

Training Module No. 11

One Day Training Programme on ANR and Silvicultural Operation

Date : _____

Venue: Preferably the treatment area

Registration of Participants (30 Minutes Prior to the Start of First Session)

Participants: 30 Persons

- Team members of Partner NGOs
- Working group members of VSS involved in direct implementation,
- Concerned forester and forest guard

Objectives of the Training

The objective is to enhance and improve conceptual and practical knowledge on Aided Natural Regeneration Plantation and various Silvicultural operations to be implemented in the ANR sites.

Training Outcomes

1. Participants will have clear understanding of various steps involved in Aided Natural Regeneration Plantation and various Silvicultural operations.
2. Enable the participant to undertake Aided Natural Regeneration Plantation and various Silvicultural operations involved in forest management in the VSS treatment area.

Pre-requisite for this Training:

- The VSS members/Field officials should be selected prior to the training.
- Micro plan should be ready with information about the species to be raised.
- A demonstration site for the ANR should be finalised for the training.
- The areas for ANR plantation with the species to be planted should be finalized as per the micro plan.
- Number of seedlings needed to be planted (species wise) should have been finalized.
- List of participants (VSS members) having inclination for nursery activities should be selected.

Training Methodology: On the site demonstration of ANR techniques.

Materials and Aids Required

Spades, (small & large), pick axes, Wooden hammer, Ropes, cotton or steel tape, Wooden pegs, Khurpa, sickle, axes, Wooden planks, stones, bamboo splinters.

Details of Session Plan

Duration (Min)	Key Steps/ Key activities	Method	Aid/ Materials Required
Session 1: Introduction			
10	1. What is Assisted Natural Regeneration? 1.1 Natural regeneration. 1.2 Community approach. 2. Why Practice ANR?	Discussion during the walk around in the nursery	<ul style="list-style-type: none"> • Field note book, Pen etc.
50	3. Constraints of ANR 4. Steps Involved in ANR a) Clarify goals and objectives b) Select appropriate sites c) Protect the area from fire and grazing	Lecture/Interaction and Field demonstration	<ul style="list-style-type: none"> • Field note book, Pen etc. • Handouts • Dry-wipe Board with Markers
Session 2:			
60	d) Identify and mark woody plants e) Ring weed. f) Suppress the grass layer throughout the site g) Thinning and pruning	Lecture/Interaction and Field demonstration	<ul style="list-style-type: none"> • Field note book, Pen etc. • Field equipments • Handouts • Dry-wipe Board with Markers
Session 3:			
60	5) Choosing sites and strategies	Lecture/Interaction and Field demonstration	<ul style="list-style-type: none"> • Field note book, Pen etc. • Field equipments • Handouts • Dry-wipe Board with Markers
Session 4:			
60	6) Natural regeneration 7) Site matching.	Lecture/Interaction and Field demonstration	<ul style="list-style-type: none"> • Field note book, Pen etc. • Field equipments • Handouts

Session 5:			
30	8) Implementation	Lecture/Interaction and Field demonstration	<ul style="list-style-type: none"> • Field note book, Pen etc. • Field equipments • Handouts
30	Group interaction and questions from participants	Discussion	
Feedbacks and Vote of Thanks			

Course Materials

Session 1:

Introduction

Degradation of forests continues to cause serious problems worldwide and deforestation now is the second largest source of greenhouse gas emissions. A variety of measures have been tried to address these problems at different levels, with varying degrees of success, the more recent being the options around Reduced Deforestation and Degradation. Communities around the world have also shown their ingenuity in manipulating forests and ecological succession to reverse the process of deforestation.

1. What is Assisted Natural Regeneration?

Assisted natural regeneration (ANR) is a flexible approach to reforestation that,

- Uses natural regeneration of forest trees (“wildlings” or natural seedlings, and sprouts).
- “Assists” natural regeneration by preventing fire pressing species, and helping trees grow faster in other ways. ANR is sometimes called “accelerated natural regeneration.”
- Plants additional trees when needed or wanted (enrichment planting).

1.1 Natural regeneration.

It is the renewal of Forest crops by seed sown or by coppice or root sucker. When regeneration obtained from seed forms a crop, it is called seedling crop which is defined as a crop consisting of seedling neither planted nor of coppice or root sucker origin but originating in-situ from natural regeneration. ANR also stimulates new natural regeneration from seed from nearby natural forest. In both cases, by using naturally occurring trees, ANR avoids the problem of matching species to the site. The encouragement of these species can help restore a diverse native forest.

