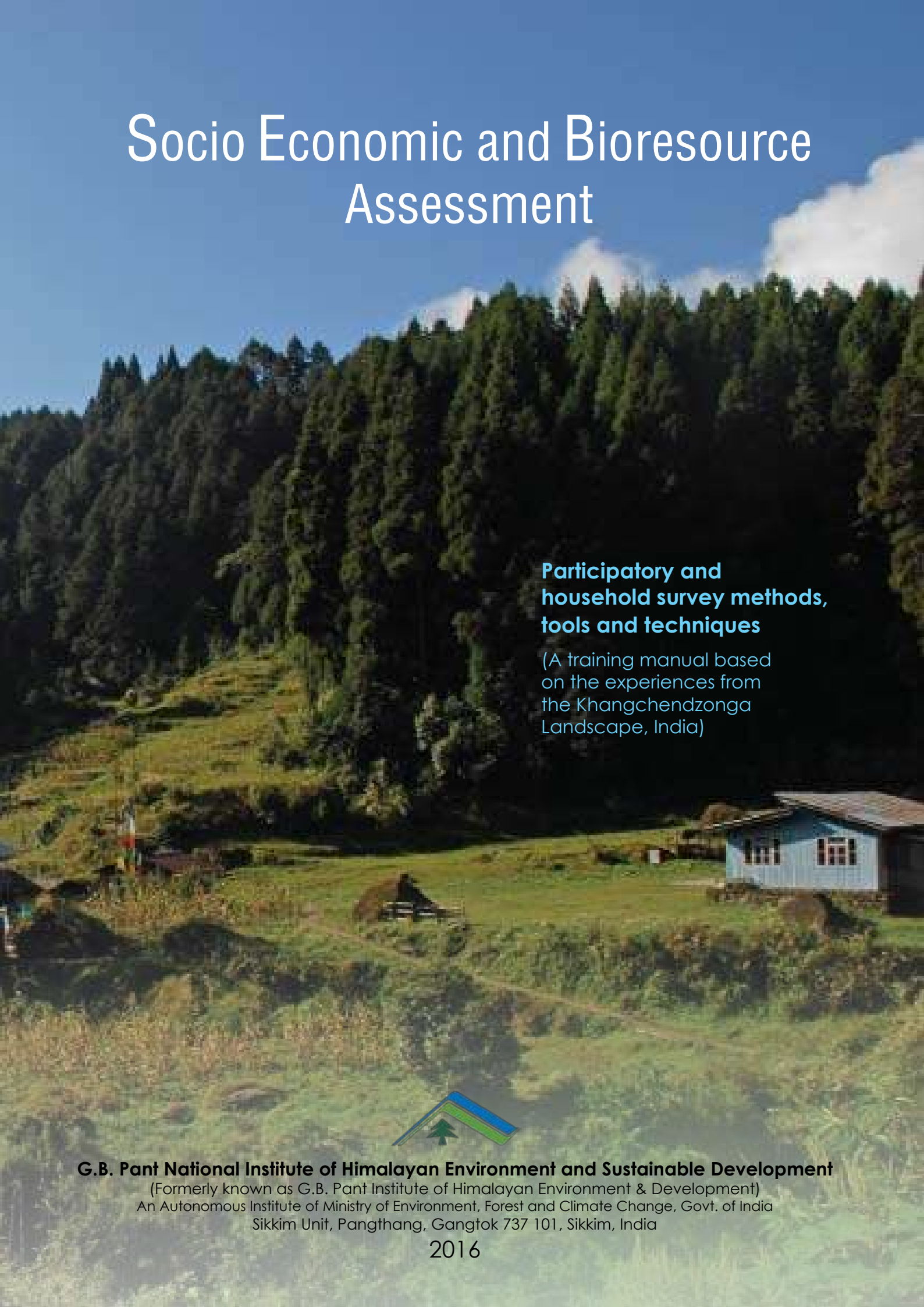
Socio Economic and Bioresource Assessment



Participatory and household survey methods, tools and techniques

(A training manual based on the experiences from the Khangchendzonga Landscape, India)

G.B. Pant National Institute of Himalayan Environment and Sustainable Development
(Formerly known as G.B. Pant Institute of Himalayan Environment & Development)
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Prepared by

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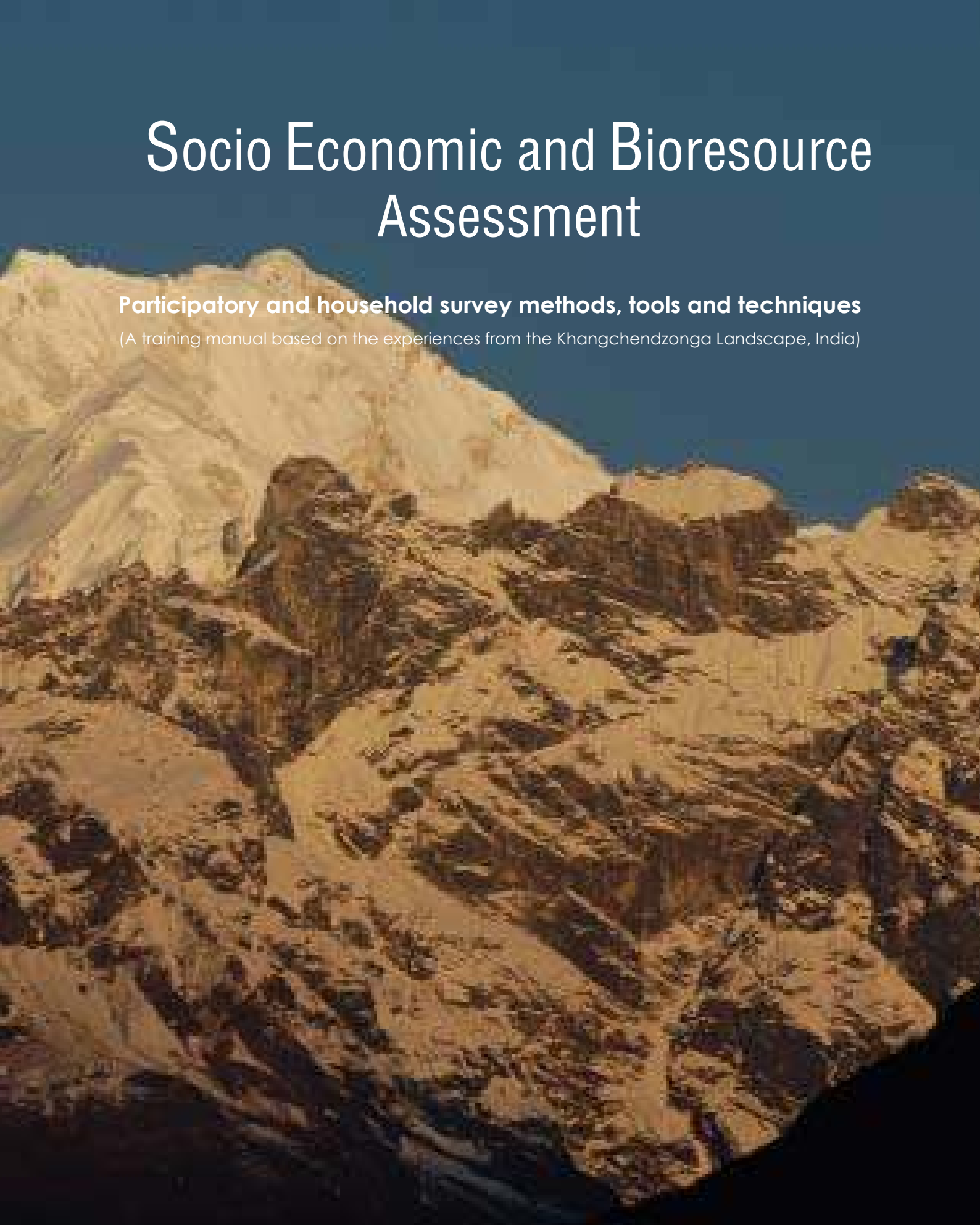

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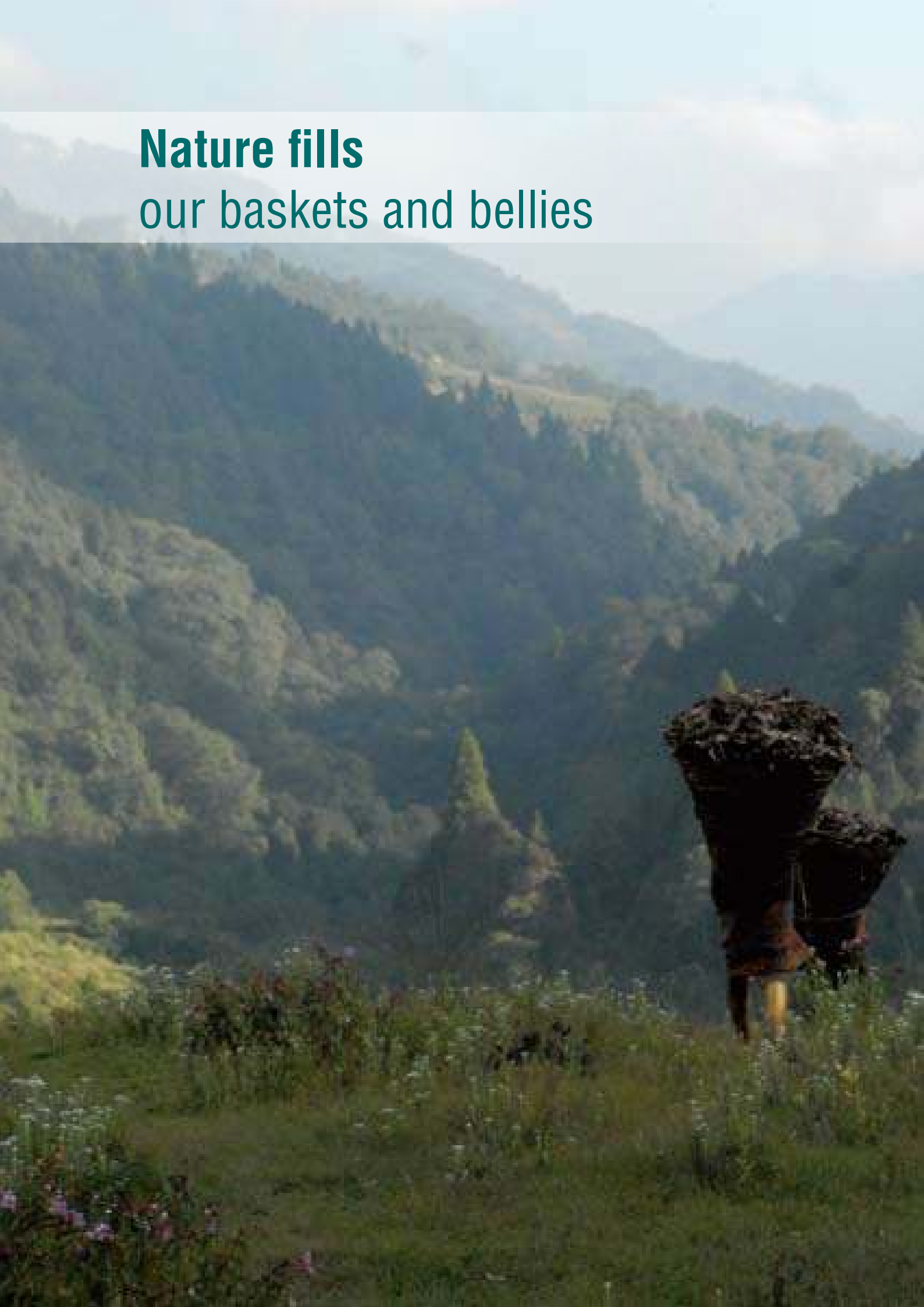
Nature fills
our baskets and bellies

Preface

Khangchendzonga Landscape is one of the seven transboundary landscapes identified by the International Centre for Integrated Mountain Development (ICIMOD), Nepal, involving Bhutan, India and Nepal. As a transboundary approach, "Khangchendzonga Landscape Conservation and Development Initiatives (KLCDI)" programme has been identified and initiated in India initially through a letter of agreement (LoA) between the GBPNIHESD (formerly GBPIHED), India and ICIMOD, in November 2013, for starting up a preparatory phase, under the guidance of the Ministry of Environment, Forest and Climate Change, Government of India. The programme had overarching purpose to develop Regional Cooperation Framework (RCF), Feasibility Assessment Report (FAR), Conservation and Development Strategy (CDS), and Implementation Plan (IP) at regional level for the Khangchendzonga landscape (KL). The preparatory phase was highly productive, which also delineated Indian part of Khangchendzonga Landscape covering Sikkim state and north part of West Bengal (Darjeeling, Alipurdur and Jalpaiguri districts) for a spatial area of 14,061.7 km^2 spreads along 40 m asl foothills of West Bengal to 8586 m asl of Mt. Khangchendzonga, in Sikkim. The KL is part of one of the global biodiversity hotspots, which is further highlighted with its 16 protected areas, including recently inscribed UNESCO's world heritage site under mixed category of nature and culture, the Khangchendzonga National Park (Sikkim). The preparatory phase was extended, seeking for the actual implementation of the programme KLCDI in India under the broad vision as "The Khangchendzonga landscape represents the biological, social and cultural entities, which continue to be celebrated by the community living in the landscape through equitable access and conservation of natural resources". The vision directed to set the goal of conservation and development strategy for KL India is supported by the International Centre for Integrated Mountain Development (ICIMOD). On behalf of GBPNIHESD, the programme has been executed by GBPNIHESD, Sikkim unit by involving two Government agencies as national partner namely Forest, Environment and Wildlife Management Department (FEWMD), Government of Sikkim and Directorate of Forest (DoF), Government of West Bengal. There has been involvement of other organizations and NGOs.
In June 2015, an addendum to LoA was signed (progressed till August 2016) by GBPNIHESD-India and ICIMOD-Nepal for three major deliverables as outputs. These include generating the baseline data on vegetation and on socioeconomic status and developing bioresource management plans for three identified pilot sites. One of the objectives of these deliverables has been the preparation of a training manual on socio-economic and bioresource management assessment, especially following participatory approaches and household survey methods. These deliverables are vital and form baseline for actual implementation of the comprehensive and long-term implementation programme on conservation and development of KL India.

This manual, "Socio Economic and Bioresource Assessment: Participatory and household survey methods, tools and techniques" (A training manual based on the experiences from the Khangchendzonga Landscape, India), not only includes the socio-economic and bioresource evaluation tools but also emphasizes their application especially in the context of transboundary landscapes in KL as well as elsewhere in the world. This manual will help inform, inspire and stimulate ideas to develop one's existing approaches to evaluate socio-economic status of an identified site or village by understanding various bio-cultural and socio-economic linkages that influence the livelihood scenario. It is hoped that it will provide the practitioners and associated stakeholders a stepping stone to guide in a practical way – where to find help, advice, training, products and services. Using the learning from the actual field-based case studies primarily generated from the Khangchendzonga Landscape, India, the manual is expected to become more or less comprehensive and easy to implement guiding source to field based researchers, land area management personnel and NGOs, etc. However, this publication is not designed for the comprehensive collection of information which touches all the subjects or topics one knows, but it focuses more on participatory approaches and field methodologies for household surveys on the theme identified here, which may be utilized in wider context. I feel this publication would serve as guiding resource to all concerned agencies and individuals.

