



# **Unit C: Forest Management**

## **Lesson 6: Examining Deforestation Practices**

# Terms.

- Cuttings
- Direct seeding
- Heel-in
- Planting bar (dibble)
- Wild seedlings

# Identify Methods of Reforestation

- The majority of forest owners rely on natural regeneration to restore most stands after logging.
  - However, in some instances human intervention is necessary.
  - In these cases, foresters artificially reforest an area.
- Some methods by which this accomplished are:

# Wild Seedlings

- Wild seedlings are those growing in the woods in a natural state.
- For all practical purposes, digging up and transplanting of such seedlings for reforestation purposes should be avoided.
- Such practice is uneconomical and inefficient.

# Direct Seeding

- Sowing repellent-coated seeds on an area where trees are desired is known as direct seeding.
- This method can be effectively and successfully employed under proper conditions.

# Direct Seeding

- Large areas can be directly seeded by hand, airplane, cyclone seeder, or grain drill.
- Also, the cost of establishing a stand by this method is usually less than the cost of planting tree seedlings.

## Some factors that affect the success of direct seeding are:

- Vegetative cover - Heavy vegetative cover can prevent seed from reaching the soil and interferes with germination.
- A prescribed burn can be used prior to seeding to remove such cover in the desired area.

## Some factors that affect the success of direct seeding are:

- Soil moisture - Soil moisture affects germination of seed and growth of seedlings.
- An insufficient amount of moisture following direct seeding will result in a low germination rate and/or a high mortality rate of seedlings.



## Some factors that affect the success of direct seeding are:

- Birds and rodents - Birds and rodents consume seed for food.
- Therefore, seed should be treated with a bird and rodent repellent before being broadcasted.

# Cuttings

- Some species of trees can be reproduced from cuttings.
- Cuttings are pieces of branches, usually 20 to 30 cm in length, cut from a tree.
  - Examples of species that can reproduce via this method are willow, cottonwood, and several conifers.

# Nursery Seedlings

- The planting of nursery-grown seedlings will increase the probability of establishing a good stand.
- Nursery seedlings are usually planted barerooted because of the ease of transporting and handling seedlings with this method.



Eucalyptus saplings are unloaded for distribution in Kunar Province  
These are bare root saplings.

# Containerized Seedlings

- Using containerized seedlings for reforestation is becoming increasingly accepted.
- In this method, seeds are germinated in small pots of soil or other growing medium.
- After 8 to 32 weeks, the seedlings are planted without disturbing their roots.



Pistachio saplings at the Department of Agriculture farm in the Tagab District of Badakshan are grown and waiting to be distributed to farmers.

## Advantages of this method are:

- Improved rates of survival and growth of seedlings.
- Difficult species are more readily produced.
- The planting season can be extended.

## Disadvantages of this method are:

- Cost. Containerized seedlings often cost at least twice as much as bare root stock.
- Seedlings are bulky, making them more difficult to handle and transport.
- Requires more site preparation than direct seeding



# Explain Tree Planting Guidelines

- A number of key factors should be considered when planning to reforest an area.
- They are:

# Tree Planting Guidelines

- Estimating needs - It is important to order the proper species and number of seedlings required for the area to be reforested.
- If an open area is to be reforested, the following guide gives the number of seedlings per acre, depending on spacing used:

## **SEEDLINGS PER 0.4 HECTARE BASED ON SPACING USED**

- 1.8 meters  $\times$  2.4 meters: 908 seedlings
- 1.8 meters  $\times$  3.1 meters: 726 seedlings
- 2.4 meters  $\times$  2.4 meters: 680 seedlings
- 2.4 meters  $\times$  3.1 meters: 544 seedlings
- 3.1 meters  $\times$  3.1 meters: 436 seedlings

# Tree Planting Guidelines

- Areas in need of planting - The area that will be planted during the reforestation process should be considered in selecting the species to be planted.

## Some possible locations are:

- 1. Cleared or abandoned farmlands
- 2. Non restocking forest land
- 3. Openings in forest stands
- 4. Watershed protection areas
- 5. Windbreaks

# How to Properly Plant a Seedling

- There are several steps to follow to properly plant a tree seedling.

# How to Properly Plant a Seedling

- Before planting, seedlings may be stacked in layers 8 to 10 deep for temporary storage without any adverse effects.
- It is important however to plant the seedlings as soon as possible after receiving them from the nursery.

