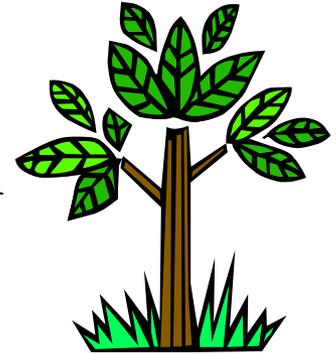


# Forests of Afghanistan



## Preface

- The surface area of Afghanistan is 65.3 million hectares.
- Before the war in 1357, our forests were 1.97million ha (3% of total area).
- The geographical condition of Afghanistan because of different topography is not the same; the climate regime is also different.

# Forests of Afghanistan (con)



- The maximum height of Koh-e-Baba is 5140m.
- Nuristan mountains are 6300m high.
- Wakhan of Pamir is 7500m in elevation.
- The minimum elevation for the country is 300m above sea level.

# Forests of Afghanistan (con)



- Precipitation varies across Afghanistan (100mm – 400mm).
- The Indian Ocean monsoon season occurs from July to September and is very important for the eastern, northeastern, and southeastern regions of the country.
- Different topography takes monsoon rain in the east and southeast (Nuristan and Paktia) on 2000-3000m elevations.
- That's why conifer forests grow naturally there.

# Forests of Afghanistan (con)



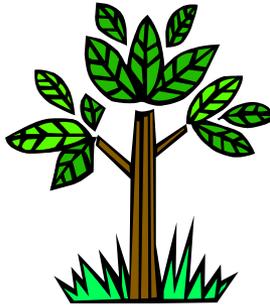
- Precipitation from the Black and Caspian Seas starts in late autumn and continues to May/June. It also reaches to the Pakistan plain areas.
- The Pamir high peaks block the cold Siberian winds from the northeast into Afghanistan.
- The cold winds of Siberia come together with the Indian warm monsoons and make moderate, sunny weather for Afghanistan.

# Forests of Afghanistan (con)



- Temperature extremes range from  $-15.5$  in the winter and  $+45.5$  in the summer
- Microclimate is very different between localities based on elevation. High elevations are more cold, and lower valleys are warmer and even hot in some places.

# Forests of Afghanistan (con)



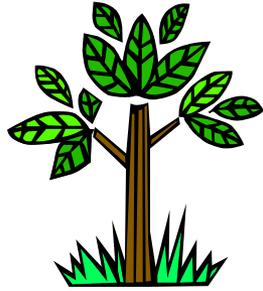
- From ancient history (2000 years ago), Afghanistan had good forests and was green (like an orchard).
- The people exploited their forests severely, and there was no management or protection of the forests.
- Destruction of the woody lands changed the climate and the ecosystem as well.
- Soils are eroded, plants of the forests of the country have disappeared, and the remaining greenery will also go in a few years.

# Forests of Afghanistan (con)



- Mountains and valleys are naturally suitable for forests.
- Hindukush is the biggest and highest mountain range in the country. It is located east to west (very important because of its forests and ranges).
- Elevations range from 300m to 6000m or greater.
- South and Southwest deserts are found between 300-1000m. Marco is the biggest and joined in the south to Loot deserts.
- These deserts plus others covered the majority of the country.

# Forests of Afghanistan (con)



- The Afghanistan climate is dry and semi-dry.
- Afghanistan's climate is Mediterranean.
- Formula for measuring is  $I = P / (T + 10)$ 
  - $I$  = Index (de Mortonnes aridity index)
  - $P$  = Annual rainfall in mm
  - $T$  = Average temperature
  - If  $I$  is lower than 20, then the climate is considered dry. Between 20-40 is semi-dry and greater than 40 is humid.

# Forests of Afghanistan (con)



- Varying topographies in the country caused different plant ecosystems to occur at different elevations.
- A classification of the ecosystems has been done based on the different elevations, topography, climate, and vegetation.
- It is divided mainly into two ranges or orders.

# Forests of Afghanistan



## **I – Range one**

### **Scrub Forests**

- The scrub forests of the country are nominated as Plant Formation or station and are a collection of natural plants. This scrub forest does not reach a climax stage but continues to the next ecological succession condition.
- These plants or forests are divided to sub-orders as follow:

# Forests of Afghanistan



## 1- Colligonata collective

- This collective is located in the south and southwest areas of the country.
- Rainfall of this area is less than 150 mm.
- The plants of this collective grow in sand or sand dune areas (Endodynamomorphic), and the plants' collective height is in the group of Manophanirophytes.

# Forests of Afghanistan



## **1- Colligonata collective (cont.)**

- The plants' water status is xerophytic, and they are drought resistant.
- Because of ecological conditions, Psemmosere started its succession in sandy soils and continued.

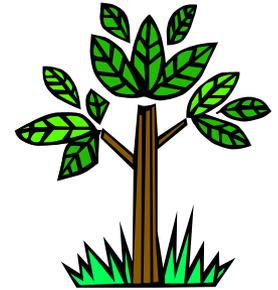
# Forests of Afghanistan



## **1- a-The Colligonum spp are**

- Colligonum commosum
- Colligonum turkistanicum
- Colligonum bungi

# Forests of Afghanistan



## **1- b- Character of Coligonum spp**

- Root system is long and deep.
- Root system controls sand dunes, soil creep, and desertification .
- Good fodder for animals

# Forests of Afghanistan



## 1- c- Problems

- People use its wood for fuel.
- Severe over grazing occurs.
- People dig up the plants
- Soil erosion by wind occurs.
- Desertification takes place.
- Destruction of neighboring agriculture lands occurs.
- Control is not easy and not economical.