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We are grateful to the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India (GoI) for the support and guidance and for entrusting the task to the institute as lead agency for implementing the Khangchendzonga Landscape Conservation and Development Initiative (KLCDI) programme in India.

We thank Dr David J. Molden, Director General, International Centre for Integrated Mountain Development (ICIMOD), Nepal for providing the financial support to execute KLCDI programme in India, and for publishing this manual under an addendum to Letter of Agreement of preparatory phase. Our appreciation goes to Dr Eklabya Sharma (Director Programme Operations) at ICIMOD, Nepal, who has been very motivating and a guiding force behind the success of KLCDI programme in India. The role of Dr N. Chettri (programme coordinator KLCDI at ICIMOD) has been very supportive to the KLCDI programme in India throughout the course. We appreciate the encouragement we received from Shri B.M.S. Rathore, Chief Policy Advisor, ICIMOD. We thanks Mr K. Phunstsho, Dr K. Gurung, Mr K. Aryal and Ms J. Gurung (ICIMOD), for their inputs during the PRA studies/validation in pilot sites are suitably acknowledged.

We highly appreciate the support and cooperation of the Forest, Environment and Wildlife Management Department (FEWMD), Government of Sikkim and Directorate of Forest (DoF), Government of West Bengal to KLCDI programme in India. We thank Dr Thomas Chandy, IFS (Principal Secretary cum PCCF), FEWMD, Government of Sikkim for his constant encouragement and support to KLCDI programme. The nodal persons for KLCDI India from both the state forest departments, Dr PT Bhutia (Add PCCF-Wildlife North, DoF, Government of West Bengal) and Shri CS Rao, IFS (CCF and Chief Wildlife Warden, FEWMD, Government of Sikkim) are thanked for their consistent support, cooperation and for providing useful inputs to the on-going programme.

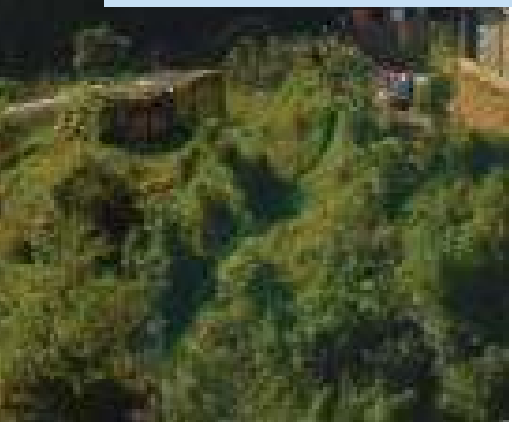
We specially thank Mr. Animesh Bose and team (Himalayan Nature and Adventures Foundation –Siliguri, West Bengal), Dr G. Sharma and team (The Mountain Institute- India, Gangtok), and Mr U.P. Lepcha and team (Mutanchi Lom Aal Shezum, Dzongu, Sikkim) for their cooperation and collaboration in KLCDI, India programme and particularly in jointly organizing the PRAs in respective pilot sites with GBPNIHESD.

The facilitative role of Dr R.S. Rawal (a senior level scientist) at institute headquarters, Kosi-Katarmal in various matters supporting the successful campaign of KLCDI (India) is highly acknowledged and thanked. Supportive role of Mr Bijoy Chettri (Sr Project Fellow) and Mr Prem Chettri (former Jr Project Fellow) at Sikkim unit during field expeditions and PRA exercises in the different sites of KL-India is greatly valued. We also thank cooperation of Mr Alexander R. O'Neill (former Fulbright Nehru Fellow) and Ms G. Tariyal (former researcher). We fully admire the secretarial assistance and data entry work and the team spirit of Ms Milan Kumari Rai (project staff KLCDI India) throughout the KLCDI programme in India.

We are highly grateful to local communities of the three pilot sites and other stakeholders for their active participation in PRA studies and consultation workshops under KLCDI-India; their useful inputs are immensely acknowledged.

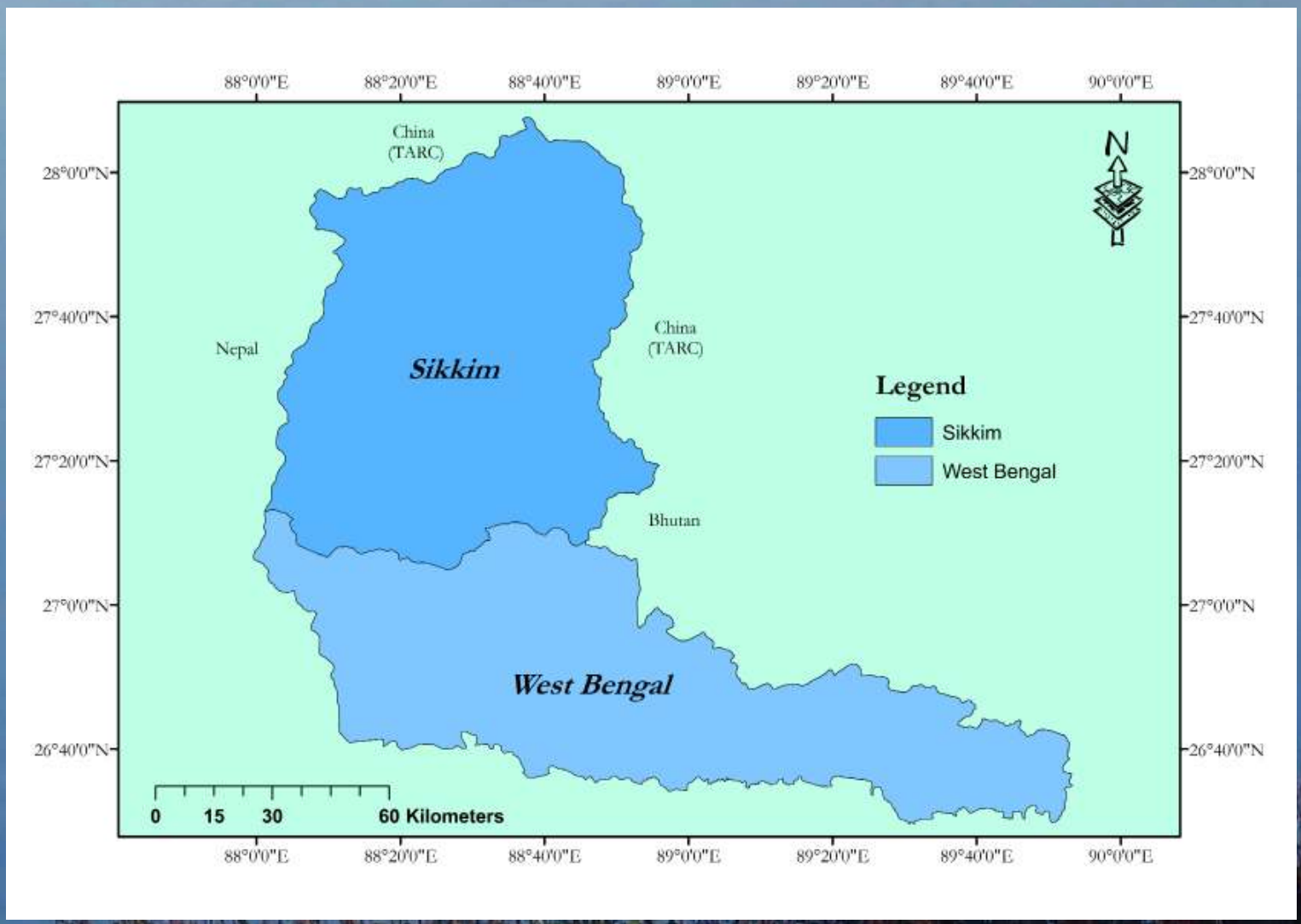
Many persons/organizations have contributed directly or indirectly in generating information for this manual preparation, and they deserve due appreciation from the programme team.

Contents



The Khangchendzonga Landscape

The Khangchendzonga Landscape (KL) is a part of global biodiversity hotspot, representing unique biodiversity, bio-cultural and geo-climatic assemblage with transboundary complexity shared by Bhutan, India, and Nepal. It extends from 26°21'40.49" to 28°7'51.25" N latitude and 87°30'30.67" to 90°24'31.18" E longitude. The KL covers a total area of 25,085.8 Km^2, which is shared by India (56%), Bhutan (23%) , and Nepal (21%). The KL offers life support systems to over 7.25 million people (87% in India, 11% in Nepal and 2% in Bhutan). However, part of the KL which lies in India covers a total area of 14,061.7 Km^2 along the altitudinal gradient, ranging from 40 m asl in Alipurduar and Jalpaiguri districts of West Bengal to 8586 m asl of Mt. Khangchendzonga, the third highest mountain in the world, in Sikkim. The KL-India comprises the state of Sikkim and northern part of West Bengal (three districts, viz. Alipurduar, Darjeeling and Jalpaiguri), located along 26°29'13.56" to 28°7'51.6" N latitude and 87°59'1.32" to 89°53'42.96" E longitude. Mean temperature varies from 2°C to 19°C in Darjeeling, 7°C to 27 °C in Gangtok and 11°C to 32°C in Jalpaiguri. A significant amount of snow ice and glaciers (11 major high mountain peaks) offer sustained down streams, and multiple land use provides wider biodiversity patterns, i.e. needle leaved forest, broad-leaved forest, mixed forest, shrub land, grassland and agricultural land with high frequency of lakes/ponds (wetlands - 431 in Sikkim and 775 in northern West Bengal) linking with strong socio-economic and cultural fabric. The KL-India comprises rich floral diversity (more than 5500 species), and the faunal taxa (over 1500 in record). With an aim of conserving and governing the rich biological diversity, KL-India has 16 notified protected areas, including recently inscribed, in July 2016, UNESCO's World Heritage Site, the Khangchendzonga National Park in Sikkim, India.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CHAPTER 1

Background

For any landscape or an area or an identified site, if we desire to have knowledge on its resources for their availability in natural or manipulated ecosystems, especially in the context of interactive forces emerging from human driven activities either for direct consumption or for the commerce, it would be suggestive that the social and economic aspects along with natural dynamics be viewed in its entirety. That means we need to have appropriate mechanism and tools for assessing available entities as resources, factors influencing their changing qualities and quantities as forces and the surrounding environment as landscape in broader sense. Nonetheless, human factor in its social and economic perspective is the focal point influencing the ecosystems and availability of resources; however, the natural factors swaying the resources and environment are the additional areas of concerns. A socio-economic assessment can be described as an appraisal collectively undertaken for learning the social, cultural, economic, political scenario of either an individual or group or even the entire communities and organization (Abdrabo and Hassaan, 2003). In addition to above mentioned fields, essentially evaluated in any socio-economic assessments, the other subject of concerns such as, the resource use pattern, stakeholders' analysis, gender issues, market linkages, etc. are also focused. The targeted study theme or the process adopted for an assessment will determine, whether, the work may deal with the full evaluation of the entire topic or else may be focused on a particular topic or perception (Bunce *et al*., 2000).

Assessment on the socio-economy and bio resource has always been important as the basic area of investigation in almost all the management and conservation related works. The understanding of the targeted area in all respects, whether physiographic, social or ecological, is the first imperative step before making any decisions related to its conservation or management. In addition, it is a known fact that the understanding of these areas is like getting into the web of a complex relationship between the community and its surrounding environment. Therefore, keenness on the approaches and on the outputs needed for the desired purpose and the outcomes envisaged from the study is pre-requisite, and that is not simple as it appears. In actuality, the humans and associated biodiversity of a region are often highly blended together in a way that every human behavior or act leads to a vital outcome over the ecosystem (Gret-Regamey *et al*., 2012). Human activities largely impact the ecological health of a region, and on the other side, the livelihood and prosperity of the locals equally depends on the wealth of the associated ecosystems (Gret-Regamey *et al*., 2012; Badola and Aitken, 2010). For any type of effective conservation and development initiative, it is essential to have good knowledge on the either aspect. An appropriate study approach helps in getting a better picture about the direction of resource flow and the issues related to it and regarding the present socio-economic scenario. For a knowledgeable and more productive process, a systematic and logical approach is a must. Even without arduous job of data analysis every issue and the opportunities will surface out in the process itself.

Structure of the assessment

The primary phase of an assessment is the preparatory phase, when various activities should be incorporated as discussed below. The requirements of the identified programme or the project determines the goal of the survey. The next is the identification of the study area and the study sites, according to the pre-planned criteria. Focusing on the projected goals, the process conducting the socio-economic and bioresource assessment could be decided. The appropriate selection of the process to be followed for the survey is as important as the final outcome. The stakeholders under each group of the study must be identified and their level of participation needs to be analyzed for ensuring their proper involvement, accordingly. Defining objectives in every work is important in easing out the process and to channelize the procedures and efforts in the direction of the goal. Identification of the team for the survey assessment is the final step of the preparatory activity. The planning and investigation is the next phase, where secondary data needs to be procured, congregated and assessed; following which the survey is conducted and the collection of the field data is undertaken. The guiding principles, data collection methods and eventually the analyzing techniques are to be practiced by the team for data collection during the actual field works. The last phase of the field data analysis only cover some basic key principles of analysis and the analysis processes, however the manual is basically more focused on the assessment methods, tools and techniques.

Box 1. What is a manual?

Manual is a book/booklet which offers step by step detail instructions or information about the particular topic for both beginners and practitioners.

About this manual

The current manual focuses in providing some important sets of techniques and general

guideline that should help in conducting the socio-economic as well as bioresource assessment, using participatory approaches, of an identified area or site, with relative ease, giving the clearer objectives and using methods of each tools identified. It intends to aware the assessment team with the existing and probable problems and the techniques adopted to avoid them. It aims to make the group aware about the background of the socio-economic survey and provides a step by step guideline of the survey methods. The supporting case studies largely from the Khangchendzonga landscape, India with each of the tools discussed in the manual can help in better understanding of the same. The picturesque elaboration of the study techniques further adds to the enhanced, understanding and acts as a model for further and wider use of the tools. It can be used as a training material for easy understanding and congenial use in the field based studies. The manual does not claim to provide the complete sets of all the available tools for data extraction and analysis that can be followed for socio-economic and bioresource assessment through literature or firsthand experiences, but it includes the simple procedures as followed, tested and validated during the studies in Khangchendzonga Landscape-India in the selected pilot sites. It can be used as a friendly manual, or as guidelines to the stakeholders also, for further analysis in the required field of study. The assessment techniques discussed in this manual are basically the participatory and process-oriented. The participatory approaches being much common, simpler and rewarding increase the interest amongst stakeholders' participation in natural resource management. However, in cases the product-oriented assessments may also be followed, depending upon the necessity of the assessment. This publication provides knowledge regarding the preparatory activities, planning and survey and on the field data collection related activities. The manual will help understand the works that is being undertaken in a particular site and the participatory process gives the present scenario of the resources availability, resource use pattern and the important steps to be taken for its management of the resources for conservation and community welfare.

