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Toolkit on
Sustainable Harvesting of Non-Timber Forest Products (NTFPs)

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Preface

Green, fair and inclusive economic development presents an immense challenge both to theorists and practitioners in the field. Many such development and conservation projects face tremendous challenges in implementation because they are not equipped with effective methods and tools. ANSAB itself has tried various approaches since its establishment in 1992. We have developed a practical combination of technical, policy and capacity building interventions that conserve biodiversity, increase production and productivity of farms and forests, create jobs and provide income for the rural poor while ensuring environmental and social safeguards.

This toolkit provides practical methods and tools needed for the sustainable harvesting of non-timber forest products (NTFPs). The specific objectives of the toolkit are to:

i) Provide strategy and curricula for training on sustainable harvesting of forest products, focusing on NTFPs;

ii) Offer practical methods and tools required for the sustainable harvesting of NTFPs and

iii) Facilitate to develop skills and capacities of harvesters on sustainable harvesting of NTFPs in general, and the five species of NTFPs (namely Harro, Barro, Amala, Guduchi and Cinnamon) in particular.

This toolkit is mainly targeted for the field facilitators and program managers of development organizations and government agencies who are interested in, and are responsible for the promotion of sustainable harvesting of NTFPs. This toolkit can also be useful for forest user groups

and can serve as a reference material for researchers, students, and professionals who are interested in sustainable forest management. It is expected that the forest technicians, suitably trained as facilitators to work with local communities, will be able to carry out the activities as well as handle relevant tools outlined in this toolkit.

We are thankful to the International Climate Initiative (IKI) of the Government of Germany and Manfred-Hermsen-Stiftung (MHS) Germany for providing the grant that allowed us to develop this toolkit and for encouraging us to translate ANSAB's expertise into simple-to-use toolkit. Major technical contributors of this toolkit are Dr. Nabin Raj Joshi, Mr. Puspa Lal Ghimire and Mr. Sudarshan Chandra Khanal. A number of ANSAB staff namely Mr . Chandika Amgain, Mr. Deepraj Bhusal and Ms. Aakriti Poudel provided relevant information during the preparation of this toolkit. This toolkit is prepared with the overall guidance of Dr. Bhishma Subedi, Executive Director of ANSAB.

We are thankful to Mr. Johannes Burmeister and Mr. Mauricio Villarreal of MHS, the independent consultant Dr. Wolfgang Kathe, and Dr. Rajendra K.C (Joint Secretary, Ministry of Forest and Environment) for reviewing and providing inputs and suggestions.

We welcome suggestions and feedbacks from readers and users as we are very much keen on periodically updating the toolkit to make it more productive and useful.

Bhishma P. Subedi, PhD
Executive Director, ANSAB

Acronyms and Abbreviations

AAH	Annual Allowable Harvest
ANSAB	Asia Network for Sustainable Agriculture and Bioresources
BZCFUG	Bufferzone Community Forest User Group
CF	Community Forest
CFUG	Community Forest User Group
DFMP	District Forest Management Plan
DFO	Divisional Forest Office
DPR	Department of Plant Resources
FECOFUN	Federation of Community Forestry Users, Nepal
FUG	Forest Users Group
GACP	Good Agriculture and Collection Practices
LRP	Local Resource Person
NFSS	National Forest Stewardship Standards for Nepal
NGOs	Non-Governmental Organizations
NTFPs	Non-Timber Forest Products
MPs / OPs	Management Plans / Operational Plans
TOT	Training of Trainers
WHO	World Health Organization

Glossary

Annual Allowable Harvest: The percentage of forest products (e.g. the volume or number of plants or plant parts) that can be removed annually from a forest or from its part/block in a sustainable basis.

Bulb: It is a modified stem that is the resting stage of certain seed plants, particularly perennial monocotyledons. A bulb consists of a relatively large, usually globe-shaped, underground bud with membranous or fleshy overlapping leaves arising from a short stem.

Community Forests: Legally handed over forests or their parts, to the communities for the protection, management and utilization, in which forest-dependent local people have a primary role in the management and utilization of the resources.

Forest User Groups: These refer to community forest user groups, buffer zone community forest user groups, collaborative forest management groups or leasehold forest user groups.

Facilitator: A person who supports local communities and other groups to conduct a specific activity or a range of activities primarily in reference to the objectives of a development program.

Local Resource Person: An individual recruited from local community and trained and mobilized for the delivery of specific development services to the community.

Natural Regeneration: Plants that regenerate as a result of natural seed dispersal or sprouting, as opposed to being planted by humans.

NTFPs (Non-timber Forest Products, also known as NWFPs - Non-wood Forest Products): All goods of biological origin other than timber, fuel wood and fodder derived from forest, grassland or any land under similar use like medicinal and aromatic plants, bamboo and rattan, nuts, fruits, tubers and berries, grasses and leaves.

NTFPs Inventory: A measurement and assessment of the existing stock and growth of NTFP's in a given area.

Management Plans / Operational Plans: A management plan is a detailed plan of forest management activities for a particular area for a certain period of time. This is a prerequisite for obtaining forest management rights by forest user groups in Nepal.

Population: Total number of units or the "universe" from which samples are taken.

Root: Root is part of a vascular plant normally underground whose primary functions are anchorage of the plant, absorption of water, dissolved minerals, conduction of these to the stem, and storage of reserve foods.

Rhizome: A horizontal underground stem that sends out both shoots and roots. It may act as a storage organ in plants, especially when situated underground.

Rotation: The number of years required to establish and grow plants to a specified size, age, product or condition of maturity.

Sustainable Harvesting: Sustainable harvesting refers to harvesting practices that allow the population of target species as well as biodiversity in the collection area to be maintained or to increase over time.

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About the toolkit

This toolkit on "Sustainable Harvesting of Non-timber Forest Products (NTFPs)" provides guidance and detailed steps that will help and guide facilitators and forest practitioners for proper training and adoption of sustainable harvesting practices of NTFPs.

This toolkit focuses on the five targeted NTFPs namely Harro, Barro, Amala, Guduchi and Cinnamon in particular. The following table presents the list of the targeted NTFPs with their local name, common name and scientific name.

Table: List of the targeted NTFPs in this toolkit

Local Name	Common Name	Scientific Name
Harro	Chebulic myrobolan	*Terminalia chebula*
Barro	Belleric myrobolan	*Terminalia bellirica*
Amala	Gooseberry, Embellic myrobolan	*Phullanthus emblica*
Guduchi (Gurjo)	Tinospora, Heart leaf plant	*Tinospora cordifolia*
Tejpat, Dalchini	Nepalese cinnamon, Bay leaf	*Cinnamomum tamala*

This toolkit is developed based on ANSAB's over three decades of field-based practical experience in sustainable management and utilization of NTFPs. Review of relevant literature and consultation with the experts have also been made during the preparation of this toolkit. It is expected that this toolkit will be useful for those who are involved or wish to support sustainable management practices of NTFPs, as part of their conservation or rural development program.

