOF line agencies at the operational level.

Social Lessons

1. Because the local people have been traditionally relying on the surrounding natural resources for their survival, they have a strong incentive to manage these resources sustainably. Hence, success in community forestry may depend on foresters recognising the fact that, given proper opportunities and training, the local people have the knowledge and capacity to manage the forest resources.
2. The function of the DOF staff should be to facilitate rather than merely implement. The operational staff should provide the opportunities and create mechanisms for institution building. Suitably designed organisations can develop the community management potential, thereby leading to not only sustainable management of the forest resources but also to achievement of success in other development activities.
3. To be fair and equitable, due recognition of the place and role of all the community members, including marginal farmers, women, occupational castes, and the poor, is required. In particular, the distribution and utilisation of forest products should be carried out as per the needs and wishes of all the members of the group, especially the women. To achieve this, the operational plan must be prepared with the full participation of the concerned users.
4. Although indigenous social groups can be used as a basis for 'social engineering' and for sustainable community forestry, more innovative approaches are necessary to make these groups more sustainable. For example, according to the Master Plan guidelines, "at least one half

of the members of the users' committees should be women". However, it was found that a fixed quota system led to passive and ineffective participation.

5. Both internal and external socioeconomic and political factors influence the success of UGF. A successful FUG was found to manage both these factors to its best advantage. Early detection of issues that could lead to conflicts was facilitated by increased discussions and regular contacts. Similarly, some FUGs in Palpa were already planning to exploit the market for furniture in the nearby town.

Technological Lessons

1. Since forests have multiple uses for multiple users, appropriate silvicultural and management technologies must be developed to promote integrated management. In particular, the users must understand the biophysical conditions of the forest, tradeoffs between different products, and their preference and needs. The management prescriptions should be detailed so that the users can implement them successfully with minimum training.
2. Forestry activities must be planned as an integral component of the total agro-ecosystem. Both the socioeconomic and environmental needs must be identified and solutions should be planned to improve linkages between forestry and other components of the system, with the major objective of enhancing the system's productivity.
3. Community resource problems demand multi-disciplinary solutions. However, forestry professionals often provide single sector solutions and/or single-objective technology. The DOF must plan CF activities based on the principle of integrated resource management. 'Food chain' forestry is one example in which trees are integrated with aquaculture, pisciculture, and pig farming.
4. The silvicultural prescriptions included in the operational plans are often incompatible with the expertise and

understanding of the UGC members. User group forestry should address this issue carefully. Rangers have an important role to play in providing technical support.

Economic Lessons

1. While a full-scale, cost-benefit analysis of the UGF projects in the study area was beyond the scope of this study, preliminary assessment indicates that the activities are efficient and cost-effective. One of the best indicators of the economic condition is 'user satisfaction'. Since the majority of the user members consulted were satisfied with the tangible and intangible returns they were receiving from the investment of their human resources, it can be concluded that the cost of mobilising the otherwise idle manpower is far less than the benefits.
2. In terms of quantitative analysis also, the community-planned, implemented, and managed reforestation projects were reported to cost ten times less than the centrally-managed plantations. The figures given by Baral (1993) were Rs 14,159.4/ha and Rs 1,490.6/ha for traditional and community-managed plantations respectively.

Emerging Issues

1. Although rural communities are undergoing rapid transformation in their attitudes and perceptions, there is still a need to recognise and remove sociocultural and religious inhibitions that hinder the development of improved technologies and quick adoption of new technologies. Some examples that are directly relevant to alternative energy use and forest protection are use of human waste to produce biogas, keeping small herds of livestock, switching to pork meat from goat, etc.
2. Forestry institutions, apart from investing in forest resource development, should also invest in human resource improvement and management. Part of the capital from forest resources should be re-invested in education and training of the rural population. Non-

government organisations (NGOs), including international NGOs, have to play a greater role in the sustainable development and management of both human and natural resources.

3. Forest resources have been consistently undervalued and forest products have been priced in an inappropriate manner. In particular, non-timber products, such as herbs, mushrooms, fodder, and recreational services, are grossly underpriced or not priced at all. Even fuelwood and poles in the community-managed forests are not valued properly. This creates distortions in the system and resource degradation continues. Improved valuation techniques or non-market valuation methods should be developed and/or refined to suit the existing needs. Undervaluation of forest resources leads to misallocation and inefficiency.
4. The lessons learned from Palpa and Phewa can be treated as windows through which the future of UGF in Nepal can be looked at critically. While the picture may appear somewhat rosy, this should by no means mask the great challenges that lie ahead in order to develop a truly sustainable community forestry system. An indisputable criterion for the success of UGF is the availability of a minimum proportion of resources in the resource base. This figure, in our judgement, is between two to three ha of forest for each HH.
5. Social variables continue to play a major role. But since rural society is transforming rapidly, the attributes of sustainable resource management may also change. Proper cognisance of this 'social dynamism' is critical.

Recommendations

Future Direction of CF

1. The central message that emerges from this study is that the lessons learned from UG forestry in Nepal provide the potential to build a strong foundation for sustainable

management of community forests in the region. It is not that the people have finally realised that the forests provide multiple benefits for them, and, therefore, they need to be used rationally. It is the government bureaucracy as well as the policy-makers who have come to the conclusion that their attempts to own resources beyond their control were basically flawed. It is in this context that the new approach to community forestry activities in Palpa and watershed management (WM) programmes in Phewa, that are primarily based on the 'multiple use and multiple user' concepts, should be sustained through greater support from the donor agencies and HMG/N. It is recommended that the resource management, information gathering, and planning capacities of the district-level staff should be improved through training and workshops. The sustainable programmes on productive forestry activities should be continued in the study region.

2. The study confirmed earlier reports regarding the people's preference for broad-leaved multipurpose tree species over pine and other timber species. Highly productive agroforestry species should be planted both on private farms and in forests. In order to make UGF truly people-oriented, UGF programmes should be primarily focussed on satisfying the people's preferences and needs. It is recommended that high-yielding fodder, fuelwood, and fruit trees should be distributed for plantation on private lands and multipurpose tree species (MPTS) should be planted on common lands. Secondary forest growth should be promoted in the natural forests by combining natural regeneration and enrichment plantations.
3. The study also revealed that perhaps the most important, but hitherto unrecognised benefit, of community forestry and watershed projects is improving the local people's knowledge, perceptions, and attitudes. It is recommended that UGF should continue to implement programmes in which both biophysical and socioeconomic activities are included. Specifically, the projects should strengthen the existing institutions and build new organisations that are more effective in mobilising the human resources for improved forest management.

Training of User Members

4. Training was found to be the most effective CF component in increasing awareness, knowledge, participation, and improving the perceptions of the people. However, the existing training programmes were disorganised, centrally-planned, and poorly-programmed. It is recommended that the training and cross-visit components of CF should be strengthened by improving the planning and evaluation capacities of the District Forest offices.
5. It was also found that the selection criteria for training participants could be improved if some need- and job-based criteria were established. Some of the proposed criteria are leadership potential, willingness to train other members, past history of regularly participating in UGF activities, and motivation to work for the community. It is recommended that need- and job-based criteria should be employed in selecting training participants. It was also concluded that training should be conducted more intensively and on aspects most relevant to the problems faced by users. The objective of the training should be to train local manpower in production, processing, utilisation, and marketing of forest products.
6. Training activities carried out by the DFO in Palpa and the PTWDP in Phewa were limited both in number and frequency. Most of the training programmes for the project beneficiaries were conducted on a one-time basis. In order to ensure that the active members of the user groups gain a better understanding of the forestry concepts, as well as ensuring that they develop appropriate skills, training programmes should be conducted on a periodic basis. It is recommended that well-planned and organised training programmes on skill development should be conducted for UGF committee members as well as for motivated users. In order to make the training programmes more effective, on-the-spot training classes, as well as the use of training kits, are required.
7. Out of the most commonly-practised training methods, such as field visits, lectures, discussions, and workshops,

practical field work was evaluated as the most effective method of learning forestry techniques. Audiovisuals and result demonstrations were found to be equally effective training aids. It is recommended that practical exercises should be given more emphasis while training forest farmers. More audio-visual materials should be produced to reinforce lectures and discussions.

8. The FUG members in both Palpa and Phewa reported that they lacked information on recent CF legislation; thinning; multiple shoot cutting or singling; plant diseases and their prevention; improving forest productivity; and vegetative propagation techniques. It is recommended that information, extension, and training materials on these topics should be provided and widely distributed to the people in Palpa and Phewa.
9. Husband's advice; radio programme; and professional staff were the most common sources of information for women. It is recommended that selected spouses, village elders, and field staff from the Forest Department should be trained to become more efficient and effective sources of information for women users.

