ICIMOD Proceedings 2017/3

ICIMOD

FOR MOUNTAINS AND PEOPLE

Regional Orientation Training on Ecosystem Services Assessment

United Nations Decade on Biodiversity

About ICIMOD

The International Centre for Integrated Mountain Development (ICIMOD) is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush Himalayas (HKH) – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – based in Kathmandu, Nepal. Globalization and climate change have an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream and downstream issues. ICIMOD supports regional transboundary programmes through partnerships with regional partner institutions, facilitates the exchange of experiences, and serves as a regional knowledge hub. We strengthen networking among regional and global centres of excellence. Overall, we are working to develop economically and environmentally-sound mountain ecosystems to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now and in the future.

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Regional Orientation Training on Ecosystem Services Assessment

19–23 December 2016, Udayapur, Nepal

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The ecosystem team, ICIMOD
Seema Karki, Pratikshya Kandel, Kamal Aryal, and Nakul Chettri

Acronyms and Abbreviations

ESA	Ecosystem Services Assessment
EU	European Union
GIS	Geographic Information System
GPS	Global Positioning System
Himalica	Support to Rural Livelihoods and Climate Change Adaptation in the Himalaya
HKH	Hindu Kush Himalaya
ICIMOD	International Centre for Integrated Mountain Development
LULCC	Land Use Land Cover Changes
MEA	Millennium Ecosystem Assessment
PA	Protected Area
PRA	Participatory Rural Appraisal
RS	Remote Sensing
SDG	Sustainable Development Goal
ToT	Training of Trainers
VDC	Village Development Committee

Executive Summary

The Support to Rural Livelihoods and Climate Change Adaptation in the Himalaya (Himalica) initiative aims to support poor and vulnerable mountain communities in the Hindu Kush Himalaya (HKH) mitigate and adapt to climate change impacts through collaborative action research and pilot activities. Research and pilot activities are expected to help build the capacities of institutions working on building and strengthening resilience to climate-induced vulnerability which will subsequently improve the livelihoods of mountain communities in the HKH. Adaptive capacity can be attained when the significance and value system of the services mountain ecosystems provide local communities and those living downstream are understood, maintained, and recognized. Visualizing such impacts, the Himalica initiative is implemented through five main activity areas: i) building capacity to formulate adapted policy, ii) expanding knowledge management, iii) strengthening collaborative action research, iv) piloting activities for climate change adaptation, and v) building overall capacity. After the completion of Ecosystem Services Assessments (ESAs) in Bhutan, Myanmar and Nepal in 2014 and 2015 as a part of strengthening collaborative action research, the ecosystem theme at the International Centre for Integrated Mountain Development (ICIMOD) further initiated assessments of ecosystem services in Bangladesh and Pakistan.

As part of the process, ICIMOD organized a Training of Trainers (TOT) event in Udayapur, Nepal, to orient partners from Bangladesh and Pakistan. A total of 12 participants (four from Bangladesh, six from Pakistan and two from Nepal) attended the training. The first day of the training covered theoretical concepts, the evolution and significance of ecosystem services, and the application of tools and techniques to assess the status of ecosystem services. Methods and techniques – Participatory Rural Appraisal (PRA), Remote Sensing (RS), Geographic Information System (GIS), and Global Positioning System (GPS) – were explained in detail. During the opening session, the District Forest Officer from Udayapur highlighted the vulnerable situation of the Churiya hills, iterated the importance of conservation, and enumerated on the linkages between ecosystem services and the livelihoods of communities.

The second and third day of the training were assigned to several exercises, and the demonstration of PRA tools and techniques using GPS in the Rauta Village Development Committee. A household survey questionnaire which is to be used for future ecosystem services assessments was revised by the participants who validated the context and suitability of the questions to Bangladesh and Pakistan. The inputs received from Bangladesh and Pakistan are expected to modify the questionnaires to better the possibilities for and results of ecosystem services assessments in the two countries.

Background

Ecosystem services, as defined by the Millennium Ecosystem Assessment, are 'the benefits people obtain from ecosystems'[1] . The services that ecosystems provide are generally classified into four types: provisioning services (food and water), regulating services (regulation of flood, drought, diseases), cultural services (recreational, spiritual/religious) and supporting services (soil formation and nutrient cycling). The health of ecosystems and the services provided by them play crucial roles in human survival and well-being[2]. However, excessive demand of ecosystem services arising from a rapidly growing human population, and several anthropogenic activities have led to the extensive modification of vital ecosystems of the world[3]. This has generated global concern, as this undermines ecosystem functioning and resilience, and thus threatens the ability of ecosystems to continuously supply a flow of services.

The Hindu Kush Himalaya (HKH), spanning over 4.3 million sq km, includes the whole of Nepal and Bhutan and some parts of Afghanistan, Bangladesh, China, India, Myanmar, and Pakistan. The region has been identified as one of the most important conservation priority regions of the world[4]. The Himalayan region, endowed with rich natural resources, not only provides shelter to magnificent flora and fauna but also provides ecosystem services

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[1] MA (2005) *Millennium Ecosystem Assessment: Ecosystems and human well-being: Synthesis*. Washington: Island Press.

[2] Costanza, R; d'Arge, R; de Groot, RS; Farber, S; Grasso, M; Hannon, B; Limburg, K; Naeem, S; O'Neill, RV; Paruelo, J (1997) 'The value of the world's ecosystem services and natural capital.' *Ecological Economics* 25: 3–15.

[3] Burkhad, B; Petrosillo, I; Costanza, R (2010). Ecosystem services – Bridging ecology, economy and social sciences. *Ecological Complexity* 7 (2010) 257–259.

[4] Brooks, T.M., R.A. Mittermeier, G.A.B. da Fonseca, J. Gerlach, M. Hoffmann, J.F. Lamoreux, C.G. Mittermeier, J.D. Pilgrim& A.S.L. Rodrigues. 2006 Global biodiversity conservation priorities. *Science* 313:58-61.

Participants of the training

to two billion people in Asia and beyond[5]. However, these ecosystems, like any other ecosystem in the world, are not exempt from the impacts of anthropogenic activities like over exploitation and unsustainable use of natural resources due to rapidly growing human population and haphazard infrastructure development. Global climate change also poses an acute threat to the biodiversity and valuable ecosystem services of the region. Despite the multi-dimensional (ecological, socio-cultural and economic) importance of these ecosystems to human society, there have been no serious efforts to assess the ecosystem services of the HKH[6]. The benefits provided by these ecosystem services are inadequately recognized by resource users and decision makers. Also, there is very limited understanding of the dynamics and values of ecosystems, and their services in the region.

In this regard, the Support to Rural Livelihoods and Climate Change Adaptation in the Himalaya (Himalica) initiative financed by European Union (EU) at the International Centre for integrated Mountain Development (ICIMOD) aims to support poor and vulnerable mountain communities in the HKH mitigate and adapt to climate change impacts through socio-economic development, and the conservation of ecosystem assets and services through active regional cooperation. The programme is being implemented through five main areas of activity: i) building capacity to formulate adapted policy, ii) expanding knowledge management, iii) strengthening collaborative action research, iv) piloting activities for climate change adaptation, v) capacity building.