Objectives of the toolkit

This toolkit provides practical methods and tools to be used and required for the sustainable harvesting of NTFPs. The specific objectives of the toolkit are to:

- Provide strategy and curricula for training on sustainable harvesting focusing on NTFPs;
- Offer practical methods and tools required for the sustainable harvesting of NTFPs;
- Develop skills and capacity of the harvesters on sustainable harvesting of NTFPs in general, and the selected five NTFPs, in particular.

Who is this toolkit for?

This toolkit is intended for the forest technicians and field facilitators including local resource persons (LRPs) involved in supporting the sustainable management of NTFPs. It will also be useful for researchers, community leaders and relevant organizations working in the NTFPs sector. It is expected that the forest technicians, suitably trained as a facilitator to work with the local communities, will be able to carry out the activities as well as handle relevant tools outlined in this toolkit.

What does this toolkit contain?

1. preparatory work;
2. delivery of effective training;
3. adoption of sustainable harvesting practices; and
4. proper record keeping and monitoring on the ground (see Figure 1)

Stage 1: Describes how to get prepared for the training, including rapport building and communication.

Stage 2: Guides on how to deliver training at the community level including the development of training curricula, training materials and tools.

Stage 3: Provides a description of the adoption of sustainable harvesting practices on the ground, with a brief explanation of the principles of

sustainable harvesting and harvesting tools and techniques. Specifically, this toolkit provides details on the sustainable harvesting of 5 target NTFPs i.e Harro, Barro, Amala, Guduchi and Cinnamon.

Stage 4: Presents the method of record keeping and harvest monitoring to ensure that the harvesting practices are sustainable. Each of the four stages contained in this toolkit is illustrated by examples in order to provide further clarity to the users of this toolkit.

Figure 1: Framework of the toolkit on sustainable harvesting of NTFPs

Stage I: Getting prepared

In order to be better prepared for the actual delivery of training effectively, there are three major steps to be followed with a number of activities to be performed within in each step. It starts with the procedure and activities regarding how a facilitator should prepare and set the groundwork for sustainable harvesting. The three major steps are given in Box 1.

Box 1: Major steps	
Step 1:	Prepare yourself
Step 2:	Build rapport with local communities
Step 3:	Communicate with local leaders and key persons

Step 1: Prepare yourself

Before organizing training for communities, the facilitator has to check his/her own understanding of sustainable harvesting of NTFPs and, if required, has to develop skills. The more qualified the facilitator is, the greater is the chance of getting sustainable harvesting practices implemented at the community level. The facilitator should possess the following specific qualities for developing community capacity on sustainable harvesting:

- **Proper planning:** The facilitator needs to have a proper plan and command over the plan with the flexibility of necessary adjustments as circumstances require;
- **Sufficient knowledge of the target community, including availability of resources:** Know the strengths of the community in terms of resource availability and management practices, commitment, capacity, skills, technology and policy;

- **Socialization and familiarization:** Don't avoid attending social activities, although not directly linked with forest management and NTFPs harvesting in order to build rapport with the community and familiarize yourself with social values and norms. Events such as marriage ceremonies, feasts and festivals may help to build rapport in the community;
- **Assess the situation:** Be proactive to assess the favorable situation for interventions and to make timely interventions;
- **Prepare alternative plans:** Always have a 'Plan B' (an alternative plan): If the facilitator is sure that 'Plan A' (main plan) is not going to work, s/he should use 'Plan B';
- **Prepare for the guidance:** Be prepared to provide proper guidance in situations when the community groups are not able to make appropriate decisions, by themselves.

Step 2: Build rapport with local communities

In the second step, the facilitator should build rapport with community members. This helps to foster engagement, develop a good training plan and subsequently conduct activities required for the sustainable harvesting of NTFPs. Rapport building can be done through formal discussions such as visiting community leaders and key persons including the chairperson, secretary and treasurer of FUGs. Also, it can be done through informal discussions like participating in social functions at the community level and sharing the purpose of visit. In these meetings, the facilitator and local leaders can discuss about the goals and objectives as well as the requirements and benefits of sustainable harvesting. Through this visit, the facilitator will fix the date of a meeting to prepare a preliminary plan for the training to local resource persons (LRPs) and roll out the trainings to community members. These visits and discussions will help the facilitators to familiarize themselves with the communities and encourage active participation of communities in sustainable harvesting processes.

The facilitators should also conduct a stakeholder analysis to identify, list and prioritize key stakeholders at local, regional and national level based on their level of knowledge and existing gaps, and their potential contribution towards the sustainable harvesting practices.

As planned during the rapport-building meetings, local leaders and facilitators will now arrange a meeting at the forest user group (FUGs) level, in which individuals from major interest groups should participate, including harvesters, local collectors, middlemen, traders, and processors of NTFPs. In the meeting, agenda/points for the discussion and decision could be as follows:

- » Agree on the purpose of sustainable harvesting of NTFPs;
- » Understand the community's prior knowledge and practices about sustainable harvesting;
- » Develop training strategy, training curricula and training materials;
- » Develop an activity list and timeline;
- » Identify the team members and potential trainees;
- » Find the venue, date and time schedule;

Step 3: Communicate with local leaders and key persons

The facilitator will communicate with the key participants of the training on sustainable harvesting and conduct training need assessment. The communication will also be facilitated and made through the FUGs executive members. During the communication, special focus will be given to the actual harvesters of the NTFPs including Women, Dalit, Indigenous People (IPs) and the poor or disadvantaged groups. The aim of considering these harvesters for communication and later on delivery of the training is because they are the key drivers of resource conservation and depletion or vice versa.

Stage II: Building capacity on sustainable harvesting

This stage intends to develop the capacity of the FUGs members, NTFPs harvesters, collectors, middlemen, local agents and traders through the mobilization of trained local resource persons (LRPs) on sustainable harvesting techniques.

The specific aim is to train and impart knowledge, skills and positive attitudes to the harvesters on different aspects, methods, tools and practices of sustainable harvesting. The major steps involved in this stage are given in Box 2.

Box 2: Key steps	
Step 1:	Conduct training need assessment
Step 2:	Develop a training strategy and methods
Step 3:	Develop training curricula
Step 4:	Develop local resource persons (LRPs)
Step 5:	Organize roll-out training at community level/Mobilize trained LRPs

Step 1: Conduct training need assessment

In order to encourage the use of sustainable non-timber forest products (NTFPs) harvesting methods and practices, training need assessment (TNA) is a critical component. Using an emphasis on resource management and environmental conservation, a thorough TNA may pinpoint skill, gaps and design desired training curriculum. This will assist in creating and examining current methods, potential hazards and intended results. The sustainable harvesting methods and practices along with biodiversity conservation, and sustainable forest management should be covered

in these curriculums. Through the efficient TNA, stakeholders can empower communities; promote responsible practices for the long-term conservation and management of non-timber forest products; and foster harmony between NTFPs harvesting and environmental sustainability.