The manual can be adopted for any kind of studies related to the assessment of an identified area including its local inhabitants and associated biodiversity. The manual offers wider scope of involving research or an assessment team, be it a researcher, stakeholder, common person, policy-maker, end-user, financing committee, or others linked to such assessment programme, who may find it practical, understandable and user friendly. However, it is not intended that the manual in its current form may integrate all the available literature based knowledge on the processes and techniques used for the assessment purposes. Therefore, the studies dealing with cost-benefit analyses, total economic values, impacts of specific management strategies, etc. are not under the direct scope of this manual. But, very hopefully, this manual should serve as a strong supplement to the training programmes addressing the assessment of socio-economic scenario and bioresource of a targeted area in Khangchendzonga landscape or elsewhere. Based on experiences, the tools and techniques offered in the manual may further be modified as per the situation and type of socio-cultural setting and/or physiography of the identified site.

CHAPTER 2

Identify a Site and/or a Pilot Village

Within a selected site, the identification of the pilot village, amongst many other villages, is the primary task on which the entire study will depend upon the attributes that are taken for the selection of the pilot village should be properly set according to the objectives of the study and needs to be listed out properly as per the priorities and importance of the attributes. Amongst many villages that fall within an identified site, selecting the one most appropriate for initiating the programme and implementing the objectives of the same, is the task of utmost importance. Selection of the pilot village depends on the criteria fixed accordingly, prior to the actual start of the exercise. The criteria for the selection should be framed according to the desired lists, attributed to the demands of the project (e.g., see Box 3). Many such attributes can be listed out and prioritized according to its importance based on which the pilot/ideal village can be prioritized.

Box 2. What is a pilot village?

A pilot village is a targeted setting of a community or group of communities dwelling and interacting with associated resources, where a project/ programme aims to carry out extensive or intensive studies according to the project needs on a timeframe basis and also to work through needed interventions identified through such assessments. A pilot village is often taken as a sample for the start of the long term programme and can be highlighted as a model for such kind of further works in other regions.

It is vital to have preliminary information of the area/site which can be procured from various secondary sources. The secondary information is equally important in the field of research/study, which help us to understand the selected topic/ area without conducting any surveys or field visits. Also, these data can be used in different phases of the research work from preparation of the field visit to final data analysis. Relevant secondary information can be gathered in various forms such as:

- Census data (e.g., see table 1)
- Official and unofficial documents
- Journals and/or magazine articles
- Reference/Text books
- Newspapers and internet
- Maps and photo images
- Satellite images, and others

Every secondary data is not reliable to be used for the study. The relevant secondary information has to be reviewed appropriately

Box 3. A case from KLCDI-India Programme

Identification and prioritization criteria for selecting site/pilot village in Khangchendzonga Landscape under KLCDI-India Programme

- Eco-climatic zones, i.e. tropical, sub-tropical, temperate and alpine/sub-alpine,
- Corridor between and within PAs,
- Transboundary nature, and
- Key threats' centric outlook.

Focusing the significance of the above features and criterias, the major three broad pilot sites [1- Bandapani Site (Alipurduar, West Bengal), 2- Barsey-Singalila Site (Sikkim and Drajeeling, West Bengal) and 3- Dzongu Site (north Sikkim)] and pilot villages in respective sites have been identified.

and verified to ensure its quality and applicability to the objective of assessment. After the collection of secondary data and finalization of the criteria for pilot village selection under a field programme, rapid survey is required in all the villages in identified site. The rapid survey involves interaction with the local key informants, which include dedicated farmers, government servants, business men and Panchayat members of the village, local folks, etc. The interaction with the community people leads to identification of the issues and possibilities and that enable us to select villages according to the criteria set up for the pilot village selection without, if any, prejudice. While having interaction with villagers, it is essential to have a conversation on the chosen criteria because, finally that will be the basis of village selection. On the basis of primary and secondary data, the appropriate guidelines and management approaches can be developed for implementing the conservation and development programme in an identified area. The primary data can be collected by applying the standardized processes, i.e. Household survey and Participatory Rural Appraisal (PRA) tools, besides field surveys in surroundings and closed wilderness (more details in chapter 3).

Table 1. Secondary information about Lingdem village, north Sikkim (an example)

Village Profile	
State: Sikkim, India **Sub-district: Mangan**	**District: North** **Village: Lingdem**
Area details	
Area of village (in hectares)	1,386
Number of households	97
Population data based on census, Government of India	
Total population – Persons	542
Total population – Males	301
Total population – Females	241
Scheduled castes population – Persons	14
Scheduled castes population – Males	7
Scheduled castes population – Females	7
Scheduled tribes population – Persons	436
Scheduled tribes population – Males	240
Scheduled tribes population – Females	196
Education facilities	**Available**
Number of primary schools	2
Middle school available within range	Between 5 Kms and 10 Kms
College available within range	More than 10 Kms
Medical facilities	**Available**
Allopathic hospitals available within range	More than 10 Kms
Maternity and child welfare centre available within range	Between 5 Kms and 10 Kms
Number of child welfare centre	1
Primary health centre available within range	Between 5 Kms and 10 Kms
Number of primary health sub centre	1
Drinking water facilities	**Available**

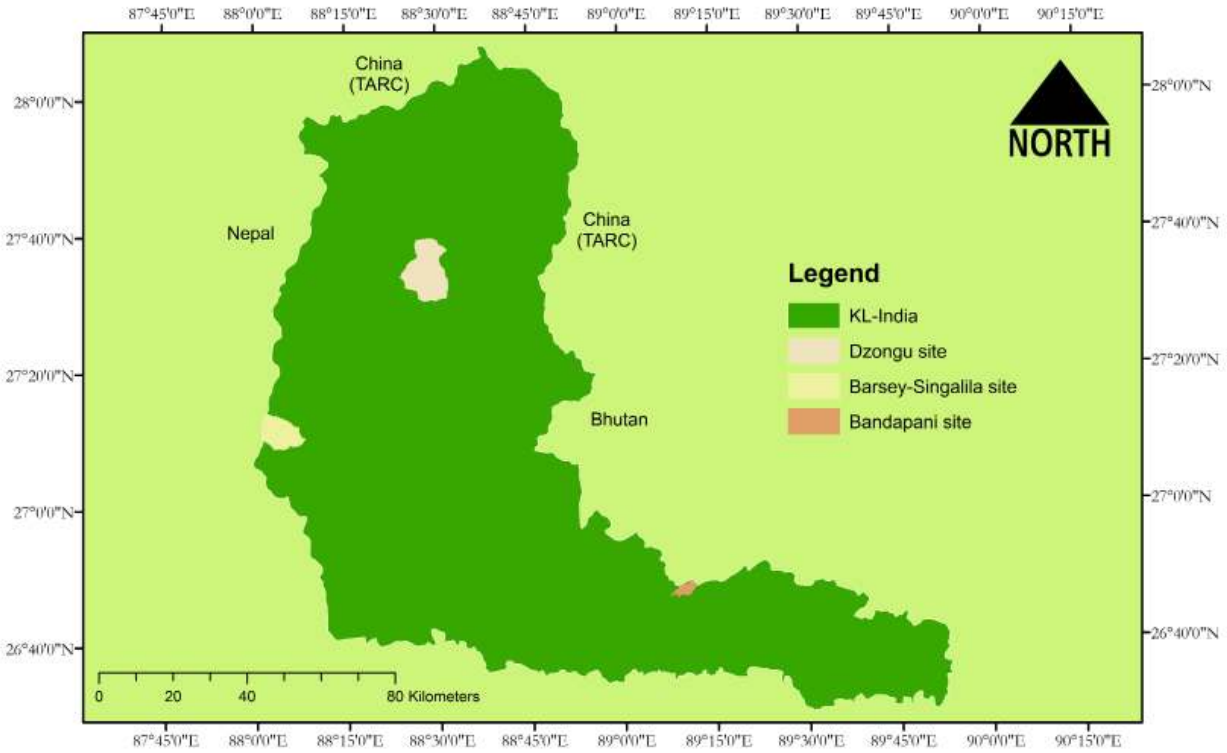
Tap water	Available
Spring	Available
Other drinking water sources	No information
Post, telegraph and phone facilities	**Available**
Number of post office	1
Telephone connection available within range	More than 10 Kms
Communication facilities	**Available**
Bus services available within range	More than 10 Kms
Railway service available within range	More than 10 Kms
Navigable water way including river, canal etc.	No information
Navigable water way available within range	More than 10 Kms
Banking facilities	**Not available**
Commercial bank available within range	More than 10 Kms
Co-operative bank available within range	More than 10 Kms
Approach to villages	
Approach mud roads	Available
Approach foot path	Available
Nearest town	Mangan
Distance from the nearest town (in kilometre(s))	25
Power supply facilities	**Available**
Electricity for domestic use	1

Source: *Census data 2011, Govt. of India*

Box 4. A case study from KLCDI-India programme

On the basis of criteria for pilot site/village selection, the three broad pilot sites has been identified in Khangchendzonga Landscape, Indian part under KLCDI-India Programme.

1. **Dzongu Site:** The site covers 149 km^2 area sharing part of North district of Sikkim and vary from 800 m to 4595 m asl altitude and also falls under Khangchendzonga Biosphere Reserve (KBR) and the entire Dzongu is totally populated by indigenous Lepcha tribal community.
2. **Barsey-Singalila Site:** The site covers 80 km^2 area, which spreads from1800 m to 3685 m asl altitude. It shares parts of Singalila National Park (SNP) and Barsey Rhododendron Sanctuary (BRS) and also covers parts of Sikkim (West district) and West Bengal (Darjeeling district), India. It is a unique transboundary location with eastern Nepal (Badola *et al.*, 2016).
3. **Bandapani Site:** The site covers 16 km^2 area, under Alipurduar district of West Bengal, India and shares transboundary foothill region with Bhutan. It is also identified as corridor for wildlife migration, especially elephants, connecting Jaldapara National Park, Gorumara National Park and Chapramari Wildlife Sanctuary.



CHAPTER 3

Data Collection Methods

1. Participatory Rural Appraisal (PRA)

The PRA use has gained popularity because of its basic approach of involving the local communities in decisions making and planning instead of only generating information from them (Freudenberger, 1999). With the involvement of the community people, PRA can be used in generating both qualitative and quantitative information covering diverse fields. The PRA encourages people to identify the issues, develop strategies for possible solutions and turn them into the plan developer for the prioritized issues in the landscape. The PRA further contains several tools for their specific purposes. The tools that can be used in PRA are very effective, easy and of practical utility, exhibiting diagrammatic and visual representations of collected data, which make it easier even for a layman to build idea about the results of the work and which can initiate them to dwell over the matter.

Box 5. Participatory Rural Appraisal (PRA)

Participatory Rural Appraisal (PRA) is a growing family of approaches and methods to enable local people to share, enhance and analyze their knowledge of life and conditions, to plan and to act.

Chambers, R. (1994)

Box 6. There are five key principles that form the basis of any PRA activity no matter what the objectives or setting

1. **PARTICIPATION -** PRA relies heavily on participation by the communities, as the method is designed to enable local people to be involved, not only as sources of information, but as partners with the PRA team in gathering and analyzing the information.
2. **FLEXIBILITY -** The combination of techniques that is appropriate in a particular development context will be determined by such variables as the size and skill mix of the PRA team, the time and resources available, and the topic and location of the work.
3. **TEAMWORK -** Generally, a PRA is best conducted by a local team (speaking the local languages). The team may include few outsiders, a significant representation of women, a mix of sector specialist and social scientist, etc, as per the topic to be analyzed.
4. **OPTIMAL IGNORANCE -** To be efficient in terms of both time and money, PRA work intends to gather just enough information to make the necessary recommendations and decisions.
5. **SYSTEMATIC -** As PRA-generated data is seldom conducive to statistical analysis (given its largely qualitative nature and relatively small sample size), alternative ways have been developed to ensure the validity and reliability of the findings. These include sampling based on approximate stratification of the community by geographic location or relative wealth, and cross-checking, that is using a number of techniques to investigate views on a single topic (including through a final community meeting to discuss the findings and correct inconsistencies).

Adopted from, Cavestro (2003)

Box 7. Tools selection criteria

Tools can be selected on the basis of number of criteria:

- What is the focus of this institution or project?
- What stage of the process is the project currently in?
- Which aspects need to be evaluated?
- What is the extent of the community's organization or mobilization around the project?
- Who are the participants, and how are they going to come together?
- Can all of the participants read and write?

Tools can be classified in three main categories:

- Participatory appraisal tools (identifying problems and causes)
  - General interviewing and oral communication tools
  - General characteristics of the community
  - Characteristics of the production system
  - Natural resource management
  - Gender issues
  - Extension and communication issues
- Tools to analyze and identify possible solutions
- Tools to plan actions
- Follow-up and evaluation tools

Adopted from Geilfus, (2008)

Application of important PRA tools

The PRA tools are generally used for generating information in diverse fields but the outcome depends upon the approach of their application and the criteria adopted. It is more essential to have correct information about the particular tool and its application appropriately. Therefore before application of the PRA tools, it is necessary to understand the criteria of the application at landscape/location level. The correct selection of a PRA tool is the basic need of the study. There are numbers of tools used in Participatory Rural Appraisal (PRA) study and a single PRA tool has a number of applications. In addition to general use in collecting data about the socio-economy of the area, the tools can also be used for collecting information on larger theme, like, gathering information about community perceptions and responses to climate change (Pandit and Choudhury, 2011) and Ecosystem based planning and management (ICIMOD, 2015). However in this manual we are focusing only on some important tools and techniques of the PRA, besides describing convenient field approaches and techniques of household surveys, which are discussed below.