Members of the Ecosystem theme at ICIMOD lead the Ecosystem Services element of the programme. Their main concern is to develop capabilities to adapt to policy. One of the primary objectives of the Ecosystem Services element is do a detailed assessment of the ecosystems and ecosystem services in identified project sites within the regional member countries i.e., Bangladesh and Pakistan in the year 2017.

In this regard, ICIMOD organized a "Regional Orientation Training on Ecosystem Services Assessment (ESA)" from 19-23 December 2016. The training was aimed at enhancing the capacities of researchers (partners) in relation to the concept, principles, tools, and applications of ecosystem based management, and approaches to and assessment of ecosystem services. Participants for this Training for Trainers (TOT) included officials from Bangladesh, Pakistan, and Nepal.

The specific objectives of the TOT were to:

- Bring clarity to the concept of ecosystem assessment and its rationale, linking the same to the Himalica programme prior to conducting household surveys.
- Enhance the skills, knowledge, and understanding of partners regarding the application of the various tools and techniques that are applied for ecosystem services assessment.
- Discuss and agree upon household survey research questionnaires on ecosystem services assessment, and get inputs from the participants/partner.
- Foster co-operation, partnership and networking at regional levels through cross learning to address issues in relation to ecosystem services and their degradation.

Outputs of the TOT

- Enhanced understanding and capacity of partners in relation to the application of ecosystem assessment concepts, tools and approaches.
- Finalization of household survey research questionnaires to be used on ecosystem assessments in Bangladesh and Pakistan.
- Sharing and cross-learning about the state and dynamics of ecosystem services in each country.
- Enhanced awareness and strengthened human and institutional capacities for joint action plans for the assessment of ecosystem services of all partner countries.

[5] Schild, A (2008) 'The case of the Hindu Kush-Himalayas: ICIMOD's position on climate change and mountain systems.' *Mountain Research and Development* 28(3/4): 328-331.

[6] Rasul, G; Chettri, N; and Sharma, E (2011) *Framework for valuing ecosystem services in the Himalayas.* Kathmandu: ICIMOD

Day 1: Opening Session

Welcome address

The opening session started with the introduction of all participants. Nakul Chettri (Senior Biodiversity Specialist, ICIMOD) gave the welcome remarks. He welcomed all the participants, and expressed ICIMOD's pleasure in hosting participants from Bangladesh, Nepal and Pakistan. Chettri said that the training brought together professionals working on the ground in the fields of forest and biodiversity conservation, and livelihood improvement. He explained that the planned ecosystem services assessment (ESA) would provide an opportunity to contribute to ongoing activities for further planning.

Dr Nakul Chettri giving presentation

He said that in 2015, the level of dependency on forests, wetland and agriculture ecosystems, as well as the challenges faced by communities in terms of managing the fragile Churiya belt (Mahabharat range) were identified through an assessment of ecosystem services in Dumrithumka village development committee (VDC), Udayapur, Nepal. He talked about some of the interventions piloted as action research in the same area. These include activities such as home gardening, the installation of improved cooking technology to reduce forest dependency, and tree plantation to stabilize landslides prone areas. He highlighted the importance of upscaling home gardening practices to a commercial level through the pilot project. Referring to some of these aspects from Nepal and contextualizing cases in Bangladesh and Pakistan, Chettri linked the opportunities to conduct ESAs in the future to add value to ongoing projects in Bangladesh and Pakistan.

Opening remarks

In his opening remarks Shree Baral, District Forest Officer, Udayapur, mentioned that Udayapur district falls under the Siwalik range, 60% of which is covered by forest. He said that the range is highly vulnerable, and extremely prone to landslides. He talked about how effective conservation efforts in upstream areas of the range can help reduce siltation in the Chure and Terai belts (downstream), reducing impact on the natural ecosystems and livelihoods of people living downstream. He also spoke about other issues such as open grazing, illegal logging and forest fire which are prevalent in the region. He said community based forest management is playing an important role. Also, the existing 3,350 forest user groups in the region have to implement their operational plans effectively. He gave an example from one of the women-led community forest user groups that is actively working to implement a community forest operational plan. He also highlighted those

Mr Shree Baral DFO Udayapur giving opening remarks

Himalica pilot project activities where the impacts are visible. He said that open grazing has been reduced and plantations set up in erosion prone areas. With the introduction of improved cooking stoves, fuel wood consumption and dependency on forest for fuel wood has been reduced. Baral concluded his remarks by saying that since South Asia faces similar issues, these lessons learned can be taken home and upscaled or customized to make the related practices better suited to the context of the respective countries. Addressing a query from Pakistan, Baral explained the types of forestry management practices prevalent in Nepal. He said there are major two forest types in Nepal: national forests and private forests. Further clarifications and sub-divisions of these forest types are described below:

A) National forest

- Community forest: Managed by communities to fulfill their basic needs. It is appropriate for the mid and high hills.
- Leasehold forest: People below the poverty line are handed over a forest for 40 years. It is a kind of agroforestry model whereby communities can get involved in income generating activities within the forest but are restricted from using forest land for annual crop plantation.
- Religious forest: Managed for religious purposes.
- Collaborative forest: Covers distant users and usually has a larger user group involved than a community forest does. It addresses the needs of distance users. The partners involved are locals and the government, sharing equal portions of the benefits generated.
- Scientific/block forest management: Other areas not managed/coved in such forests. Last year, Udayapur approved one block as a scientific forest. In Udayapur, the Churiya region being vulnerable to degradation, they only allow dry felling.

B) Private forest

Private land/forest owned by communities with land certificates.

Ecosystem assessment in Bangladesh and Pakistan: A rationale

While contextualizing the rationale for ESA, Chettri explained ICIMOD's institutional mandate emphasizing on facilitating and promoting regional cooperation by bringing all or some of the countries in the HKH together, and working for the sustainable development of the environment and the people living in the region. He stressed on collaborating with research partners across countries, implementing research activities on the ground and translating them into generating knowledge which can be shared to wider stakeholders.

During his presentation, he said that over the past years, intensive agriculture has invaded forest ecosystems, and that the scenario is still prominent in some areas. He pointed out that as human population density is a major driver of such changes in ecosystems, this scenario is expected to continue in the future if no interventions are made. High greenery, the natural state of the ecosystem, was disturbed by frontier clearing for sustenance livelihood which is more intense. He also talked about interventions like integrated approaches that are happening around the globe to address the need for balancing economic growth and sustainable development. He mentioned that as a realization, the Millennium Ecosystem Assessment (MEA) highlighted the significance of ecosystem services and the need for assessment, contributing to the related Sustainable Development Goals (SDG 2015). As a result, the SDGs now recognize the value of ecosystems that will assure both economic development and sustainability. He also cited examples from Bhutan where social, cultural and environmental factors, and good governance are used to measure Gross National Happiness.