1.2 Community approach.

Assisted natural regeneration has been successfully implemented in village projects on communal / public lands/ forest land. Full community participation is necessary to prevent fire. ANR has been used in programs giving villagers legal tenure on national lands, in return for the assistance of the villagers in converting grasslands and mixed brush lands into forest. ANR techniques can also be used on individual farms, especially for fallows and agro forests. The key element of ANR is to control fire, restrict grazing, suppress the weed growth and involve the local people.

2. **Why Practice ANR?** Assisted natural regeneration (ANR) is a simple, low-cost forest restoration method that can effectively convert deforested lands of degraded vegetation to more productive forests. The method aims to accelerate, rather than replace, natural succession processes by removing or reducing barriers to natural forest regeneration such as soil degradation, competition with weedy species, and recurring disturbances (e.g., fire, grazing, and wood harvesting). Compared to conventional reforestation methods involving planting of tree seedlings, ANR offers significant cost advantages because it reduces or eliminates the costs associated with propagating, raising, and planting seedlings. It is most effectively utilized at the landscape level in restoring the protective functions of forests such as watershed

protection and soil conservation. ANR techniques are flexible and allow for the integration of various values such as timber production, biodiversity recovery, and cultivation of forest crops, fruit trees, and non-timber forest products in the restored forest.

Where the ANR approach has been implemented successfully, grasslands/degraded land develop into secondary forest. Compared to conventional reforestation with a single tree species, the ANR approach may have social, environmental, and cost advantages. Depending upon the site, it has the potential to:

- Regeneration of degraded forests and converting grassland to forest.
- Involve local people in developing a forest that meets their needs, to motivate them to conserve it.
- Reduce total reforestation costs, because there is less site preparation, nursery establishment, and enrichment planting.
- Fit well with farmers' cropping schedules, because ANR concentrates on maintenance instead of planting.
- Provide local employment, if there is outside funding. Most expenses are for local labour.
- Include species chosen by villagers, through enrichment planting.
- Develop a forest with many species, especially native species. This benefits wildlife habitat and reduces the risk of severe damage from pests and diseases.
- Reclaim land for long-term timber production, since it assists natural woody species that can be used as nurse trees for enrichment plantings of high-value timber tree species.
- ANR includes soil moisture conservation which reduces soil erosion and protects the soil.
- Quickly restore forest cover to watersheds. The secondary forest is likely to be multi-storey, including shrubs and herbaceous plants.
- Multi-storey forests control soil erosion and increase the amount of rainfall going into the ground. Restoration may take 2-7 years.

3. Constraints of ANR

Here are some problems that can prevent ANR from succeeding, together with possible solutions.

Lack of community participation:- Plan the project with local people.

Conflicting laws and regulations:- If communities are not legally allowed to own, enter, or manage their surrounding forests, then the community will not cooperate with fire prevention and maintenance for ANR.

Poverty: Local people must provide for their short-term needs. Their time and possibly the ANR area is needed for food production

Labour scarcity: ANR activities are labour intensive. Labour often becomes a limiting factor, since ANR is usually applied in remote forest areas with low population densities. Be realistic in estimating labour availability.

Inadequate extension: Because ANR activities are spread throughout the year, project staff cannot supervise all activities, and must put more responsibility in the hands of villagers.

Train local people in ANR techniques;- plan adequate resources for that training.

Lack of staff support: Experience with successful ANR implementation can help build staff confidence and support.

Planning uncertainties: Total nursery costs, maintenance activities, and production are difficult to predict because of uncertainties in the number of seedlings or wildlings needed for enrichment plantings, the time period for the natural woody species to close canopy, and the composition and volume of the secondary forest vegetation that will eventually emerge.

4. Steps Involved in ANR

These steps of ANR implementation are based on experience but can be adjusted depending upon the sites, resources available, and project and community objectives.

- a) Clarify goals and objectives.
- b) Select appropriate sites.
- c) Protect the area from fire and grazing.
- d) Identify and mark woody plants.
- e) Help existing woody plants grow faster.
- f) Continue to suppress grass. Thin and prune
- g) Enrich by planting sun-loving species.
- h) Enrich by planting shade-tolerant species.

a) Clarify goals and objectives

Be sure that the goals and objectives of any ANR project are clear before it begins. ANR is a technology that may be used by farmers and communities on their own, degraded forest area but ANR may also be promoted and subsidized by a regional or national program addressing watershed or timber goals. Broad goals must be negotiated and agreed upon between the community and those providing assistance from outside. Not all goals are compatible, and misunderstanding must be avoided.

b) Select appropriate sites

Work in communities that are interested in ANR. Work first with villages or communities that have objectives that can be achieved with ANR, and are willing to organize them to prevent fire. Work on lands that the village identifies. Choose sites that match the objectives and as per prevailing working plan prescription. Also choose objectives that match the sites.