Policy and Legislation

10. The recent enactment of UGF legislation (Nepal Gazette 1993) is a welcome step and augers well for community forestry development in Nepal. However, the Bill has not yet become effective in the absence of relevant bye-laws. It is recommended that the bye-laws should be framed and the Act implemented at the earliest.
11. The current incentive structure related to the handing over process of common forest land management to the UGs promotes management of natural and/or secondary growth. However, for sustainable forest management, reforestation and forest conservation are vital elements. Different incentive schemes, such as free distribution of seeds and seedlings, purchase guarantee of seedlings from private nurseries, and guarantee of 100 per cent revenue from the forests so developed are highly appreciated by the

people. It is recommended that the current incentive scheme launched by the DOF should be continued and institutionalisation planned on the basis of self-reliance and the socioenvironmental sustainability of the users.

12. The major factors that account for passive participation, or even discourage participation, according to the people, are inherent apprehension of the DOF's activities; politicisation of the programme; delayed delivery of assistance; and administrative mismanagement by some of the DOF staff. However, the reasons given by the staff for poor participation are lack of awareness; unfavourable attitude; and high expectations. It is recommended that the DOF staff should be given reorientation training in awareness-raising, extension methods, and communication skills.
13. The benefit-sharing system adopted by the majority of the FUGs is efficient, equitable, and tends to discourage 'free riders'. However, the system appears to have been devised for low-value, bulky products such as fodder and fuelwood. There is a need to modify and improve this system to ensure fair distribution of forest products, such as timber, recreation, high-value herbs, and water, as well in the future. It is recommended that the benefit-sharing system adopted by the FUGs in Palpa and Pokhara should be refined and modified to ensure equitable distribution of all the anticipated forest products.
14. The empowerment of FUGs reflects the recognition by the Government of indigenous management of resources by small but locally-evolved institutions. The structure, as such, is still new and evolving. The functions are leadership- and situation-specific. The performance can be termed to be more accidental and irregular, both spatially and temporally, than probable and predictable. It is recommended that the institutional design and development of FUGs should be refined and modified continuously, based on Common Property Forest Resource Management (CPFRM) principles and practices.
15. The study revealed that the ethnic composition, population density, forest location in relation to community

settlement, and forest conditions influenced the participation level and benefit flow. It is recommended that, while forming UGs, these variables should be considered carefully.

16. The study also found that protection systems requiring volunteers rather than paid guards were more effective in controlling free riders. Social fencing and 'self-restraint' by the users were found to enhance commitment at the local level in protecting common forest resources. It is recommended that more and more FUGs should be encouraged to institute indigenous systems of forest protection such as 'rotation duty' and the '*manapathi* payment' system.

Gender and Tenure Issues

17. In general, the women respondents were found to be motivated to participate in FUG activities. In particular, they demonstrated their strengths in recognising valuable plant species, drawing boundaries, providing historical information, protecting the forests, facilitating community agreements regarding allocation and boundary rules, and representing the weaker section's agenda. It was also found that women as well as men represented the composite household, contrary to the 'conventional wisdom' of women's goals and perceptions being different from those of male members of the HH. It is recommended that the CF programmes should be gender-sensitive, but implementation should be oriented towards addressing the combined HH needs as opposed to 'women's needs' alone.
18. Under the current constitutional laws, the recognised users have tenural rights over the trees only, not over the land they grow on. However, the customary or 'extra-legal' codes ensure both tree and land tenure to the users. For sustainable community forest management, both the constitutional and customary rights regarding usufruct should be well established. It is recommended that the tree and land rights should be guaranteed to the recognised users on a perpetual basis.

Monitoring and Evaluation

19. A carefully designed and implemented monitoring and evaluation system is crucial for the efficient and effective operation of UGF projects. The system should provide continuous feedback to the district/watershed level office on the different activities of the staff. The sub-district/sub-watershed staff should receive and give feedback to and from the FUG committee. It is recommended that a simple but efficient monitoring and evaluation system should be installed or strengthened for both the projects.

Strengthening the District Level Capability

20. It was found that the main prerequisites for the success of CF/UGF were improving awareness and knowledge; training the users as well as the field staff; and increasing participation. The major constraints were ignorance of the CF provisions; limited land for tree plantation; socioeconomic disparity among the users; and the lack of supply of suitable types and sizes of seedling. These prerequisites for and constraints to the success of CF require well-trained field staff and innovative human resource managers. It is recommended that the field staff should be trained in planning, training methods, development and use of training materials, extension programmes, and M&E of all these activities.
21. The future of community forestry in the mid-hills of Nepal depends not only on how quickly secondary growth is established in the natural forests, but, more importantly, on how plantation forests are developed on degraded lands. It is recommended that, apart from promoting successful regeneration of natural forests, innovative and cost-effective reforestation methods and strategies should be developed so that more and more communities are encouraged to participate in reforesting degraded hilly slopes.

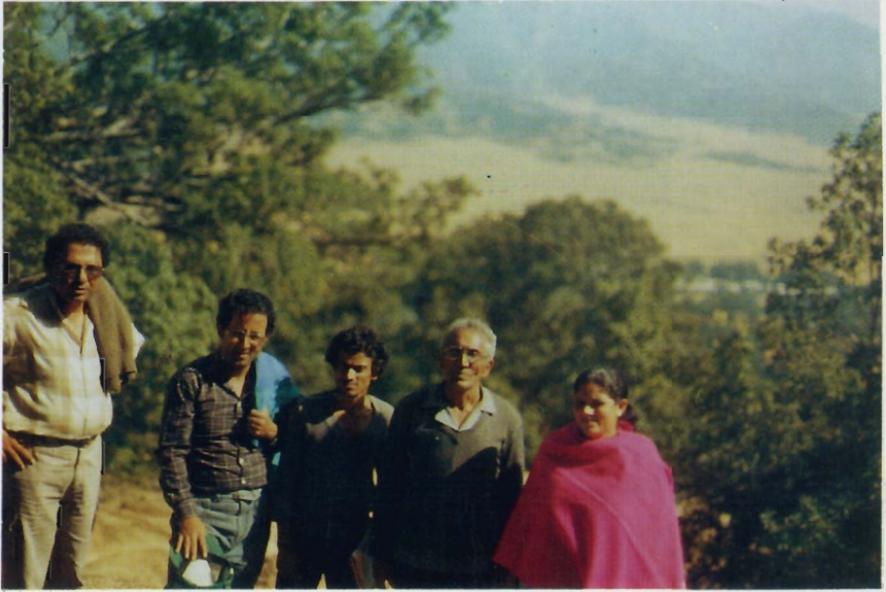


Plate 1: FUG Executive Committee members of Mulgaira village in Madan Pokhara with the researchers



Plate 2: Mr. Ghant P. Aryal, a model leader in the forest managed by the Mulgaira FUG



Plate 3: A View of a User Group Forest in Turung Village, Phewa Watershed



Plate 4: A Well-established Chir Pine Plantation in Sikharadanda, Palpa District

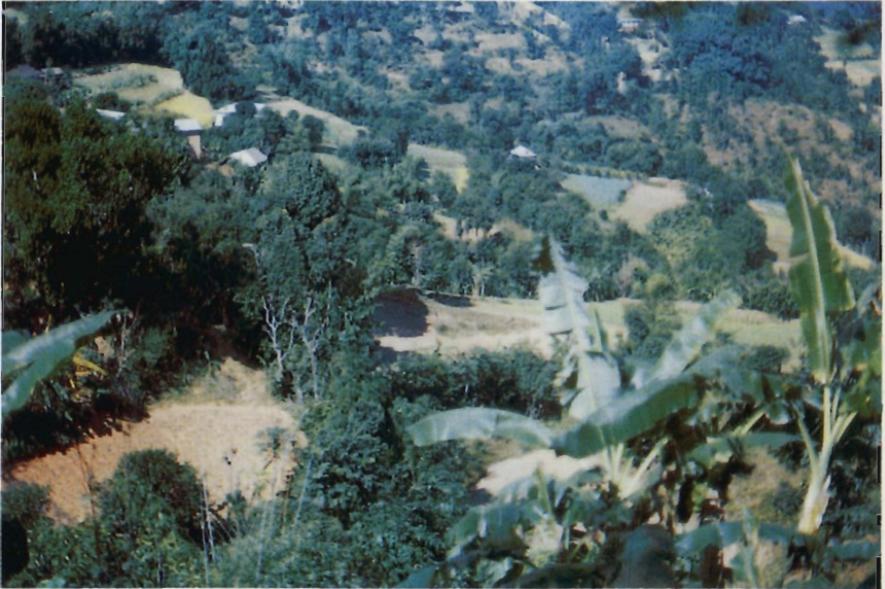


Plate 5: A Complex Agroforestry System Practised by Farmers in Madan Pokhara Village, Palpa.

