



Ministry of Forests & Environment  
Government of Nepal



Arts & Social  
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# Socio-ecological Monitoring Protocol for EnLiFT2



Volume 2020-03

ISSN 2208-0392

**RESEARCH PAPER SERIES** on  
**Agroforestry and Community Forestry in Nepal**

The *Research Paper Series on Agroforestry and Community Forestry in Nepal* is published by “Enhancing livelihoods from improved forest management in Nepal” or the EnLiFT2 Project (<http://enliftnepal.org/>). EnLiFT2 Project (ACIAR FST/2017/037) is the second phase of the EnLiFT (ACIAR Project FST/2011/076) and is funded by the Australian Centre of International Agricultural Research. EnLiFT2 commenced on 2018 and is a collaboration between: University of Adelaide, University of New South Wales, Department of Forests and Soil Conservation, Forest Research and Training Center (Government of Nepal), ForestAction Nepal, Nepal Agroforestry Foundation, and RECOFTC Nepal.

This is a peer-reviewed publication. The publication is based on the research project funded by Australian Centre for International Agricultural Research (ACIAR). Manuscripts are reviewed typically by two or three reviewers. Manuscripts are sometimes subject to an additional review process from a national advisory group of the project. The editors make a decision based on the reviewers' advice, which often involves the invitation to authors to revise the manuscript to address specific concern before final publication.

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ISSN: 2208-0392

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#### Suggested Manuscript Citation

Bardsley, D., Cedamon, E., Gyawali, B., Paudel, N.S., Banjade, M. and Nuberg, I. (2020). Socio-ecological Monitoring Protocol for EnLiFT2, Research Paper Series on Agroforestry and Community Forestry in Nepal, 2020-03:1-31.

#### Our Cover

The Chaubas Sawmill in operation located in Bhumlu Municipality, Kavrepalanchowk District. Shown in the background is small private woodlot of *Pinus patula* and the Chapani Community Forest (mainly *P. patula*) in the far background. Photo by Douglas Bardsley.

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# Socio-ecological Monitoring Protocol for EnLiFT2

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## ACRONYMS

ACIAR	Australian Center for International Agricultural Research
CFUG	Community Forest User Group
EnLiFT2	Enhancing Livelihoods from Improved Forest Management in Nepal
NGO	Non-Governmental Organisation

## EXECUTIVE SUMMARY

The socio-ecological monitoring protocol under Activity 1.3 *Monitoring and assessment of social, economic and ecological and economic impacts of silvicultural practices* outlines the approach that will be undertaken to determine how local Nepali Community Forestry User Group (CFUG) households are valuing and utilising forests for the Australian Center for International Agricultural Research (ACIAR) project, *Enhancing livelihoods from improved forest management in Nepal* (EnLiFT2). Activity 1.3 will inform decision-making on what types of silvicultural systems will best meet local needs and aims to analyse how management activities and governance arrangements could better support sustainable forestry by developing a sophisticated understanding of the complex ways that communities exploit the forest resource. To achieve that goal, the monitoring activity integrates and informs understanding of the four major project domains within EnLiFT2 namely the community forest, private forests, forest industry and natural resource management sectors. An initial large household survey will be followed by two smaller surveys in the third and fifth year. By dividing the three community stakeholder assessments across the five years of the EnLiFT2 project, timely insights of key social, economic and ecological changes or impact trajectories of action research activities will be developed through the social perceptions monitoring protocol.

The large initial survey of 600 household respondents across five sites was developed and implemented in 2019-2020, to generate both quantitative and qualitative socio-ecological data. The questionnaire was developed in a participatory manner across the EnLiFT2 research groups and ForestAction staff and associates in Kathmandu, Nepal. The survey was trialled and was finalised only after feedback from the CFUG households in Banepa. Three CFUG communities were represented in the survey at each of the five sites Bhumlu, Bethanchowk and Banepa in Kavrepalanchok, and Chautaura and Lisankhupakha in Sindhupalchok. The initial random selection of potential household respondents was complemented by purposive stratification of sampling of the district household list to ensure representation of specific key groups relevant to the research aims. The surveys took about 90 minutes and enumerators conducted the interviews directly within CFUG villages. Local Nepali field assistants based at ForestAction facilitated the surveys, coded and transcribed the data, but the data is being analysed by the EnLiFT2 research team in association with ForestAction employees.

The survey data was entered into an *Access* database in the ForestAction Nepal office in Kathmandu. Data cleaning was an important step before data analysis to ensure that the data entered were correctly coded and entered. The survey data has now been finalised into *SPSS* statistical software and the analysis is underway to examine key relationships between responses regarding socio-economic and demographic conditions, environmental and forestry perceptions, and the roles of silviculture, industry and governance. The data were collected quantitatively using stated values, yes/no binary questions and 1-5 Likert scale ratings. The values attributed to the forest will be examined in relation to demographic information, management approaches and questions on how those values contribute to the livelihoods of local people to generate a holistic evaluation of forestry practices in the context of the mid-hills of Nepal. By analysing the data across sites and forest types, the approaches to establishing and managing local forests will be compared, enabling recommendations for future practice.

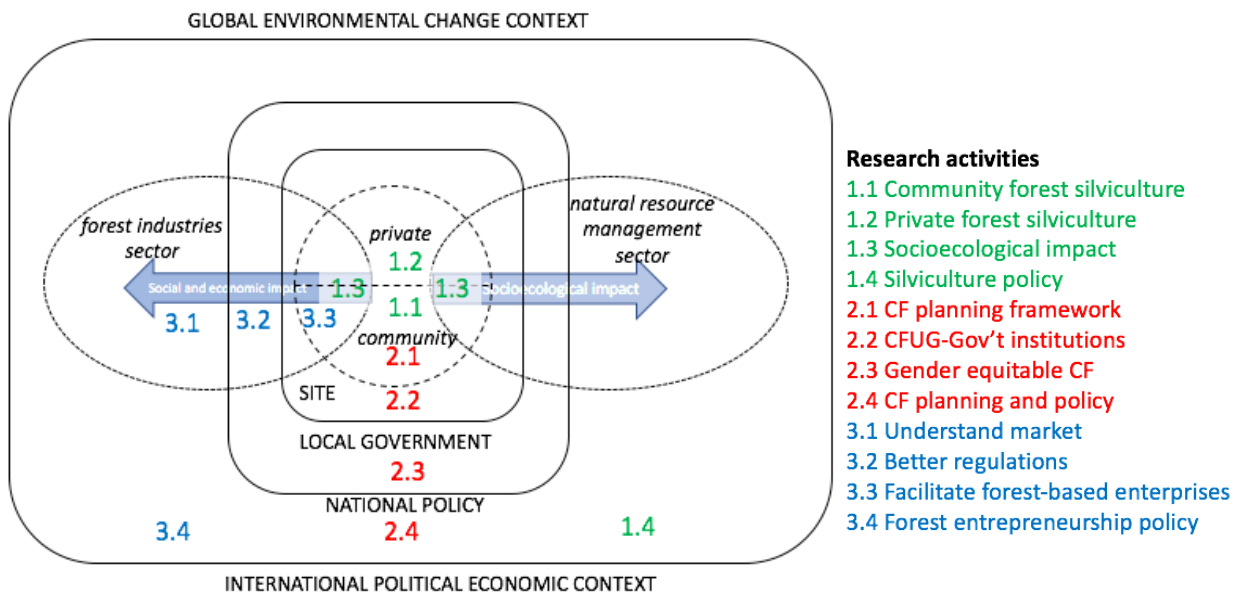
The lessons learned from the large survey will also inform the application of the smaller, follow-up surveys. The data generated provides the opportunity to analyse relationships between forest use and values, socio-economic, environmental, business and governance variables in depth, which in turn will inform discussions on the opportunities for managing the CFUGs and agroforestry systems. There were also noted challenges with the approach linked to translation, trialling and training of Nepali interlocutors, as well as the time and effort required to undertake a complex survey in remote villages. Nevertheless, the survey is providing a unique integration tool for the range of sub-projects across EnLiFT2 and suggests a useful conceptual and practical model for linking otherwise disparate research and applied fields in agroforestry.