Focus Group Discussions (FGDs)

A focus group discussion (FGDs) is one of the PRA exercises used in finding out more perceptions/ opinions on a particular topic from key informants regarding specific issues, problems, etc., of the community and associated resources. The exercise should be performed with small groups of key informants based on their profession, education, age group, and sex or based on well-being ranking or social status focusing on a single subject. The opinions of each and every participant should be treated equally and hence it should be noted that all should get the chance to propose her/his

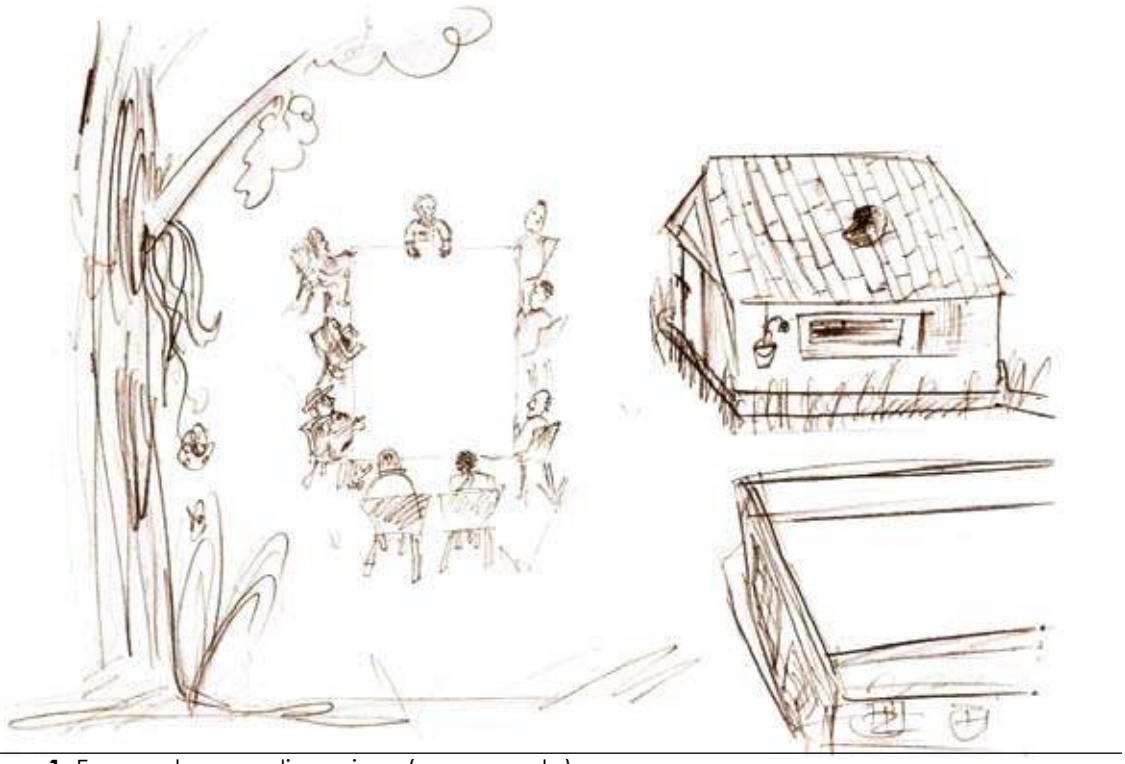


Figure 1. Focused group discussions (an example)

views regarding the matter being discussed. It is important to spotlight the discussions within the subject area; therefore any irrelevant discussions can be avoided. It is very useful exercise in terms of gathering detailed facts about the prioritized issues of the specific topic and all the information accumulated from the exercise can also be used for the validation purpose. The exercise requires sound recorders for documenting the entire conversations but not compulsory.

Steps for the exercise

Step 1: It is important that the list of the topics to be discussed with the group is selected prior to the start of the exercise particularly regarding the theme that needs further elaboration and understanding. Or this can also be prioritized from the set of lists as per the groups' prioritization. It is better to choose the subject of discussion earlier in order to save time, unless local people come up with certain other areas of importance during the process.

Step 2: Select suitable place for the meeting. After the formal introduction about the process and of the group members, start the process. Try to make friendly environment at the time of discussion so that everybody can contribute their knowledge/information on the ongoing topic, substantially.

Step 3: Start discussion on the topic that was listed earlier for the exercise and record the entire conversation. While having discussion with the participants try to avoid writing or taking notes because that may be distracting to them, and they may hesitate to share their information with the group.

Step 4: Share the information gathered so far during the discussions with participants in brief so that the generated information could be verified instantly with all members. It also helps in making the participants feel their importance in sharing the views and rely on their role in the discussions.

Step 5: Thank every participant for their time and participation.

Seasonal calendar

Seasonal calendar is the tool to collect seasonally varying information about the different happenings such as tourism activity,

Box 8. Seasonal calendar of major crops

A case study from Dzongu, North Sikkim, India
(an example, based on PRA exercise jointly organized by GBPNIHESD, Sikkim unit and MLAS-Dzongu)

Outcome: Major crops grown in the village namely maize (*Zea mays* L.), Finger millet (*Eleusine coracana* Gaertn.), large cardamom (*Amomum subulatum* Roxb.), wheat (*Triticum aestivum* L.), paddy/rice (*Oryza sativa* L.) and ginger (*Zingiber officinale* Rosc) were listed out with the help of local informants and the seasonal calendar tool was used to identify the agricultural activities (sowing, plantation and harvesting period) of the particular crops in the year. According to final seasonal calendar of agricultural products, the sowing period of the maize starts from February to mid March and weeding period falls in the month between mid March to April. The local informants shared that the maize requires earthing up "Dhurai" in Nepali language in the month of May and the crop starts mature in the month between July to August and starts harvesting the agricultural products in the month of September. Millet is another major agricultural product of the village, the sowing period of the seeds starts in between the month of May to June and plantation of the seeds generally done in the month of July. Weeding of the crop is done in the month of September and harvesting of the crop, in the month of November. The plantation of the seedlings of the large cardamom, the main crop of the village, falls in between the month of May to mid June and as the weeding and pruning is done in the month of July and August respectively. After around two months, in November, harvesting of mature crop is started. The sowing period of wheat falls in between November to last week of December and harvesting of the crop done in the month between first week of march to mid April. Another major crop of the village is paddy. Paddy is sown in the month of April and the seedlings are planted in June. Generally the paddy seedlings are planted during the rainy season and weeding period starts in between mid July to mid August and harvested in between first week of October to mid November. Ginger is another important crop for the region. Sowing of the crop starts from mid March to end of April and the weeding period falls in between mid June to last week of July and harvesting is done between middle of October to November. The local informants emphasized on the need of frequent weeding in ginger cultivation. The main source of income for Ruklu-Kayem and Lingdem village, Dzongu is the agriculture and the crops particularly large cardamom, ginger and orange are the high value crops of the region. Other agricultural produces are mainly used for household consumption.

natural resource use pattern, agricultural practices, and socio-cultural activities, etc. The tool provides us an understanding and offers a visual representation of the seasonal activities over the year. Materials required at the time of exercise are white chart papers, colorful sketch pens and markers but it is not compulsory to use these materials, one can use any kind of locally available materials for representing months and activities such as beans, soil, leaves, charcoals, stones, seeds etc. It is important to plan that all the materials should be arranged well before the exercise begins.

Steps for the exercise

Step 1: Find out the suitable place for organizing meeting with the help of local people. At the start of interaction, a gesture of greetings, followed by self introduction is good before the purpose of the study to the local participants is shared and explained.

Step 2: Explain parameters of task that are going to be discussed in the meeting and use lines or boxes to portray the seasonal variations of each seasonal parameter. Start discussion with varying activities of one parameter for the year and draw it as per the participants' information. After finishing one parameter leap to another one and draw. The process continues until all the parameters are covered.

Step 3: After finishing the exercise, discuss the results with participants and provide some space of time for rectification in the seasonal calendar. Thank all the participants for their valuable time and supports towards accomplishing the task and provide copy of the final exercise to the participants, if possible.

Mobility mapping

Mobility mapping is a visual representation of people's movement within and outside the village for diverse purposes or it is visual representation which depicts a family's social network (De Lay, 2003). The tool also enables us to understand the role and responsibilities of gender and how far they travel or walk to the places of interest (health centre, school, city, etc.) for their daily activities. The tool is helpful in identifying different problems and issues of the village or community. The frequency of movement of the villagers can also be noted in the picture according to their inputs. The exercise requires pens, markers and chart papers or one can use locally available materials.

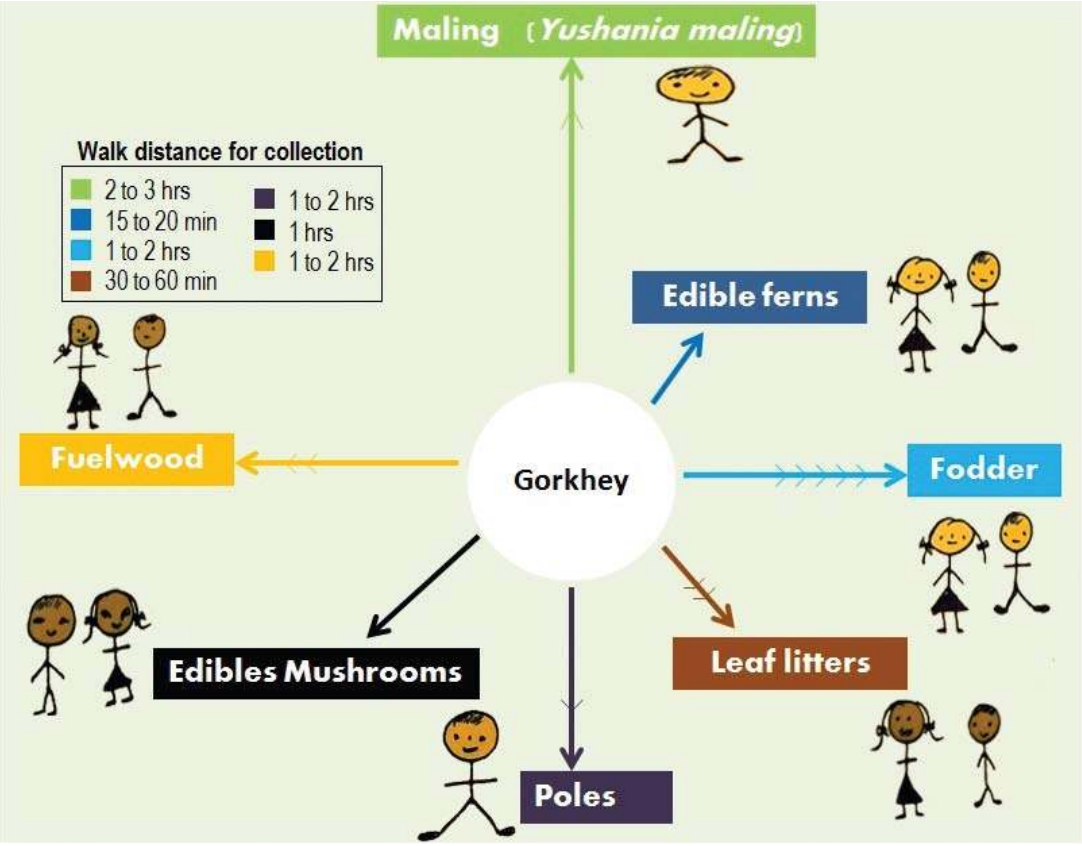
Steps for the exercise

Step 1: Choose suitable place for the exercise and start with usual greetings and personal introduction.

Step 2: Draw village on the centre of the chart paper and ask the participants their movement and the purpose of it. Portray place of interest (hospital, school, market, etc) around the village and use line to represent a movement. The lines can be provided with arrow markings, with the number of arrows representing the frequency of visit to the place, thicker or thinner line can also be used to represent the frequency of visit to the location. Distance of the location from the village can be represented by the length of the line.

Step 3: After completing the exercise give time to participants for adding any additional information about topic and discuss the results

Box 9. Mobility map of community for forest resource extraction



Outcome: The mobility mapping is used here for tracing the movement of the villagers inside forest for the collection of forest products and also to see the frequency of collection. The finding from this exercise helps to assess the availability of various bioresources and the amount of pressure generated by its collection on the forest. The map reveals that people go deep inside the forest, walking 2-3 hrs for collecting maling (*Yushania maling*), but not very frequently. Since maling is used for thatching, fencing, construction purposes, etc., it seems to be important forest product for the people. Owing to its durability, maling is not collected yearly. Mostly males are involved in the collection of maling because of the long distance to be travelled and difficulty of the task. The map further shows that the people frequently visit forest to collect fodder for cattle. People walk for around 1-2 hrs almost daily to collect the fodder for their cattle. Both males and females are engaged in this work. The poles used for making flag posts or for other constructive purposes are less frequently collected with the walk or an hour or two. Like maling, poles are also not collected yearly because once brought and used these last for 4-5 years depending upon the durability of the species used. The species like *Eurya acuminata*, *Symplocos glomerata*, *Symplocos theifolia, Cryptomeria japonica, Quercus* sp., etc. are preferred for poles. Mostly, the males are engaged in the pole collection. Forest is frequently visited for fuelwood collection but only for few months, during which villagers collect and store sufficient amount of fuelwood for their use for the entire year. Both male and female travel 1-2 hrs inside the forest for collecting fuelwood by chopping only the loops and tops of the trees or collect dry twig from ground.

Similar to fuel-wood, the leaf litter is also collected frequently but only for three months (January, February, March). Rest of the year forest floor is wet and there are greater chances of encountering snakes, so the leaf litter gathering is avoided. For this purpose both male and female travel 0.5-1 hr inside the forest. The people are also dependant on the forest for the wild edibles like ferns and mushrooms for their household consumption, but the frequency is much less. Wild edible ferns are available within a walking distance of 15-20 min; for edible mushrooms, they have to travel inside the forest for around an hour.

with them. Close the meeting by thanking all the participants for their precious time.

Natural resource mapping

Natural resource mapping is the tool for locating the available natural (forest, river etc.) and man-made (school, hospital, temple, community hall, bridge, etc.) resources of a particular village in the form of diagrams. Chart papers and markers or other locally available materials are required at the time of mapping with the local participants.

Steps for the exercise

Step 1: Before exercise begins, identify the meeting place and gather all the participants there. Start with the discussion concerning what is actually going to be done and explain its purpose.

Box 10. Resource map

A case study from Bandapani, West Bengal, India (an example, based on PRA exercise jointly organized by GBPNIHESD, Sikkim unit and HNAF-Siliguri)

Outcome: To the north-eastern side of the village lies the foothills of Bhutan. This transboundary area is of significant importance for the livelihood of the village people since the foothills hold the water sources, one is Dumchi river and the other is Tindharey. The Bhutan hills also provide fuelwood and a available ground for free grazing for domestic animals and for fodder collection. Towards the eastern side of the village (Garochira) there are two important market areas, Makrapara tea garden (India) and Gomtu (Bhutan) which is also a place for income source for the villagers of Sukti, Garochira and Bandapani since many locals are engaged in the cement factory of Gomtu (Bhutan) as laborers in daily wages.

Within the village of Garochira two churches, one temple, one pre- primary and primary English medium school, a water tank for water supply for the village are located as shown in the map above, one more temple or Deorali as known in the village is present, two Integrated Child Development Services (ICDS) are located within the village. There are many agricultural fields within all the villages but it is left uncultivated due to frequent entry of wild elephants.

Step 2: Talk about features (roads, rivers, temples, orchards, health centre, etc) to be included in the resource map and draw some main features as a reference point on the chart paper so that the participants can locate further features easily. Let the participants continue with drawing on the chart paper.

Step 3: Once the resource map is prepared, request participants to offer comments on the final map and recheck the entire features. Make the copy of the resource map for the participants and express gratitude to them.

Venn diagram

Venn diagram is a tool for identifying external or internal organizations/institutions/groups and their roles or responsibilities in the community. The tool also allows us to identify relationships or linkages between the community and the organizations/institutions/groups by visual representation and also show their (organizations/persons) level of support and involvement in development program of the particular place or region (Adebo, 2000). The exercise requires pens and chart papers or locally available materials.

Steps for the exercise

Step 1: Gather all the participants at a chosen place and begin with explaining the exercise and its objectives. It is important to note that there should be equality in the number of male and female in the group while performing any PRA exercises.

Step 2: Ask participants to list out every external or internal organizations/institutions/groups involved with the community and if possible represent them with symbols so that even the illiterate members, if any, can easily understand and participate actively in the exercise.