No.	Species	Number	Area (ha)	Volume (m ³)	Remarks
1	Shorea	1000	10.0	1000	Common
2	Albizia	2000	20.0	2000	Common
3	Acacia	3000	30.0	3000	Common
4	Terminalia	4000	40.0	4000	Common
5	Leucaena	5000	50.0	5000	Common
6	Gliricidia	6000	60.0	6000	Common
7	Calliandra	7000	70.0	7000	Common
8	Leucaena	8000	80.0	8000	Common
9	Gliricidia	9000	90.0	9000	Common
10	Calliandra	10000	100.0	10000	Common
11	Leucaena	11000	110.0	11000	Common
12	Gliricidia	12000	120.0	12000	Common
13	Calliandra	13000	130.0	13000	Common
14	Leucaena	14000	140.0	14000	Common
15	Gliricidia	15000	150.0	15000	Common

ANNEX

Table 1: List of the Forest User Groups Formed by 1992 in Palpa and Pokhara

S. No.	Reference No.	Name of the UG	Location	Forest Type	Area (ha)	Operational Plan (Y/N)	Year Comm. Formed	Current Phase	No. of heralo
PALPA									
1.	046/1	Khumdanda	Chhidipani-2	N	35.0	Y	2046	Implemented	three
2.	046/2	Kalaban	Pokharathok-4	N	9.0	Y	2046	Implemented	-
3.	046/3	Bharkesh	Telgha-1	N	62.0	Y	2046	Suspended	-
4.	046/4	Shikhar danda	Madanpokhara-5	N/P	8.0	Y	2046	Implemented	two
5.	046/5	Raniban	Darchha-7	N	60.0	Y	2046	Implemented	-
6.	046/6	Raniban	Khaliban-1	N	42.04	Y	2046	Implemented	-
7.	046/7	Ramcheban	Rampur-4	N	60.0	Y	2046	Implemented	-
8.	047/1	Raute danda	Tansen-10	N	36.5	Y	2047	Implemented	-
9.	047/2	Sanogairiban	Nayarmuntaly-3	P	4.5	Y	2047	Implemented	-
10.	047/3	Amlabas	Chhahara-5	P	15.0	Y	2047	Implemented	-
11.	047/4	Mulgaira	Madanpokhara-9	N	8.4	Y	2047	Implemented	None
12.	047/5	Khure danda	Palinmandi-7	P	9.6	Y	2047	Implemented	-
13.	047/6	Salleryban	Baughapokra-4	N	22.0	Y	2047	Implemented	-
14.	047/7	Dumrikatuwa	Pokharathok-9	P	8.4	Y	2047	Implemented	-
15.	047/8	Jagdiban	Rampur-1	P	10.0	Y	2047	Implemented	-
16.	048/1	Majhuwa	Hungi-6	N	35.0	Y	2048	Implemented	-
17.	048/2	Dhamabayadi	Humin-9	N	22.0	Y	2048	Implemented	-
18.	048/3	Bandkhola	Madanpokhara-7	N	8.12	Y	2048	Implemented	-
19.	048/4	Dharadipakha	Baughapokri-1	N	19.0	Y	2048	Implemented	-
20.	048/5	Mahajirban	Bhairabsthan-9	N	84.0	Y	2048	Implemented	-
21.	048/6	Bahundanda	Rineraha-3	N	70.4	Y	2048	Implemented	-
22.	048/7	Khairaniban	Khaliban-3	N	17.0	Y	2048	Implemented	-
23.	048/8	Khaltepani	Pipaldanda	N	17.0	Y	2048	Implemented	-
24.	048/9	Musipokhara	Baughagumaba-6	N	17.0	Y	2048	Implemented	-
25.	048/10	Voltar	Gaidakot	N	8.12	Y	2048	Implemented	-
Average					27.52 +/- 23.02				
POKHARA									
1.	1/046	Dopahare	Sarangkot-3,5	P	15.0	Y	2048	Implemented	one
2.	2/048	Turung	Sarangkot-6,7	N	30.0	Y	2048	Implemented	one
3.	3/048	Andheri Khola	Dhikur Pokhari-8	P	40.0	Y	2048	Implemented	one
4.	4/048	Salghari	Tamangi-5	N	21.0	Y	2048	Implemented	one
Average					26.5 +/- 8.5				

Source: Survey Team

Table 2: Average Number of On-farm Trees by Type in the Study Villages (Unit - No./HH)

VDC	Fodder Tree	Fuelwood	Fruit	Total
PALPA				
Mulgaira	48.60	1.4	37.5	87.5
Shikhardanda	30.3	3.8	31.8	66.0
Bharkesh	19.8	3.8	3.2	26.8
Mahajir	45.4	15.8	10.1	70.0
Khumdanda	95.4	39.3	2.6	137.2
Ramche	82.6	0.2	9.4	92.2
Hungi	15.5	7.5	3.7	26.7
PHEWA				
Dopahare	36.5	13.5	4.0	54.0
Turung	12.5	4.6	12.0	29.0
Mean	48.1	10.3	14.0	72.4
Std. Dev.	30.6	13.8	14.5	38.8

Source: Survey Team

Table 3: Fuelwood Requirement by Season in the Study Villages (Tonne/HH/Year)

Village	Summer	Monsoon	Winter	Total
Mulgaira	2.2	2.6	2.9	7.7
Shikhardanda	2.4	2.4	2.4	7.2
Barkesh, Telgha	2.2	2.2	2.3	6.7
Mahajir	2.7	2.7	3.2	8.6
Khumdanda	2.9	2.9	3.0	8.8
Ramche, Rampur	1.8	1.8	1.8	5.4
Hungi	2.4	2.5	2.5	7.4
Dopahare	2.3	2.6	3.1	8.0
Turung	3.3	3.0	4.3	10.6
Average	2.5	2.5	2.8	7.8

Source: Survey Team

Table 4: Fuelwood Supply from Different Sources in the Study Villages (Tonne/HH/yr)

Village	Farmland Trees	Community Plantation	Users' Forest	Government Forest	Market	Crop Residue	Total
PAPLA							
Mulgaira	4.62	0	2.45	0	0.08	0.95	8.1
Shikhar	4.56	0.58	1.20	0	0.15	0.90	6.8
Barkesh	3.46	0	1.46	0.33	0	0.76	6.0
Mahajir	4.56	0	2.71	0	0	1.28	8.6
Khumdanda	3.43	0	4.42	0	0	0.88	8.7
Ramche	2.58	0	0.81	0.80	0.81	0.72	4.9
Majhuwa	2.62	0	4.00	0	0	0.70	7.3
PHEWA							
Dopahare	2.67	2.5	4.6	0.0	0.07	2.2	12.04
Turung	2.30	2.3	5.1	0.0	0.03	2.3	12.03
Total	3.70	0.1	2.43	0.2	0.15	0.88	7.5
Percentage	49.3	1.3	32.4	2.7	2.0	11.7	100.0

Source: Survey Team

Table 5: Fodder Supply by Type of Source as Indicated by the Sampled Respondents of the Study Area (kg DM/HH/Day)

Amount (kg) and Source of Green and Dry fodder Requirement					
Village	Leaf Fodder	Crop Residues	Cut Grasses	Total	kg FM/HH/day
PALPA					
Mulgaira	44.75	11.50	20.00	76.25	81.9
Shikhardanda	30.53	15.27	30.50	76.30	71.6
Barkesh	12.81	23.28	36.67	72.76	83.3
Mahajir	40.51	31.76	53.22	125.03	95.3
Khumdanda	41.36	78.77	31.23	151.49	157.8
Ramche	23.20	50.30	44.86	118.36	108.8
Hungi	35.90	58.00	31.64	125.34	117.7
PHEWA					
Dopahare	18.0	17.5	32.5	68.0	83.0
Turung	15.6	16.4	39.5	71.5	87.2
Mean	32.72	38.41	38.30	106.50	102.3

Source: Survey Team

Table 6: Tree Composition by Species in the UG Forests in Palpa and Phewa

Species	Palpa		Phewa Watershed	
	No. of Spp.	Per cent	No. of spp.	Per cent
<i>Shorea robusta</i>	8290	67.89	--	--
<i>Schima wallichii</i>	880	7.21	13829	11.73
<i>Castanopsis indica</i>	870	7.13	69300	58.79
<i>Alnus nepalensis</i>	--	--	15727	13.34
<i>Pinus roxburghii</i>	850	6.96	--	--
Misc.	1320	10.81	19027	16.14
Total	12210	100.00	117883	100.00

Misc. Spp. include *Siltimbur*, *Ficus*, *Prunus*, *lakuri*, *mayal*, *jamun*, *kaymuno*, *Rhododendron*, *amla*, *phadi*, *bhalayo*, *tiju*, etc

Source: Survey Team

Table 7: Average Estimated Height, DBH, Tree Density, and Biomass of Different Tree Species in the Two Study Sites

FU Group	Av. ht. (m)	Av. dbh. (m)	Stem No. No./ha	Biomass kg/tree	Total bio. (t/ha)	Fuelwood (t/ha)
PALPA						
Mulgaira	9.02	9.42	1950	52.16	101.82	81.46
Shikhardanda	6.42	7.60	1720	51.85	68.36	54.69
Bharkesh	7.30	7.06	1900	56.15	65.11	52.09
Mahajir	16.10	24.60	450	41.30	46.60	37.30
Chidipani	4.90	6.80	1720	37.57	58.20	46.60
Ramche/Rampur	6.74	7.30	2450	53.40	87.20	69.80
Majuwa/Hungi	5.60	5.70	2020	44.90	71.20	57.00
PHEWA WATERSHED						
Turung	6.58	10.65	3235	57.08	184.60	147.68
Dopahare	7.45	21.44	1488	88.00	130.94	104.80