## INTRODUCTION

The socio-ecological monitoring protocol under Activity 1.3 *Monitoring and assessment of social, economic and ecological and economic impacts of silvicultural practices* outlines the approach that will be undertaken to determine how local Nepali Community Forestry User Group (CFUG) households are valuing and utilising forests for the ACIAR project, *Enhancing livelihoods from improved forest management in Nepal* (EnLiFT2).

Forests have multiple values in Nepal (Gautam and Devoe 2005; Shrestha and McManus 2008). The complex social interactions with silviculture range from natural resource exploitation for timber and fuel harvesting, hunting and gathering, grazing and fertiliser for agriculture; to water and biodiversity management; mitigation of earthquake, mass earth movement, wildfire and flood hazard risk; through to opportunities for ecotourism. There is a growing conceptual understanding that forest management must account for such multiple values to meet local sustainable development objectives (Levers *et al.* 2014; Innes and Tikina 2016). In fact, if managed effectively, agroforestry can be an important tool for enhancing values for local communities and mitigating potential risks, such as climate change (Aryal *et al.* 2014; Pandey and Bardsley 2015). To achieve a goal of sustainable public and private silviculture, policies and practices can respond to the complex ways that different types of rural households' value and exploit the forest resource to support different local livelihood and risk mitigation objectives (Maharjan *et al.* 2009; Baynes *et al.* 2015).

Activity 1.3 will inform decision-making on what types of silvicultural systems will best meet local needs. Within EnLiFT2, Activity 1.3 aims to analyse how management activities and governance arrangements could better support sustainable forestry by developing a sophisticated understanding of the complex ways that communities exploit the forest resource. To achieve that goal, the monitoring activity integrated and informs understanding of the four major project domains within EnLiFT2 namely community forest, private forests, forest industry and natural resource management sectors (Figure 1).



**Figure 1. A conceptual framework for EnLiFT-2 showing how the 12 research activities operate in 4 domains of interest and 3 nested scales of operation**

Given the range of forest types, silvicultural practices, socio-ecological values and risks attributed to the forest, the monitoring protocol not only provides an opportunity for an analysis of how forests meet the particular needs of different communities, but also how they change over time in association with EnLiFT2 interventions. By dividing the three community stakeholder assessments across the five years of the EnLiFT2 project, timely insights of key social, economic and ecological changes or impact trajectories of action research activities will be developed. As a result, the monitoring protocol will follow a staged process:

1. An initial major socio-ecological survey (Stage 1) will examine the different types of forests and management practices and the range of values that household respondents attribute to Community and Private forests; and,
2. Two follow-up smaller surveys (Stage 2 and Stage 3) will act to monitor how respondents' forest values and opinions of management will change over the period of the EnLiFT2 project.

## APPROACH TO DEVELOPING THE SURVEY QUESTIONNAIRE

The approach to develop the socio-ecological monitoring protocol is following a strongly participatory approach, where input has been requested from all stakeholder researcher groups across EnLiFT2. That approach reflects the importance of the socio-ecological research in providing a network of linkages between the various sub-projects in EnLiFT2. The two-stage process of the socio-ecological study is detailed below.

## Major Baseline Survey

A large survey targeting 600 households was designed to generate quantitative and qualitative data from a translated version of the attached questionnaire working with household heads in target communities. The large initial survey was developed and implemented in 2019-2020, entitled, *Enhancing livelihoods from improved forest management in Nepal - Socio-ecological Questionnaire*. The final survey questionnaire is provided in Annex 1. CFUG households were asked to explain how they use the forest, and describe its values and its management. The results will be analysed to see how technical and policy support could be better targeted to assist individuals and communities to develop successful forest enterprises.

Key steps in developing and implementing the initial major survey included:

- Throughout 2019, a draft questionnaire was developed involving extensive consultation with the different research groups working across EnLiFT2, including those researchers more directly involved with Silviculture, Business and Governance.
- In September 2019, detailed feedback was requested and provided by project partner NGO ForestAction Nepal in association with local Nepali stakeholders and those responses were integrated into the draft questionnaire
- In late September to early October 2019, an extensive week of meetings was conducted with EnLiFT2 researchers, ForestAction staff and associates in Kathmandu, Nepal to critically evaluate and finalise the major questionnaire and develop the sampling procedure (Figure 2). The draft questionnaire was tested internally with ForestAction staff and other local key stakeholders. Responses and concerns were integrated into the questionnaire and the resulting final draft was translated into Nepali. The finalised questionnaire was subsequently tested by ForestAction with CFUG members in Janagal, Banepa, on the fringe of Kathmandu valley. Minor changes were made to the finalised version as a consequence of feedback from the initial household surveys.
- Ethics approval for the research was obtained in October 2019 from the University of Adelaide Human Research Ethics Committee (H-2019-203).
- The Major Baseline Survey began in late October 2019, with a target of 600 respondents during the first stage, equivalent to approximately 120 across the five sites. A database was created with the Microsoft Access program to assist with the translation of results into electronic form.



**Figure 2. The EnLiFT2 Team in September 2019, critically reviewing and finalizing the survey questionnaire prior to field testing**

### **Smaller follow-up monitoring surveys**

Follow-up smaller surveys with targets of 150 households will be undertaken across the five sites in years three and five of the project. Those follow-up monitoring surveys will allow for a longitudinal study of changing attitudes and behaviours in association with project activities and interventions. The same questionnaire used in the large initial household survey (Stage 1) will be used in the follow-up surveys. The expected schedule for the Follow-up Surveys (Stage 2 and 3) involves two further staged surveys:

Stage 2 to be undertaken in Year 2021: 150 respondents = 30 x 5

Stage 3 to be undertaken in Year 2023: 150 respondents = 30 x 5

The follow-up surveys will be undertaken with survey respondents who have indicated a willingness to participate in the ongoing monitoring of the CFUG management activities. At the completion of the initial major survey, respondents were asked if they would be willing to participate in further follow-up smaller monitoring surveys in years 3 and 5 of the EnLiFt-2 project. Those households who agreed will be targeted in follow-up surveys but in cases

where there are insufficient potential household respondents, further recruitment will be undertaken at specific sites. On each of these occasions, 25 households will be recruited from each site. In this manner 150 participants will undertake the surveys in year 3 and again in year 5.