Step 3: Request one of the participants to draw a big circle in the centre of the chart paper and ask her/him to write or place a symbol of her/ his interest in centre of the circle that represents village or community.

Step 4: Begin with asking questions about the organizations/institutions/groups and their importance in the community development. Draw the most important and less important entities with bigger and smaller circles respectively, the size representing the importance of the organizations, institutions and groups in terms of significance of developmental works for the community. One can represent relationships between the community and the organizations by maintaining distance on the map by drawing circle isolated from; circle close to, with small overlap or big overlap, to indicate such relationships.

Step 5: Lastly, discuss the results with the local participants and thank all the members for their time and interest towards the successful exercise or study.

Problem tree analysis: cause, effect and solution

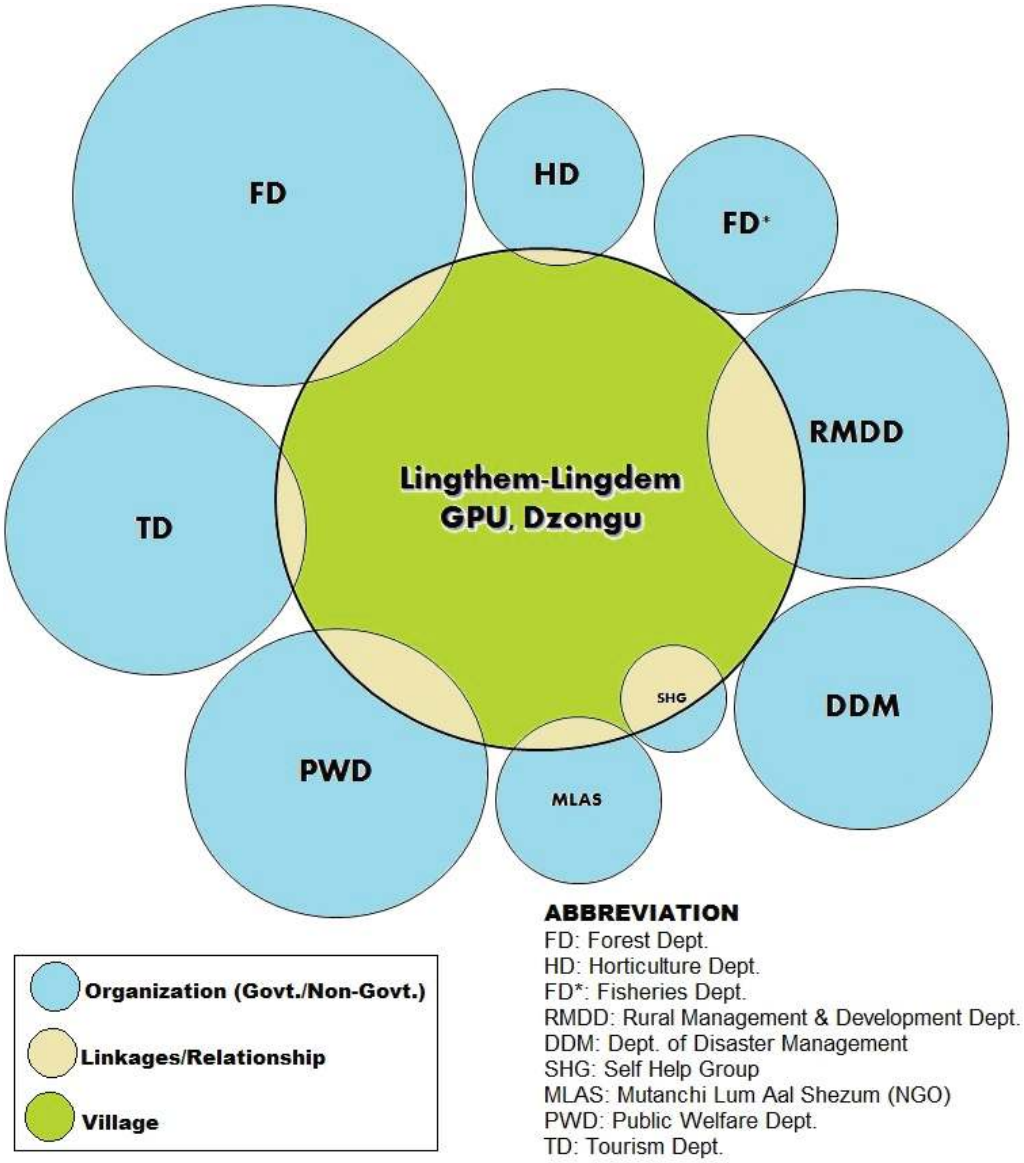
The tool allows us to identify various problems of the community and their causes, effects and solutions. The exercise offers opportunity to the local people to present their perceptions on the causes, effects and probable steps that can be taken as its solutions that are prevailing in the community. While discussing problems of the community with local people, it is important to make sure whether all the group members are participating in the discussion. There should be equal participation of all the groups including the farmers, business men, government employees of all ages and both the genders. The tool also enables us to find linkages between different cases and effects of problems and their solutions. The exercise requires cards, chart papers, pens and markers and active participation of the community.

Steps for the exercise

Step 1: Begin with discussion to find out various problems of the community and list them out in the chart paper. Ask participants to screen out major problems from the list; the

Box 11. Venn diagram

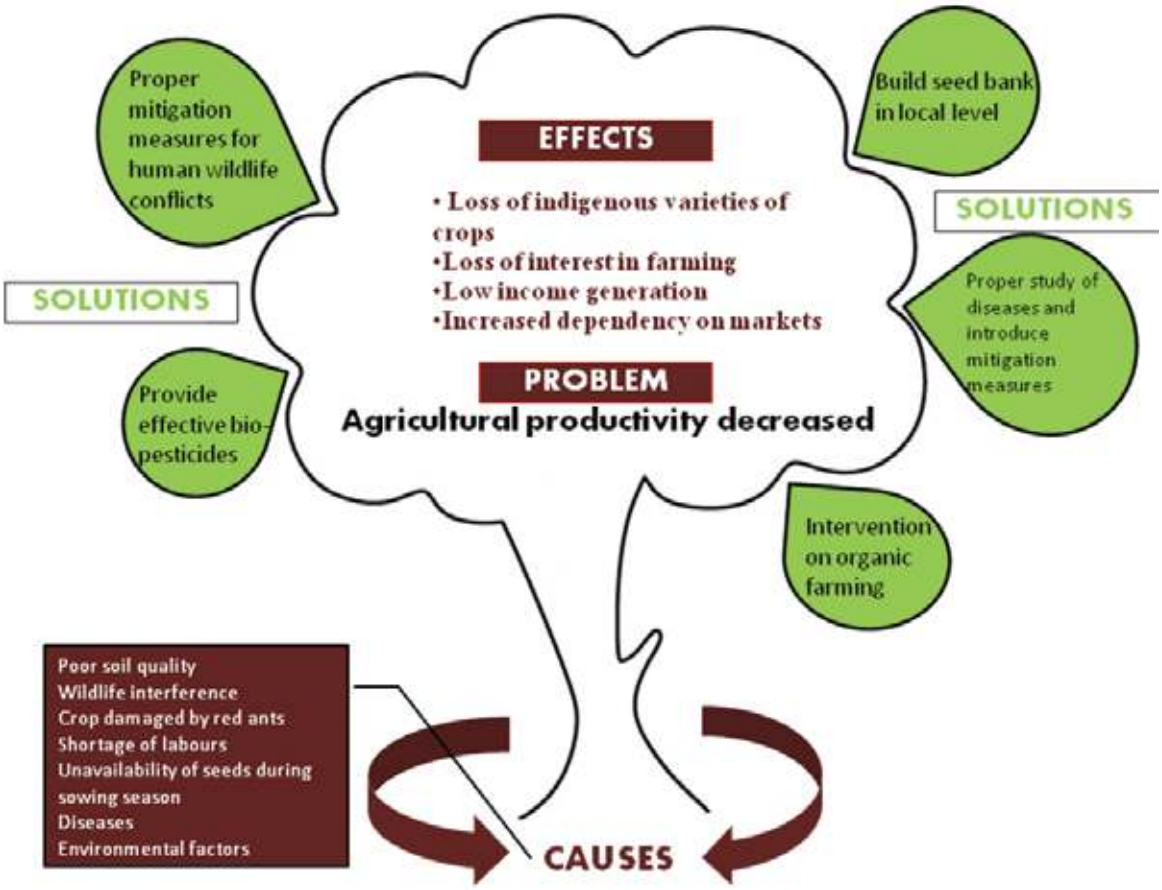
A case study from Dzongu, North Sikkim, India (an example, based on PRA exercise jointly organized by GBPNIHESD, Sikkim unit and MLAS-Dzongu)



Outcome: The village linkages with various department and organization like forest department, rural management development department, public work department, School, NGO, SHGs, Agriculture, Horticulture, Tourism department, Fisheries department, Panchayat and Gumpa committee of the village are shown above. After the PRA exercise using the Venn diagram tool, the Rural Management Development Department (RMDD) is found to have more linkage with the village people through the panchayat level, they avail most of the government scheme like Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) for their daily wages. Although other department and organization are also linked with the village, but their interventions in the village are limited.

Box 12. Problem tree analysis of agriculture and its productivity

A case study from Dzongu, North Sikkim, India (an example, based on PRA exercise jointly organized by GBPNIHESD, Sikkim unit and MLAS-Dzongu)



Outcome: Through this tool, one immediate and high impact problem highlighted was the decrease in the agricultural productivity. It has been noted from the discussion with the participants that the productivity of almost all the agricultural and cash crops is decreased at present in comparison to earlier yields. The probable causes, effects and the probable solutions as per the views of the villagers are represented in the above figure.

The probable causes for the decrease of agricultural productivity, as according to the perception/knowledge of the locals were found to be the poor soil quality, frequent wildlife interference, crop damaged by red ants, shortage of labour, unavailability of seeds during sowing season, diseases and environmental factors. The loss of indigenous varieties of crops, loss of interest in farming, low income generation and increase dependency on markets were listed out as the main effects of such decrease of productivity. The tentative/ probable solution were given by the locals to cope up with such problems and were found to be introduction of proper mitigation measures for wildlife conflicts, development of seed banks in local level, use of effective bio-pesticides, proper study of diseases and introduction of suitable mitigation measures and intervention on organic farming.

prioritizing ranking method can be used to identify the major problems of the community. Make separate sheet(s) while listing out major problems for further discussions.

Step 2: Ask all the participants to identify different causes of a particular problem and write each cause on separate boxes/lines/ colorful cards. Try to make meeting interactive and ensure everyone's participation in identifying causes of the problem.

Step 3: Ask participants to identify different effects of the problems

Step 4: Ask participants to offer their best probable solution(s) for the problem and write it down on a separate color cards/lines/boxes.

Step 5: Discuss every problem individually and try to find out the causes/effects/solutions for each one. Write them down in/with different color cards/lines/boxes. Discuss results of the exercise with participants and provide copy of the exercise to them.

Trend lines

Trend lines offers visual representation of perception of participants about the natural resource, tourism activity, settlements, income, forest structure, etc. that have changed over a period of time. The exercise encourages participants to mark the intensity (high/low) of the variable selected, against each year with dots and these dots can further be joined in a line to get the gradual change over the period. The materials needed are chart papers, markers and pens to prepare trend lines graph.

Steps for the exercise

Step 1: Select participants of different age groups and gender. Explain them the exercise properly so that participants can actively contribute in the process.

Step 2: Draw graph on the blank chart paper/ board. The graph must have vertical axis for representing the changes in variables taken over time and horizontal axis for representing the years/timelines. The method of plotting the graph is first explained well to the participants with the help of examples.

Step 3: The exercise should be initiated taking just one variable or two (e.g., change in agriculture pattern) at a time and be systematically conducted in order to avoid confusions. The use of different color pens/markers for different variable helps a lot to make the final chart more visual, clear and easy to comprehend.

Step 4: The reasons for the change in the pattern of variables with the time needs to be discussed and noted down.

Step 5: The results obtained with exercise needs to be verified against other sources and the use of the generated data should be explained to the participants. Thank all the participants for their time.

Historical timeline

Timeline is a tool used to list out all the past key events, which participants could memorize. This exercise depends on the knowledge/memory of the participants. The group of participants must represent different age groups including men and women of the community. It should be noted that the elder people are the key for the completion of this exercise, so the group must have some elder people. Materials required for the exercise are markers, pens and chart papers.

Steps for the exercise

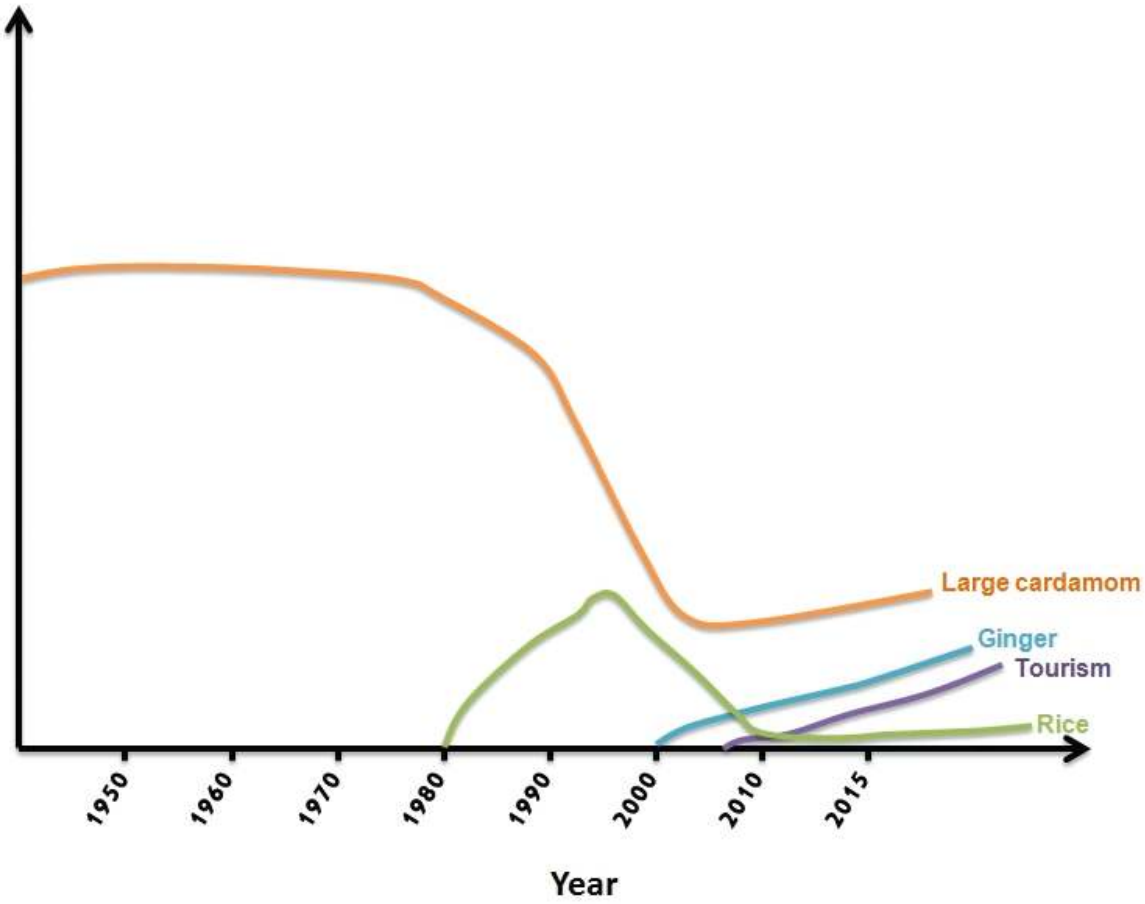
Step 1: Select a suitable place for conducting discussions with the participants. Greet all the members and start with their self introduction.