Step 2: Develop a training strategy and methods

The training strategy includes the development of LRPs and their mobilization for community-level training, closely supervised by the facilitators. The training methods include lectures, case discussions, group work and field practices. In the training, a real case of specific NTFPs will be presented, where participants will be encouraged to discuss, analyze as well as find the solutions so that the training would be effective for them to adopt and apply practices of sustainable harvesting. Training lectures will be delivered using powerpoint presentations, illustrative visual aids and video shows. In the beginning, the training will focus on general principles and the concept of sustainable harvesting and good collection practices of NTFPs. WHO guidelines on good agricultural and collection practices (GACP) for medicinal plants in general, and the manuals on GACP for the targeted NTFPs developed by the Department of Plant Resources (DPR) Nepal in specific could be taken as the reference documents to develop training curricula and materials on good collection practices. Thereafter, the training will focus on the sustainable harvesting of specific NTFPs, along with a hands-on exercise on sustainable NTFPs harvesting and the use of appropriate harvesting tools. While organizing the training, the following aspects will be considered in advance.

» **Training date, time and venue:** Training dates, time and venue should be fixed in consultation with potential participants and communicated to them in advance. The venue should be selected from the safe and secure environment prospective, and should be mindful of cultural norms and sensitivities to create inclusive atmosphere. It should be selected from the safe and secure environment prospective that ensures the gender-neutral washrooms for both men and women. It should be in close proximity to local community so that it is easily accessible to the women participants. As far as possible, it is pleasant to have a well-ventilated and well-furnished room as a training venue. The venue should have a reliable electricity supply and enough space for group work. Arrangement for food, snacks, tea/ coffee, clean drinking water and accommodation is within the responsibility of the facilitators.

- **Training participants:** During the community-level meetings with key leaders and the executive committee of the FUGs, the facilitators have to discuss the criteria of how to select the training participants. The participants of the training of trainers (ToT) will be the potential local resource persons. While conducting roll-out training at the community level, the actual harvesters of NTFPs incl. women, marginalized communities and ethnic minorities will be prioritized.
- **Trainers:** The 'Training of Trainers' (TOT) sessions will be facilitated by the experienced forestry experts, and the roll-out training for the community will be facilitated by LRPs with close backup support from the facilitators.
- **Training evaluation:** At the end of the training session, the training evaluation form will be distributed to the participants. Participants will evaluate the overall training program and resource person unanimously. The aim of this training evaluation form is to learn about the effectiveness of the training and, if necessary, improve the training based on comments and feedbacks.

Step 3: Develop training curricula

The training curricula will be developed by the trainers in consultation with experts and program staffs. It is suggested to have a three-day training course with a defined set of activities on each day. A suggested training curriculum is presented in Annex 1, which is briefly described below:

The first day of the training focuses on the general introduction of the training, participants and sustainable harvesting practices. The first day begins with the registration of the participants, sharing of general rules to be followed by the participants and the collection of the expectations of the participants from the training. With the introduction of the participants and the trainers, sharing of the objectives of the training will be done by the trainer. Afterward, the general introduction on sustainability esp. focusing on forest and forest products, provision of sustainable harvesting of NTFPs in the forest management plan and principles of sustainable harvesting of NTFPs will be covered. On the first day, a brief introduction to the relevant harvesting tools and monitoring for sustainable harvesting of NTFPs will be made. The identification, listing and prioritization of the NTFPs within the forest management unit, and the review of forest

management plans, esp. to understand the existing provisions and identify gaps of sustainable harvesting of NTFPs will be done on the first day.

The second day of the training includes detailed methods and practices of sustainable harvesting of the specific species, namely, the five targeted NTFPs - Harro, Barro, Amala, Guduchi and Cinnamon.

The third day of the training focuses on the practical exercises on the ground through real harvesting of the specific target parts of the selected NTFPs. This also covers the health and safety measures for the harvesting of NTFPs. Finally, an action plan will be developed and the training will be evaluated.

For rolling-out training to local communities, this curriculum can be adapted to fit the local context. The training curricula should provide information on the duration of the training, the number of sessions and the topics to be covered during the training.

Step 4: Develop local resource persons (LRPs)

The LRPs can be selected amongst the existing ones (if available) or from other experienced people. There may already be trained LRPs in the program areas, who are capable to carry out the identified activities. If not, the facilitator needs to list the most potential LRPs for the program and initiate the selection process. Sometimes, no potential LRPs may exist in the project area and hence the facilitator needs to select potential LRPs from the adjoining villages. For details on the selection process and criteria of the LRP selection, please refer to ANSAB's toolkit on the "Development and mobilization of local resource persons (ANSAB 2010a)". After the selection of potential LRPs, they will be trained on sustainable harvesting methods and practices based on the curricula developed in Step 2.

Step 5: Organize roll-out training at community level/ Mobilize trained LRPs

Once the LRPs are trained and the training curricula and training packages are adapted to the specific needs of the community, the LRPs will be mobilized for the trainings at community level. In the initial trainings, the LRPs and facilitators will jointly facilitate the training sessions. Once the LRPs are fully confident with the required knowledge and skills, they will independently deliver the trainings at the community level.

Stage III: Adoption of sustainable harvesting methods and practices

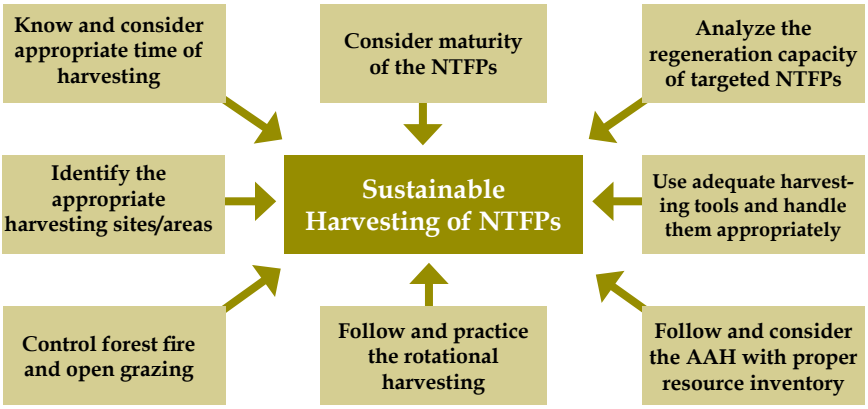
This is one of the most important stages of this sustainable harvesting toolkit. This stage guides the facilitators on the general principles, application of the harvesting methods, practices, seasons of actual harvesting and the tools used in the harvesting of NTFPs. The major steps involved in this stage are given in Box 3.

Box 3: Key steps	
Step 1:	Know the general principles of sustainable harvesting
Step 2:	Identify, prioritize & quantify the growing stock and AAH
Step 3:	Adopt key methods and practices of sustainable harvesting

Step 1: Know the general principles of sustainable harvesting of NTFPs

The harvesters, resources managers, planners and traders should strictly consider the general principles of sustainability while developing harvesting plans for NTFPs. Sustainable harvesting allow the population of the target species as well as the biodiversity in the collection area to be maintained or to increase over time. It is also important to ensure that the growing stock of NTFPs to be harvested is managed among different harvesters. The executive committee of the forest management group should also ensure that there will be no conflict while harvesting of NTFPs in the harvesting site. The general principles of sustainable harvesting of NTFPs are presented in the Figure 2 and detailed information is provided in Annex 2.