# Heel-in Seedlings

- To heel-in seedlings means to store the young trees prior to planting by placing them in a trench and covering their roots with soil.
- In this process, seedlings are placed in a V-shaped heel-in trench and allowed to lean parallel to one side of the trench.
- The roots must be fully extended to the bottom of the trench.

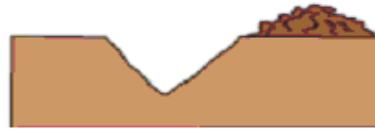


# Heel-in Seedlings

- A seedling with curled roots will be difficult to plant correctly later.
- After placing the seedling in the trench, fill it three-fourths full with soil.
- The soil is then packed around the roots and then the rest of the trench is filled with soil.
- The soil is then covered with leaves to conserve soil moisture.

# HEELING-IN AND PLANTING PINE SEEDLINGS

## Heeling-In



1. Dig V-shaped trench in moist, shady place.



2. Break bundles and spread out evenly.

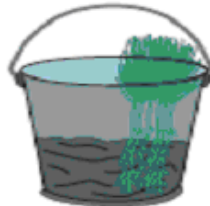


3. Fill the trench  $\frac{3}{4}$  full of loose soil, and water well.



4. Complete filling in soil and firm with feet. Water again.

## Handling Seedlings in Field



Correct

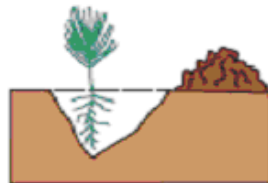
In bucket, with sufficient wet moss to cover roots.



Incorrect

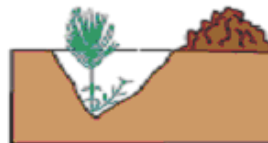
In hand. Roots dry out.

## Correct and Incorrect Depths



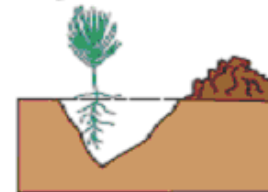
Correct

At same depth or 1.2 cm deeper than seedling grew in nursery.



Incorrect

Too deep; roots bent



Incorrect

Too shallow; roots exposed.

# How to Properly Plant a Seedling

- The site in which the seedlings will be planted must be prepared by removing any excess vegetative cover.
- This may be accomplished through prescribed burning, bulldozers, brush cutters, or plows.

# How to Properly Plant a Seedling

- Spacing of trees depends on the owner's objective.
- In pine trees, a spacing of  $1.8 \times 2.4$  meters or  $2.4 \times 2.4$  meter favors maximum cubic meter volume growth.
- A spacing of 3.6 meters between rows is sometimes used to allow the passage of vehicles and equipment.