Chettri talked about how the concept of ecosystem services has evolved from the 1980s onward, and was recognized at the UN level as a result of the MEA. He highlighted that in the years 2014 and 2015, ICIMOD completed an ESA in Tsirang in Bhutan, Inle Lake in Myanmar, and Udayapur in Nepal. He also emphasized that ecosystem productivity and extraction are two important areas to keep an eye on as they are associated with overexploitation or well management for the well-being of communities. Thus a better assessment of the ecosystem and their services will help rationalize the importance of conservation.

Participatory approaches: Some tools and techniques

Kamal Aryal, Associate NRM Specialist at ICIMOD, introduced participatory rural appraisal (PRA) tools and techniques that are important for the planning, implementation, and monitoring of activities or projects. Explaining the rationale for using PRA tools, he said that the goal is to focus on setting conservation and management objectives. He discussed the need for identifying targeted groups while working on the assessment of ecosystem services and PRA. Citing examples, he talked about resource mapping (natural and social resources mapping), focus group discussion, mobility map, institutional mapping, ranking (paired wise ranking), and seasonal calendars. The transect walk, he said, is as a participatory tool to validate or triangulate the information acquired through focus group discussions and resource mapping.

Importance of quantitative data

Nakul Chettri, while presenting the importance of quantitative data, explained that PRA tools and techniques are very useful to understanding the context, situation, and scenario of a particular area. These tools give 80-90% of the field information. He said that specific information – literacy level, household income, and other information/ issues, for example – is not covered by the generic PRA extracted from household surveys. He emphasized that quantitative data, usually interpreted in numbers and maps, clearly represent visual interpretation. He added that the quantitative data generated by the project will help prepare knowledge products that can further be used to support policy or advocate for policy reformulation. For instance, studies in Nepal show that a large chunk of flora and fauna are found beyond the borders of protected areas (PAs). Similarly, other studies have shown that these PAs are located on the high mountains. PAs are less represented in the mid hills and the plains. This recommends a revision for expanding PAs to cover the mid hills and plains of Nepal. Data is important for policy advocacy and/ or reformulation. He also pointed out that the HKH is a data deficit region, mainly because relevant data are either not shared or not uploaded to an accessible data platform. He underscored the fact that ICIMOD has a mandatory provision for systematic data sharing.

Household survey and enumerator's role in effective data collection

While discussing the role of enumerators in conducting household surveys, Kamal Aryal informed the participants that the household survey method is a time tested method for gathering specific qualitative or quantitative information. He highlighted several aspects while explaining the role. Each survey has the clear objective of getting focused and specific information. Therefore, enumerators are required to be neutral, not biased. Enumerators are supposed to be open and show interest in the topics being covered. They should be aware of the custom, tradition and culture of their study area. It is also advised that an enumerator know local terminologies in advance. An enumerator's role is crucial in the pre-enumeration, enumeration, and post-enumeration phases.

Country level experience sharing on ESA/use of PRA tools and techniques

While sharing country level experiences on the use of PRA tools and techniques, Mya Mya Nue, Project Coordinator of the Himalica Pilot Project in Bandarban, Bangladesh, said that she and her team have applied PRA tools and techniques to some studies in the country. She said they mainly use PRA tools (social mapping, resource mapping, historical mapping, and seasonal calendar) that focus on a business model and link it to the market. Social and resource mapping are performed at regular intervals to see the changes brought by the development project. She said they further conduct a problem tree analysis to prepare action plans and accordingly use a Venn diagram to see market linkages for service providers.

Ms Mya Mya Nue from Bangladesh giving remarks

Similarly, Jibran Haidar, District Forest Officer from the Forest, Wildlife and Environment Department of Gilgit Baltistan, Pakistan, shared experiences from conducting PRA – resource mapping, Venn diagram, seasonal calendar of medicinal plants utility – in Gilgit Baltistan to: a) Identify the status of wildlife and ecosystem b) Identify eco-tourism potentiality in the area c) Identify effective communication in environmental education.

They also talked about the challenges they have faced and the lessons they have learnt while employing PRA tools and techniques. Nue mentioned challenges faced in relation to time. Female facilitators/enumerators in particular, she said, face problems as data has to be collected in the evening, when villagers, after a busy day of work in the field, come back home. Language, she pointed out, is also a barrier as Bangladesh has many local, indigenous languages. Dress codes, she noted, were complicated as mingling with and getting along with specific local communities requires the enumerators to be dressed in very specific ways. To this Haidar added that the things he has learnt as a good facilitator are a big asset to conducting PRA in the field.

The discussion highlighted the difficulties associated with conducing household surveys using questionnaires. It is not an easy task, and facilitators need to have the professional skills necessary to extract expected data from community members. Research and assessment processes associated with livelihood improvement activities such as tourism development are supported by government agencies and policy makers as well. In the case of tourism development, for instance, it is necessary to link the health of an ecosystem to tourism. The availability of water – for cleaning, recreation, and sanitation – has the potential to increase. But degrading water quality and quantity affect tourism negatively.

Till the 1980s, PRA was not considered an integral part of community planning. It has now been mainstreamed as an important science in community planning. In developed countries, scientists and planners are working with communities to develop scenarios and prepare plans.

Community preparing the resource map

Participants learning to use GPS

Experience sharing on ESA process and methodology

Seema Karki, Research Associate, Natural Resources Management, shared experiences and lessons learnt from ecosystem assessments carried out following the same processes and methodologies used in Bhutan, Myanmar, and Nepal. Karki presented the Myanmar case study with sequential details of the processes involved. She explained how it started with the regional orientation training for project partners from the three countries on ESA, and continued with a training aimed at enumerators to help them conduct household surveys and carry out PRA tools for collecting general information on the study sites. Karki also said that 30% of households in three sites – upstream, midstream and downstream – in the Inle lake/water catchment study area were surveyed. Household survey questionnaires, she said, were used mainly to understand the level of a given community's dependency on ecosystem goods and services, the current status of ecosystem services, and the community's opinions on major land use land cover changes (LULCC). In addition, remote sensing imageries from 1989 to 2014 were analyzed to identify LULCC over the years. The resultant LULCC data and the community's opinions on LULCC were triangulated, and a report was prepared accordingly. The technical support provided by ICIMOD included help in applying PRA tools and methods in the field, conducting household surveys, analyzing household survey data, and analyzing and interpreting remote sensing imageries.

Use of GPS

Karki and Kriti Nepal from Bird Conservation Nepal facilitated a peer learning session on remote sensing (RS), geographic information system (GIS), and global positioning system (GPS) next. The session was about visual interpretation of data and getting information about specific locations. The facilitators highlighted the usefulness of these tools with justifications. Spatial analyses of households in terms of resource (ecosystem services) utilization will differ location wise, they said. In assessing ecosystem services, GPS will help researchers get near accurate information that is useful for monitoring and revisiting a given area. It can also be linked with a systemic data sharing process that is well accepted in the international community. Furthermore, such methods are well recognized by international scientific communities. Karki and Nepal explained that calibrating instruments and considering GPS error can help researchers come up with near accurate data and information. Participants learnt how to use GPS, mainly recording GPS location (latitude, longitude and height). They also learnt about tracking way points and saving GPS locations which can later be transferred into the ArcGIS environment to prepare a household/cluster map.