The results from those two follow-up surveys will be analysed both independently and in association with previous surveys. That longitudinal analysis will help to determine if there have been changes over time in relation to a range of parameters and try to explain why such changes might have occurred to better inform both policy and practice.

## **SAMPLING APPROACH AND KEY PARTICIPANT DETAILS**

Participation in the survey was totally voluntary. Initial contact was made with potential respondents within CFUG households via ForestAction Nepal and CFUG leaders, who request that members participate in the survey. CFUG leaders also worked with the survey team to develop the sampling approach and to undertake the latter stratification from the local knowledge of household types, to ensure an adequate representation of minority groups.

The key design and decision-making elements of the survey approach were:

- Surveys were undertaken across five sites with an approximate target of 600 respondents, aiming for equal representations across 5 sites Bhumlu, Bethanchowk and Banepa in Kavrepalanchok, and Chautaura and Lisankhupakha in Sindhupalchok. The typical landscape of the research sites is shown in Figure 3. Although involved in the wider EnLiFT2 project, Sunkoshi was not sampled because no work had been undertaken at the stage of the first survey and we wished to identify and monitor the role of any interventions over the period of the project.
- Three CFUG communities were represented at each of the five sites, with a choice of two communities where EnLiFT2 is working intensively and one community where the project is only providing information and general support.
- In this manner, an idealised sampling design was established where 3 CFUGs x 5 sites x 40 households = 600 respondent households.
- Initially, a random household choice of potential respondents was selected from a household. The goal was to select 60 households from each CFUG (with 20 potential additional households that could be approached for when people were not home or were too busy), but subsequent purposive sampling was undertaken after an initial period to ensure representation.



**Figure 3. Typical landscape in the study sites (Top photo: panoramic view of a village in Banepa municipality; Bottom photo: farm lots and scattered homesteads in a village in Chautara municipality)**

- Purposive stratification of sampling of the district household list was undertaken to ensure representation of specific key groups relevant to the research aims. The sample was checked to ensure representation, triggering saturation sampling to ensure that the mix of respondents included:

- Members with only CFUG forest and CFUG and private forest interests, with 20% at least with only access to CFUG forest.
- Men/women household representatives, with at least 40% representation from both genders.
- Ethnic group representation, the aim where possible was to reflect the balance across the local community with some representation from each of the broad ethnic groups: Brahmin / Chhetri, Janajati, and Dalit.

The protocol was adhered to as closely as practically possible. Importantly, at least 100 respondents were to be obtained from each of the 5 sites, and a broad range of respondents representing the socio-economic, gender and forest interest divisions in the mid-hills of Nepal are represented. However, it is to be noted that the 15 surveyed CFUG sites are only representative of the total of 30 sites across the 3 CFUGs, which in turn are only a representation of the estimated more than a 1000 active CFUGs across Sindhupalchowk and Kavrepalanchowk Districts in Nepal.

The survey took about 90 minutes and enumerators conducted the interviews directly within CFUG villages (Figure 4). Prior to each survey questionnaire being undertaken, an information sheet was hand-delivered by project staff at the initial contact. Illiterate participants were informed by asking a literate member of the household or a close relative to read the information sheet to the potential participant. The sheet contained information about what the project is about, what kind of information was to be collected from participants, how the collected information is stored to be kept confidential, how participants' confidentiality and privacy are going to be protected, and how the research will use the collected information in a limited timeframe in accordance with the regulations and systems of the University of Adelaide. It was recognised that obtaining written formal consent from participants would be difficult, because signing formally on any document is perceived to be sensitive and potentially counter-productive to the research process. Instead, consent from participants for their participation was obtained verbally by project staff before the commencement of each interview. The names of respondents and interviewers, who sought consent, date and the time that the consent was obtained was recorded. A statement on the last page of the information sheet was signed by the researcher or the enumerator stating that he/she believes the consenter understood what the project entails and indicate whether the consent is provided for whole or only selected part of the research



**Figure 4. Researchers conducting field interviews**

## **DATA MANAGEMENT AND ANALYSIS**

### **Data entry**

The survey was completed on March 2020 and was participated by 600 respondents from 18 community forest user groups in five municipalities. Data collected during surveys will be stored securely at ForestAction and the University of Adelaide with access limited to the research team. Local Nepali field assistants based at ForestAction have facilitated the surveys, code and transcribe the data, but the data will be analysed by the EnLiFT2 research team in association with ForestAction employees. Codes were assigned in the

questionnaire for all respondents to de-identify the respondents. Some minor changes were made to the questionnaire by ForestAction staff to ensure that interviews followed a logical process.

The survey data was entered into an Access database in the ForestAction Nepal office in Kathmandu. Three persons were involved in the data entry each serving at different stages of the data entry which runs from January to May 2020. The data entry operator must make calculation or conversion of raw numeric data and translate to English text responses for open-ended questions before data entry. Due to limited capacity of statistical analysis, the survey data was exported to *SPSS* database to facilitate data analysis.

