



Assisted Natural Regeneration (ANR) (Md. Fazlay Arafat)

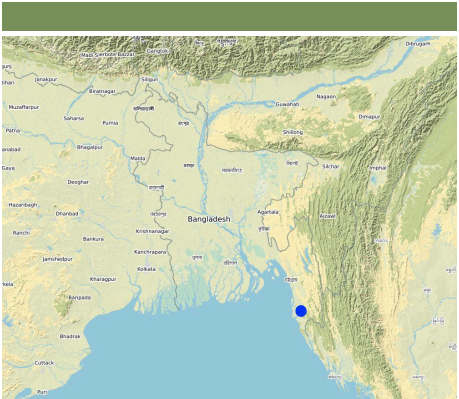
Assisted Natural Regeneration ()

ANR

Assisted natural regeneration (ANR) is a simple, low-cost forest restoration method that can effectively convert deforested lands to more productive forests.

Medhakachapia National Park (MKNP) is nationally known for protecting the most extensive stands of mature critically endangered Garjan (*Dipterocarpus turbinatus*) trees in Bangladesh. Other native trees present in MKNP include Telsur *Hopea odorata*, Boilam *Anisoptera scaphula*, Gamar *Gmelina arborea* and Chapalish *Artocarpus chaplasha*. MKNP is tropical semi-evergreen forest in the low hills of the Fulchari Forest Range and covers 396 hectares. The park is located in Chakaria Upazila, not far from Cox's Bazar in the southeast part of the country. Originally, the entire park area was densely covered with Garjan forest, but now there are about 9000 mature Garjan trees as many parts have been encroached upon with agriculture. MKNP is bordered by 13 villages where most of the people depend directly or indirectly upon the forest. Encroachment by settlements and agriculture has been associated with illegal tree cutting, hunting, and collection of fuel wood, bamboo and cane and other forest products. These activities are encouraged by sawmills in the vicinity and unemployment. Due to reduced canopy coverage, the forest soils have been exposed degraded. In order to restore forest health, the Bangladesh Forest Department introduced Assisted Natural Regeneration (ANR) practice. The access for public recreation and education and research is allowed inside national park. However, the collection of fuel woods and non-timber forest product from national park area by the local communities is a common scenario here.

ANR aims to accelerate, rather than replace, natural succession processes by removing or reducing barriers to natural forest regeneration such as competition with weedy species and recurring disturbances (e.g., fuel wood collection, grazing, fire and wood harvesting). Compared to conventional reforestation methods, which involve planting tree seedlings, ANR offers the significant advantage avoiding costs associated with propagating, raising, and planting seedlings. ANR is most effectively utilized at the landscape level in restoring the forest protective functions, such as soil protection, and is most suitable for restoring areas where some level of natural succession is already in progress. ANR offers distinct advantages over other forest restoration methods but also has some limitations. ANR is much cheaper to implement and can be applied over larger areas than other restoration planting approaches, but may be less effective in enhancing floristic diversity at the initial stages. Some of ANR's disadvantages can be overcome by enrichment planting with desirable species. ANR aims to accelerate, rather than replace natural succession process by removing or reducing barriers to natural forest regeneration. Soil degradation of MKNP has been greatly reduced through practicing ANR and co-management. In MKNP co-management was established on 2009 engaging local communities. As a part of co-management activities, the Forest Department (FD) formed a Community Patrolling Group (CPG) with 35 members from the local community to protect the Garjan trees and look after the whole forest along with forester officers. Under the support from Climate-Resilient Ecosystems and Livelihoods (CREL) project of USAID, the CPG along with FD intensively patrol the forest in rotating groups to ensure that no harm is done to the mature trees and natural seedlings. As a result, sufficient tree regeneration is now taking place and their growth is accelerating. Even where weeds dominate, seedlings of pioneer tree species are often found. The minimum required number of preexisting seedlings to implement ANR depends on the acceptable length of time for the forest to be restored and site-specific conditions that influence the rate of forest recovery. As a general reference, a density range of 200–800 seedlings/ha (>15 cm in height; counting clumps in 1 m² as one seedling) has been suggested for ANR reforestation, and it has been estimated that at least 700 seedlings/ha are needed during the early treatment period in order to achieve canopy closure within three years. Although the forest restored through ANR in MKNP will have lower commercial value in terms of timber, it will support greater biodiversity and more effectively provide for the subsistence needs of the local people compared to commercial plantations.