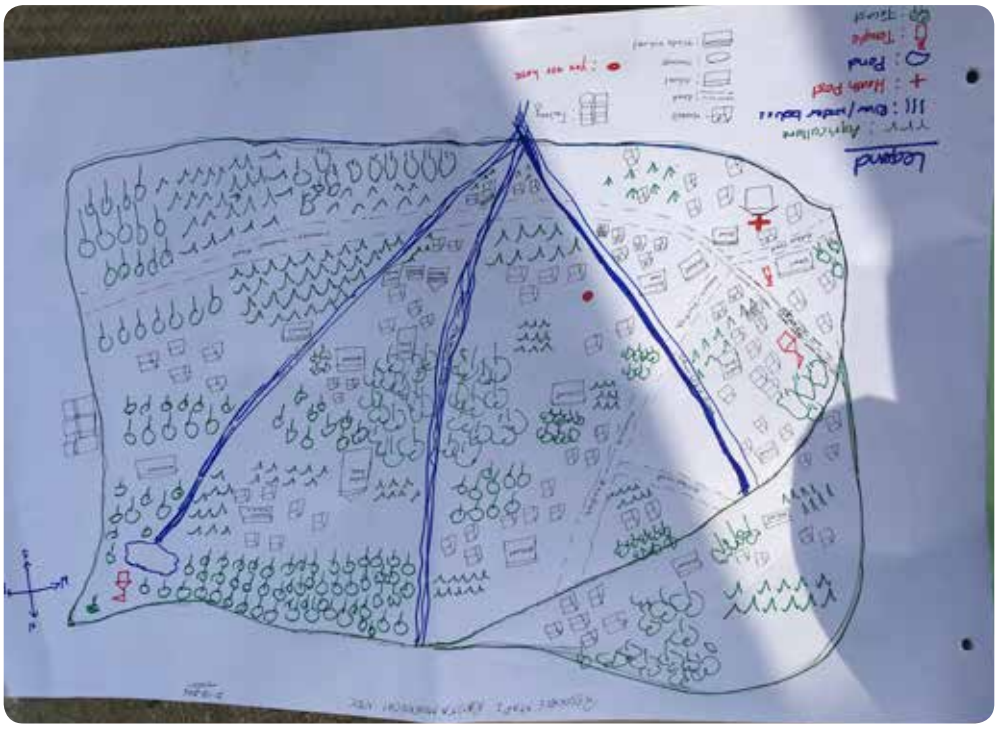
Day 2 and Day 3: PRA tools and techniques exercised in the field

As indicated in the programme (Annex 1), the second day of the training was dedicated to demonstrating PRA tools and techniques with the community (see Figures 1-11). Tools such as community resource mapping (natural and social resources mapping), focus group discussion, mobility mapping, institutional mapping, paired wise ranking and seasonal calendar were exercised in Dumrithumka VDC, Udayapur. Each tool was carried out with livelihood activities, and issues related to forest management and natural resources extraction in mind. The information and data acquired from the PRA exercise were triangulated with communities and the findings were shared with relevant stakeholders from Dumrithumka VDC. Pictures 1-10 illustrate the results of the PRA tools applied in the field.

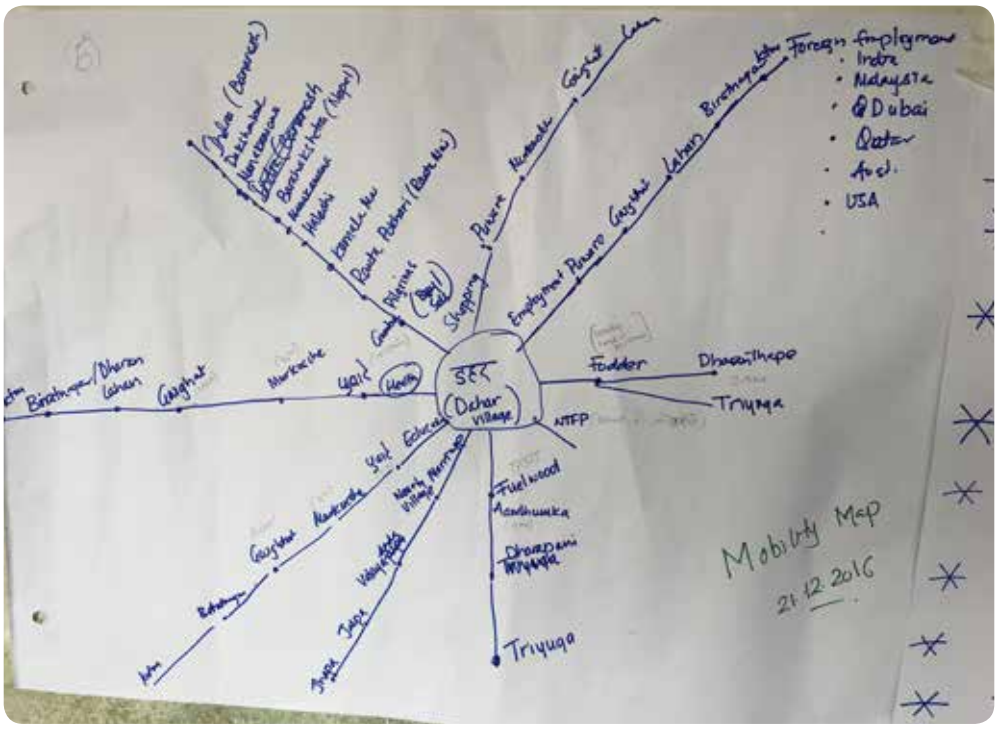
After the demonstration of tools was complete, there was a session on the revision of the standard household survey questionnaire ICIMOD uses to conduct ESA in Bhutan, Myanmar and Nepal. The questionnaire was first revised by the study team at ICIMOD considering the contexts of Bangladesh and Pakistan. These questionnaires were further reviewed by teams from Bangladesh and Pakistan to check whether the questions reflect each country's context. There were a few suggestions for modifications made: a) include a question about whether communities have proper access to ecosystem services, b) add a question related to the status of wildlife, human-wildlife conflict, and the status of pasture land c) include a provision for understanding the endowment fund in a given study area. The team from ICIMOD pledged to incorporate these suggestions and recommendations, and to modify the questionnaire accordingly for conducting ESA in Bangladesh and Pakistan.