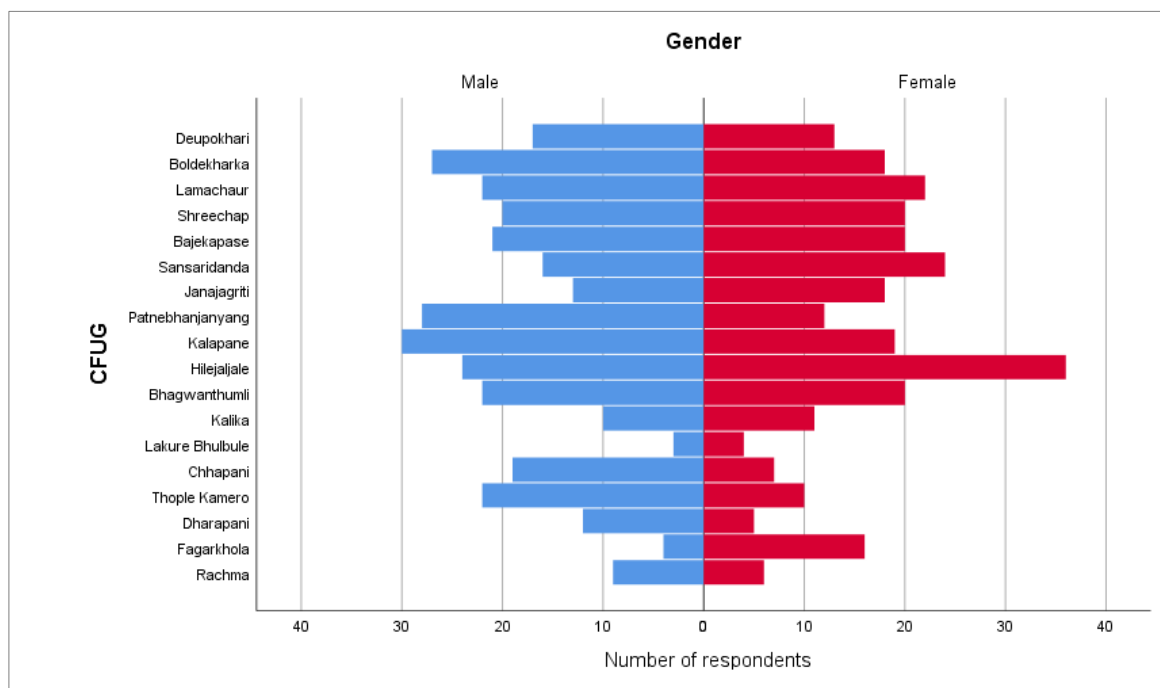
Data cleaning was an important step before data analysis to ensure that the data entered are correct. The first step was to check entries of a random sample of 60 questionnaires from the *SPSS* database. The first stage data check which had taken 3 weeks to complete yielded errors of entries for 90% of respondents in up to 50% of the variables. Most errors are typing errors i.e. wrong values were entered, and although only in few tables, correct values were entered in a wrong data cell of the access database. Because of the expanse errors of data, the project team decided to conduct a thorough data check of all entries of the database. The *SPSS* database was divided into three sub-databases and was given to three project staff including one of the three data entry operators to check data entries. The data check involved checking data entries against the data in the questionnaires and correcting any incorrect data. The data checking and re-entry process has taken for a month for 3 persons.

## **Data analysis**

The survey data has now been finalised into *SPSS* and the analysis is underway to examine key relationships between responses regarding socio-economic and demographic conditions, environmental and forestry perceptions, and the roles of silviculture, industry and governance. Value, socio-economic, management perception and demographic data were collected quantitatively using stated values, yes/no binary questions and 1-5 Likert scale ratings. The values attributed to the forest will be examined in relation to demographic information, management approaches and questions on how those values contribute to the livelihoods of local people to generate a holistic evaluation of forestry practices in the mid-hills of Nepal. By analysing the data across sites and forest types, the approaches to establishing and managing local forests would be compared, enabling recommendations for future practice.

Descriptive statistics, such as frequency distributions and means will be derived for all key demographic variables in the survey and represented in Tables or Graphs. An example of the descriptive statistics being generated is presented in Figures 5 - 7. Perception and values data which in both binary and Likert scale forms will be analysed using non-parametric tests such as Chi-square, Mann-Whitney U and Kruskal-Wallis means test using SPSS Software. For example, Kruskal-Wallis Means test can be conducted to test if importance ratings on forest products or services vary significantly between Caste groups (see Figure 8 and Table 1).

Such relationships will be examined in depth and discussed in relation to the broader opportunities for managing the CFUGs and agroforestry systems. Apart from allowing for important relationships between variables to be highlighted within any time period, this analysis approach will allow for time series analysis, because the same data that will be collected and analysed in the further two rounds of surveys.