Step 2: Begin with explaining the exercise and start asking questions to the participants about the village/community such as what is the age of the village?, etc.

Step 3: Try to explore events while discussing with the participants and note them down with years and comments. The events and years should be in chronological order. Sometimes it

Box 13. Trend lines for large cardamom, ginger, rice production and tourist flow

A case study from Dzongu, North Sikkim, India (an example, based on PRA exercise jointly organized by GBPNIHESD, Sikkim unit and MLAS-Dzongu)



Outcome: With the help of trend lines, the productivity trends of three major agricultural products such as large cardamom, ginger, rice and the tourism development from 1950 to 2015 were developed.

The above figure shows the decrease in production of large cardamom, witnessed from the year 1980 till 2010 because of diseases; there was a slight increase in the production from 2011 to 2015. Large cardamom plantation in new agricultural land was one of the reasons behind slight increase in productivity, according to the informants. Ginger cultivation was witnessed from the year 2000 and the production is still increasing by the year 2015. Productivity of rice showed a decline over the years and becoming least preferred agricultural product owing to associated high investment, low productivity and labor shortage, comparatively. According to informants, large cardamom and ginger have high market demand as well as high price in the local market and in other side over local rice species.

Trend line for the tourism activity in the village indicates that the tourism was started in the year 2000 because of the hot-water spring. According to local informants, presence of hot–water spring in the village is the reason for attraction of tourists (domestic and international).

Box 14. Historical timeline

A case study from Bandapani, West Bengal, India (an example, based on PRA exercise jointly organized by GBPNIHESD, Sikkim unit and HNAF-Siliguri)

YEAR	EVENTS
Early 18th century	Establishment of Tea estate
1951	Human settlement started
Late 70s	Heavy landslide and erosion
1970s	Cement factory established in Gomtu and Beginning of Human elephant conflicts
1976	Evacuation of settlement and beginning of teak plantation
1977	Village fire at Sukti line
Early 80s	Observed Dolomite siltation
1984-85	Distribution of land patta
1986	Village highly damaged by elephants
1993	Heavy flood and erosion on Sukti river
1995	Forest protection committee (FPC)
2009	Makrapara tea garden closed
2010-11	Beginning of permit system to Indian workers by Bhutan Government
2012-13	Heavy declined of paddy, Maize, millets cultivation

Outcome: The tool is used in order to point out the important events of the village, as recalled by the villagers during the exercise. The knowledge about the past events and analyzing the main impacts it has caused, helps a lot in getting the idea about factors that has shaped the present scenario of the village.

The forests and the tea gardens have been already there since early eighteenth century. The people used to visit the place for daily works in the tea gardens from other places and only have some agricultural fields in the areas, which they use to visit at times. It has been seen that the human settlements in the region started at around 1951. The legal documentation of the land owners was been prepared since 1984-85. During late 70s', the river Khagre, started expanding enormously that has also been related to the start of the elephant entry in the village, but the relation between these two big events was not elaborated in the exercise. The year is also important because of the establishment of a cement factory, in Gomtu and the people are still dependent in this industry for livelihood working as a daily wage labours. The next big event that has been noted is the start of dolomite siltation in the river since early 80s'.

The teak plantation by the forest department was started at 1975; the plantation was done in massive scale as a result of which the mixed forest of the area has turned out to be a teak forest at present. The year 1977 is important because of the fire outbreak that destroyed many houses and property in the Sukti line village. Among many human wildlife conflicts that have occurred till now in the regular basis, the conflict of 1986, was important, because of the devastating damage caused by the elephants. The houses, agricultural fields were damaged even the conflict resulted in the death of many villagers. The fright of the incidence has led a huge impact in the people and after this incident some of the people migrated to the nearby villages leaving the land and property behind. In 1993, there was a heavy flood and landslide in the Sukti river site that expanded the river further. In the year 2010, the Makrapara tea garden was closed which was reopened later. In the same year the Garochira eco village tourism was started, which can be marked as a first step for the development of ecotourism in the area. The people of the village started migrating for job opportunities shifting from agriculture to non- farm sector for economical support. Year 2010-2011 onwards, Bhutan Government implemented regulations for allowing Indians to enter for works. The 2011-2012 is marked as the year from when there was a change in the traditional farming practices like paddy, maize, millets, etc. The paddy cultivation has been stopped since then because of increased wild elephant entry in the agricultural fields.

is hard for the participants to recall dates/years, in this case try to cites some important events (e.g., National or international events) as a point of reference so that members can relate and recall the local events.

Step 4: After completion of the exercise, summarize all the events and years for rechecking and adding. Discuss result of the exercise with the participants and appreciate them for their time and interest towards the exercise/study.

Transect walk

Transect walk is a tool which provides diagrammatic representation of the present scenario of community in relation to the location and availability of the resources, land use pattern, vegetation change, cropping system, community composition, etc. The result enhances the works culled from other sources and provides greater information on the matter. Tool can be used to identify the topological differences along transect with respect to the soil, vegetation, cultivation and other agricultural practices and human settlements. It also helps people to express, what they know about their locality and to identify the major problems, and possibilities in relation to features or area along transect.

Steps for the exercise

Step 1: Explain transect walk tool to all the participants and select transect within the village for the exercise.

Step 2: The observer should watch and note down the variations and relevant data along the walk with the help of a local analyst. The features are then illustrated with a simple diagram covering the entire transect taken for study and the variations observed within it.

Step 3: Give copy of the diagram made as a result of the exercise to the participants and discuss outcome of the results. Thank all the participants for their time and valuable information.

Pairwise ranking

Pairwise ranking is a method/approach for analyzing, ranking and prioritizing the problems/ issues, opportunities and options on the selected topics, according to the preferences given by local participants. The selection of most important and urgent activities can be made through this tool. Not only in the above fields, the Pairwise Ranking can also be useful in prioritizing the resources present in the area as per the importance to the people for various uses. The exercise offers proper monitoring and

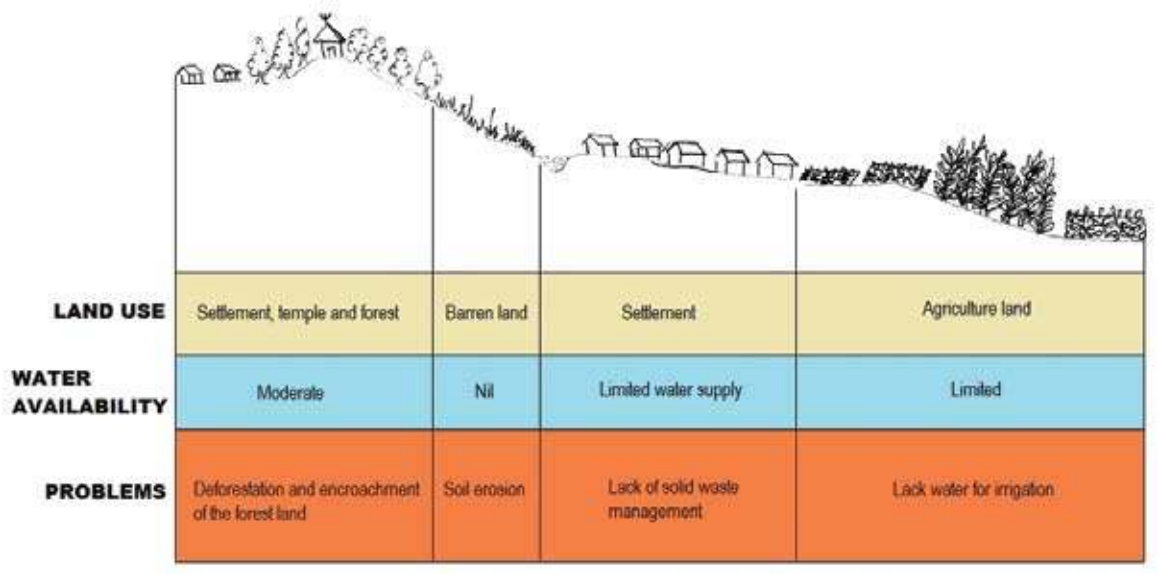
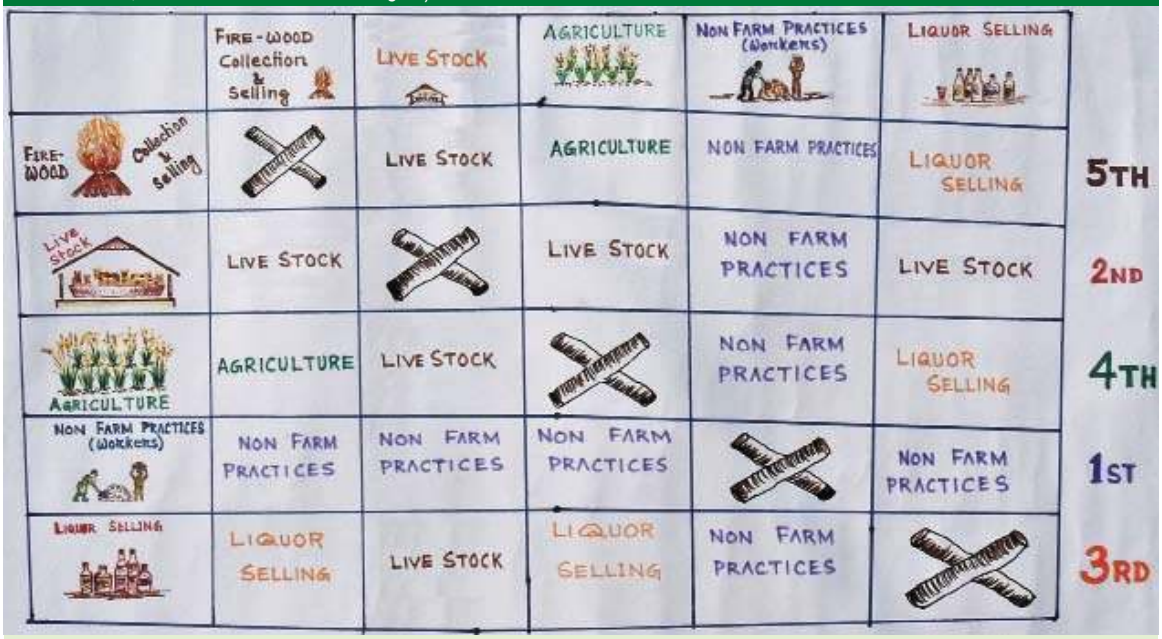


Figure 2. Transect walk (an example)

Box 15. Pairwise ranking

A case study from Bandapani, West Bengal, India (an example, based on joint PRA exercise jointly organized by GBPNIHESD, Sikkim unit and HNAF-Siliguri)



Outcome: The tool was used to prioritize the income generating sources for the people of Bandapani. As a result of pairwise comparisons, the involvement of the people in non-farm activities, basically as labours for sand collection in the river beds, for cement factory of Gomtu, Bhutan, as well as other laborious works in near and far flung areas even abroad was ranked first.

Next is the livestock rearing and dairy practice. Exercise reflected that the people generate some sort of income through liquor selling. The dependency of the people for income generation in the agriculture, which was once the highest but is now seen to be almost nil, owing to several reasons. Only small portion of agricultural fields are now cultivated and therefore, it is not viable option for income generation to people. Tool helped getting information that, some of the households also generate income by selling firewood collected from the forests of both the Indian and Bhutan parts. The brokers buy this fuelwood in bundles from the collectors, which in any way is least amongst all other options for income generation.

evaluation of the resources of the area, with all related issues and opportunities. For example, if the selected topic is the fodder collection, the options will be the different species used as fodder and which needs to be ranked according to the preferences or availability or abundance, with the help of experiences and knowledge of the local people.

Steps for the exercise

Step 1: Organize a group and involve its members in selecting the topics that needs to be analyzed. List out all the options available within the community for selected area/topic of interest and try representing all the options diagrammatically on a chart/board for easy recognition.

Step 2: List the options accordingly, vertically and horizontally in the left hand side and at the top, respectively, of the board/chart. Rank the options, taking one option each from the vertical and the horizontal list and mark the prioritized option below, taking a fixed criteria of selection in all the variables.

Step 3: In the similar way rank one between each two options and priorities, according to the criteria considered.

Step 4: Analyze the work chart and extract the required results from it. Share the outcome of the exercise to the participants and show appreciation for their participation.

Matrix ranking

Matrix ranking is an important tool for comparing and rating the variables of the selected topic of study.

Steps for the exercise

Step 1: With the organized group, discuss the topic over which the analysis needs to be done and the different criteria on the basis of which the comparisons between the variables are made. The criteria should be general and important in nature, which can be applicable for each variable. It may be developed in advance or can be raised as a result of the discussion with participants.

Step 2: Give the diagrammatic representation of the variables of the selected topic in first row on the chart and the comparing criteria in the first column.

Step 3: Rank each variable as according to the given criteria. The ranking may be done by giving numbers or by placing stars or dots.

Step 4: Identify, the preferred variable on the basis of given points (number/dots/stars), according to the criteria taken for the exercise/ analysis, are identified.

Step 5: Discuss results with the participants and express gratitude to all the participants.

Force Field Analysis (FFAs)

Force field analysis is a tool used to provide visual representation of present and future scenarios, depicting the opportunities and problems of the topic of interest. For example, if tourism is the topic, the exercise will deal with collecting the information regarding the present situation of tourism in the area, the problems hindering its growth, the resources favoring it and all other relevant information. The vision of the community people on the subject is vital for FFAs.

Steps for the exercise

Step 1: Systematically explain the exercise to the participants by citing suitable examples and encourage them to discuss the topic(s) selected.

Step 2: Draw square/circle on the left hand side of the chart paper to represent present scenario of the topic. Ask participants to provide their visions and write it down inside the box/circle on the right hand side, which will represent the future scenario of the matter discussed. Link these two boxes/circles to represent the path from present situation to future.