Sl. No	Site	Objectives
	Areas accessible to villages, where villagers have tenure or harvest rights	Produce forest and tree products for local use and sale.
	Areas bordering villages or where	Improve fallows.

	shifting cultivation is practiced	Use land for agroforestry in the future.
	Steep slopes	Reduce fire threats. Reduce flow of water from area during the rainy season.
	Areas subject to erosion because of regular burning of grass cover	Reduce soil erosion and siltation. Reduce flow of water from area during the rainy season.

The ANR work is to be started only in areas that can be protected from fire. Consider labour available to monitor and control fire, and plant and maintain firebreaks. Consider the stage of plant succession of the site. If little or no natural regeneration has occurred, conventional reforestation would be as effective as ANR. Choose sites with enough natural regeneration already present to meet objectives. Estimate the number of existing woody plants/ha, including seedlings and saplings 15-200 cm tall and choose sites close to forest patches, Gallery forests, forest edges and patches of forest have seed-bearing plants and seed-dispersing animals. This increases the number of new wildlings that can come into the ANR area. Soil conditions may also be more favourable near forest patches. Grasslands that are far from any remaining forests, and grasslands that have been burned and grazed for a long time, do not have enough natural regeneration to make ANR successful. After choosing the site, there must be proper understanding about the local people, the history of the area, local species, and local soils and rainfall.

c) **Protect the area from fire and grazing**

The most critical step in ANR is protection of woody plants from fire. Since ANR is often implemented by communities rather than individual farmers, groups can be organized for fire control. At least a month before the dry season begins, make plans and organize firefighting crews. Review plans and roles when dry season begins. During the dry season, patrol the ANR area to locate fires. The question of grazing in ANR areas must be addressed by the community. Animals may eat or trample woody seedlings and saplings, which is to be checked.

Session 2:

d) **Identify and mark woody plants**

All existing woody wildlings hidden in the grass should be located and clearly marked in order to protect them during grass pressing and clearing. This can be done by two workers: the first marks the wildlings with a stake, and the second rings weeds or presses the grasses and weeds with his/her foot. Use stakes only if they are available on the site. Do not cut any trees needed to reforest the site. Instead, make stakes from branches pruned from large trees, stems thinned from stumps of fire-hardy species, stems thinned from dense thickets, or thinnings from forests near the ANR area. When cutting stakes from clusters of stems on stumps and in thickets, cut



the smaller stems, and leave the largest stems to grow. If stakes are not available, ring weeding will help make the wildlings more visible.

e) **Ring weed.**

It is the most efficient procedure is to:

- Press grass away from the base of the wildling, using feet or a pressing board.
- Pull climbing vines from the trees.
- Slash or uproot ferns, climbing vines, and other weeds within ½ m of the stem.
- Be careful not to damage wildling stems and roots.
- Hand cultivate around the tree, removing grass rhizomes, up to a ½ m diameter.



After ring weeding, the ANR site will look like this. Be careful that ring weeding does not take away shade from wildlings that need shade, such as seedlings of climax forest tree species, especially in the dry season.

Identify and count wildlings in sample plots if this was not already done during site selection. Do this at the same time as marking and clearing. Local people may be very helpful in identifying plants, though with local names.



f) **Suppress the grass layer throughout the site**

After fire prevention and control, the most important activity in ANR is suppressing weeds. Weed must be suppressed efficiently, with minimum use of labour. Usually a combination of methods is used, with cheap and easy methods in open areas and more intensive methods around trees and near forest edges. Native legumes should be protected and even released from weed competition. They make the soil more fertile and may help suppress weed. Then stimulate the new natural regeneration by way of protecting the area free from fire and weed.

g) **Thinning and pruning.** Where two seedlings or saplings are close enough to each other to compete for light, water, and nutrients, remove the one that is smaller, less healthy, or of a less desirable species. When a tree stump has several sprouts, remove all except the 1-3 largest. Prune branches of nurse trees. Prune nurse trees to gradually increase light for trees and other species that need shade when young and sun when large. Thin the trees as the forest develop. As the canopy begins to close and trees compete with each other, in some cases it is worth the labour to thin trees. If an unhealthy, branchy, crooked, or worthless tree is interfering with the growth of a healthy, straight, or valuable tree, cut the unhealthy, branchy, crooked, or worthless tree. If trees are crowded, and the thinned trees can be used for firewood or other

products, Cut trees that are shorter, smaller in diameter, or less straight. The remaining trees will grow faster and produce superior seed. Thin enough nurse trees to increase sunlight. Be careful not to cut trees that are still needed for shade of shade-tolerant plants or seedlings. Finally, cut trees carefully so that they don't damage other trees as they fall.