Community preparing the resource map

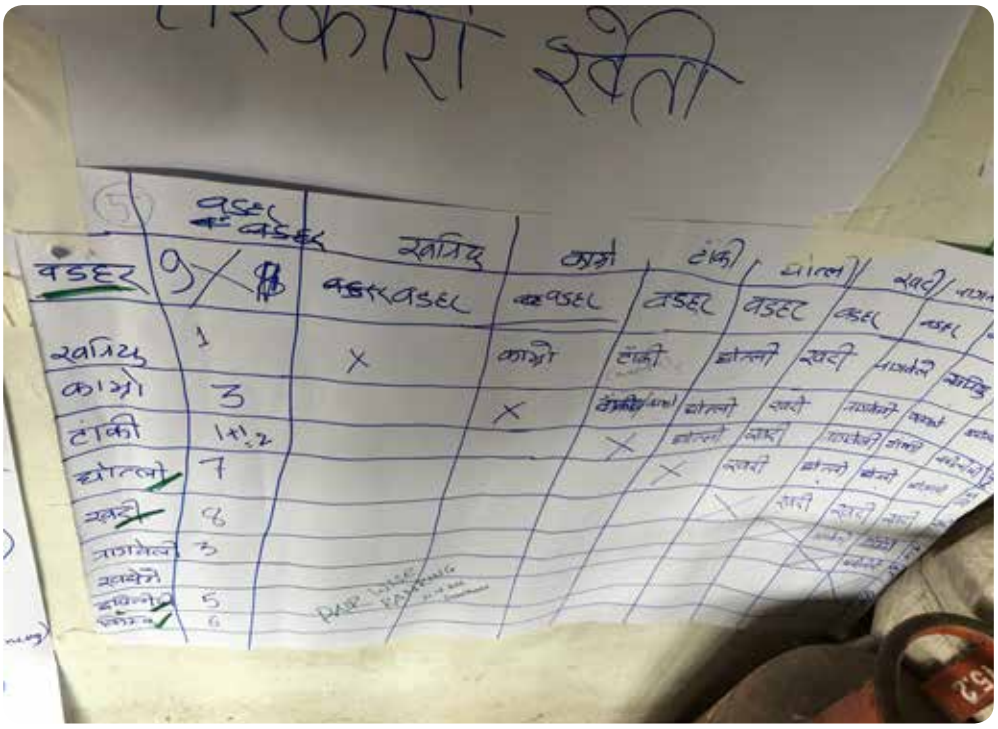
Community prepared resource map translated



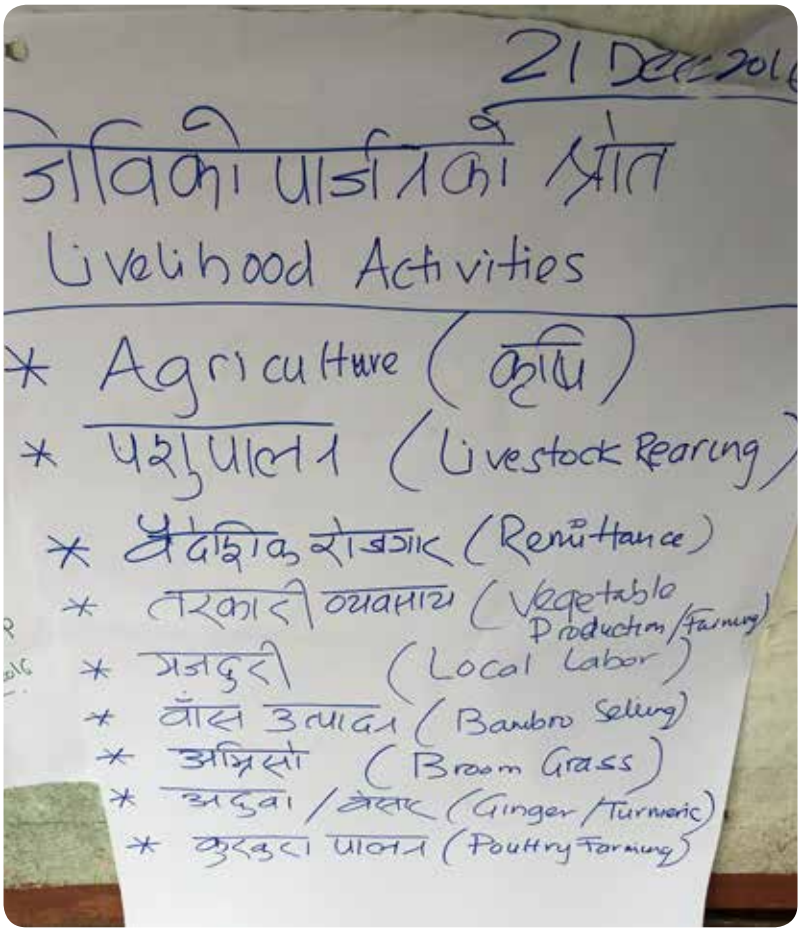
Mobility map



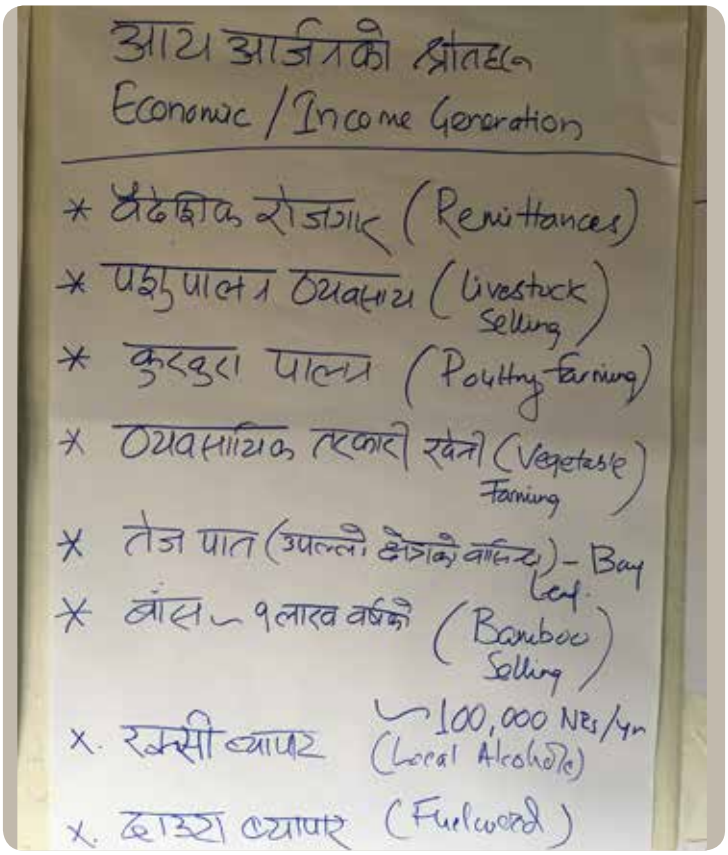
Important fodder species ranked in pairs