**Figure 5. Distribution of respondents by gender and Community Forest User Group**

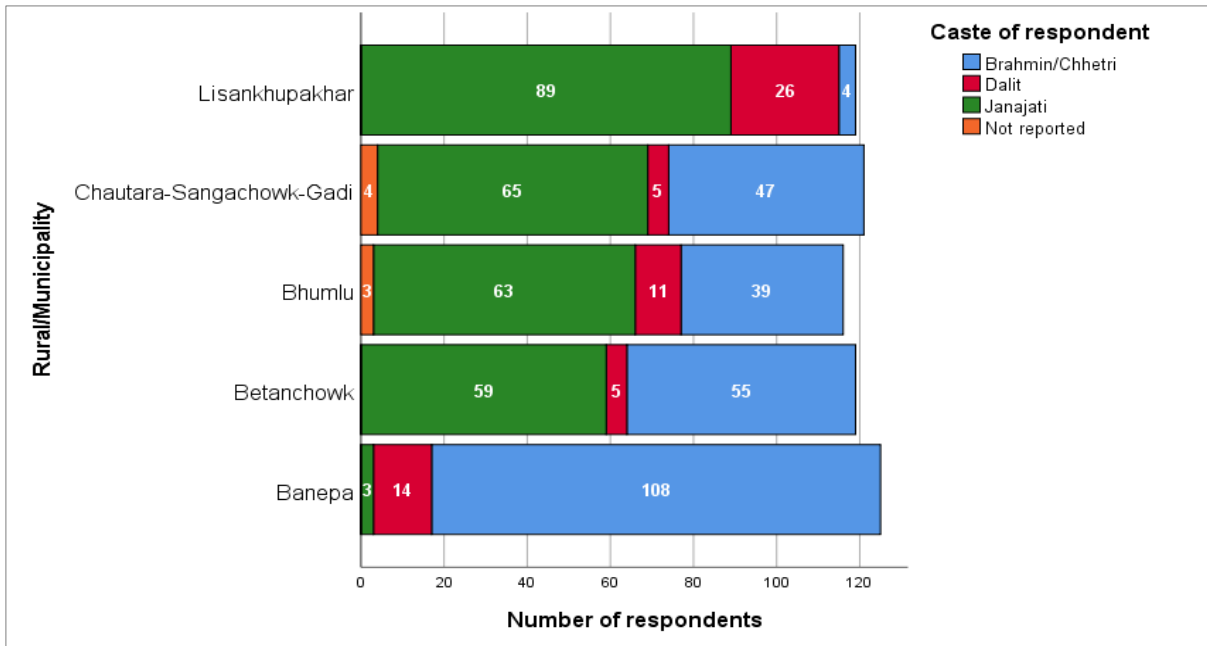


Figure 6. Distribution of respondents by Caste groups

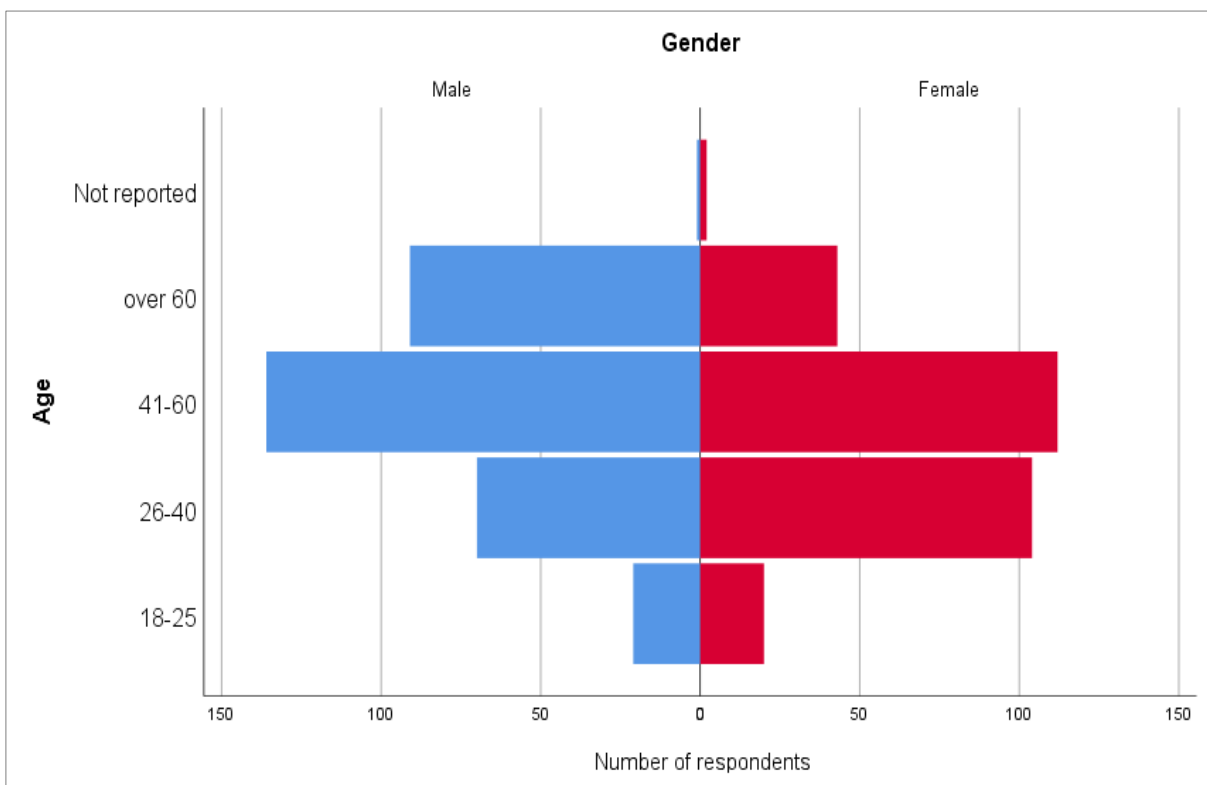
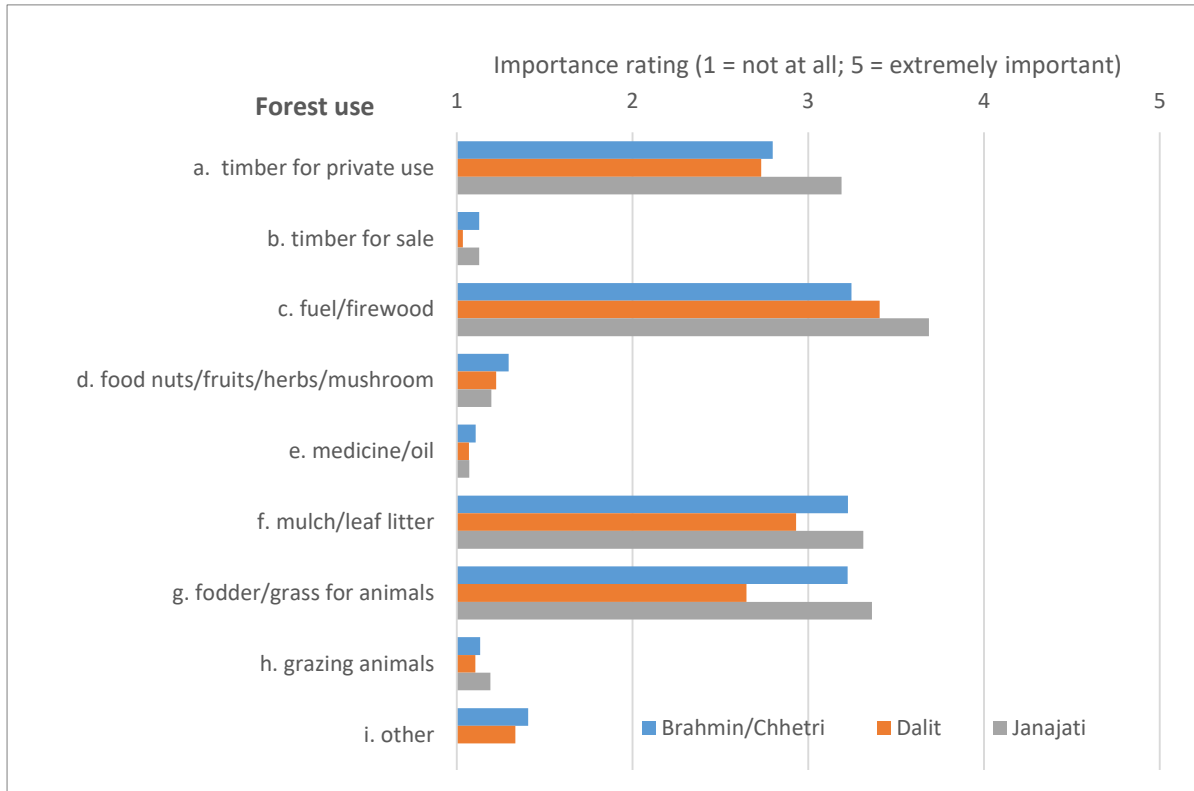


Figure 7. Age group by gender distribution of respondents



**Figure 8. Example of a graph derived from the survey data: Average importance ratings for the value of forest uses by caste group**

**Table 1. Example of a non-parametric test conducted for Likert scale data: Kruskal-Wallis H significant test for various forest uses against caste groups**

Forest use	Kruskal-Wallis H	df	Asymptotic. Significance – p values*
a. timber for private use	15.035	2	0.001
b. timber for sale	2.254	2	0.324
c. fuel/firewood	13.750	2	0.001
d. food nuts/fruits/herbs/mushroom	5.298	2	0.071
e. medicine/oil	0.780	2	0.677
f. mulch/leaf litter	4.585	2	0.101
g. fodder/grass for animals	11.164	2	0.004
h. grazing animals	0.880	2	0.644
i. other	4.971	2	0.083

## **REFLECTIONS ON DEVELOPING AND IMPLEMENTING A SOCIO-ECOLOGICAL SURVEY IN NEPAL**

Part of the process of undertaking the EnLiFT2 socio-ecological research is to learn how such an approach could be implemented effectively. Such holistic research that works in association with all stakeholders to undertake a social learning approach to research and management requires unique forms of interaction and method, which in turn generate particular opportunities and risks. Thus, each interaction, including the development and implementation of the socio-ecological survey itself has important lessons for similar approaches to monitor social and ecological elements of a system and project, which might be implemented in the future. In the shorter term, the lessons learned from the large survey will also inform the application of the smaller, follow-up surveys. Key points that were highlighted by the ForestAction team regarding the survey process include:

### **Lessons from developing a socio-ecological survey for Nepal**

1. Translation from English to Nepali and reverse must be undertaken very carefully because literal translation sometimes distorts the essence of the questionnaire. Even the perception of questions at times differed between respondents and interviewers that could be minimized at most through minute study and training.
2. A pilot trial of the questionnaires in Janagal, Banepa (one of the cluster sites) helped to clarify many interview questions before the final survey.
3. The interviewers were mostly self-trained and conducted the survey using more personal/ academic skills. Project team later realized the need for more intense training.
4. The survey is providing a unique integration tool for the range of sub-projects across EnLiFT2. By generating data across the range of different themes (forestry practices, business development, governance etc.) the survey provides a means of identifying important links within the broader agro-forestry socio-ecosystem.