Figure 2: General principles of the sustainable harvesting of NTFPs



Step 2: Identify, prioritize and quantify the growing stock and AAH of NTFPs

Before applying sustainable harvesting practices on the ground, the harvesters, collectors and local forest users should identify, prioritize and quantify the growing stock and annual allowable harvest (AAH) of the desired NTFPs. While selecting the NTFPs, two major criteria, availability in forests and demand in the market, have to be considered. In this process, the facilitator may display photographs, herbarium or specimens of the desired species. The facilitator should also describe the local and trade name, and briefly introduce the species with a particular focus on its habitat and distribution. If there is no detailed inventory of NTFPs and no prior estimation of AAH, the facilitator and harvesters have to conduct a participatory resource mapping and detailed NTFPs inventory. For details on participatory mapping and inventory, "Toolkit on participatory inventory of NTFPs (ANSAB, 2010b)" could be referred. The AAH value of the major tradable NTFPs species of Nepal is provided in Annex 3.

Step 3: Adopt key methods and practices of the sustainable harvesting

Adequate harvesting methods and practices vary from species to species. NTFPs can be grouped into 7 categories based on their harvestable parts as suggested by Forest Regulations, 2022 of Nepal. They are i) Root, rhizome & bulb harvesting; ii) Bark harvesting; iii) Leaf and stem harvesting; iv) Flowers/flosses harvesting; v) Fruits and seeds harvesting; vi) Whole plant

harvesting; and vii) Gum, resin and lohawan harvesting. The general idea of sustainable harvesting is that the NTFPs are not harvested prematurely or above optimum population size or beyond their regeneration capacity, or before the harvesting season.

The key things to be considered for sustainable harvesting of NTFPs are the life cycle of the targeted NTFP species incl. the time for specific developmental stages; and growth stages of fruits, seeds and other valuable parts. The ecological factors such as rainfall patterns, temperature, humidity, and soil conditions that favor the growth and development of the targeted NTFP species are equally important. The sustainability in terms of natural regeneration of the NTFPs population and minimizing the negative impacts on the forest ecosystem are essential. On the other hand, the legal and regulatory provisions are also considered to ensure the sustainability of the NTFPs.

While selecting the appropriate tools for the sustainable NTFPs harvesting, the harvesting tools should minimize damage to the NTFP resources. For example, use of appropriate pruning scissors instead of sharp or blunt equipment is necessary to avoid damage to the NTFPs. The tools should be locally available and should be rust and chemical free. The local knowledge and practices respecting the traditional norms and practices related to NTFPs harvesting should also be considered. The tools should have low-impact on the trees or soil and should be durable, easy to maintain, and repairable locally.

Adequate safety and health practices should be adopted for the protection of harvesters from occupational safety and health hazards. Health and safety provisions mentioned in employment conditions in the National Forest Stewardship Standards for Nepal (NFSS) could be taken as a reference document for the provision of adequate occupational safety and health measures.

For more on sustainable harvesting of NTFPs, please refer to ANSAB (2010b), ANSAB (2060), Subedi et. al. (2017) and DPR (2016, 2017 & 2020).

Details on the sustainable harvesting practices of five targeted NTFPs are presented in Annex 4 to 8.

Stage IV: Record keeping and monitoring

Stage four describes the documentation and record keeping of each activity that has been carried out in the community forests or other forest management units, and their monitoring. The specific aim of this stage is to develop a system of record keeping and monitoring of how these performed activities have contributed to achieve the intended goals of sustainable harvesting of NTFPs. The two steps involved in this stage are given below.

Step 1: Record keeping

In this step, the facilitator/forest technician will facilitate the FUG members or resource managers to maintain each and every records of the work done in their community forests or in any forest management units or areas. The records of the following activities should be well recorded and maintained, as a minimum:

- Copy of the forest operation plan;
- Meeting minutes of the executive committee for setting the rules for the harvesting of NTFPs from their forest (incl. date, species and site/ or block of harvesting, method of harvesting);
- Minutes of the training on sustainable harvesting of NTFPs organized in the FUGs;
- Record of the number of harvesters trained on the sustainable harvesting of NTFPs;
- Minutes of the general assembly organized by the FUGs;
- Minutes of the public hearing or public audit organized by the FUGs;

» Minutes of any other activity related to sustainable harvesting and sustainable forest management.

» Meeting organized/ held at CFUGs level.

Step 2: Monitoring

In this step, the facilitator/forest technician will assist FUG members or resource managers in preparing for regular monitoring, with the objective of ensuring sustainable harvesting of forest products through the use of appropriate tools and techniques. FUGs could develop a monitoring plan incl. the calendar of events to observe the harvesting practices in their forests.

The facilitator should provide support to the resource managers in order to conduct participatory monitoring that involves key stakeholders. Joint monitoring will involve the participation of key stakeholders, such as the local government, divisional forest office, associations of forest users, and local NGOs. This process will include reviewing the Operational Plans (OPs) or Management Plans (MPs) of the respective FUGs, conducting interviews with executive committee members and forest users, and making field visits.

A participatory approach can also be applied to periodic (semi-annual or annual) monitoring and evaluation of sustainable harvesting practices, which will provide suggestions for future improvements. The monitoring and evaluation should be conducted by comparing the current situation against the baseline, focusing on key performance indicators such as improved sustainable harvesting of Non-Timber Forest Products (NTFPs), enhanced forest management, reduced incidents of illegal operations related to NTFPs, decreased instances of forest fire and uncontrolled grazing, improved forest condition, increased number of visitors, and higher household income. These suggestions can be incorporated into management practices to promote sustainable harvesting.

The resource manager should develop a long-term monitoring plan for assessing the impact. Proper communication and sharing of the plan with relevant agencies should be established to integrate the monitoring plan into local development plans, such as municipal plans, provincial plans, and the Divisional Forest Office.