: Medakachapia National Park under Cox's Bazar North Forest division, Chittagong division,

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

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, Oil from *Dipterocarpus turbinatus*



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Step 1: Marking of Woody Regeneration

Once the target area is identified and its boundaries are demarcated, the site is surveyed to assess its succession status and to locate any natural woody regeneration growing in the weedy vegetation. The located seedlings should be clearly marked with stakes. Decision on the minimum size of seedlings to be protected and released depends on the density and distribution of seedlings in the area, as well as budget and time constraints. However, the seedlings should be large enough to have a reasonable chance of survival.

Step 2: Liberation and Tending of Woody Regeneration

The next step is to accelerate the growth of the marked seedlings by reducing competition from the weedy species for water, nutrients, and light. The initial weeding and climber cutting should be implemented at the onset of the rainy season so that the liberated seedlings will have the full growing season of accelerated growth. All competing vegetation such as weeds and climbers within at least 0.5 m radius around the stem of the marked seedlings are removed. In some cases, clumps of woody seedlings may need to be thinned in order to liberate the largest individuals or the more desirable species.

Step 3: Protection from Disturbance.

Protecting against fire and other forms of disturbance is the most important ANR activity. Establishing firebreaks around blocks of ANR-treated sites is important, if the area is prone to fire. If animal grazing is prevalent in the area, fencing should be established, or patrols/guards should be assigned to protect the site from such activity. Long-term community involvement and support is critical in preventing the re-occurrence of disturbance events that will set back succession to the before-treatment state.

Step 4: Maintenance and Enrichment Planting.

It is suggested that the maintenance of weeding, and liberation of any additional seedlings that establish or that are newly found, should be conducted three times in first two years and two times in next two years. In the fifth year one climber cutting should be conducted in rainy season. The frequency of maintenance operations can be adjusted according to field observation and monitoring data on the growth of the liberated seedlings and the density of natural woody regeneration. Enrichment planting can also be carried out to accelerate canopy closure, add useful tree species, and increase floral diversity. Even after the restoration of canopy cover, large-seeded primary forest trees and rare species are unlikely to colonize naturally. If restoring some of the floral diversity of the original forest is one of the restoration objectives, species or functional groups of trees lacking in natural regeneration will need to be planted either at the initial treatment stage or after canopy closure depending on the ecological requirements of the species.



Author: Nazrin Sultana

- (The most important factor affecting the costs is labor
- **1 hectare**
- = 1 ha = 2.47 acres)
- **BDT**
- () 1 USD = 84.0 BDT
- 500 BDT

1. Site preparation (Boundary demarcation, site map preparation with GPS, marking of woody regeneration) (/ : May-June)
2. Care and maintenance of natural regeneration (liberation and tending of woody regeneration, protection from disturbance) (/ : June-July)

			(BDT)	(BDT)	%
Survey for map preparation and marking of woody regeneration	person-days	1,0	500,0	500,0	
Tying up seedlings and young trees	person-days	4,0	500,0	2000,0	
Tending of woody regeneration	person-days	10,0	500,0	5000,0	
Application of fertilizers	person-days	4,0	500,0	2000,0	
Weeding equipment (manual weeding tool)	lump sum	1,0	1000,0	1000,0	
Bamboo sticks for tying up seedlings	pieces	800,0	2,0	1600,0	

Rope	lump sum	1,0	1000,0	1000,0	
Compost fertilizer	Kg	625,0	4,0	2500,0	
Rod, Cement, Sand, Khoa, etc for RCC signboard	Lump sum	1,0	1000,0	1000,0	
				16'600.0	
				197.62	

1. 1st year weeding (/ : 3 times)
2. 2nd year weeding (/ : 3 times)
3. 3rd year weeding (/ : 2 times)
4. 4th year weeding (/ : 2 times)
5. 5th year climber cutting (/ : 1 time)