### **Issues and challenges of implementing a socio-ecological survey in Nepal**

1. The multiple questions included in the questionnaire made the form a bit lengthy. October/ November are a busy time for the yearly harvest. On noticing the bulk of the questionnaire form, some respondents just completed the initial sections. In particular, the Climate Change and Governance were less enthusiastically completed as compared to the initial Forest and Personal sections.
2. High altitude sites such as Lisankhupakhar presented problems of access for interviewers because of remoteness, snowfall and extreme cold in February.

3. Because of the scattered location of households, it took time to identify and reach the respondents to generate an appropriate stratified sample, leading to delays.
4. The interviewers faced some unwillingness from respondents to answer the questions, who expect tangible project-related benefits from their involvement. In particular, some respondents from Bhumlu cluster questioned the utility of the survey and said they were interviewed time and again with no significant benefits – an issue that the EnLiFT2 project is attempting to resolve with its focus on community-based, on-ground work.

## CONCLUSION

Socio-ecological surveys can be used to generate important arguments to support decision-making regarding forest management and governance systems. To make the most of the considerable dataset already available to EnLiFT2, the relationships between forest values and socio-ecological needs will be analysed in relation to the socio-economic and environmental opportunities and vulnerabilities recognised by mid-hills communities in Nepal. That analysis will continue throughout the life of EnLiFT2 with shorter monitoring surveys. The intention is to try and map the better approaches to silviculture within different socio-economic or cultural contexts, or from the perspective of the key values and risks identified. Importantly, such an analysis would also help to frame links and integrate goals between silvicultural practices and other governance regimes including the Nepal's National Strategy for Disaster Risk Management; National Adaptation Programme of Action to climate change; National Biodiversity Strategy and Action Plan; Zero Hunger Challenge National Action Plan, and others or equivalents.

## REFERENCES

- Aryal, A., Brunton, D. and Raubenheimer, D.** 2014. Impact of climate change on human-wildlife-ecosystem interactions in the Trans-Himalaya region of Nepal. *Theoretical and applied climatology*, 115(3-4), pp.517-529.
- Baynes, J., Herbohn, J., Smith, C., Fisher, R. and Bray, D.** 2015. Key factors which influence the success of community forestry in developing countries. *Global Environmental Change*, 35, pp.226-238.
- Gautam, K.H. and Devoe, N.N.** 2005. Ecological and anthropogenic niches of Sal (*Shorea robusta* Gaertn. f.) forest and prospects for multiple-product forest management—a review. *Forestry*, 79(1), pp.81-101.
- Innes, J.L. and Tikina, A.V.** 2016. *Sustainable Forest Management: From Concept to Practice*. Taylor & Francis, London.
- Levers, C., Verkerk, P.J., Müller, D., Verburg, P.H., Butsic, V., Leitão, P.J., Lindner, M. and Kuemmerle, T.** 2014. Drivers of forest harvesting intensity patterns in Europe. *Forest Ecology and Management*, 315, pp.160-172.
- Maharjan, M.R., Dhakal, T.R., Thapa, S.K., Schreckenberger, K. and Luttrell, C.** 2009. Improving the benefits to the poor from community forestry in the Churia region of Nepal. *International Forestry Review*, 11(2), pp.254-267.
- Pandey, R. and Bardsley, D.K.** 2015. Social-ecological vulnerability to climate change in the Nepali Himalaya. *Applied Geography*, 64, pp.74-86.
- Shrestha, K.K. and McManus P.** 2008. The politics of community participation in natural resource management: lessons from community forestry in Nepal. *Australian Forestry*, 71:2, 135-146

## ANNEXES

### Annex 1. EnLiFT2 Socio—ecological Survey Questionnaire

# Enhancing livelihoods from improved forest management in Nepal Socio-ecological Questionnaire

Symbols/ Project info

Introduction: Namaste! We are undertaking research on the use of forests in the middle hills of Nepal. The research is part of a bigger project funded by the Australian government on how forests could be used to enhance livelihoods and food security. We are asking you to provide answers to how your household uses the forest, its values and its management. If you agree, the survey should take about 90 minutes and your answers will be kept confidential. The results will be analysed to see how technical and policy support could be better targeted to assist individuals and communities to develop successful forest enterprises. Thank you for your support.

Don't worry if you cannot answer any question, you can just leave that question and move onto the next one. We don't mind what answers you provide, we just want your honest answers, even if it means no answer.

**A. Survey Information**

Questionnaire no.		Respondent code					
Surveyed by		Date of survey	___ - __ - 20....	Start time:			
				End time:			
District		Rural / Municipality		Ward no.			
Sub-division/Forest Office		What is the CFUG?					
Data entry Operator		Data Entry Completed		Data entry Supervisor		Corrections Completed	

A1. Gender: 1. Male  2. Female  3. Other

A2. What is your age? 1. 18-25  2. 26-40  3. 41-60  4. over 60

A3. What is your Caste or Ethnicity? 1= Brahmin / Chhetri 2 = Janajati 3 = Dalit, 4 = Others (Specify) .....

A4. What is your highest education level? 1. Illiterate  2. Literate without schooling  3. Schooling  4. Further education

A5. Have you been directly involved in EnLift activities to this point? 1. Yes  2. No

**B. Land and forest details**

B1. What kind of closed forest management regimes are your household engaged in?

- a. Community Forestry (CF) 1. Yes  2. No  Approx. Area .....
- b. Forest on Private Land (PF) 1. Yes  2. No  Approx. Area .....
- c. Leasehold Forest - collectively 1. Yes  2. No  Approx. Area .....
- d. Leasehold Forest - individually 1. Yes  2. No  Approx. Area .....
- e. Other Forest ..... 1. Yes  2. No  Approx. Area .....

For Enumerator to say: We will focus our questions on Community forest and Private forest for the remainder of the questionnaire. Please consider any Leasehold forest as part of your managed Community or Private Forest depending on whether they are managed collectively or individually.