Session 3:

5) Choosing sites and strategies

Plant only as much area as can be maintained in addition to the natural regeneration that is already being present in site. But the ANR approach is different from simple tree plantations because it:

A. Use a wider variety of local native species.

B. Have a variety of "micro sites" where shrubs and trees provide shade, affect soil moisture, and form windbreaks.

Therefore, instead of choosing a single species, try to use several enrichment species matched to different spots within the ANR area.

Session 4:

6) Natural regeneration

The cleaning, weeding, thinning and pruning should provide scope for Natural regeneration. Include a few local tree species known to provide fruit or food for birds and bats that spread seed. Include local species that are common roosts (sleeping and nesting areas) for birds and bats.

7) Site matching. Information about common reforestation species is available from foresters and VSS members. The local species should be considered for local cultural, medicinal, wildlife, or other values. To figure out how to match these local species to planting spots.

Observe surrounding areas and notice where similar species grow well. Notice the soil texture and colour, soil drainage (wet, dry, variable), Topographic position (slope, aspect, hilltops and ridges, stream sides, flood plains), rainfall, elevation, and shade. Consider having a soil test done for fertility. The VSS members/ local people to be involved to identify potential species, their uses, and habitat requirements.

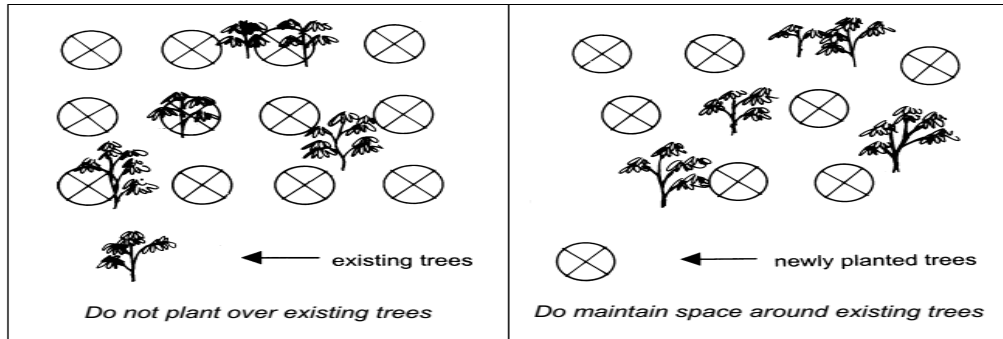
Session 5:

8) Implementation

Seedlings are raised in nursery as per demand of the local people and the site condition. Pitting usually done in month of Feb-March in blank spaces. Early pitting require for weathering of soil. During month of July i.e. planting season, seedlings are transported to the planting site and planting operation started followed by

application of fertilisers. Many planting techniques are the same as those for simple tree plantations.

Spacing. As a rule of thumb, use a 2.5m x 2.5m spacing to close canopy in gaps @200 seedling /ha Other spacing's can be used depending upon the species and objectives for the site. Maintain spacing between new trees and existing natural regeneration.



- 9) The plantation is usually maintained supported by casualty replacement in first year and second year, weeding, soil working and manuring as per the plantation norms. Then proper protection measure to be ensured by engaging protection /plantation watcher/ VSS members. The ANR plantation is to be maintained for three years including zero year as per the norms provided. The plantation journal is to be maintained citing all details like year of plantation, species planted, GPS reading of treatment area along with the details year wise expenditure of various activities.

Participant 's Feedback

Name of Training: One Day Training Programme on ANR and Silvicultural Operation

Venue:

Date:

1) How far has this training fulfilled your demands?

Completely Partly None

2) Please mark your opinions on the contents discussed in the course:

SI No	Content	I have achieved a clear concept		
		Fully	Partly	None
1.	Introduction about the Assisted Natural Regeneration			
2.	Identify end mark woody plants thinning and pruning			
3.	Choosing sites and Strategies			
4.	Natural regeneration and site matching			
5.	Implementation			

3) Give v mark in appropriate box :

Aspects	Very Good	Good	Fair
Training Room Facilities			
Quality of Food			
Lodging Facilities			

4) Mention three things during the course you liked and did not like

I Liked		I did not like	
1.	_____	1.	_____
2	_____	2.	_____
3	_____	3.	_____

5) Of all contents discussed in the course.

You liked most _____

You disliked most _____

4) Give your overall impression about the training with v mark.

Very good		Good		Fair		Not satisfactory	
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5) If you have any additional comments, write here.

Signature

Name