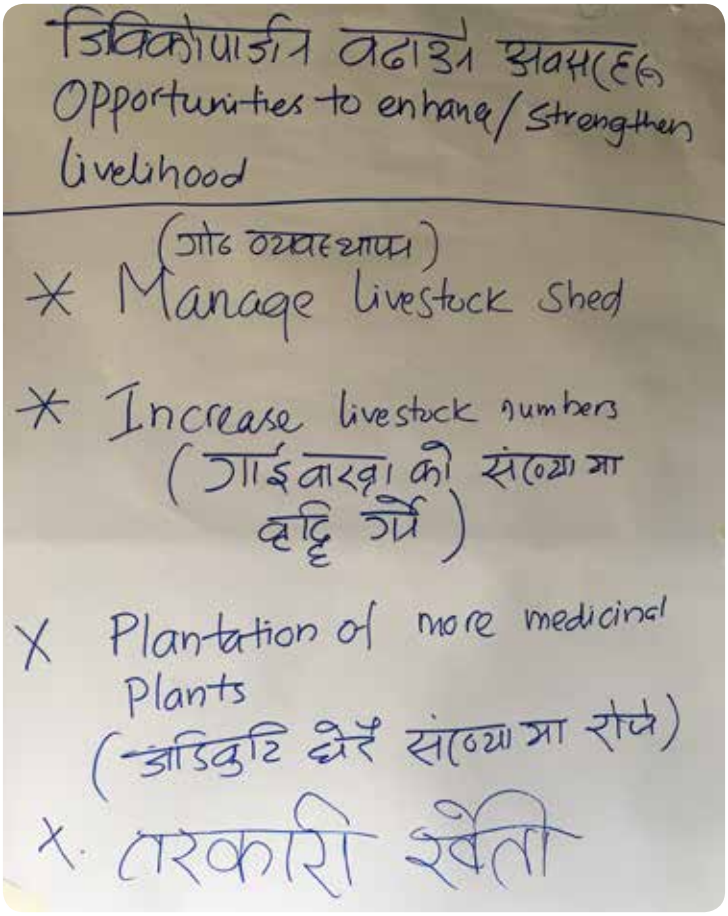
Existing livelihood activities



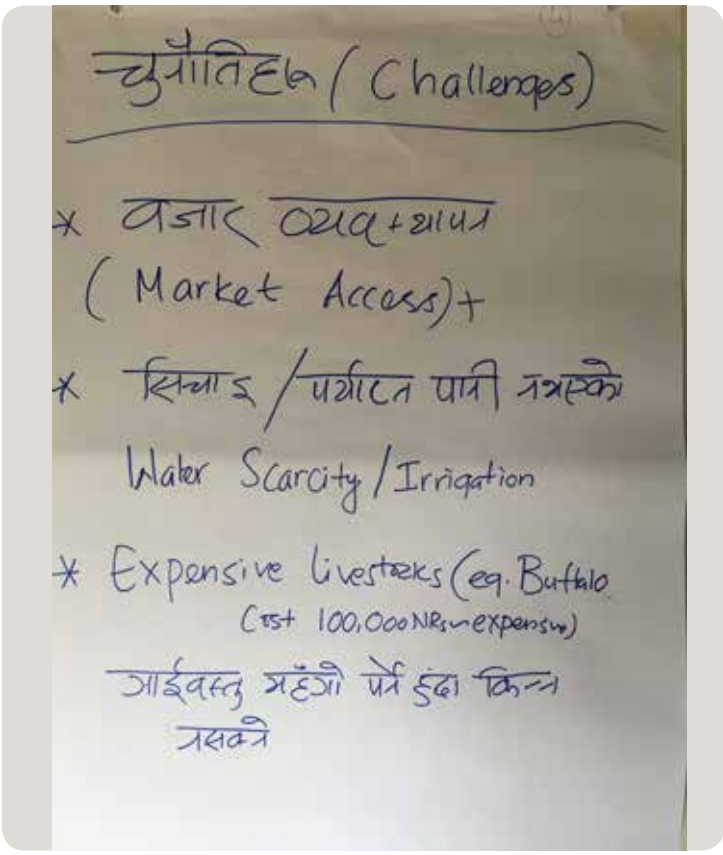
Ongoing economic activities



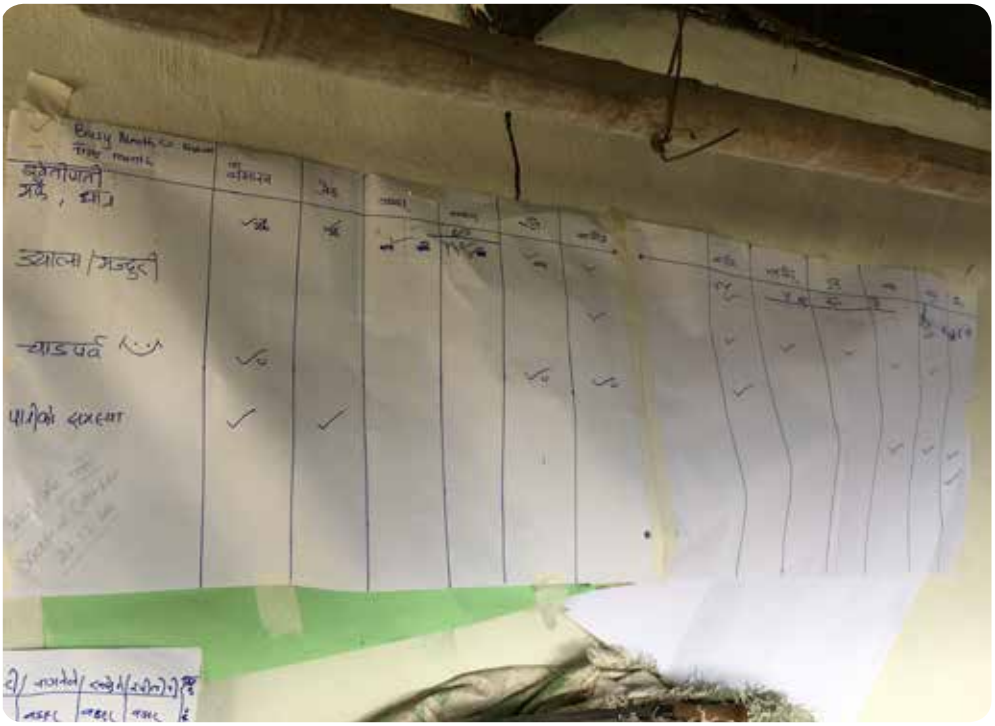
Opportunities to strengthen income generation