B2. What are the four most important types of forest that you manage or use? (eg. Sal, Pine, Schima-castanopsis, Alnus, Quercus, others including mixtures)

- a. Forest type 1 ..... Regime (CF/PF) ..... Approx. Area ..... (Hectare)
- b. Forest type 2 ..... Regime (CF/PF) ..... Approx. Area ..... (Hectare)
- c. Forest type 3 ..... Regime (CF/PF) ..... Approx. Area ..... (Hectare)
- d. Forest type 4 ..... Regime (CF/PF) ..... Approx. Area ..... (Hectare)

B3. What direct benefit of forest products have been most important to your household over the last 5 years?

Use the scale:

1. Not at all	2. Some use	3. Important	4. Very important	5. Extremely important	
Code	Forest Use	Importance of use (1 to 5)	Primary source of forest product (in %)		
			CF	PF	
a.	Timber for private use				
b.	Timber for sale				
c.	Fuel/firewood				
d.	Food nuts, fruits/herbs, mushroom				
e.	Medicines and Oils				
f.	Mulch / leaf litter				
g.	Fodder / grass for animals				
h.	Grazing animals				
i.	Other: .....				

B4. Has your household sold any forest products (timber or non-timber) during the last 5 years?

1. Yes           2. No           3. Unsure

If no or unsure, skip to B7. If yes, continue to B5

B5. Please list the top 5 forest products sold, along with the total volumes/units, price and income generated over the last 5 years?

Code	Forest Product (Timber or Non-Timber)	Quantity	Units (no. of trees, kg, Cft)	Sales price per unit (rupee)	Total income (rupee)
a.					
b.					
c.					
d.					
e.					

B6. For the products listed above, please provide details on who the immediate buyer was (if known), and what final product it went into (if known)?

Code	Forest Product (Timber or non-timber)	Buyer Name (if known) (Business or Person)	How often do you deal with this buyer?	Final Product (if known) (ie. Construction, furniture, plywood, firewood, bricks, essential oil, food etc)
a.				
b.				
c.				
d.				
e.				

B7. Do you believe that there are new forest products that you could successfully exploit? 1. Yes  2. No  3. Unsure

If no or unsure, skip to B9. If yes, continue to B8.

B8. What new products do you think you could exploit and why?

Product	Reason why it is a good opportunity
a. _____	_____
b. _____	_____
c. _____	_____

B9. What are the 3 biggest constraints preventing you from maximizing the commercial benefits from your forest products?

Constraint	Explain why it is an issue
a. _____	_____
b. _____	_____
c. _____	_____

For Enumerator to say: In the next two questions we will identify the most important indirect benefits or major problems your household faces with the forest (use separate tables with respondent).

B10. In your experience, which indirect values generated from the forest are most important to your household?

Use the scale:

1. Not at all	2. Some use	3. Important	4. Very important	5. Extremely important
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B11. In your experience, what problems are generated from the forest and its management?

Use the scale:

1. No problems	2. Some problems	3. Important problems	4. Very important problems	5. Extremely important problems
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B10. Indirect Forest Values

B11. Forest Problems

CD	Forest Use	Importance of the CF (1 -5)	Importance of the PF (1 -5)
a.	Water quantity		
b.	Water quality		
c.	Control landslides / erosion		
d.	Managing storms / floods		
e.	Responding to earthquake		
f.	Managing drier periods		
g.	Supporting food security		
h.	Providing shade/shelter		
i.	Improved biodiversity & habitat		
j.	Conserve carbon dioxide		
k.	Religious/spiritual values		
l.	Tourism and recreation		
m.	Other: .....		

CD	Problem	Problems from the CF (1-5)	Problems from the PF (1-5)
1.	Water quantity		
2.	Water quality		
3.	Increase in landslides / erosion		
4.	Increase in flashfloods		
5.	Less food plants and fungi		
6.	Risk of fire		
7.	More weeds / invasive species		
8.	Wild animal predation		
9.	Crop damage by wild animals		
10.	Decrease in personal safety		
11.	Shading of crops		
12.	Time taken to manage		
13.	Other .....		

B12. How actively is your household involved in different forest-related activities in your Community and Private forest, both currently and 5 years ago?

Use the scale:

1. No involvement	2. Some involvement	3. Important involvement	4. Very important involvement	5. Extremely important involvement
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Code	Forest-related activity	Currently (CF)		Five years ago (CF)		Currently (PF)		Five years ago (CF)	
		1-5	Who undertakes the activity now? M/F/C	1-5	Who undertook the activity? M/F/C	1-5	Who undertakes the activity now? M/F/C	1-5	Who undertook the activity? M/F/C
a.	Change in land use from agriculture to forestry								
b.	Planting of new species								
c.	Fencing								
d.	Pruning								
e.	Clearing unwanted trees								
f.	Weed control								
g.	Insect pest control								
h.	Gully control								
i.	Fertilising / mulching								
j.	Grazing control								
k.	Harvesting timber								
l.	Harvesting of fodder, grass, mulch or leaf-litter								
m.	Harvesting firewood								
n.	Harvesting food and medicines								
o.	Other: .....								

B13. Have you experienced a wildfire in your local forest? 1. Yes  2. No

If yes, have you changed the way you manage the forest in response?

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B14. Do you know what has happened to the cost of managing an area of private forest over the last five years? 1. Yes  2. No  3. Unsure

If no or unsure, skip to B15. If yes, continue to B14.

B15. How has it changed? 1. Decreased a lot  2. Decreased  3. Remained unchanged  4. Increased  5. Increased a lot

B16. In your opinion, has the condition of the forest has changed in the last 10 years? 1. Yes  2. No  3. Unsure

If no or unsure, skip to B18. If yes, continue to B17

B17. What are the three main changes to the forest that you have observed and why do you think that change in condition has occurred?

Change	CF or PF or both	Reason for the change
a.		
b.		
c.		

B18. If you were going to invest more time or resources into forestry, which type would you invest in? 1. Community forest  2. Private forest  3. Both equally

**C. Agricultural and food security issues**

C1. What are the main types of agricultural and grazing land that you own or manage?

Type	Area (Rupani)	What is the main ownership type (Identify as: 1. Privately 2. With extended family 3. Tenant 4. Other)
a. Homestead		
b. Khet (lowland field)		
c. Bari (upland field)		
d. Kharbari (grassland)		
e. Other.....		

C2. What are the major crops or livestock that you currently have on your agricultural and grazing land?

Code	Crop or livestock type	Percent for household consumption (%)	Percent for sale (%)	Percent for sharing with others (%)
a.				
b.				
c.				

C3. How many trees do you have on your agricultural and grazing land? ..... trees

C4. Is the food production from your land sufficient for your household for the entire year?    1. Yes        2. No   

If yes, skip to C7. If no, continue to C5

C5. How many months is your food production sufficient for? \_\_\_\_ months

C6. If you do not produce enough food from your farm, how do you access further food? (please tick more than one answer if applicable)

- 1. Family income
- 2. Social Welfare
- 3. Food-for-work
- 4. Community support
- 5. Forest food
- 6. Debt
- 7. It remains difficult to access sufficient food

C7. Is any area of your farmland left uncultivated? 1. Yes  2. No

If no, skip to C12. If yes, continue to C8

C8. What is the total area of land that is not cultivated: Approx. area ..... (Rupani)

C9. What are the reasons behind not cultivating any crops on that land?