			(BDT)	(BDT)	%
1st year weeding	person-days	15,0	500,0	7500,0	
2nd year weeding	person-days	15,0	500,0	7500,0	
3rd year weeding	person-days	10,0	500,0	5000,0	
4th year weeding and 5th year climber cutting	person-days	15,0	500,0	7500,0	100,0
Weeding equipment (manual weeding tools)	lump sum	1,0	1000,0	1000,0	
				28'500.0	
				339.29	



< 250

251-500

501-750

751-1,000

1,001-1,500

1,501-2,000

2,001-3,000

3,001-4,000

> 4,000

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3770.0

The driest month is December. The greatest amount of precipitation occurs in June.

Mean annual temperature is 25.6 °C

(0-2%)

(3-5%)

(6-10%)

15%)

(16-30%)

(31-60%)

(>60%)

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0-100

101-500

501-1,000

1,001-1,500

1,501-2,000

2,001-2,500

2,501-3,000

3,001-4,000

> 4,000

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(0-20)

(21-50)

(51-80)

(81-120)

(> 120)

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(> 20)

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aesthetic beauty of forest improved

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eco-tourism increased

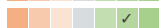
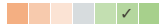


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Poor people working in Community Patrolling Group (CPG) taking care of ANR with forest department. Social status of these poor people improved.

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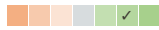


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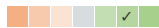
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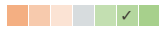


Through ANR only native plant species promoted to grow here



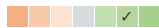
Animal diversity increased as the habitat improved

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habitat diversity increased with the canopy coverage and tree density improvement

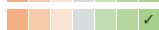
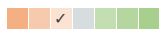
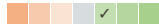
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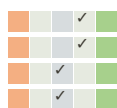
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Due to the presence of vegetation on slope the stream flow become stable

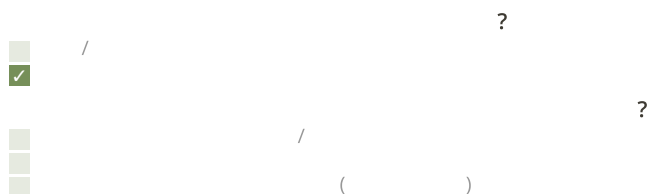
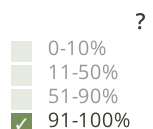


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Assisted Natural Regeneration (ANR)

- It is a low cost intervention to regain the protective roles of the forest.
- Community Patrolling Group (CPG) are involved in maintenance of ANR forest through co-management of natural resources. Regular patrolling activity reduces the disturbance in forest and help to prevent land degradation.
- Biodiversity conservation and wildlife habitat restoration are accelerated through ANR.
- ANR is less effective in enhancing floral diversity than techniques e.g. mixed plantation, enrichment plantation, selection cum improvement etc. It promotes the existing regeneration and significant portion of regeneration comes from the dominant trees of the stand. Enrichment plantations with ANR can increase the floral diversity.
- The forest restored through ANR may have less commercial value in terms of timber compared to commercial plantation. This weakness of ANR is only valid for the forest which is managed for production purpose. Desirable timber species can be planted as enrichment with ANR.
- ANR is suitable for areas where some level of natural succession is in progress. This, because sufficient tree regeneration must be present on the targeted site so their growth can be accelerate through ANR. Plantation activity with other restoration method should be practiced where natural succession is low or absent.

Editors

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: 18

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2019

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https://qcat.wocat.net/km/wocat/technologies/view/technologies_4372/

SLM

- Bangladesh Forest Department (Bangladesh Forest Department) -
- FAO Bangladesh (FAO Bangladesh) -
- Decision Support for Mainstreaming and Scaling out Sustainable Land Management (GEF-FAO / DS-SLM)

- Shono, K., E. A. Cadaweng & P. B. Durst (2007) Application of assisted natural regeneration to restore degraded tropical forestlands. Restoration Ecology, 15, 620-626.: <http://www.fao.org/forestry/19102-0bf30dd3d800687636a5ddc85e409044a.pdf>
- Medhakachapia National Park: <http://nishorgo.org/project/medhakachapia-national-park/>