Box 16. Matrix ranking of problems related with major agriculture crops

A case study from Dzongu, North Sikkim, India (an example, based on joint PRA exercise jointly organized by GBPNIHESD, Sikkim unit and MLAS, Dzongu)

Major crops → / Problems ↓	Vegetables	Large Cardamom	Ginger	Orange	Maize	Tomato	Nakima (*Tupistra nutans*)	Amliso (*Thysanolaena latifolia*)
1. Diseases	★★	★★★★★	★★★	★★★		★		
2. Poor soil quality	★★	★★★★	★★★	★★★	★★	★★		
3. Wildlife conflicts	★★★	★★★★★	★	★★★	★★★★★	★★	★★	★★
4. Environmental factors	★★	★★★	★★★	★★★	★★★★	★★★		
5. Red ants	★★★★	★★	★★★★	★★★★	★★	★★★★	★★	
6. Seed unavailability		★★★★	★★★			★★★★		
7. Labour shortage		★★★★	★★★★	★★	★★★			
8. Storage problem	★★★★★		★★★		★★★★		★★★	
9. Poor market linkages	★★★		★★	★★	★★★★★	★★★	★★★★	★★★
10. Shortage of Organic manure			★★★		★★★			

Outcome: Here, the tool matrix ranking was used in order to rate the threats that have caused decline in agricultural productivity of different important crops of the area. First, with the help of the participants, the checklist of all the varieties of the crops grown in the area were made; among which the important crops with respect to income generation to the villagers were shorted out. Accordingly the threats were listed out that have caused the crop damage or productivity loss. The matrix ranking was then used giving stars to the preferred variables according to the people's perception. The number of the stars indicates the scale of preference.

The main income generating agricultural crops are vegetables, large cardamom, ginger, orange, maize, tomato, nakima (*Tupistra nutans*), amliso/kuchoo (*Thysanolaena latifolia*). Vegetables like, cabbage, cauliflower, broccoli, spinach, radish, etc., are grouped as one, large cardamom and ginger are the important cash crop grown in Dzongu, orange is the important fruit as income generator, maize is another stable crop and used in various purposes, tomato is listed as an important crop in view of income generation, nakima is a high value crop and amliso/kuchoo used in making broom also a suitable cash crop. Since decades, people are highly dependent on these crops for their livelihood, as promising crops for them. But now the scenario has been shifting a bit because of the low productivity and therefore agriculture became low income generator, mainly due to occurance of diseases, poor soil quality, wild life damage, harsh environmental factors, infestations by red ants, shortage of labour, storage problem, poor market linkages, shortage of organic manure, unavailability of seeds in the sowing period etc. While ranking these threats against different crops, from the exercise the main threat to each of the cultivated varieties are prioritized by counting the number of stars given against each variable and the higher the number the more intense is the threat from it. For example, the ginger cultivation has been affected more by red ants infestation and because of labour shortage, likewise the vegetables production are affected by storage problem, large cardamom cultivation by disease and wildlife conflict and so on. In the same way here, from the generated outcome it can also be noted that the wildlife conflicts have created threat in cultivation of almost all the agricultural produces as identified by the number of stars against this threat criteria.

Box 17. Force field analysis of tourism development

A case study from Gorkhey, West Bengal, India (an example, based on joint PRA exercise jointly organized by GBPNIHESD, Sikkim unit and TMI-India)

Outcome: The exercise explored the desires of the village people on the future prospects of tourism to uplift their area (Gorkhey village) as a better tourism spot and for enhanced economic growth. Currently, the tourist attractions of this village are beautiful rural settings, clean and peaceful environment, cool and fresh water resource (rivers: Ramam and Gorkhey Khola), ample opportunity to sight Red Panda (a flagship endangered species), good hospitality of the villagers, pure and fresh organic products and good diversity of birds and flowers. These all support making their vision true.

Conversely, there are few constraint/opposing forces obstructing the vision of better tourism in the area. Frequent strikes in Darjeeling are one of the constraints because most of the tourists follow the route from Rimbik and Phalut which falls under the tourist route of Darjeeling to the Gorkhey village. Although there is another route via Bhareng (Sikkim) but only few domestic tourists enter through this trek. Lack of electricity is another constraint for flourishing tourism in the area. Also, poor telecom network limits the future prospects. Unavailability of resourceful guides is a major constraint, as the tourists are unaware of hidden natural beauty of flora and fauna of the area. There is no proper exposure to the outside world. Our team explored a lots of potential spots of tourist attractions in the area, which need to be highlighted; hitherto, the local informants feel that the tourism is not flourishing here properly.

Step 3: Begin discussion on the prevailing problems/constraints that obstructs the way towards the future/vision. Draw arrows between two boxes. Arrow pointing towards the left hand side directed to present scenario, and problems/constraints are placed below it in a box. Continue discussions over the opportunities and represent them in a similar way on the chart using a box, placing it above a diagonal arrow facing right direction to future scenario.

Step 4: Conclude the exercise by discussing every problem and possible opportunities listed on the diagram and try to have the participants' ideas to counter with the problems and for encouraging the prevailing opportunities to come up to their vision.

Step 5: Discuss the results with all the participants and show appreciation to them for their valuable inputs.

Validate PRA outcomes

A validation process should be practiced in participatory based studies, which ensures authenticity of information collected. The validation and presentation of the PRA outcomes back to the locals adds the advantage of inclusion of additional information, that are sometimes missed during the actual exercise, and the practice offers chances to validate all the information in the field itself.

2. Household survey and its steps

The household survey is conducted in order to collect information about the individuals,

Box 18. What is the meaning of validation?

It is to prove/confirm that something is true/ correct.

Box 19. Interaction cum validation of Participatory Rural Appraisal (PRA) outcomes

A case study from Dzongu, North Sikkim, India (an example, based on validation exercise conducted by GBPNIHESD, Sikkim Unit in collaboration with MLAS-Dzongu)

A validation and presentation of PRA outcome program was organized on 12 March 2016 in Dzongu site. The program was successful in terms of validation of information. The additional leftover essential information regarding issues related with large cardamom, tourism, human wildlife conflicts, etc. was also gathered from this interactive session.

or the village or the community regarding a wide area of concern, be it related to their social, cultural, economic or resource use scenario. The household survey, with the help of a standardized questionnaires, help collect information/people's perception over a selected topic or over a wide range of topics. A structured way to collect standardized information from individual's household using a questionnaire is defined as household survey, which is one of the most popular approaches to collect desired information. Usually data collection through household survey can be used to make inferences about the population or socioeconomy of a particular area (village, block, district, watershed, landscape, etc.).

Step 1. Develop questionnaires (forms)

The questionnaire includes a set of questions related with the research topic, prepared by the

Box 20. What is survey?

A survey is to collect detailed information in an organized and methodical manner about people or things/resources, usually by asking people a series of questions, to find out their opinions or behaviors, and to carefully consider and examine it.

experts for the collection of information from the respondents. It is considered as the main tool involved in the survey method. The questions in the questionnaire are to be prepared logically and systematically, targeting the collection of all possible information about the related topic of the research. Value of the survey in terms of data collection depends on the quality of the questionnaire and knowledge and performance of the enumerators. It is important to give time for the preparation of the questionnaire and pre-testing of the final questionnaire, as well.

All the questions should be developed in a manner that anybody can easily understand and give clear answers, whether the respondent is educationally qualified or not.

The questions should be logically and objectively arranged. The questionnaire must be arranged with simple questions in its initial part and sensitive one later on. The systematic arrangement of questions leads to successful outcome of households' survey. The sensitive questions should be asked indirectly to the respondents.

The questionnaire can be divided into different sections for easy understanding (see appendix 1), for example:

- Common questions about the household
- Socio-economic status
- Agriculture
- Forest resources
- Tourism and Ecotourism
- Water resources
- Human wildlife conflicts
- Climate change
- Personal view of the respondents, etc.

The questionnaire needs to be designed very carefully and systematically in order to avoid the related confusions and being focused on the objective of the survey.

The key principles of effective questionnaire design

The following steps are required to be kept in mind before the start of preparing the format in order to produce an appropriate, pragmatic and productive questionnaire:

Better understanding about the need of the information: The expert(s) developing the questionnaire must be clear with the aim of the survey. The clear understanding about the information to be procured and about the area/region to be investigated would lead to better preparation of questionnaire, wherein questions can be set accordingly. This will not only shorten the question lists but it would also avoid the confusion and hardship during the analysis and thus save the time, too.

Box 21. The questionnaire can be formed in three different patterns depending upon the type of question and the type of response needed:

1. **Structured questionnaires:** The type consists of questions which have predefined sets of answers. Such types of questions are known as close questions. It can be just for getting yes or no response to certain questions or will be provided with a set of responses from which the participants will choose their response. Such type of questionnaire consists of mainly quantitative data extraction and for listing or prioritizing the responses already given.
2. **Semi-structured questionnaires:** The type of questionnaire formed with both closed and open questions comes under this type. It is essential for the cases where both the quantitative and qualitative data are needed, and in cases where large variations in the responses are suspected and which cannot be pre listed.
3. **Unstructured questionnaires:** The type which consists of only open ended questions is the unstructured questionnaire, to draw out the varieties of responses. Unlike in the other two types, the questions are not firmly set up. Rather the lists of topics to be dealing with in the assessment are prepared and the new question related to it can also be set during the interview. The questioning and the response can be like a conversation on a topic of interest and the conversation can be guided by the interviewer by following to some flexible questions. Much of the qualitative information can be procured with this process in depth.

1. Making questions list and refinements: The practice of listing questions and their multiple counter checks are proved to be effective. This may highlight the repeated questions, and indicate the important questions that are left out.

2. Fine-tuning of the question frame: The question must be framed in such a way that it is easy to explain and easy to understand by both the respondents and the enumerators. The question should be short and to the point, avoiding any confusion where it makes correct sense and will generate correct answers.

3. Developing the response format: The pre-coded answers provided for each question should be framed with appropriate analysis, and that should cover the entire range of the possible responses. The open end questions should also be well thought and analyzed for suitable responses. For getting desired outputs, the good formatting of the questions as well as their responses is important.

4. Sequencing the questions: The most neglected process in the majority of cases but the very crucial step is the arrangement of all the questions in a sensible sequence, as to make it easy for both the enumerator and the respondent and makes the flow spontaneous and logical. The correct sequencing of the questions is crucial in case the questions are linked type.

5. Finalizing the questionnaire: Every questions in the questionnaire needs to be fully formatted, enough space should be maintained for the response and the response codes need to be carefully formed and provided. In case of linked questions the steps should be well described to the enumerator and the link should be shown in a simple, easy and understandable way.

6. Testing of the questionnaire: Once the final questionnaire is made, at least 1 or 2 demo sessions needs to be conducted with few researchers/surveyors, for analyzing the process. Difficulties faced in each question, time requirements, etc., accordingly the required modifications is to be done, before the actual implementation of questionnaire in the field.

Step 2. Validate questionnaire

The final questionnaire should be checked

properly by the team members/expert and later it should be distributed to other members of the institute/organization to ensure its quality and errors. After all these exercises, it is better to validate the questionnaire once more through rapid surveys in the nearby villages. Validation of questionnaire in the field assures the quality and it also practice interviewer for actual field survey. This type of exercise is imperative, as all the outputs and assessments depend on a good questionnaire.

Step 3. Select and guide the enumerators

A person who facilitates the conversation with the respondent is the enumerator. The person must be very familiar with the entire survey work and the questionnaire. An enumerator plays the most significant role, from the point of view of qualitative data collection and for assisting the respondents in answering the questions, accordingly. She/he is responsible in making the questions clear and to the point. She/he has the responsibility of keeping the respondents in track if they are diverted from the main issue, and in helping them getting a clear picture of the questions asked. The enumerators must follow the instructions and terms and conditions provided by the organization under which the survey is being conducted.

Following some of the rules during the survey will help both the enumerator and the respondent for an easy conversation and a desired output. Certain rules, like reassuring the confidentiality of the information collected, to the respondents, checking on the accuracy of the collected information, recording of the information clearly and accordingly.

Responsibility of an enumerator

1. Pre-enumeration

- Take advice from the survey experts or any experienced person about techniques of household survey
- Collect the equipments (for example, questionnaire sets, ballpoint pens/pencils, identity card, notebook, clip boards, etc.) needed during the survey
- Read, understand and try to memorize questions to be asked to the respondent in the field
- Practice interview with the team member/ fellow and try to finished it on defined time limit

2. During enumeration

- Ask all the questions and record answers in the given questionnaire
- Ensure that all the questions have been asked and answered, and
- Other than questionnaire, gather other relevant knowledge (if required) using audio recorders

3. Post-enumeration

- Gather all the filled questionnaires systematically
- Give all the filled questionnaires along with brief field observation or report, and to the programme manager of organization

Step 4. Determine sample size and select sampling techniques

The section from the total population of the selected site that is actually taken for the assessment, is known as the sample and its selection needs to be analyzed keenly. The selection of the required sample size for any assessment can be selected depending on the type of survey, the finance for the survey and the man power involvement and the time period allotted for it. These are the factors and parameters that must be considered in determining the sample size. In fact sample size is the key feature that directs the overall study. But in any case, the more sample size taken the more will be the accuracy of the assessment and with less error. Hence the more

the sample sizes the better the result excluding the limitations for the type. After finalizing the appropriate sample size to be analyzed from the targeted population, the required population or the household number can be selected by following various sampling techniques. Among the many, some of the basic sampling methods are random sampling, stratified sampling, systematic sampling, convenience sampling, quota sampling, purposive sampling, etc. The method can be adopted after understanding the targeted population, its size and the nature of the survey.

Step 5. Conduct survey

Once the preparation of the questionnaire is completed and sampling methods defined, it is the time to conduct a household survey for the socio-economic assessment in study site. The main aim of the survey is to collect primary information related with the research work which will later be compiled and assessed. In the field, whole survey depends on the interviewer/ enumerators. Therefore, interviewer should know the local language of the target village as often respondents prefer answering in their own language and also to create a familiar environment. The importance of conducting household survey lies in the fact that the data collected from this survey have different results from those generated through participatory approach. In case of collecting information for the sensitive issues of the community and also for gathering minor details of the community at the household level, household survey method becomes vital. In certain cases the answers of the similar questions asked to the respondents individually may differ as compared to the answers gathered from group exercises. While conducting a household survey, the team members can observe the community closely and they should add deep remarks on the community status, at individual household level. Some of the information that has been left out during the PRA exercises, like the health status of the family members, assets of each family, type of house, sanitation, etc. can be generated through household survey and observations made by the interviewer. The survey should be conducted avoiding biasness in time, gender and informant).

CHAPTER 4

Compile and Analyze Data

The perception of stakeholders is a vital tool to participatory approach for assessing socio-economic scenario and resource status of an identified area, landscape or a village. Therefore, in such assessments, the foremost task would be the identification of the stakeholders of a particular location or landscape. Among different stakeholders, local communities are recognized as the primary stakeholders because of their basic dependency on available bioresources (e.g. fuel wood, wild edibles, fodder, timber, and other NTFPs, etc.) for survival and for making socio-economic benefits. Hence, the local people understand their problems most closely and they may offer appropriate solutions for the same. Realizing the importance of the local people or communitie's knowledge and experiences, it is essential to involve them as an integral part of the sustainable development process (Dearden et al., 2005). By involving local people or communities through participatory process, the assessment tools and methods suggested in this manual may help to congregate information on:

- Resource use patterns
- Stakeholder characteristics and perceptions
- Gender issues
- Organization and resource governance
- Traditional knowledge and cultural affiliation of resources
- Community services and facilities
- Tourism and ecosystem services
- Market attributes for extractive and non-extractive use
- Non-market and non-use values, etc.
- Climate change and adaptation

Such as sembled raw information can be modeled according to the needs of the short-term and long-term programme for demonstrating and implementing the value of natural resources and services to the community. This will also provide valuable information in strengthening the policies and plans to the policy-makers, which would generate greater support to strengthen the landscape/area specific conservation and development goals, through (i) understanding research and development, (ii) implementing management and policy, and (iii) monitoring the implementing the targeted programme.