- a.....
- b.....
- c.....

C10. Would you be interested in cultivating forest in those areas currently left uncultivated? 1. Yes  2. No  3. Unsure

C11. What type of trees would you be interested in planting? 1. Timber  2. Fodder  3. Fruit  4. Other.....

C12. Where do you source most of your forest seedlings?  
.....

**D. Demographic and Social Economic Data**

D1. Please provide the number, gender and primary occupational status of your household members: \_\_\_ adults, \_\_\_ children (of below 18 years)

D2. Please identify major employment activities for the adults (including multiple roles):

C D	Gender M / F	Age	Forestry	Agriculture	Self-employed trader or other business	Public Service / Pension	Wage Laborer	Foreign employment / remittances	Housework/ Caring	Elderly / Unemployed / Student	Other
a.											
b.											
c.											
d.											
e.											
f.											
g.											

D3. What is the highest level of education completed by other members of your family?

Code	Highest educational Status by Gender	Illiterate	Literate without schooling	Schooling	Further education
a.	Female				
b.	Male				

D4. What percentage of your household income is sourced from forestry and agriculture?

1. 0-25%     2. 26-50%     3. 51-75%     4. 76-100%

D5. How important to your household livelihood is/are:

	Unimportant		Important		Extremely Important
a. Community forests	1	2	3	4	5
b. Private forests	1	2	3	4	5
c. Grain crop production	1	2	3	4	5
d. Fruit crop production	1	2	3	4	5
e. Livestock production	1	2	3	4	5
f. Trader or business	1	2	3	4	5
g. Salaried/pension	1	2	3	4	5
h. Local wage labour	1	2	3	4	5
i. Remittance income	1	2	3	4	5
j. Other _____	1	2	3	4	5

D6. Has anyone within or your household received government welfare assistance in the last 12 months?    1. Yes     2. No

D7. Does your household own:    1. Mobile phone     2. Computer/laptop/tv     3. A motorbike     4. A tractor/truck/bus     5. A car

D8. What type of fuel does your household use for cooking:    1. Wood/Charcoal     2. Gas     3. Electricity     4. Biogas

D9. What has happened to your household financial status in the last 12 months?    1. Declined     2. Remained unchanged     3. Improved

D10. Do you believe that the quality of life is improving in your village?    1. Yes     2. No

D11. Do you think your children will live in this village in the future? ?    1. Yes     2. No     3. Unsure

D12. How long have you lived in the village? (please tick more than one answer if applicable)

1. Previous generations moved here     2. You moved here for marriage     3. You moved here for other reasons     4. Worked elsewhere & returned

**E. Climate Change Questions**

E1. Have the weather patterns changed in your region from 10 years ago?      1. Yes       2. No       3. Unsure

If no or unsure, skip to E3. If yes, continue to E2

E2. How important are climate change impacts on:

	Unimportant		Important		Extremely Important
a. Your forests?	1	2	3	4	5
b. Your agriculture?	1	2	3	4	5
c. Your water resources?	1	2	3	4	5

E3. How would you rate the importance of climatic impacts in your area over the last 10 years?

CD	Changes	Scale: 1= Unimportant, 3= Important, 5= Extremely Important				
a.	Heat	1	2	3	4	5
b.	Changing rainfall patterns	1	2	3	4	5
c.	Storm damage	1	2	3	4	5
d.	Danger of forest fires	1	2	3	4	5
e.	Flood damage	1	2	3	4	5
f.	Landslide / erosion damage	1	2	3	4	5
g.	Drought impacts	1	2	3	4	5
h.	Changing flowering / fruiting / harvesting seasons	1	2	3	4	5
i.	New exotic plants	1	2	3	4	5
j.	New diseases	1	2	3	4	5
k.	New insect pests	1	2	3	4	5
l.	Other: .....	1	2	3	4	5



F2. In what CFUG activities did you make decisions for or participate in last year and how influential was your input?

CD	CFUG Activities	Yes/No	How much do you feel that your input influenced decisions or actions? Use scale eg. 1=unimportant, 3=important, 5=extremely important
a.	General assemblies		
b.	Executive Committee (EC) meetings		
c.	CFUG planning meetings		
d.	Tolerance meetings		
e.	Operational Plan revision processes		
f.	Making decisions about forest product harvesting & distribution		
g.	Forest patrols / management		
h.	Enforcing fines and penalties		
i.	Arbitrating disputes		
	.....		

F3. Do you know about the operational plan for your community forest?      1. Yes       2. No

If no, skip to F6. If yes, continue to F4.

F4. Are you happy with how operational plans are developed for your community forest?      1. Yes       2. No       3. Unsure

F5. In what areas will your CFUG require assistance to develop your operational plan?

	Unimportant		Important		Extremely
	Important				
a. Financial support	1	2	3	4	5
b. Technical assistance	1	2	3	4	5
c. Knowledge and information about planning	1	2	3	4	5
d. Training in forest management	1	2	3	4	5
e. Development of leadership capacities	1	2	3	4	5
f. Market connections	1	2	3	4	5
g. Other .....	1	2	3	4	5

F6. On a scale from 1 (not inclusive) to 5 (extremely inclusive), how inclusive are CFUG committees (EC and sub-committees)? \_\_\_\_\_

F7. What are the most important changes that you would wish for in the governance of the CFUG?

	Unimportant Important		Important		Extremely
a. Greater focus on conservation	1	2	3	4	5
b. More active use of forest resources/timber for community income	1	2	3	4	5
c. Targeted forest access by women	1	2	3	4	5
d. Targeted forest access by Dalits and the poor	1	2	3	4	5
e. More representation of women and Dalits in leadership roles	1	2	3	4	5
f. More influence of women and Dalits in decision-making	1	2	3	4	5
g. More support to harvest forest products for community benefit	1	2	3	4	5
h. De-politicization of the decision-making process	1	2	3	4	5
i. Closer working relationships with the local government	1	2	3	4	5
j. Other .....	1	2	3	4	5

F8. Are you involved in any institutions apart from the CFUG in your village or elsewhere? 1. Yes  2. No  3. Unsure

If yes, please list the main ones: 1..... 2..... 3.....

We have come to the end of our Questionnaire Survey today with you! Thank you for your time, opinion and input. The information will be very useful for our research and will shape important policies and actions in the future in the area of livelihood and food security from agro-forestry and community forestry. Before we take permission to leave, is there anything that you would like to say regarding the discussions that we have had? Is there anything that we have missed or that you would like to add? If so please feel free to do so.

We are hoping to do some follow-up interviews in later stages of our project. Would you like to be contacted again: Yes  No   
Unsure

If yes, what is your name? ..... Mobile # .....

Thank You!