Source: Survey Team

Table 8: Tree Density, Tree Height, DBH, and Estimated Biomass of the User Group Forests in Palpa District

A. MULGAIRA USER GROUP FOREST, MADANPOKHARA

Species	Av. Ht.	Av.DBH	Stem #	Biomass kg/tree	Tot. Bio.t/ha	Fuelwd. t/ha
SORO	4.50	2.50	10	14.61	0.146	0.12
SORO	7.67	7.50	880	39.75	34.98	27.98
SORO	9.29	12.50	460	62.40	28.70	22.96
SORO	10.50	17.50	10	83.92	0.839	0.67
SYOP	9.24	7.50	120	41.64	4.997	4.00
SYOP	11.70	12.50	50	67.11	3.355	2.68
SYOP	12.42	17.50	10	86.22	0.862	0.69
EMOF	7.0	7.50	20	38.85	0.777	0.62
EMOF	8.0	12.50	10	60.11	0.601	0.48
SYCU	9.5	7.50	10	41.94	0.419	0.34
SYCU	10.3	12.50	10	64.04	0.640	0.51
CATR	11.85	7.50	130	44.32	5.762	4.61
CATR	11.97	12.50	190	66.50	12.64	10.11
Bhalayo	7.0	7.50	20	38.50	0.77	0.62
Tiju	12.70	7.50	10	45.10	0.45	0.36
Haderaj	7.50	7.50	10	39.52	0.395	0.32
All Spp.	9.02	9.42	1950	52.16	101.82	81.46

Source: Survey Team

B. MAJHIR USER GROUP FOREST, BHAIRABSTHAN

Species	Av.Ht. (m)	Av.DBH (cm)	Stem No./ha	Biomass kg./tree	Tot.Bio t/ha	Fuelwd t/ha
PIRO	20.12	31.41	340	130.88	44.50	35.60
SIWA	3.20	2.50	50	13.14	0.67	0.54
SIWA	4.80	5.00	30	25.66	0.77	0.62
ROAR	3.00	2.5	10	13.20	0.13	0.10
ROAR	3.40	5.0	20	23.54	0.47	0.38
All Spp	16.1	24.6	450.00	41.3	46.6	37.3

Source: Survey Team

C. SHIKHARDANDA USER GROUP FOREST, MADANPOKHARA

Species	Av. Ht.	Av.DBH	Stem #	Biomass kg/tree	Tot.Bio. t/ha	Fuelwd. t/ha
PIRO	2.50	2.50	10	12.61	0.126	0.10
PIRO	5.30	7.50	60	35.74	2.144	1.72
PIRO	10.40	17.50	40	83.78	3.351	2.68
PIRO	11.20	25.00	50	113.01	5.651	4.52
SORO	3.91	2.50	400	14.15	5.66	4.53
SORO	7.50	7.50	870	40.45	35.192	28.15
SORO	10.20	12.50	80	63.75	5.10	4.08
SIWA	2.62	2.50	10	13.72	0.137	0.11
SIWA	3.71	7.50	100	40.72	4.072	3.28
SIWA	4.17	12.50	80	64.61	5.169	4.14
SIWA	4.48	25.00	20	87.80	1.756	1.40
All Spp.	6.42	7.60	1720	51.85	68.36	54.69

Source: Survey Team

D. BHARKESH USER GROUP FOREST, TELGHA

Species	Av. Ht.	Av.DBH	Stem #	Biomass kg/tree	Tot.Bio. t/ha	Fuelwd. t/ha
SORO	4.50	2.50	580	14.60	0.847	0.68
SORO	7.95	7.50	550	40.48	22.26	17.81
SORO	9.41	17.50	240	62.58	15.02	12.02
SORO	12.60	25.00	10	116.39	1.164	0.93
PIRO	3.23	2.50	70	13.55	0.948	0.76
PIRO	6.92	7.50	120	39.11	4.693	3.75
PIRO	10.05	12.50	90	63.65	5.729	4.58
PIRO	11.15	17.50	60	84.47	5.068	4.05
PIRO	25.22	25.00	10	88.53	0.885	0.71
SIWA	4.25	2.50	20	14.41	0.288	0.23
SIWA	8.56	7.50	80	40.85	3.268	2.61
SIWA	10.32	12.50	50	64.07	3.204	2.56
SIWA	12.26	17.50	20	87.24	1.745	1.40
All Spp.	7.30	7.06	1900	56.15	65.11	52.09

Source: Survey Team

E. MAJUWA USER GROUP FOREST, HUNGI

Species	Av. Ht.	Av.DBH	Stem #	Biomass kg/tree	Tot.Bio. t/ha	Fuelwd. t/ha
SORO	4.25	2.50	220	14.41	3.17	2.54
SORO	5.25	7.50	700	36.14	25.30	20.24
SORO	8.00	12.50	40	60.11	2.40	1.92
SORO	8.15	17.50	40	78.75	3.15	2.52
SIWA	5.00	7.50	40	35.71	1.43	1.14
SIWA	6.50	12.50	100	57.06	0.57	0.46
SIWA	9.40	17.50	20	81.62	1.63	1.30
SIWA	9.25	25.00	40	107.72	4.31	3.45
CATR	4.88	2.50	80	14.91	1.19	0.95
CATR	5.95	7.50	200	37.30	7.46	5.97
MALA	2.00	2.50	20	11.93	0.24	0.19
MALA	4.85	7.50	10	31.41	0.31	0.25
MALA	8.00	12.50	20	40.17	0.80	0.64
Mayal	5.67	7.50	60	36.85	2.21	1.77
Mayal	7.50	12.50	20	59.15	1.18	0.94
Mayal	8.00	17.50	20	78.39	1.57	1.26
LAPA	4.50	2.50	20	14.61	0.29	0.23
LAPA	5.70	7.50	20	36.90	0.74	0.59
TETO	3.0	2.50	40	13.20	0.53	0.42
TETO	5.50	7.50	160	36.57	5.85	4.68
TETO	7.0	12.50	20	58.13	1.16	0.93
SYCU	4.0	2.5	20	14.19	0.28	0.22
SYCU	6.80	7.50	20	38.56	0.77	0.62
SYCU	7.0	12.50	20	58.13	1.16	0.93
SYOP	4.50	7.50	20	34.77	0.70	0.56
SYOP	7.50	17.50	20	77.13	1.54	1.23
All Spp.	5.56	5.65	2020	44.92	71.06	56.85

Source: Survey Team

F. RAMCHE USER GROUP FOREST, RAMPUR

Species	Av. Ht.	Av.DBH	Stem #	Biomass kg/tree	Tot.Bio. t/ha	Fuelwd. t/ha
SORO	4.54	2.50	620	14.28	8.85	7.10
SORO	7.05	7.50	950	38.00	34.00	27.20
SORO	9.10	12.50	250	63.11	3.16	2.53
SORO	11.56	17.50	50	85.96	4.30	3.44
SORO	14.20	25.00	10	119.93	1.20	0.96
SIWA	2.50	2.50	10	12.61	0.13	0.10
SIWA	7.00	7.50	10	38.85	0.39	0.31
SIWA	8.70	12.50	10	55.21	0.55	0.44
SIWA	10.25	17.50	20	83.41	1.67	1.34
SIWA	11.40	25.00	10	98.22	0.98	0.78
MAPH	3.88	2.50	30	14.08	0.42	0.34
MAPH	5.04	7.50	10	31.41	0.31	0.25
MAPH	8.10	12.50	20	60.30	1.21	1.40
MAPH	9.25	17.06	20	81.29	1.63	1.30
SYOP	4.00	2.50	10	14.19	0.14	0.11
SYOP	6.59	7.50	350	38.26	13.39	10.71
SYOP	7.25	12.50	20	58.64	1.17	0.94
All Spp.	6.74	7.30	2450	53.39	87.19	69.75

Source: Survey Team

G. KHUMDANDA USER GROUP FOREST, BHAIKABSTHAN

Species	Av.Ht. m)	Av.DBH (cm)	Stem No./ha	Biomass kg/tree	Tot.Bio t/ha	Fuelwd. t/ha
SORO	3.54	2.50	270	13.76	3.72	2.98
SORO	4.60	7.50	1010	34.97	35.32	28.27
SORO	8.15	12.50	10	60.39	0.604	0.48
SORO	9.04	17.50	20	115.5	2.30	1.84
SORO	10.00	25.00	10	127.26	1.3	1.04
SIWA	4.10	2.50	20	14.28	0.29	0.23
SIWA	5.07	7.50	150	35.83	5.37	4.30
CATR	6.45	2.50	40	15.99	0.64	0.51
CATR	6.72	7.50	220	38.45	8.50	6.80
CATR	4.50	2.50	10	14.61	0.15	0.12
All Spp.	4.90	6.80	1720	37.57	58.19	46.55

Source: Survey Team

Spp. Codes: SORO - *Shorea robusta*; TETO - *Terminalia tomentosa*; SYOP - *Syzygium operculata*; SYCU - *Syzygium cumini*; SIWA - *Schima wallichii*; EMOF - *Emblia officinalis*; RHNE - *Rhamnus nepalensis*; LACO - *Lannea coromandelica*; CATR - *Castanopsis tribuloides*; MALA - *Madhuca latifolia*; MAPH - *Mallotus philippinensis*.