ANNEX

Annex 1: Suggested training curricula on the sustainable harvesting of NTFPs

DAY-1		
Time	**Title**	**Description**
8:30-9:00	Registration	Registration of the participants
9:00-9:30	Introduction & Orientation	Introduction and objectives of the training
		Collection of expectations from this training
		Rules to be followed during training
9:30:-11:00	Sustainability & legislative measures	Introduction of the NTFPs, definition, classification, distribution, availability
		General principles of sustainable harvesting of NTFPs and its importance from conservation and local livelihood
		Forest law related to NTFPs (e.g. collection permit, measurement, checking, chhodpurji (transport permit), seal, revenue
11:00-11:30		Tea/Coffee Break
11:30-13:00	Harvesting methods	General introduction on sustainable harvesting methods by NTFPs types (e.g, whole plants or specific plant parts such as root/rhizome, leaf and fruit/flower etc.) (Details on each NTFP types to be followed on 2nd day)
		Introduction of harvesting tools and techniques.
		Record keeping and monitoring for sustainable NTFP's harvesting.
13:00-14:00		Lunch Break
14:00-15:30	Reviewing NTFPs harvesting provisions in management plans	Group exercise on: 1. Sustainable NTFPs harvesting provisions and practices in the District Forest Management Plan (DFMP) and specific local level forest management unit (e.g. CFUG, BZCFUG, collaborative forest) 2. Identification, listing and prioritization of the most potential NTFPs at local level 3. Identification of the gaps on sustainable harvesting of NTFPs in management plans
15:30-16:00		Tea/Coffee Break

16:00-17:30	Sharing of group work	Sharing of group work on the provision of harvesting of NTFPs, and on major gaps in the management plans
DAY-2		
Time	**Title**	**Description**
9:00-9:15		Recap of the day
9:15-10:15	Sustainable harvesing methods and practices	Sustainable harvesting methods and practices of leafy NTFPs e.g. Cinnamon leaf
10:15-10:45		Tea/Coffee Break
10:45-12:00	Sustainable harvesing methods and practices	Sustainable harvesting methods and practices of bark NTFPs e.g. Cinnamon bark
12:00-13:15	Sustainable harvesing methods and practices	Sustainable harvesting methods and practices of stem/whole plant NTFP e.g. Guduchi
13:15-14:15		Lunch break
14:15-15:30	Sustainable harvesing methods and practices	Sustainable harvesting methods and practices of fruit NTFPs e.g. Harro, Barro, Amala
15:30-16:00		Tea/Coffee Break
16:00-17:30	Sustainable harvesing methods and practices	Sustainable harvesting methods and practices of root/rhizome/bulb NTFPs e.g. Asparagus root
DAY-3		
Time	**Title**	**Description**
9:00-9:15		Recap of the day
9:15-13:00	Field visit	Brief introduction and demonstration of the harvesting tools
		Field demonstration of NTFPs harvesting practice (by visiting in nearby forest)
13:00-14:00		Lunch break
14:00-15:30	Preparing action plan	Development of action plan
15:30-16:00		Tea/Coffee Break
16:00-17:00	Training evaluation and closing	Recap of the overall training
		Evaluation of the training
		Training closing with a few remarks

Annex 2: Suggested training evaluation form

The participants are requested to fill the form and provide feedback and suggestions for future improvements. For the sake of confidiatility, participants may not have to disclose your name and other details if you do not want to.

General information (Optional)
Name of the participant:
Organization:
Contact address:
E-mail:

Areas of Evaluation	Rating					Remarks
	Excellent	Good	Fair	Needs Improvement	Poor	
Training course contents - including presentation, field visits, field demonstration interactions						
Resource persons-ability to deliver the content, teaching methodology, friendliness						
Duration - length of the training and field demonstration						
Management and logistics - comfort, ease of travel, food, transportation						
Training expectations - meeting your training needs						
Availability of reading materials						
Effectiveness - how this ToT will help you in your own work in the coming days						
If others (please indicate)						

Other recommendations (if any) and suggestions to make such ToTs more effective:

Annex 3: General principles of sustainable harvesting

Identify the appropriate potential sites/area of target NTFPs: This is one of the most important general prerequisites of sustainable harvesting as the harvesters should identify and select those areas or sites or blocks in the forest, which rich in the target resource. (i) Harvesters should not

harvest NTFPs from areas, in which the target resource is sparse or less abundant. (ii) Harvesters should not harvest NTFPs near water sources or springs as this might have an adverse impact on the water sources and might cause the pollution of springs. It is also important to ensure that the stock of the NTFPs to be harvested is managed among different harvesters, and the executive committee of the forest management group should ensure that there will be no conflict while harvesting of NTFPs in the harvesting site.

Know and consider appropriate parts to be harvested and harvesting season: For the targeted NTFPs species to regenerate as intended, the right harvesting season is essential. Therefore, the harvesters need to be aware of the ideal harvesting season. Seasonal variations, biological processes, plant phenology, and physiography all affect the time of year that NTFPs are harvested. In particular, the NTFPs harvesting season runs from the end of autumn until the start of winter. In order to ensure natural regeneration and conserve the population of the target resource and its habitat, harvesters should always harvest the NTFPs after their maturity and dispersal of the seeds/fruits, unless seeds or fruits are the target plant part to be collected. The appropriate harvesting season of major NTFPs has been provided below in the following Table.

Table: Appropriate season of harvesting of major NTFPs of Nepal

Local Name	Scientific Name	Parts Harvested	Harvesting Season
Alainchi	*Amomum subulatum*	Fruit	Mid August-November
Amala	*Phyallanthus emblica*	Fruit	September-November
Atis	*Delphinium himalayai*	Root	September-November
Barro	*Terminalia bellirica*	Fruit	November-March
Bel	*Aegle marmelos*	Fruit	March-June
Bodhichitta	*Ziziphus buddhensis*	Fruit	August
Bojho	*Acorus calamus*	Rhizome	September-February
Chiraito	*Swertia chiraita*	Whole plant	November-December
Chiuri	*Bassia butyracea*	Fruit/Nut	June-August
Gucchichyau	*Morchella conica*	Whole plant	April-July
Guduchi	*Tinspora cordifolia*	Stem	February-April
Harro	*Terminalia chebula*	Fruit	December-March
Jatamansi	*Nardostachys grandiflora*	Rhizome	September-December

Kaulo	*Machilus odoratissima*	Bark	January-February
Kurilo	*Asparagus racemosus*	Rhizome	September-November
Kutki	*Neopicrorhiza scrophulariiflora*	Rhizome	September-December
Lapsi	*Choerospondias axillaris*	Fruit	September-January
Padamchal	*Rheum australe*	Rhizome, petiole and leaf	November-May
Pasanbed	*Bergenia ciliata*	Underground stem	October-November
Rittha	*Sapindus mukorossi*	Fruit/Nut	October-December
Rudraksha	*Elaeocarpus sphericus*	Fruit/Seed	December-February
Satuwa	*Paris polyhylla*	Rhizome	September- November
Serpagandha	*Rauvolfia serpentina*	Root	November-March
Setakchini (Khiraula)	*Polygonatum chhirifolium*	Rhizome	October-December
Siltimur	*Lindera neesiana*	Fruit	July-September
Sugandhawal	*Valeriana jatamansi*	Rhizome	September-November
Tejpat (Bark)	*Cinnamomum tamala*	Bark	October-May
Tejpat (Leaf)	*Cinnamomum tamala*	Leaf	September-May
Timur	*Zanthoxylum armatum*	Fruit	September-December

Source: ANSAB 2010b

Consider the maturity of the NTFPs: The harvesters must consider the maturity (i.e. age and size of the plant or plant parts) as pre-mature harvesting of the NTFPs is one of the major causes of resource depletion and extinction of the species. Thus, for the purpose of sustainable resource conservation and quality raw material, harvesters should harvest only mature plants or plant parts. The maturity of NTFPs varies with season, environmental factors, biological processes, life cycle, phenology and the physiography of the plants.