All the information that is gathered through different PRA tools and household survey with the help of questionnaires needs to be compiled systematically for further analysis. After compilation of the collected data, all the important points noted by the team members during the survey should also be incorporated for better understanding about the matter. The compiled information should further be analyzed properly, both qualitatively and quantitatively, using either simple mathematical calculations and/or the advance statistical tools. The elaborative description of the results obtained from each of the applied PRA tools must be written down on the same date in order to avoid confusion and loss of data. Not only the results from the prepared charts but also the information collected by the team members from the conversation with the locals becomes very important primary information, that helps proper analysis and understanding in longer run. After the completion of the exercise each of the charts or any diagrammatic representations prepared, need to be photographed well and kept safe for future use. The filled-up questionnaire, in the same way needs to be collected in complete sets and must be kept safe till its entry in the desired formats as prepared for the task. All the responses from the questionnaires need to be entered carefully with much attention. The calculated and systematically analyzed data results should be interpret in view of qualitative observation and field experiences, including local perceptions and the local prevailing socio-cultural conditions and other environmental factors.

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Appendix ▶▶▶

Appendix

Appendix 1. An example of household survey questionnaire

Questionnaire for household surveys
(An example)

Study Area:

Village: Date:...../...../.....

Name of the Respondent: .....

1. Sex: Male Female **2. Age:** _____ **3. Religion:** _____

4. Indicate your economic status:

a) BPL ☐
b) APL ☐

5. Source of family income:

a) Government employment ☐
b) Daily wages ☐
c) Agriculture practices ☐
d) Contractual basis ☐
e) Private employment ☐
f) Business ☐
g) Other ☐

If other, [Please specify name]: _____

1. Socio-economic status

1.1 Please provide detail of your family members below:

Name	Sex	Age	Occupation	Educational Qualification	Work place/ Study place
1.					
2.					
3.					
4.					
5.					

1.2 Total Monthly income [Rupees per month (INR)]:

Total Monthly income	Below 5,000	5,000-10,000	10,000-15,000	15,000-20,000	Above 20,000
No. of earning members					

1.3 What is the size of land holdings in Acres?

Land	In Acres/Kattha
Agricultural land	
Land under forest cover	
Degraded or waste land	
Others	

If other, [Please specify name]: _____

1.4 What type of cooking fuel do you use?

a) LPG/Gas ☐ b) Firewood ☐

c) Kerosene ☐ d) Gobar gas/bio fuels ☐

e) Other ☐

If other, [Please specify]:_____

1.5 What is the main building/house material?

1.5 What is the main building/house material?

a) Brick ☐

b) Concrete ☐

c) Wooden ☐

d) Stone ☐

e) Soil ☐

f) Other ☐

If other, [Please specify name]: _____

2. Livestock

2.1 Please provide detail of your livestock below:

Livestock	Quantity
Cow	
Goat	
Chicken	
Sheep	
Duck	
Pig	
Other	

If other, [Please specify name]: _____

2.2 Has any livestock been affected with any kind of diseases?

a) Yes ☐ b) No ☐

If yes, please give the details about it

Livestock	No. affected	Disease	Mode of transmission	Frequency of occurrence			Threat		
				Annually	Frequently	Less often	Low	Medium	High

2.3 Please provide information regarding wildlife threats

Name of Livestock	Any threats by the wildlife		Name of wildlife species causing threats	No. killed/ injured in last one year	Incentives given by	Remarks on the incentives given
	Yes	No				

2.4. Purpose for keeping livestock (Give Preference, 1 to 8, as top to low priority)

a) Milk ☐ b) Wool ☐ c) Field Ploughing ☐

d) Manure ☐ e) Meat ☐ f) Social security ☐

g) Sale h) Others ☐ ☐

If other, [Please specify]:_____

2.5 Level of dependence for fodder extraction from the forest

a) None ☐ b) Low ☐ c) Moderate ☐ d) High ☐

2.6 Method of feeding your livestock (Preferred practice, rank 1 to 5)

a) Limited open grazing ☐ b) Migratory grazing ☐ c) Fodder extraction ☐

d) High open grazing ☐ e) stall feeding ☐

2.7 Are the fodder collected from the forest sufficient?

a) Yes ☐

b) No ☐

If No, then how is the amount meet? _____

2.8 Alternatives to forest grazing/fodder extraction, after Govt. imposed ban (Preference, rank 1 to 6, from highest to lowest)

a) Agriculture fields ☐ b) Purchase from other source ☐ c) Collected from the reserve forest ☐

d) Reduce the number of livestock ☐ e) Grow fodder ☐ f) Collection from private forest ☐

3. Agriculture

3.1 Please give your opinion:	**No**	**Small scale**	**Moderate**	**High**
a) Do you adopt agro forestry practices in your land?	☐	☐	☐	☐
b) Agro forestry practices helped you become less dependent on forest resource	☐	☐	☐	☐

3.2 Resources that you enjoy from this Agro forestry practices (Prioritize, Give rank, from top to low order of use)

a) Fodder ☐ b) Fuelwood ☐ c) Fruits ☐ d) Crop protection ☐

e) Timber ☐ f) Medicinal plants ☐ g) others ☐

If other, [Please specify name]: _____

3.3 Agricultural productivity

Agricultural Crops/Agro-products	Variety	Seeds production	Consumption	No. of times grown/year	Amount shown	Total yield (Kg/Bun-dle/ piece)	Productivity	Reason	Market price	Market demand		Market Linkages	Importance of the product for livelihood upliftment	
	B. Hybrid	B. Market	B. Market	B. Twice	__/month/ season	__/month/ season	B. Decrease		Rs /kg, bundle, piece etc.	B. Moderate		B. Through brokers	B. Low	D. High
	A. Local	A. Local	C. Distributed by Govt.	A. Household	A. Once	C. Throughout the year	A. Increase			A. Low	C. High	A. Direct selling	A. None	C. Moderate

3.4 What measures do you adopt for the protection from wild animals?

a) Guarding ☐ b) Bio-fencing ☐ c) Permission to kill wild animal ☐

d) Iron fencing ☐ e) Digging trenches ☐ f) Other ☐

If other, [Please specify name]:_____

3.5 Which according to you is the most effective measure for a particular wildlife species?

Wildlife species	Effective measures
1.	
2.	
3.	

3.6 Provide the information regarding the following:-

Name of crop	Destroyed by	Frequency of destruction		Total loss		Financial (Rs.)	Incentives given		Incentives provided by	Remarks on the incentives given
		B. Frequently	D. Seldom	Quantitative (Kg/pieces)	Financial (Rs.)		Yes	No		
		A. Daily	C. More often							

4. Forest resources

4.1 Forest resources for income generation

a) None ☐ b) Low ☐ c) Moderate ☐ d) High ☐

4.2 Factor responsible for negative impact on bio-resources

a) Deforestation ☐ b) Unmanaged resource use ☐ c) Climate change ☐

d) Population pressure ☐ e) Over-exploitation ☐ f) Other ☐

4.3 Wild animals encountered- Prioritize according to the encounter rate:-

1_____ 2_____

3_____ 4_____

5_____ 6_____

4.4 Please give your perceptions regarding the threat of wildlife to

	No	Small scale	Moderate	High
a) Livestock	☐	☐	☐	☐
b) Agriculture	☐	☐	☐	☐
c) Humans	☐	☐	☐	☐
d) Others	☐	☐	☐	☐

If other, [Please specify name]: _____

4.5 Any forest resources (plants/animals/birds) having cultural/religious significance

1._____ 2._____ 3._____

4._____ 5._____ 6._____

7._____ 8._____ 9._____

10._____ 11._____ 12._____

4.6 Any noted plants/animals/birds extinct/ not seen for long time in the wild

1._____ 2._____ 3._____

4._____ 5._____ 6._____

7._____ 8._____ 9._____

10._____ 11._____ 12._____

4.7 Any places/ spots/ faunal/ floral/ as a point of attraction of the forest (Unique to the area)

_____

_____

_____

4.8 Are the locals involved in any kind of conservation practices?

a) Yes b) No

If other, [Please specify name]: _____

4.9. Any changes needed in prevailing forest rules/policies?

a) Yes b) No

If other, [Please specify]: _____

4.10. Forest resources

Forest products	Species	Distance of resources		Collect by		Frequency of extraction		Seasonal (extracting season)	Amount of extraction	Purpose of extraction		Market value	Market demand		Availability of resources over the last decade		Reason
		B. 30-60 min	D. >2 hrs			B. Monthly							B. Moderate		B. Decrease		
		A. <30 min	C. 1-2 hrs	Male	Female	A. Daily	C. Yearly			Household use	Marketing		A. Low	C. High	A. Increase	C. No change	
Fuelwood																	
Fodder																	
Leaf litter																	
Timber																	
Bamboos																	
Others																	

4.11. Medicinal plants and wild edibles

Forest products (Preference wise-high to low)		Distance of resources		Collect by		Frequency of extraction		Seasonal	Amount of extraction	Purpose of extraction		Market value	Market demand		Availability of resources over the last decade		Reason
		B. 30-60 min	D. >2 hrs	Male	Female	B. Monthly							B. Moderate		B. Decrease		
		A. <30 min	C. 1-2 hrs			A. Daily	C. Yearly			Household use	Marketing		A. Low	C. High	A. Increase	C. No change	
Medicinal plants																	
1.																	
2.																	
3.																	
4.																	
5.																	
Wild edibles																	
1.																	
2.																	
3.																	
4.																	
5.																	
Others																	
1.																	
2.																	

5. Tourism and Ecotourism

5.1 Status of tourism in your village

a) Nil ☐ b) Small scale ☐ c) Moderate ☐ d) High ☐

5.2 What do you think about tourism?

a) Beneficial ☐ b) Waste of time ☐ c) Threat ☐ d) Others ☐

If other, [Please specify name]: _____

5.3 How much has ecotourism helped in the socio-economic upliftment of your society?

a) Nil ☐ b) Small scale ☐ c) Moderate ☐ d) High ☐

5.4 Can ecotourism be the new livelihood options for the locals?

a) yes ☐ b) No ☐

5.5 Please provide reason, why ecotourism can flourish in the region?

1_____ 2_____

3_____ 4_____

5_____ 6_____

5.6 Please give an approximate number of tourist visits in your village each season

_____

5.7 Does entire village practice ecotourism?

a) yes ☐ b) No ☐

5.8 Do you practice homestay for tourists?

a) yes ☐ b) No ☐

If Yes, How many rooms, rate and annual income per year you earn from home stay

Total number of rooms	Rate per night in rupees	Annual income per year (Approx.)

5.9 Please give your opinion regarding the following:

	No	Small scale	Moderate	High
a) Govt. assistance/support to ecotourism practices	☐	☐	☐	☐
b) Other external assistance/support to ecotourism practices	☐	☐	☐	☐

5.1.1 Specific reason/attraction of tourists visits in your village:

Please prioritize on scale 1 to 3, Where 1 means Low, 2 means Moderate and 3 means High			
Specific Reason/Purpose	**1**	**2**	**3**
a) Home stay			
b) Trekking			
c) Nature			
d) Religious/Historical			
e) Adventure			
f) Research			
g) Others			

If other, [Please specify name]: _____

6. Water Resources

6.1 Do you have your own water connection?

a) yes ☐ b) No ☐

If yes, [Please provide us with details]: _____

Source of Drinking water		Type		Constructed by	
River/Stream				PHE	
Spring water		Permanent		Self	
Pond				Group/Community/Panchayat	
Well		Temporary		Organization	
Others				Others	

If other, [Please specify name]: _____

6.2 Do you experience drinking water scarcity?

a) No ☐ b) During winter season ☐ c) During summer season ☐

d) During rainy season ☐ e) Throughout the year ☐

6.3 How would you assess the water quality?

a) Good ☐ c) Bad ☐ e) No idea ☐

6.4 Have you witnessed the drying up of the spring or the other water sources?

a) yes ☐ b) No ☐

If yes, Please give the probable reasons for it

a) Unmanaged use b) Constructions c) Landslides

d) Climate change e) Deforestation f) Others

If other, [Please specify name]: _____

7. Climate change

7.1 Have you noticed any such changes in your locality? (Because of climate change)

Changes (over last two decades)	Yes	No	No idea	Remarks, may specify
Unpredictable Weather condition				
Loss of any plant species				
Loss of any animal species				
Loss of any bird species				
Encounter of new animal/plant/bird species				
Early flowering in plants				Species:
Increase in local or regional temperature				
Increase in water resources				
Decrease in water resources				
Changes in agricultural crops				
Others				

8. Personal view of the respondent

8.1 In your perception, what are the four basic immediate needs of your village?

1. _____2. _____

3. _____4. _____

8.2 Please give your vision of your village after 10 year

1. _____

2. _____

3. _____

Personal observation of the interviewer

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Notes

About Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development, Almora, Uttarakhand, India

Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD), established in year 1988-89 [Formerly known as: Govind Ballabh Pant Institute of Himalayan Environment and Development (GBPIHED)] as an Autonomous Institute of the Ministry of Environment, Forest & Climate Change (MoEF&CC), Govt. of India, has been identified as a focal agency to advance scientific knowledge, to evolve integrated management strategies, demonstrate their efficacy for conservation of natural resources, and to ensure environmentally sound development in the entire Indian Himalayan Region (IHR). Institute functions in a decentralized manner with its HQs at Kosi-Katarmal, Almora (Uttarakhand) and the 4 regional units viz., Mohal-Kullu (Himachal Pradesh), Srinagar-Garhwal (Uttarakhand), Pangthang (Sikkim) and Itanagar (Arunachal Pradesh). More recently, the 5th unit of GBPNIHESD has been housed in the MoEF&CC as Mountain Division.

About Sikkim unit of the Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development, Pangthang, Sikkim, India

One of the regional units of GBPNIHESD, the Sikkim unit was established in Gangtok, Sikkim in the year 1989. In the year 2004, a campus covering a land area of 17 acres came functional at Pangthang (2000 m,asl), at a distance of about 15 Km from Gangtok facing the mighty Mt. Khangchendzonga, having with the main office building, laboratories, a gamut of nurseries, herbal garden, functional arboretum, residential quarters, etc. The functional arboretum (10 acres area) houses over 100 native tree species, besides numerous shrubs and herbs, bamboo groves, rhododendron's conservatory, medicinal plants and multi-purpose tree habitat zones, with over 100 inhabiting and visiting birds and small mammals. The broad focal area of unit covers Biodiversity Conservation and Management and Biotechnology Applications, Sustainable Environmental Development, Knowledge Base Development and Capacity Building, etc. The unit has been publishing substantially in a range of quality publications in national and international journals, using financial support from in-house and external projects at national and international level.

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