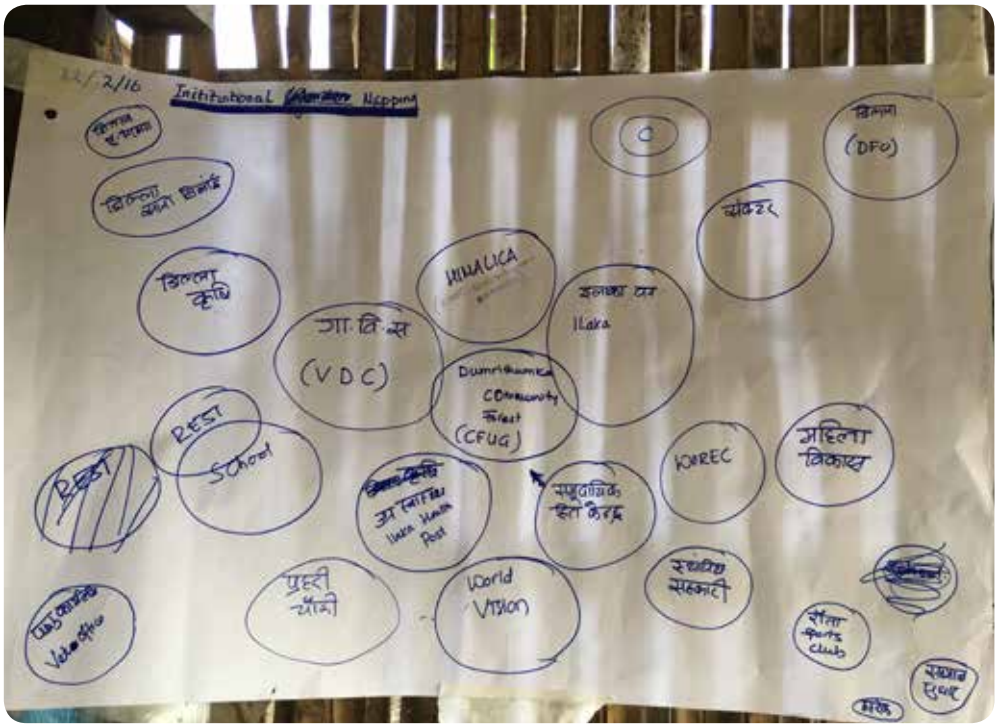
Challenges faced



Seasonal calender



Institutional mapping



Sharing PRA results with local stakeholders in Dumrithumka

Group Picture with the community

Participants' reflections

Participants from Bangladesh and Pakistan shared their reflections on the three-day ESA orientation training. The Bangladeshi participants said that the overall programme went well and that they found the modules they learned in the field following the sequential processes very useful. Additionally, they said that the lessons learnt were equally important for community members to understand the status of resources, and the challenges and opportunities available. The participants also said they appreciated the proactive nature of the communities in Dumrithumka and said they were grateful for the participation of the community members in the planning process. The participants gained a better understanding of the villagers, their practices and culture. Since such information is useful and important, VDCs and District Forest Offices could also benefit from them.

Participants from Pakistan said that having the definitions and utility of PRA explained to them gave them confidence to work in the field back home. They said the tools and techniques they picked up during the training can be applied by other institutions in Pakistan. They added that it would be good if there was an official forum on which to share expertise and information from the ground.

Closing session

In the concluding session, Nakul Chettri thanked the participants from Bangladesh, Nepal and Pakistan for actively participating in the three-day training. During his remarks he assured the participants that the suggestions and reflections provided by them would be incorporated in a questionnaire. He recommended that the suggestions made for ESA in Bangladesh be incorporated in Himalica pilot sites in the country. He added that in case of Pakistan, conducting ESA will add value to the Hindu Kush Karakoram Pamir Landscape Initiative as it is planned as a long term programme facilitated by ICIMOD.

He said that in terms of sharing field experience, the Himalica website could be a good platform, one of the best ones available. He also informed that upon completing ESA in Bangladesh and Pakistan, all five countries (Bangladesh, Bhutan, Myanmar, Nepal and Pakistan) will share their ESA results and learning through a sharing workshop organized by ICIMOD.

Pre- and post- evaluation results

Figures 12 and 13 depict the progressive changes that took place in the participants' knowledge and understanding of the topics covered by the training. Regarding the concept of ecosystems and ecosystem services, 17% of the participants had reported 'better knowledge' prior to training. After the training, the percentage of participants who reported 'better knowledge' regarding ecosystems and ecosystem services rose to 67%. Similarly, the pre-training evaluation revealed that none of the participants had 'better knowledge' of the concept of ecosystem services assessment. However, the post-training evaluation showed a considerable increase in the number of participants (50%) with 'better knowledge' regarding the concept of ecosystem services assessment.

Regarding household survey and research ethics, only 25% of the participants had 'better knowledge' prior to training. This figure grew to 83% after the training. The same was true regarding the concept of PRA tools. The figure rose from 17% to 83% in this case. Similarly, there is a considerable increase in the number of participants (25% to 83%) who reported 'better knowledge' regarding the use of PRA tools after the training. Regarding the use of GPS, 83% of the participants mentioned they had 'better knowledge' after the training. The figure stood at only 17% prior to the training.

Figure 12: **Pre-training assessment results**

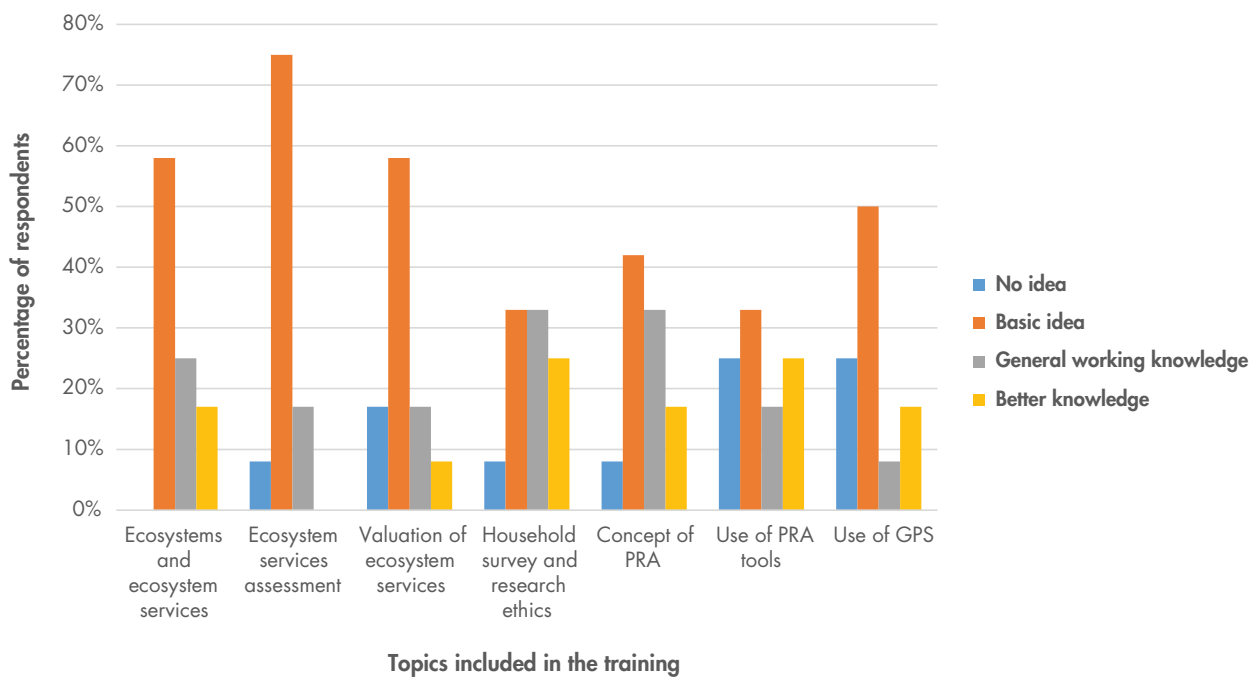
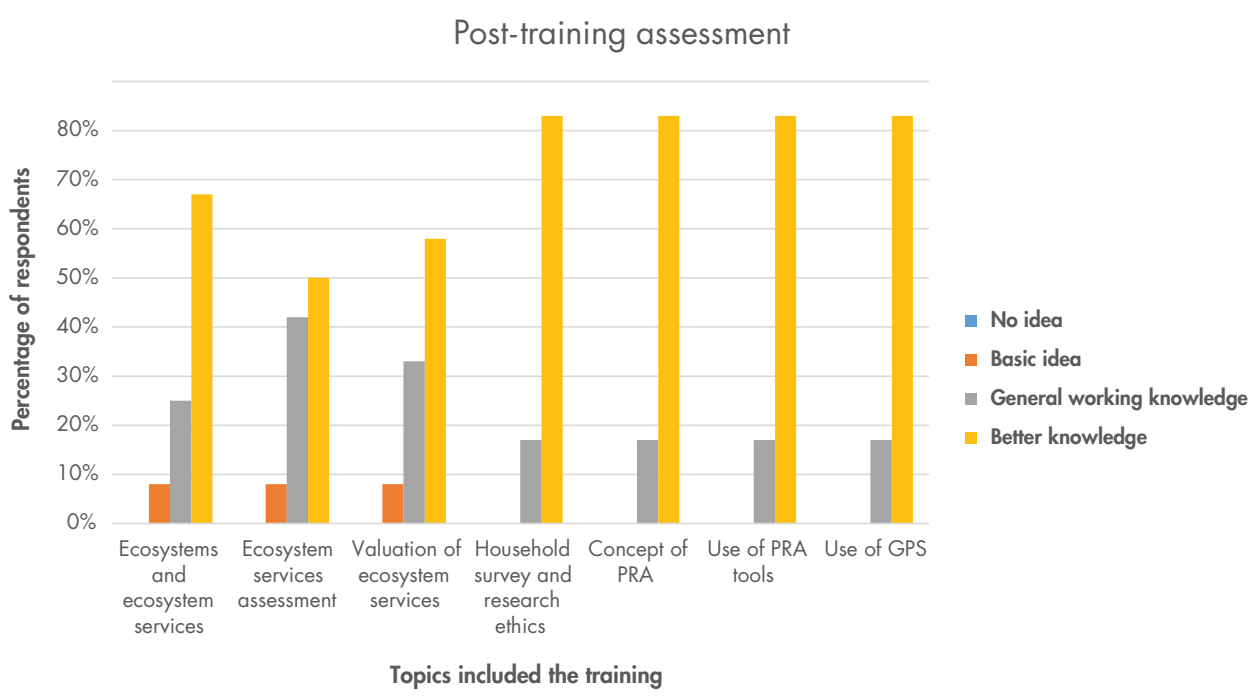