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of Animal Fodder*. APROSC Occasional No. 1. Kathmandu,
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TOPIC INDEX

CHAPTER 1

A

accessibility	1,6
afforestation	4,6
agencies	4
- implementing	4
analysis	2
assessment	8,13
- of sustainability	13
attributes	6,7,13
- biophysical	13
- institutional	13
- socioeconomical	13

B

'basic forestry goods' (BFGs)	3
benefits	10,11,13
- environmental	13
- social	13
biomass	6,8,9
- estimation	9
- productivity	9
- standing	9

C

checklist	9,12
class	13
community	2,3,5
composition	1,4,6
- ethnic	1,4,6
conflict	10
- resolution	10

conservation	2,5,6
constraints	1,6,10
- staff	1,6

D

data collection	5,11,13
- methods	5,7,13
Participatory Rural Appraisal (PRA)	7
Rapid Vegetation Assessment (RVA)	6,7,8
Resource Availability Appraisal	7
decision-making	2,12
Department of Forests (DOF)	2
development work	2
disputes	1,4,6
distribution	4,5,7
District Forest	1,4
- Office (DFO)	4
- Officer (DFO)	1

E

equity	1,6,12
evaluation	1,2,3
extension	5
externalities	13

F

framework	1,2
forest	1,2,3
- guards	1,6
- natural	8,11,12

- plantation	11,12	Management Office	4
- resources	2,3,13	key	4,5,6
fodder	3,5,6	- factors	4,5,6
fuelwood	3,5,6	- indicators	4,5,6
leaf litter	3,5,6		
timber	3,5		
- secondary growth	11,12	L	
- user groups (FUGs)	1,3,6	land use	7
formation	4,9,10	leadership	1,4,6
function	1,4,5	- local	1,4,6
identification	6,10,12	lopping	4
members	3,4,6		
performance	1,2,3		
selection	11	M	
structure	1,2,3	management	1,2,3
forestry	2,3,4	- forest	1,2,3
- community	2,3,4	- system	2,3,4
- user group (UG)	2,3,4	common property-based	
fragmentation	2,4	natural resources	2
- socioeconomic	1,6	- user group (UG)	2,11
		- watershed	2,4,6
G		mechanism	1,4,6
gender	4,13	- distribution	4
growth	6,8,9	- harvesting	4
		- incentive	1,4,6
I		- rule-enforcing	1,6
impact	1,3,4	membership	10,12
informants	10	methodology	1
- key	10	monitoring	5
inputs	5,6		
- project	5,6	O	
interventions	2,6,8	objectives	1,2,4
interview	4,7	observation tours	4
- semi-structured	7	operational plan (OP)	3,4,9
		- formulation	9
K		- implementation	12
Kaski	1,11		
- Pokhara	2,4,6	P	
Phewa Tal Watershed		Palpa	1,3,4
Dev. Programme		participation	1,2,3
(PTWDP)	1,5	personnel	4,6
Phewa Watershed		practices	4,13

pressures	2	- rapid	12
- market	2	- sample	7,9
- population	2	sustainability	1,2,6
projection	9,13		
- demand	13	T	
- supply	13	techniques	8,9
protection	4,6,8	- measurement	8
		- projection	9
Q		extrapolation	9
quadrate	8	regression	9
questionnaire	9,12	tenure	2,3,7
- close-ended	9,12	- land	7,13
- open-ended	9,12	- tree	3,13,14
- structured	12	termination	2,6
		- project	2,6
R		thinning	4
reforestation	1,2,5	training	4,5
regulations	4		
replicability	2,6	U	
research team	8,11	use pattern	5
resource	1,6,7	users	3,10
- availability	1,6,7	utilisation	6,8,12
- consumption	13		
- production	13	V	
- productivity	13	variables	2,3,4
rights	4	- biophysical	2
- violation	4	- dependent	4
role	1,6,9	'effect' factors	4
- of women	1,6,9	'impact' factors	4
rules	4,6,12	- exogenous	13
- trespassing	4	marketing	13
		- independent	4
S		'causal factors'	4
sample plot	8	'indicators'	4
species	4,8	- socioeconomic	3
- composition	8	- sociological	2
stands	12	- socio-psychological (PSVs)	3
stocking	8	vegetation	7,8
survey	4,7,9	composition	8
- formal	12	conditions	8
- historical	7	distribution	8

CHAPTER 2

A

approach	19,20,21
- community	20,21,22
arrangements	17,21,24
- social	17
formal	17
informal	17,24
awareness-raising	25

B

base	15
- institutional	15
benefit-sharing	21,27

C

committees	18,22,27
- <i>panchayat</i> -based	27
protection	27
- Village Development Committees (VDCs)	18,22
community	15,18,22
- forestry development	15,18,22
user group (UG)-centred	15,19
- forestry programme	18,25
composition	17
- caste	17
- ethnic	17
concepts	18,29
condition	17
- structural	17
conflicts	21,25
consensus	15,27
control	17,20,21
cooperation	17

D

decision-making	18,24,27
Department of Forests (DOF)	17,18,23

- line agencies	18
- staff	17,19,23
extension workers	19
law enforcement agents	19
dependence	27
- joint	27
District Forest	19,23
- office (DFO)	19,23
- officer (DFO)	18,22
diversity	15

E

economy	17
- subsistence	17
agriculture	17
enforcement	17,24
evolution	15,16,18
externality	25

F

factionalism	17
factors	16,17,19
- ethnic	16,17
heterogeneity	17
homogeneity	16,17
flexibility	15,27
forest	16,17,18
- common	16,18,24
- community	16,17,19
- degradation	21,24
- national	16,25
- natural	18,23
- products	16,17,19
fodder	21,27
fuelwood	27
timber	27
- <i>Panchayat</i> Protected (PPF)	18
- unprotected	16
- user groups (FUGs)	15,17,18
composition	17
consumers	25
formation	25

function	17,18	L	
managers	25	landholdings	17
members	19,20,24	- private	17
producers	20,25	level	16,19,24
- watchers	17	- department	24
community sanctioned	17	- institutional	24
government funded	17	- ministerial	24
forestry	15	- operational	24
- community	15	- policy	24
user group (UGF)	15		
framework	20,24,25	M	
- schematic	25	management system	15,17,18
performance	25	- forest	15,17,18
situation	25	Common Forest Resource	
structure	25	(CFRM)	22
G		communal	16
gender	16	community plantation	21
grazing	16,17,23	effectiveness	16,17,20
groups	20,22,27	formal	15
- established	27	incorporation of women's	
- organised	27	views	17
- social units	27	indigenous forest manage-	
household	27	ment system	
kinship group	27	(IFMS)	15,16,17
subgroup	27	lonely-net	15
I		resource	21,23,27
identification	15,25	size	16
implementation	21,27	traditional	17
incentives	17	unit	16,17
Institution	21,22,23	user group (UG)	17
- Common Property Resources		- livestock	17
(CPRI)	21,22,23	mechanisms	22
inter-community	17	- institutional	22
- relationships	17	methodologies	27
interventions	22	- CPR	27
- government	22	modalities	27
		- group management	27
		monitoring	27
K			
<i>kipat</i> (communal system of		M	
land tenure)	16	motivation	17

- N**
 new Forest Act 1993 (Nepal Gazette 1993) 19,21
 non-compatible goods 26
- O**
 obstacles 21
 - social 21
 institutional 21
 organisational 21
 - technical 21
 managerial 21
 silvicultural 21
 operational plan 19,22
 overuse 25
 owners 22,24,25
 - common 25
 ownership 17,18,22
 - community 24
 - private tree 17
- P**
panchayat 18,20
 participation 27
 policy 16,18,19
 - public resource 16
 - nationalisation of forests (1957) 16
 practices 15,17,18
 - biologically unsound 15
 - harvesting 17
 production 16,21
 protection 16,18,24
 proximity 17
 - to local markets 17
- R**
 rangers 23
 - Assistant 23
 reforestation 18,27
 regime 21,22,24
- property 21,22,24
 common property regime (CPR) 21,24,26
 open access property regime (OAPR) 21,24
 private 26
 rights 22,24,25
 state property regime (SPR) 21,22,26
 resource 17,23,27
 - accessibility 17
 - availability 17
 - development 23,27
 - improvement 27
 resources 16,17,21
 - biological 16
 - forest 17,21
 rules 15,17,19
 - allocation 15
 - forest protection 24
 - socially sanctioned 17
- S**
 scarcity theory 16
 structure 17,18,25
 - *panchayat* 18
 - sub-structure institutional 15
- T**
 tenure 27
 - group 27
 topologies 16
- U**
 under-investment 25
 users 16,17,18
 - resource 22
 - rights 15,16
 primary 15
 secondary 15
 tertiary 15