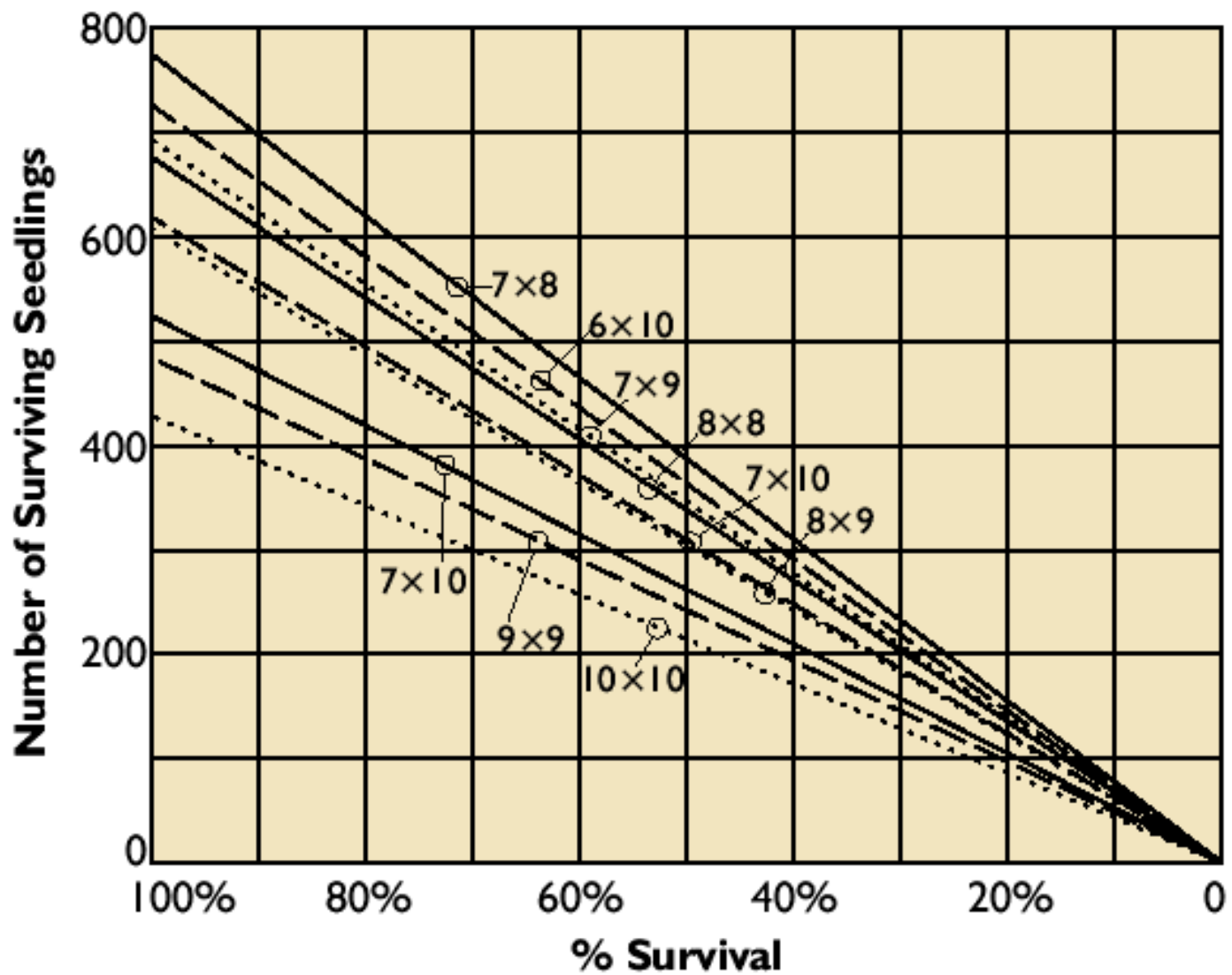
# How to Properly Plant a Seedling

- Wide spacing, such as 3.1 x 3.1 meters or 3.6 x 3.6 meters often allows trees to grow to large diameters in a relatively short time.

# How to Properly Plant a Seedling

- There are a variety of procedures that can be used to plant seedlings.
- As a rule, only about 75 to 80 percent of all properly planted seedlings will survive.

# PLANTING PROCEDURE

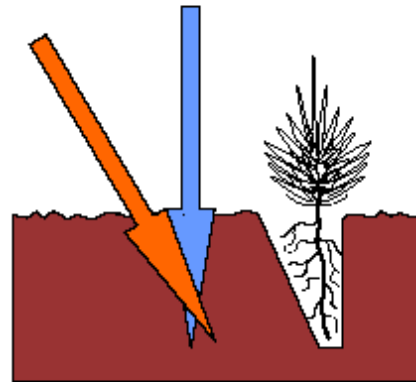


## Some of the procedures are:

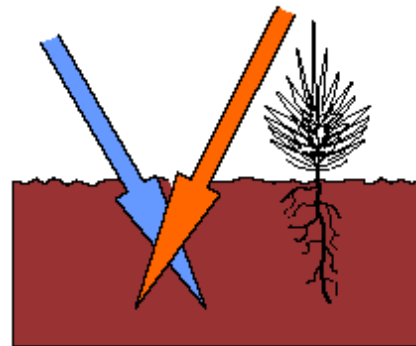
- Hand planting - The planting bar (dibble) is a metal tool used to make a hole in the soil and is one of the best tools for planting seedlings by hand.
  - The planting bar has four parts: handle, shaft, blade, and foot step.
  - The wedge-shaped steel blade is usually 20 to 25 centimeters long and about 7.6 centimeters wide, tapering to a sharp edge at the base.
  - A shovel can also be used; it just takes longer to plant trees.



# PROPER USE OF A PLANTING BAR



Pull handle of planting bar toward planter to firm soil around root end.



Push handle of planting bar away from planter to firm soil around root top.



In Nuristan Province, a USAID field technician shows farmers how to plant a sapling. During the March 2009 campaign to restore forestry in eastern Afghanistan, 1.2 million trees were planted.

## Some of the procedures are:

- Machine planting - As expected, machine planting is much faster than hand planting.
- A two-person crew can set out 7,000 to 10,000 seedlings a day on suitable sites.

# Review / Summary

1. Identify methods of reforestation.
2. Explain tree planting guidelines.
3. Explain how to care for and plant a seedling.