Figure 13: **Post-training assessment results**



Annexes

Annex 1: **Programme agenda**

Programme agenda

18 December 2016, Sunday, Participants arrive from Bangladesh and Pakistan		Check in at Hotel Himalaya
19 December 2016, Monday, Travel to Udayapur		Via flight and jeep
20 December 2016, Tuesday (Theoretical Session)		Resource Persons/ Facilitators
09:00–09:15	Registration	Ms Seema Karki
09:15–09:30	Pre-training assessment	Ms Seema Karki
09:30–09:45	Participant's introduction	All
09:45–10:00	Welcome remarks	Dr Nakul Chettri
10:00–10:15	Opening remarks	Mr Shree Baral, DFO, Udayapur
10:15–10:45	Ecosystem Assessment in Bangladesh and Pakistan: the rationale	Dr Nakul Chettri
10:45–11:00	Discussion	
11:00–11:15	Tea Break	
11:15–11:45	Overview of participatory tools and techniques (How to work with multiple stakeholder)	Mr Kamal Aryal
11:45–12:15	The importance of quantitative data in ecosystem services valuation	Dr Nakul Chettri
12:15–12:30	Discussion	
12:30–13:30	Lunch	
13:30–14:00	The principles of Household Survey: Why and how to extract useful data? (Enumerators role in effective data collection)	Mr Kamal Aryal
14:00–14:15	Discussion	
14:15–14:45	Tea Break	
14:45–15:30	Country level experience sharing on the ecosystem services assessment and use of PRA tools and techniques: • Presentation from Bangladesh (22 minutes) • Presentation from Pakistan (22 minutes)	Country representatives
15:30–16:00	Experience sharing of the past ESA (Process and methodology)	Ms Seema Karki
16:00–16:15	Discussion	
16:15–16:45	Use of GPS	Ms Seema Karki and Ms Kriti Nepal

16:45–17:00	Introduction of PRA tools to be used in the field and briefing on field programmes	Mr Kamal Aryal
5:30 pm onwards	Reception Dinner	
21 December 2016, Field exercises in Udayapur (Practical session)		
7:30	Participants depart for field exercise	
10:00–12:00	Field exercise: 1. Community resource mapping 2. Focus group discussion	Mr Kamal Aryal, Ms Seema Karki, Dr Nakul Chettri
12:00–13:00	Lunch	
13:00–17:00	Field exercise continue: 3. Institutional mapping 4. Mobility mapping of community for forest resource extraction	Mr Kamal Aryal, Ms Seema Karki, Dr Nakul Chettri
22 December 2016, Field exercise continues		
8:00–11:00	5. Paired wise ranking 6. Seasonal calendar	Mr Kamal Aryal, Ms Seema Karki, Dr Nakul Chettri
11:00–12:00	Sharing of the findings to the community people	Mr Kamal Aryal
12:00–13:00	Lunch	
13:00–14:00	Participant's group exercise on the questionnaire to check relevancy in their context (Country wise group exercise)	Ms Seema Karki
14:00–15:30	Review and finalize questionnaire	All
15:30–17:00	Pre-test questionnaire	Mr Kamal Aryal, Ms Seema Karki, Dr Nakul Chettri
17:00–17:15	Post-training assessment	Ms Seema Karki
23 December 2016, Travel back to Kathmandu		Via flight and jeep
24 December 2016, Participants from Bangladesh and Pakistan return to home country		

Annex 2: **List of participants**

Bangladesh

1. Mr Mohammad Razib Siddique
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2. Mr Katak Bahadur Danuwar
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ICIMOD

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Annex 3: **Evaluation form**

Training Assessment Form
for
A Regional Orientation Training on Ecosystem Services Assessment
Venue: Udayapur, Nepal
Date: 19- 23 December 2016

Please tick the appropriate box:
1- No idea, 2- Basic idea, 3 -General working knowledge, 4- Better knowledge

Concept of ecosystems, ecosystem services and their major types	1	2	3	4
Concept of ecosystem services assessment	1	2	3	4
Concept of valuation of ecosystem services	1	2	3	4
The principles of household survey and research ethics	1	2	3	4
Concept of community based Participatory Rural Appraisal (PRA): Opportunities and challenges	1	2	3	4
Knowledge about using various PRA tools and techniques	1	2	3	4
Knowledge about GPS use	1	2	3	4

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