V	
variables	16,24,25
- performance	24,25
equity	16,25
transaction costs	25
variation	16
- pattern of	16
exclusion	16
lineage	16
management	16
residence	16

CHAPTER 3

A	
afforestation	31,38
agriculture	32,33,36
- average landholding	32,33,36
- <i>bari</i>	36
- crops	32,35,36
cash	32
food	32,36
- fallow land	36
- horticulture	36
- <i>kharbari</i> (thatch grasses)	36
- <i>khet</i>	32,36
- livestock	31,32,33
- productivity	34
- subsistence	33,34,35

C	
climate	35
- monsoonal	35
- rainfall	29,35
- temperature	29
community	37,38
consumption	33

D	
deficit	32,33,35
Department of Soil and Water	

Conservation	37
District Development	
Secretariat	32
District Forest Office (DFO)	32
- staff	32
F	
forest	31,32,33
- <i>chilaune</i> (<i>Schima wallichii</i>)	31
- community	31,38
- cover	31,35
- deciduous	31,37
- degradation	33
- density	31
- <i>katus</i> (<i>Castanopsis indica</i>)	31
- <i>khote salla</i> (<i>Pinus roxburghii</i>)	31
- <i>laligurans</i> (<i>Rhododendron arboreum</i>)	31
- Panchayat (PF)	31,38
- Panchayat Protected (PPF)	38
- pine	31
- plantations	32
- products	35
fodder	33,34,35
fuelwood	33,34,35
leaf litter	34
timber	34,35
- quality	31,35
- <i>sal</i> (<i>Shorea robusta</i>)	31
- shrubland	31
- subtropical	31
- traditionally managed (communal)	37
<i>Adhikari Ban</i>	37
<i>Kunwar Ban</i>	37
<i>Paudyal Ban</i>	37
- tropical	31
user groups (FUGs)	32,35
vegetation	31,36
forestry	31,32,35
community	31,32
user group	35

- | | | | |
|---------------------------|----------|------------------------|----------|
| G | | - <i>Newar</i> | 29,36 |
| geology | 29,35 | - <i>Tamang</i> | 36 |
| | | - occupational castes | 29,33 |
| | | <i>Damai</i> | 29,33 |
| | | <i>Kami</i> | 29,33 |
| | | <i>Majhi</i> | 29 |
| | | <i>Sarki</i> | 29,33 |
| | | protection | 34,38 |
| I | | R | |
| INGOs | | regeneration | 31 |
| - FAO | 37 | Ridge | 34 |
| - FINNIDA | 33,37 | - Panchase | 34 |
| - GTZ | 31,32 | | |
| - Helvetas | 32 | S | |
| - SATA | 31 | soil conservation | 34,37 |
| - UNDP | 37 | - erosion | 34 |
| | | - sedimentation | 37 |
| L | | - siltation | 34 |
| landform | 35,36 | streams | 35 |
| - alluvial plains | 36 | - <i>Andheri Khola</i> | 35 |
| - fans | 36 | - <i>Harpan Khola</i> | 35 |
| - terraces | 36 | | |
| river | 31 | T | |
| - valleys | 31 | Tinau Watershed | |
| river | 31 | Project (TWP) | 31,32 |
| Lake | 34,35,37 | topography | 29 |
| - Phewa | 34,35,37 | - Mahabharat Range | 29,31,36 |
| | | - Siwaliks | 29,31 |
| M | | W | |
| management system | 35,37,38 | western Nepal | 29,33 |
| - community-based | 35 | - Kaski | 33 |
| - indigenous | 37 | Phewa Tal Watershed | |
| - user group-based | 34,38 | (PTW) | 33,35,37 |
| | | - Palpa | 29,31,32 |
| O | | Tansen | 29,31 |
| ownership | 38 | | |
| | | CHAPTER 4 | |
| P | | A | |
| Palpa Development Project | | access | 51,53,60 |
| (PDP) | 32 | - partial | 53 |
| population | 29,33,34 | | |
| - <i>Brahmin</i> | 29,33,36 | | |
| - <i>Chhetri</i> | 29,36 | | |
| - density | 33,37 | | |
| - <i>Gurung</i> | 33 | | |
| - <i>Magar</i> | 29 | | |

Sustainable Management of Common Forest Resources: An
Evaluation of Selected Forest User Groups in Western Nepal 161

afforestation	41	disputes	45,49
analysis	39	District Forest Office	
attributes	39	(DFO)	41,43,47
- structural	39,46	- staff	41
B		E	
<i>bari</i>	46	evolution	39
<i>bhari</i> (approx. 25kg)	42,48,53	- historical	39
birta system	51		
C		F	
<i>charu</i> (firewood)	57	factors	39,46
committee	39,41,42	- internal	39
- cooperation	60	biophysical	39
- executive	45,47,49	socioeconomic	39
- forest management	39	features	55
- general	45,62	- key	55
- informal	43,47,61	forest	39,41,42
- main	49	- deciduous	60
- <i>Panchayat</i> Forest		- density	60
Protection	39	- development	50,62
- provisional	53	- guard	43,45,50
- school	58	- rotational	44,50
- secondary	49	- natural	45,47,51
- user group (UGC)	41,42	- <i>Panchayat</i> Protected	
common fund	48,53,60	(PPF)	43
compartments	42,45,47	- plantation	41,43,47
composition	41,56,60	- productivity	55,58,62
- ethnic	41,56,60	- products	50,51,59
<i>Brahmin</i>	41,53,56	bedding materials	55,59
<i>Chhetri</i>	47,53,56	composting litter	61
<i>Damai</i>	44	dry branches	59
<i>Gharti</i>	56	floor grasses	59
<i>Kami</i>	44,56	fodder	43,44,45
<i>Magar</i>	56,57	fuelwood	43,44,45
<i>Newar</i>	47,53,56	leaf litter	44,45,47
<i>Sarki</i>	44,56,62	non-timber products	61
consensus	49	thatch grass	59
conservation	41,55,62	timber	41,43,44
control	51,55,58	tree trunks	59
D		- resources	62
development	39	- user groups (FUGs)	39,41,42
- institutional	39	members	39,41,42
		structure	53
		- vegetation	51,54,60

shrubs	47	enrichment plantations	59
- watchers	43	harvesting	43,47,53
forestry	53,58,61	improvement cuttings	59
- community	58	pruning	43,45,47
- <i>Panchayat</i>	53	singling	43,55,59
		thinning	43,45,47
G		P	
<i>guthi</i> (temple trust)	45	Palpa	39,43,46
		- Palpa Development Project	
H		(PDP)	45,51
<i>heralo</i> (forest guard)	43,51,55	penalties	46,48,59
<i>Hom Puja</i> (religious ceremony)	57	- defaulters	62
		- fines	54,62
I		- offenders	42,48,62
issues	46	- violators	54
		Phewa Tal Watershed	57,60,62
L		- Phewa Tal Watershed Dev.	
Lake	57,62	Project (PTWDP)	58,59,60
- Phewa	57,62	plan	39,41,42
<i>lalmohariya</i> (empowered)	51	- management	39,42
leaders	45,46,53	- operational	41,43,44
<i>linga</i> (pole used for religious		<i>pradhan panch</i> (village head)	53
ceremonies)	53	pressure	39,49,57
		- grazing	41,43,48
M		controlled	41,50
management	41,46,47	open access	60
- activities	41,45,46	- population	39,57
- functions	50	practices	41,43,45
- objectives	41,46,47	protection	39,41,43
- process	60	- forest	39,53,57
- user group	57	- water sources	41,42,47
<i>manapathi</i>	43,57	- wild animals	41,59
		- volunteers	43,58
O		R	
operating procedures	41	Range Office	51,53
- meetings	41,49,62	Ranger	39,45,49
operations	43,45,47	reforestation	60
- silvicultural	51	regeneration	60,61
		regulations	41,42,50
		Ridge	57

- Sarangkot	57
River	54
- Kali Gandaki	54
rules	42,46,59
- forest management	59
lottery system	42,44,53
S	
soil conservation	41
- erosion	39,42,50
- floods	55
- landslide	41,42,55
- siltation	58,61
subsistence	44
system	53
- Panchayat	53
survey	46,57,58
- Baseline Socioeconomic	
Sample	46
- cadastral	47,57
- Key-informant	46
T	
techniques	46
- Participatory Rural	
Appraisal (PRA)	46
Tinau Watershed	
Project (TWP)	39,45
tree species	39,49,54
- <i>Alnus nepalensis</i>	57,60,61
- <i>Bauhinia variegata</i>	54
- <i>Bombax ceiba</i>	57
- <i>Castanopsis indica</i>	57
- <i>Ficus glaberrima</i>	61
- fodder	55
- <i>Litsea</i>	61
- <i>Lyonia ovalifolia</i>	57
- pine (<i>Pinus roxburghii</i>)	43,44,47
- <i>Prunus cerasoides</i>	60
- <i>Schima</i>	39,47,51
- <i>Shorea robusta</i>	39,42,43
- <i>Dalbergia sissoo</i>	55
- <i>Syzygium</i>	54
- <i>Terminalia</i>	54,55