Analyze the regeneration capacity NTFPs: The harvesters need to review and consider the regeneration capacity of the NTFPs. The population of both harvestable NTFPs and their regeneration (future harvestable plants) should be identified and known within the forest and blocks or harvesting sites. Based on the regeneration capacity of the species, harvesting parts of only the mature plants should be harvested without disturbing the whole plant. To know the regeneration capacity of the NTFPs we need to review the forest management plans in case the NTFPs are harvested from FUGs or district five-year forest management plans in case the NTFPs are harvested from Government managed forests.

Use adequate harvesting tools and handle them appropriately: The harvesters must use appropriate and efficient harvesting tools during the harvesting of NTFPs. Harvesting tools should always be neat and clean (without rust, dust and soil). Thus, before using, these tools need to be cleaned. Harvesters should not use very sharp knives, sickles or axes while removing the bark of a tree. Similarly, tools with a wide surface area (e.g. shovel, spade, faudo, kodali) should not be used while extracting the underground parts of NTFPs, such as roots, rhizomes, tubers and bulbs. Instead, tools like nail (kuto or bauso) should be used which may cause no or less damage to the underground parts.

Control forest fire and open grazing: A large proportion of NTFPs are herbs, climbers and creepers; they are facing these factors of disturbances. Fire and grazing in forests cause serious damage to these plants. Most trees and shrubs, however, escape the damage to a certain extent. Repeated fires during summer cause irreversible damage to NTFP species, herbs and other ground flora. These plants do not withstand intense heat and succumb to fires. Several medicinal herbs have become locally rare due to repeated forest fires. Annual fires during summer create drier conditions resulting in a loss of moisture-loving species. The fires also alter soil properties resulting in poor growth of some of the species. Likewise, when a large number of livestock are grazing on an area, many species get trampled by their hooves and the tender parts are eaten by animals. The flowers, fruits, etc. are also eaten, resulting in poor regeneration. It would therefore appear that fire and grazing together create serious adverse effects on the ground flora including NTFPs. Thus, harvesters or resource managers should be careful and make efforts to control or minimize forest fires and grazing in their forests and in areas that are rich in NTFPs.

Follow and practice the rotational harvesting of NTFPs: Continuous harvesting of NTFPs from a specific area will result in the decline of these plant resources. The NTFPs being common resources, most harvesters tend to collect the maximum quantity covering all the available areas following unsustainable harvesting practices. For sustainable harvesting, it is necessary that some area is given a rest for some time whereas collection may continue in other areas. It is always good to either check the literature or derive from monitoring how long the regeneration of a certain plant or population takes. Resource users should be motivated to practice rotational harvesting of NTFPs in the FUGs and Government managed forests. The rotational period for harvesting is dependent upon the regeneration of the targeted NTFPs. For example, the bark of cinnamon

regenerates in about 3 years, so the rotational period for harvesting without destroying the tree could be 3 years.

Follow and consider the Annual Allowable Harvest (AAH) of NTFPs: This is one of the most important principles of sustainable harvesting of NTFPs, because the sustainable harvestable quantity, the population of target species, and the regeneration increment rate need to be identified before harvesting. The harvesting frequency should not exceed the annual increment of the NTFPs and should guarantee the stable population of that species in the long run. Also, the harvesters should be careful during the harvesting of NTFPs that there is no or only minimal damage or impact to the other plant species while harvesting desired NTFPs species. The annual allowable harvest amount of the major NTFPs species has been provided in the following Table.

Table: Annual allowable harvest amounts of major NTFPs species of Nepal

Local Name	Scientific Name	AAH (%) from specific block in a rotational basis
Amala	*Phyallanthus emblica*	90
Atis	*Delphinium himalayai*	80
Barro	*Terminalia bellirica*	70
Chiraito	*Swertia chiraita*	75-80
Chiuri	*Bassia butyracea*	90
Gucchichyau	*Morchella conica*	80
Guduchi	*Tinspora cordifolia*	90
Harro	*Terminalia chebula*	70
Jatamansi	*Nardostachys grandiflora*	80
Kurilo	*Asparagus racemosus*	80
Kutki	*Neopicrorhiza scrophulariifora*	80
Rittha	*Sapindus mukorossi*	80
Satuwa	*Paris polyhylla*	75
Sugandhawal	*Valeriana jatamansi*	80
Tejpat (Bark)	*Cinnamomum tamala*	20
Tejpat (Leaf)	*Cinnamomum tamala*	70
Timur	*Zanthoxylum armatum*	80

Source: ANSAB 2010b

For more details on the AAH please refer to the toolikit on participatory inventory of non timber forest products (ANSAB, 2010b).

Annex 4: Sustainable harvesting of Cinnamon (Tejpat)

Scientific name: *Cinnamomum tamala* (Buch.-Ham)
Family: Lauraceae
Local name: Tejpat, Dalchini, Sinkauli
Common name: Nepalese Cinnamon, Bay leaf

Brief introduction
It grows in forest and farm in Nepal between 450-2100m elevation (Lamichhane & Karna, 2009). It is a medium sized (about 8-12m high) evergreen tree, mostly found in Churia and the Mid-hill region of Nepal. Flowers are stalked, white to yellowish, small arising in the tip of branches in March to May. Fruits are light yellowish colored, green when young and black when mature. Leaves and bark are mostly used for commercial purpose (Sharma & Nautiyal, 2011).

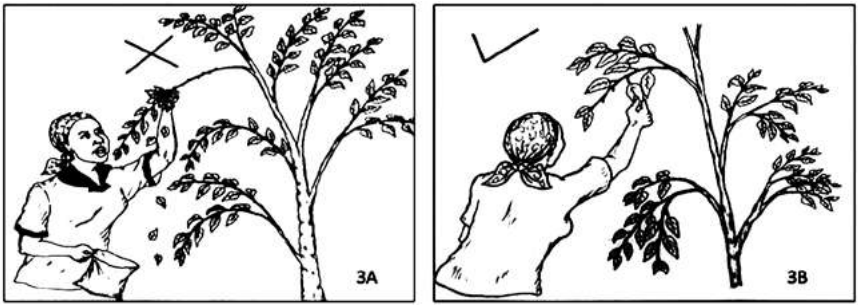
Habitat and distribution
Naturally, it is distributed in 33 districts of Nepal. It requires moist, shade and stream sides for its proper growth and development. Northern aspect is more suitable than the southern aspect.

Harvestable parts and uses
With the aromatic flavor along with the medicinal properties, the leaves and barks are used for spices and medicine. Leaf oil is used in perfumery and it is antibacterial in nature (Thapa & KC, 2017).

Harvesting methods for leaves
While harvesting leaves, harvesters should be aware on and adopt appropriate safety measures such as ladder, mask and gloves for their protection. The general principles of harvesting are:

- Select healthy and vigorous trees for harvesting;
- Harvest leaves from lower two-third old branches of the tree between September and May by using clean and rust free knifes or sickles;
- Provide sufficient care to avoid damage to the bark and branches of the tree;
- Avoid collection of leaves during rain and in early morning hours to protect the collected leaves from fungal attack;
- In case of small and young trees, harvest the leaves by hand;
- Carryout pruning of branches up to 1.5 m above ground from 2-3 years to produce good quality leaves.