U	
users	39,41,42

V	
variables	39,44
- functional	39

W	
waterfall	54
- <i>Simal Chhango</i>	54

CHAPTER 5

A	
agriculture	64,66,67
- average grain yield	66
- average landholding	63,66
- <i>bari</i>	66
- cropping intensity	66
- <i>khet</i>	63,66
- livestock	63,64,66
average number of	
livestock units (LUs)	63
grazing	68,71,72
stall-feeding	68
- <i>pakho</i>	63
- subsistence	66
analysis	63,76
attributes	64,67,69
- biophysical	69
- institutional	69

B	
beneficiaries	63
- target	63
benefit sharing	74
biogas	65,76

- | | | | |
|--|----------|--|----------|
| C | | - deciduous | 77 |
| characteristics | 63 | - guard | 72,75 |
| - socioeconomic | 63 | - inventory | 68 |
| committee | 72,73,74 | average tree density | 68 |
| - executive | 74 | total standing biomass | 68 |
| - FUG management | 72 | - <i>katus</i> (<i>Castanopsis indica</i>) | 68 |
| common funds | 72 | - land | 64,65,66 |
| community | 66,71,72 | availability per HH | 65 |
| compartmentalisation | 72 | per capita | 64,65,66 |
| control | 68,71,76 | - Panchayat Protected (PPF) | 69 |
| | | - plantations | 72 |
| | | conservation-oriented | 72 |
| | | scrub | 68 |
| | | wastelands | 68 |
| D | | - products | 68,74,78 |
| deficit | 65,68 | animal bedding | 68 |
| deforestation | 71,73,76 | farmyard manure | 68 |
| - causes | 71,73,76 | fodder | 65,68,72 |
| construction | 69,73,76 | fuelwood | 65,68,71 |
| fuelwood market | 71,76 | grasses | 72,77 |
| illegal use | 76 | leaf litter | 68,72,74 |
| lack of clear-cut management authority | 76 | non-timber | 76 |
| poor performance of DOF staff | 76 | timber | 68,71,76 |
| population pressure | 76 | - resources | 63,65,71 |
| - consequences | 71 | extent | 63 |
| degradation | 68,76,77 | nature | 63 |
| - land resources | 68 | - <i>sal</i> (<i>Shorea robusta</i>) | 68 |
| disputes | 79 | - user groups (FUGs) | 63,64,66 |
| distribution | 72,74,78 | formation | 69,77 |
| - product | 72,74,78 | function | 63,69 |
| District Forest Office (DFO) | 74,76,77 | members | 63,66,70 |
| Officer (DFO) | 74 | performance | 63,76 |
| | | structure | 63,69,72 |
| | | - user households | 66 |
| | | average family size | 63 |
| E | | forestry | 64,67,69 |
| equity | 63 | - community | 69,72 |
| | | - multiple use | 77,78 |
| F | | - user group | 72 |
| factors | 63,77,78 | concepts | 79 |
| - external | 63 | procedures | 74,79 |
| fencing | 72,73 | | |
| - social | 72,73 | G | |
| forest | 63,64,66 | grazing | 68,71,72 |

H		P	
hypotheses	74	Palpa	63,64,66
- descriptive	74	- Palpa Development Project	
- quantitative	74	(PDP)	69
- working	74	participation	63,77,78
		- local	77
		Phewa Watershed	63,66,67
I		population	63,65,66
incentives	71,76	- <i>Brahmin</i>	66
indicators	78	- economically active	63
- management	78	- Thapa <i>Magar</i>	66
initiatives	69,71,73	practices	72,77,78
- local	71	- broad-leaf based	78
- resource development	71	- multi-storey	78
inputs	63	protection	64,67,69
- external	63		
institutions	71,79	R	
- parallel	79	Ranger	74,76,79
- social	71	reforestation	71,73,77
		regimes	72
M		- harvesting	72
management system	69,72,78	- thinning	72
- forest	72,78	regulations	72
indigenous	69,72,78	requirement	65,68
sustainable	77	- feed	65,68
traditional	72	- fodder	65
- watershed	72	- fuelwood	65
mechanisms	72,77	rules	70,71,72
- enforcement	72	- access	72
- institutional	77	- <i>Panchayat</i> Forest	71
<i>manapathi</i> system	72	- penalty structure	72
O		S	
operational	66,70,73	soil erosion	68
- landholding	66	sources	66,68,76
- plan	66,70,73	- on-farm	76
operations	71,74	- private	76
- selective logging	74	- public	76
- singling	74	- water	68
ownership	71,77	supply	65,68,76
- tree	77	- fodder	68,76
		- fuelwood	68,76
		survey	66,70,73

- sample	66
sustainability	63

T

techniques	66,78
- random sampling	66
test	78
- chi-square	78
Tinau Watershed Project (TWP)	69
trees	65,68,71
- conifers	77
- fodder	65
<i>Artocarpus lakoocha</i>	65
<i>Ficus lacor</i>	65
<i>Ficus semicordata</i>	65
<i>Garuga pinnata</i>	65
- fruit	65
lemons	65
mangoes	65
oranges	65
- fuelwood	65
- <i>Castanopsis</i> sp	65
- <i>Schima wallichii</i>	65
- hardy species	77
- multipurpose	77
tools	74
- statistical	74

U

urbanisation	71
--------------	----

V

variables	63,74,78
- biometric	78
- external	63
- socio-psychological	63
attitudes	63
awareness	63
knowledge	63
skills	63

perceptions	63
- specific	74

CHAPTER 6**A**

access	94,100
analysis	81,89,97
- comparative	81
- gender	89
- sustainability	97
attitude	85,87,88
- free distribution of seedlings	88
- technical capabilities of user group	87
attributes	82,87,91
- employers'	87
- women members	91
age	91
caste	91
economic status	91
education	91
marital status	91
awareness	82,83,85
- assistance	82
- objectives	82,83,84
community forestry project	82
watershed management	82
- role	82,88,89
- rules	82,89,91
forest protection	82
- tools	83
observation	83,85,92
training	83,84,85
B	
beneficiaries	82,83,84
- target	82,83,84
characteristics	82,97
benefits	86,87,96

- perceived 86,87
bhari 95

C

caste 91,96,100
 - *Brahmin* 91,96,100
 - *Chhetri* 91,96,100
 - *Damai* 96
 - *Kami* 96
 - *Magar* 91,96
 - *Newar* 96
 - *Sarki* 96
 causes 82,85
 committee 84,87,90
 - user group forestry
 (UGFC) 84,87,90
 membership 90
 mode of functioning 91
 common fund 97
 community 97,98,100
 - leadership 100
 conflict 88,89,100
 - external 88
 - internal 88
 constraints 87

D

decision-making 88,89,92
 demand 97,98,99
 Department of 87
 - Forests (DOF) 87
 staff 85,86,87
 - Soil Conservation and
 Watershed Management 87
 disputes 97,98
 - absence of 97
 distribution 87,88,96
 - resource 96
 - unequal 87,96
 dynamics 81
 - social system 81
 literacy rate 81,82

resource development
 strategies 82

E

effects 82
 - biophysical 82
 - socio-psychological 82
 equity considerations 81,96
 evaluation 82,84,87
 - criteria 84,89,97

F

factors 84,88,92
 - motivating 92
 forest 81,82,83
 - common 97
 - guard 101
 - plantation 84
 - products 83,85,89
 fodder 83,85,86
 fuelwood 83,84,85
 timber 85,86,95
 - resource conditions 81
 average biomass reserve 81
 average density 81
 per capita forest
 area 81,96
 availability 81,96,97
 - resources 81,96,98
 adequacy of 98
 - size 100
 - type 100
 chilaune 100
 katus 100
 sal 81,100
 - user groups (FUGs) 81,83,87
 effectiveness 81,88,89
 formation 90
 function 88,89
 structure 89
 forestry 82,83,94
 - community 82,83,94
 - user group 83,84,92

H		- socioeconomic	96
<i>heralo</i> (forest guard)	92,93	non-dependence	97
holdings	100		
- <i>khet</i>	100	O	
- private	100	operational plan (OP)	90
homogeneity	97,98	operations	93
- ethnic	97,98	- silvicultural	93
		- harvesting	93,98,101
I		- thinning	93
identification	88,89		
impact	82,84,85	P	
implementation	93	Palpa	81,82,83
"Improved Cookstove Scheme"	87	- Palpa Development Project	
indicators	83,84,97	(PDP)	82,83
- biophysical	97,98	- Tinau Watershed	82
sustained-yield concept	98	participation	81,82,83
- educational status	83	- factors	83,84
- equity	97	group	85
- gender	83	motivation	84,92
women's role	89,90	suitable planting sites	84
- socioeconomic	97,98	training and visits	84
inter-community	100	perception	82,85,86
- relations	100	practices	94,97,98
issues	94,95	- sustainable harvesting	98
- women's	94,95	prerequisites	86
		problems	93,95,96
K		- deforestation	87,96
Kaski	82,86	- shortage of basic necessities	96
- Phewa Tal Watershed Dev.		- soil erosion	96
Project (PTWDP)	82,83	protection	82,83,85
		proximity	100
M		- to local markets	100
management system	97,100		
- government	99	R	
- indigenous forest	97	record-keeping	93
closed to grazing	100	rules	91,97,98
- user	99	- allocation	97,98,100
- watershed	82,83	- boundary	97,98
monitoring	87,93	- conformance	97,98
		- penalty structure	83
N			
needs	86,96	S	
- environmental	96	sanctions	101
		- social	101

self-sufficiency	97	awareness	104
Siwalik Hill	81	knowledge	104,107
sources	99,100	participation	104,105,106
- private	99,100	perception	104
species	81,83,100	skill	104
- appropriate	83		
- preferred	94		
<i>Ficus hispida</i>	94	B	
<i>Ficus semicordata</i>	94	beneficiaries	103,104
litchis	94	- project	103
<i>Litsea monopetala</i>	94	benefits	111
mangoes	94	- economic	111
stall-fed	100	- social	111
supply	85,97,98	biophysical	104
sustainability	81,96,97		
- ecological	97,98		
- socioeconomic	97	C	
		changes	104
U		- qualitative	104
user satisfaction	97	- quantitative	104
		committee	105,110
V		- user group (UGC)	105,110
variables	82,86,96	community	107,108,109
- demography	96	- structure	108
- forest biomass availability	96	type of	108
- patterns of energy use and		composition	104
demand	96,97	- ethnic	104
- specific	82	conservation	109,110,111
traditional supply and		criteria	111
demand analysis	97	- economic	111
		D	
CHAPTER 7		Department of Forests	
A		(DOF)	106,111
afforestation	110	development	103,104,106
agro-ecosystem	103	- institutional	104,106
attributes	104	discussion	103,104
- socio-psychological	104	disputes	106
attitude	104,111	- inter-village	106
		District Forest	106,108,109
		- Office (DFO)	106,108,109
		staff	104,110
		- Officer (DFO)	110,111

E

efficiency	103,111
equity issues	106,111
evaluation	103

F

factors	105
- socioeconomic	105
availability (of alternative forests)	105
development (of alternate energy sources)	105
ethnic homogeneity	105
high literacy rate	104,105
small size (FUGs)	105
successful agriculture	105
fencing	107
- religious	107
forest	103,105,106
- Forest Act 1993	109
- biomass	103
- guards	106
- mid-hill	106,110,111
- national	111
- plantation	104,110,111
exotic species (pine)	104
native species (<i>sal</i>)	104
- policy	103
- products	106,107
fodder	105,107,108
fuelwood	106,107,108
- resources	103,107
common property	107
open access	107
- resource use equation	111
- <i>terai</i>	111
- user groups (FUGs)	104,105,106
function	107
structure	106,108,110
forestry	103,104,105
- community	103,104,109
- <i>Panchayat</i>	103
- user group	103,104,105

G

grazing	107
guarantee	110
- tenurial	110

I

implementation	104,106,108
indicators	107,108
INGOs	
- GTZ	103
- SATA	103
initiatives	110
institutions	109,111
- locally-evolved	109

L

labourers	103
- wage	103
leadership	108
- local	108
level	103,104,109
- district	103
- national	103
- of scarcity	109
- user	104

M

management systems	105
- community	103,106
- decisions	103
- indigenous forest	105
- inputs	104
- watershed	104
Master Plan	111

O

observations	103,104,109
operational plan	105,109,110
- contents	110
operations	110
- harvesting	110

- pruning	110	sustainability	106,111
- thinning	110	syndrome	104
organisation	106	- dependency	104
ownership	105,108,110	- self-reliance	104
- certificate	110		
provisional	110	T	
- land	108	<i>talukdar</i>	108
- tree	108	tenure security	108
P		U	
Palpa district	103,104,105	user	105,106,108
- Palpa Development		- responsibilities	105
Project	103	- rights	105,106,108
- Tinau Watershed		users	111
Project	103,109	- <i>de facto</i>	111
participants	103	- recognisable	111
- sponsored	103	usufruct	106
permits	106		
Phewa Watershed	103,104		
- Phewa Tal Watershed		V	
Development Project	103	variables	104
population pressure	107	- institutional	104
practices	104,109,111	- technical	104
property rights	108		
protection	104,107,109		
provisions	109	CHAPTER 8	
- legal	109		
		A	
R		access	113
Range Office	106	agro-ecosystem	116
rangers	103,109,110	allocation	113,122
- Assistant	110	analysis	116,117
regulations	106,107,109	- cost-benefit	116
role	106,109	- quantitative	117
- Government's	106,109	attitude	113,117,119
rules	104,106,108	awareness-raising	121
- legal action	107		
- monetary penalties	107	B	
- sociocultural sanctions	107	beneficiaries	119
		- project	119
S		benefit flow	121
sources	107	benefit-sharing	121
- alternative	107		
survival rate	111		

C		extension	120,121,123
capability	123		
- district level	123		
- indigenous management	114	F	
committee	115,120,122	factors	115,121
- user group (UGC)	115,120,122	- external	115
members	113,114,115	- internal	115
Common Property Forest		- participation	121
Resource Management		level	121
(CPFRM)	121	- political	115
- practices	121	- socioeconomic	115
- principles	121	fencing	122
community	115	- social	122
- members	115	field work	120
marginal farmers	115	- practical	120
occupational castes	115	forest	113,114,115
poor	115	- guards	112
women	115	- natural	118,123
concepts	118,119	- plantations	117,118
- 'multiple use'	118	community-managed	117
- 'multiple users'	118	enrichment	118
conclusions	113	natural regeneration	118
conflicts	115	traditional	114,117
conservation	113,120	- products	115,119
constraints	123	fodder	117,118,121
contacts	115	fuelwood	117,118,121
criteria	119	marketing	119
- selection	119	movement	113
cross-visit	119	non-timber	117
		processing	119
D		production	113,119
Department of Forests		utilisation	115,119
(DOF)	113,114,115	- secondary	118,120,123
- line agencies	115	- user groups (FUGs)	119
- staff	113,114,115	functions	121
discussions	115,120	members	115,116,120
distribution	115,120,121	performance	121
- equitable	115,121	- uses	113,116
District Forest offices (DFO)	119	forestry	113,114,115
dynamism	118	- community	113,114,115
- social	118	sustainable	115,117
		- conservation	113
E		- 'food chain'	116
evaluation	119,122	- production	113

- protection	113	M	
- user group (UGF)	114,116	management system	115
		- fixed quota	115
H		- forest	113,119,120
household (HH)	122	- integrated resource	116
- composite	122	- productivity	116,120
human resource	116,117,119	- protection	117,122
- improvement	117	' <i>manapathi</i> payment'	122
- management	117	'rotation duty'	122
		volunteers	122
		sustainable resource	118
		Master Plan	115
I		- guidelines	115
implementation	113,122	mechanisms	115
incentive	115,120,121	methods	117,120,121
information	118,120,122	- non-market valuation	117
- sources of	120	mid-hills	123
inhibitions	117	monitoring	122
- religious	117		
- sociocultural	117	N	
international NGOs (INGOs)	117	needs	115,116,117
issues	113,114,117	- environmental	116
- emerging	113,117	- socioeconomic	116
- gender	122	non-government organisations	
- institutional	114	(NGOs)	114,117
		O	
K		operational plans	113,115,116
knowledge	115,119,123	organisation	114
		ownership	114
L		P	
lands	118,123	Palpa	115,117,118
- degraded	123	Phewa	117,118,119
legislation	120	- watershed management	
- UGF (Forest Act 1993)	120	(WM) programmes	118
lessons	113,115,116	perceptions	117,119,122
- economic	113,116	planning	114,115,118
- institutional	113	policy	113,114,120
- policy	113	- pricing	113
- social	113,115	preferences	118
- technological	113,116	prerequisites	123
linkages	116		

R

rangers	113,116
recommendations	113,118
reforestation	117,120,123
regeneration	118,123
resource base	117
rights	114,122
- constitutional	122
- customary	122
- land	114,122
- trees	122

S

'social engineering'	115
solutions	116
- multi-disciplinary	116
species	118
- agroforestry	118
- broad-leaved	118
- multipurpose	118
- pine	118
- timber	118
structure	120
- incentive	120

T

technologies	116,117
- appropriate	116
- management	116
- silvicultural	116
tenure	113,122
- tenurial rights	114
training	120,121,123
- aids	120
audiovisuals	120
result demonstrations	120
- classes	120
on-the-spot	120
- kits	120
- materials	120,123
- methods	120,123

U

users	120,121,122
- recognised	122
'user satisfaction'	116
usufruct	114,122

V

variables	118,121
- social	118

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