Figure 3A: Showing unsustainable harvesting practice of leaves in left
Figure 3B: Showing sustainable harvesting method of leaves



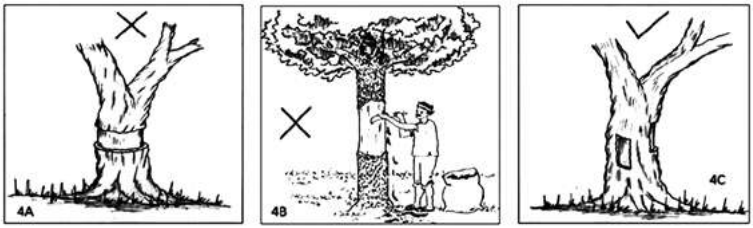
Source: DPR, 2020

Harvesting methods for barks

The general principle of bark harvesting are:

- Select a resource rich area as indicated in the forest operational plan for harvesting;
- Select healthy and vigorous trees with an age of >5 years and a height of about 3-5m with 6-10cm in diameter from main branch;
- Harvest barks from October to May by using clean and rust free knifes or sickles;
- Harvest the Cinnamon bark when the trees' tender leaves are blooming;
- Do not remove bark form whole stem making a ring (refer to Figure 4A);
- Harvesters should always harvest bark in small patches at alternate side of the stem (refer to Figure 4C);
- Do not use sharp knifes/sickles or axes for harvesting the bark (refer to Figure 4B);
- Harvest only 20% of bark from a tree in an interval of 3 years;
- Harvesters should immediately use cow dung at the debarked places of the stem to avoid the attack of insects and other pests.

Figure 4A, 4B and 4C: Do not remove bark form whole stem making a ring and do not use sharp knifes/sickles or axes while removing the bark; remove bark in in small patch at alternate sides of the stem



Source: DPR, 2020

Annex 5: Sustainable harvesting of Barro

Scientific name: *Terminalia bellirica* (Gaertn.) Roxb.
Family: Combretaceae
Local name: Barro
Common name: Belleric myrobolan

Brief introduction
It is a deciduous tree with a height upto 50m and a diameter upto 3m with a rounded crown (Orwa et al.2009). The frequently buttressed bole at the base is branchless up to 20m. The bark is bluish or ashy-grey covered with numerous fine longitudinal cracks, the inner bark is yellowish. Leaves are large, glabrous, alternate, broadly elliptic to obovate-elliptical, 4-24cm x 2-11cm. Secondary and tertiary venation prominent on both surfaces, clustered towards the ends of branchlets. Petioles are 2.5-9cm long. Young leaves are copper-red in colour and soon becoming parrot green, then dark green. Flowers are sessile, yellowish, in axillary slender spikes, and odor offensive. Flowering period occurred from October to November. Fruiting period starts from November to February (Orwa et al. 2009).

Habitat and distribution
It is distributed mostly in the tropical regions throughout India, Pakistan, Srilanka, Burma, Thailand, Indonesia, China, Malaysia and Nepal. It is distributed at an elevation of 300m-1100m in Eastern and Central Nepal. It is common in *Shorea robusta* (Sal) forests.

Harvestable parts and uses
The harvestable part, the fruits are about 2-3cm in radius, spindle shaped, divided unclearly into 5 ridges, brown in color and slightly hairy externally. The fruit tastes slightly bitter. Fruits are used as a digestive, strengthening teeth and prevention in gum bleeding. In medicine fruits are used for fever and seeds are used to cure bronchitis. Fruits soaked overnight are used to treat eye infections. Dust of dried fruit carp of Barro (when mixed with boiled water) is used as medicine to treat cough, asthma, constipation etc. It is also used as medicine for diarrhea, respiratory problems and headache. It is one of the three important constituents of triphala used in Ayurvedic medicine.

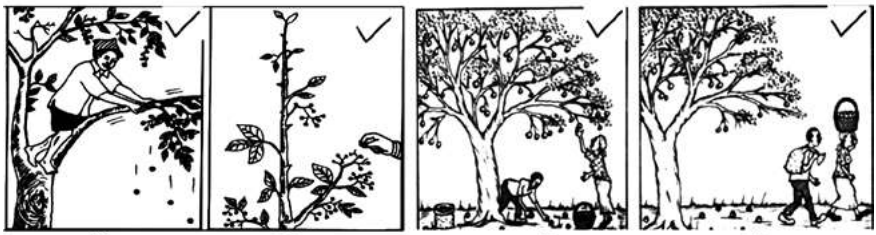
Harvesting methods
While harvesting the fruits, harvesters should be aware on and adopt

appropriate safety measures such as ladder, and appropriate clothes for their protection. The genral principles of harvesting are:

- Select resource rich areas as indicated in the forest operational plan for harvesting of fruits;
- Select healthy and vigorous trees for harvesting;
- Harvest ripe fruits between November and March from old branches only;
- While harvesting the fruits, the branches should not be cut or removed from the tree (refer to Figure 5A)
- Put the tarpaulin or flat cloth/bed sheet on the ground below the tree, shake the branches, and collect the fruits on the ground (refer to Figure 5B);
- In case of small trees, harvest the fruits by hand instead of cutting the branches (refer to Figure 5C to 5E);
- Harvest only 70% of the total fruits from a tree leaving about 30% of the ripened fruits in a mother tree to promote natural regeneration;
- Provide sufficient care to avoid damage to the bark and branches of the trees.

Figure 5A: Shows the unsustainable harvesting practice for fruits by cutting branches of tree and Figure 5B to 5E: Shows the sustainable harvesting method of fruits.

Source: DPR, 2020



Annex 6: Sustainable harvesting of Harro

Scientific name: *Terminalia chebula*
Family: Combretaceae
Local name: Harro
English Name: Chebulic myrobolan

Brief introduction
Harro is a deciduous tree with a height of about 50-80 feet. It has round crown and spreading branches. The bark is dark brown with some longitudinal cracks. Leaves are ovate and elliptical, with two large glands at the top of the petiole. The flowers are monoecious, dull white to yellow, with a strong unpleasant odour, borne in terminal spikes or short panicles. The flowers appear May-June, the fruits July-December. The fruit or drupe is about 1-2 inches in size. It has five lines or five ribs on the outer skin. Fruit is green when unripe and yellowish grey when ripe. Fruits are collected from January to April, fruit formation starts from November to January (Joshi et al., 2017).

Habitat and distribution
This species is widely distributed throughout south and southeast Asia including tropical regions of India, Pakistan, Srilanka, Burma, Thailand, Indonesia, China, Malaysia, and Nepal. It is distributed at elevations of 150m-1100m in Eastern and Central Nepal. It is common in tropical and sub-tropical forests and abundant in *Shorea robusta* (Sal) and *Terminalia belerica* forests (Pyakurel & Gurung, 2017).

Harvestable parts and uses
The harvestable part, the fruits taste somewhat sweet, a little sour and somewhat bitter. Bark, fruits and seeds are used as medicines. Mature or raw fruits are mainly used in the Ayurvedic medical industries. It is used as a medicine to treat skin diseases, leprosy, fever, and heart diseases. It is one of the three important constituents of triphala used in Ayurvedic medicine.

Harvesting methods
While harvesting the fruits, harvesters should be aware on and adopt appropriate safety measures such as ladder and appropriate clothes for their protection. The general principles of harvesting are:

- Select healthy and vigorous trees from resource rich areas as indicated in the forest operational plan for harvesting;
- Harvest fruits from old branches only in ripe form from December to March;
- While harvesting the fruits, the branches should not be cut or removed from the tree (refer to Figure 5A above);
- Put the tarpaulin or flat cloth/bed sheet on the ground below the tree, shake the branches, and collect the fruits on the ground (refer to Figure 5B above);
- In case of small trees, harvest the fruits by hand instead of cutting the branches (refer to Figure 5C to 5E above);
- Harvest only 70% of the total fruits from a tree leaving about 30% of the ripened fruits in a mother tree to promote natural regeneration;
- Provide sufficient care to avoid damage to the bark and branches of the trees;

Annex 7: Sustainable harvesting of Amala

Scientific Name: *Phyallanthus emblica*
Family: Euphorbiaceae
Local name: Amala, Rikhiya
Common Name: Gooseberry, Embellic myrobolan

Brief introduction
Amala is a medium sized, deciduous tree, which grows up to a height of 15-19m. Leaves are simple, hairless, linear-oblong blunt and are light green in color with 1-1.5cm long and 0.2-0.3cm wide with a distinct midrib. Flowers are minute, greenish yellow and flowering occurs from May to August. Leaves start falling from November to December, while leaves sprouting occurs from mid-February to mid March. Fruits are small sized, round and green in color with six ridges and they appear on the tree from August to December. The fruit harvesting period starts from September to December.

Habitat and distribution
Amala is widely distributed and found throughout tropical and subtropical ranges mostly abundant in deciduous forests throughout Nepal, China, India, Bhutan, East-Burma, Malaysia, etc. Naturally distributed at

elevations between 100m-1600m throughout Nepal. It is also found in slope areas, forests near roads and places with adequate sunlight (Subedi et. al., 2017 and Pyakurel & Gurung, 2017).

Harvestable parts and uses

The harvestable part, the fruits are greenish in color and dried fruits are light brown to black in color, wrinkled, slight sour in taste and contain a high amount of vitamin C Fresh fruits can be eaten raw or by making pickles. It's consumption is good in indigestion, anemia, and jaundice. Fresh fruits are used to cure urine related diseases and dry fruits for diarrhea and dysentery. In Ayurvedic medicine, it is used in manufacturing Chyawanprash and Trifala as an important ingredient.

Harvesting methods

While harvesting the fruits, harvesters should be aware and adopt appropriate safety measures such as ladder, appropriate clothes for their protection, while harvesting fruits for their protection. The general principles of harvesting are:

- Select healthy and vigorous trees from resource rich areas as indicated in the forest operational plan;
- Harvest fruits from old branches only when they are fully ripe from September to November by handpicking, swinging the branches, gently biting by stick, and lopping small branches;
- For harvesting the fruits, the branches should not be cut or removed from the tree (refer to Figure 5A above). In case of small trees harvest the fruits by hand (refer to Figure 5C and 5D above);
- Put the tarpaulin or flat cloth/bed sheet on the ground below the tree, shake the branches, and collect the fruits on the ground (refer to Figure 5B above);
- Harvest only 90% of the total fruits of a tree leaving 10% of the ripe fruits in a tree as mother plant seeds to promote natural regeneration;
- Provide sufficient care to avoid damage to the bark and branches of tree.

Annex 8: Sustainable harvesting of Guduchi

Scientific Name: *Tinospora cordifolia*
Family: Menispermaceae
Local name: Guduchi, Gurjo, Chini lahara
Common name: Tinospoera, Heart leaf plant

Brief introduction
It is a liana (woody climber) and grows primarily in the wet tropical biomes (Wu & Raven, 2008). It is a large extensively spreading, perennial woody climber with succulent stems. It is a deciduous climber with rambling stems, bark smooth, peeling in papery pieces, with scattered wart-like lenticels, bright green underneath the papery bark. Leaves are simple, alternate, cordate-ovate heart shaped, ovate, alternate or lobed, about 7-9 nerved and membranous (Albinjose et al., 2015; Dwivedi et al., 2016; Meshram et al., 2013). The thread like, aerial and long filiform roots are usually arising from the branches (Singh et al., 2003). Its flowers bloom in summer, flowers are in axillary position, 2-9cm long raceme on leaflet branches, unisexual, small and yellow in colour. Male flowers are clustered while female are usually solitary. There are six sepals that are arranged in two whorls and are yellowish green in colour (Joshi et al., 2016). Fruit of this plant are fleshy, orange reddish when fully matured. Flowering occurs in May-June whereas fruiting occurs in September-October (Shetty et al., 2010).

Habitat and distribution
The native range of this species is the Indian Sub-continent to China and Indo-China. Mainly found in India, Bangladesh, Cambodia, China South-Central, China Southeast, East Himalaya, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam. In Nepal it is distributed at elevations between 300-1500m in Terai and Mid-hill regions (Pyakurel & Gurung, 2017 and Wu & Raven, 2008). It grows in a wide range of soil, acidic to alkaline with moderate level of soil moisture (Tirtha, 2007).

Harvestable parts and uses
Climbing woody stems are the harvestable part of Gurjo. It is slightly bitter, somewhat acerbic and sweet in taste. The plant has diverse medicinal property and help to boost the immune system and body's defense against Micro-organisms and virus (Tirtha, 2007). Used for centuries by ayurvedic practitioners to boost the immune system in patients with chronic illnesses,

such as jaundice, malaria, asthma, bronchitis, skin disorders, urinary disease, leprosy etc. Recently people took Gurjo as a natural remedy to reduce their risk of infection during the COVID-19 pandemic. It is also used in the preparation of herbal teas and as a tonic.

Harvesting methods

While harvesting the stem, harvesters should be aware on and adopt appropriate safety measures such as ladder, and appropriate clothes for their protection. The general principles of harvesting are:

- Select healthy and vigorous stems from resource rich areas as indicated in the forest operational plan;
- Use rust and toxicity free clean and dry knifes or sickles for harvesting of stems;
- Harvest the mature Gurjo plants (stem) from November to February;
- Harvest shoots/stems of the plant above 15-30cm from the ground level;
- Follow the block rotational harvesting system and harvest stems from in a rotation of 2 years;
- Provide sufficient care to avoid damage to the bark and branches of a tree on which the Gurjo stem is hanging;
- Do not harvest whole stems of Gurjo, it might have a negative impact on the regeneration of the plant.

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