# Forests of Afghanistan



## 2- Collective of halophileta (stalwart) Con

- These plants successfully grow in salty areas.
- These forests covered deserts in western and southwestern Afghanistan (Zabul, Kandahar, Helmand and Farah Provinces).
- Annual rainfall is 150mm, and *Salsola subaphylla* (Chargas) bush is the first invader of this collective.
- This bush naturally has good role for making soil.

# Forests of Afghanistan



## **2- Collective of Halophileta (stalwart) Con Problems**

- o The people clearcut it for fuel.
- o They also dig up this plant or remove it (extended desertification).
- o The neighboring fertile agricultural lands also change to salty soil.

# Forests of Afghanistan



## 3- Haloxyloneta collective (con)

- This collective is found in sandy deserts of north and west Afghanistan.
- Rainfall averages 150 mm.
- Haloxylon bush is the invader plant of this collective in Taj Guzar of Balkh Province.
- Haloxylon persicum and H. salicornicum are the species of this collective.

# Forests of Afghanistan



## 3- Haloxyloneta collective (con)

- o *Salsola subaphyla* (Qandum or Chargas),  
*Seidlitzia rosmarinus* (Zemi or Sabun buta), and  
*Atriplex* spp are the united of this collective.

## Benefits

- o Root system is deep and bunched to stabilize the movement of sands.
- o Wood is used for fuel.

## Problems

- o The people cut wood, clearcut them, and dig them up.

# Forests of Afghanistan



## 4- Collective of Tamarixeta (con)

- There are several Tamarix spp in Afghanistan.
- Natural growth of it is on both sides of Herirod River in Heart.
- Rainfall is 150 mm per year.
- Temperature is more than 50 degree C in summer.
- Resistant to drought and bud condition of nature.

# Forests of Afghanistan



## **4- a- United plants of this collective are (con)**

- *Salsola subaphylla*, *Bromus* spp (Jaro buta), *Alhagi camelorum*, and *Glyserhizia glabra* (Sherin boia).

## **Benefits**

- This collective controls the desertification effects.

## **Problems**

- The people cut and dig them up for fuel.

# Forests of Afghanistan



## 5- Collective of Zygothilleta (con)

- This collective grows in a very difficult natural condition.
- Rainfall is less than 150 mm.
- United plants of this collective are Zygothillum tetrapetrum, Zygothillum atriplicoides, Artemisia, and Salsola subaphylla.

# Forests of Afghanistan



## 5- Collective of Zygothilla (con)

### Benefits

- Root system is long and bunched, and it can easily control desertification.
- It is resistant against drought and grows in naturally bad conditions.

### Problems

- The people cut and dig them for fuel.

# Forests of Afghanistan



## 6- Collective of Artemiseta (con)

- This collective is mostly found in the north, south, southwest, and west regions.
- Rainfall is more than 150 mm annually.
- Soil condition is deep and fertile with sufficient organic matter.
- *Artimisia herba alba* is the target plant, and *Astragalus* bushes also belong to this collective.

# Forests of Afghanistan



## **6- Collective of Artimiseta (con)**

### **Benefits**

- Grows near or adjoining to agricultural lands and sometimes uses irrigation water.
- Good plant for animal grazing.
- Protects soil from erosion

### **Problems**

- Heavy grazing use by herd owners
- Cut and dig them for fuel
- Turn to rain fed agriculture land

# Forests of Afghanistan



## **II- Second range or order (con)**

### **Collective of tree stages**

- These tree collectives complete the succession trends and are in the ecological climax stage with a chance of extension.
- All plants of this range are woody (phanerophytes), and all trees are the members of these collectives.

# Forests of Afghanistan



## II- Second range or order (con)

- All plants of this range live under environmental conditions of soil, climate, topography, and biology that occurred naturally and provided specific systems to reach different progressions of climax stages.
- Biological zones of the stages have a direct relationship with elevations.

# Forests of Afghanistan



## 1- *Amegdaletum inferious* collective(con)

- Name of this collective shows that it is farmed of *Amygdalus communis*.
- This tree zone is located between 900 and 1200 m in southwest and west regions of the country.
- Rainfall is 150-250 mm per year.
- Biological height of the trees is in the range of Manophanirophytes (short trees), up to 2m.

# Forests of Afghanistan



## 1- Amegdaletum inferious collective (con)

### Benefits

- These trees grow on sloped areas.
- Good trees for erosion control.
- Ecological growth condition of this collective is good.

### Problems

- The people clear cut them for fuel, but the volume cut is more than is growing.
- This causes strong flooding and damage to thousands of hectares of agricultural lands.

# Forests of Afghanistan



## **2- Pistacitum atlanticum collective**

- The trees of this zone are living on elevations of 1200-1800m from sea level.
- Rainfall is 250- 400mm.
- The target plant and united of this collective is *Pistacia khinjuk*.

# Forests of Afghanistan



## **3- Amygdaletum superior collective**

- The trees of this zone grow between 1800-2800m above sea level.
- Rainfall is 400- 600mm.
- Soils are shallow.
- The best variety is *Amygdalus abrahemica*.
- Some other mountain almonds are also present.

# Forests of Afghanistan



## 4- Pistacitum verum collective (con)

- The majority of this collective is pistachio trees which live at 600-1800m above sea level.
- Pistachio is from the Angiosperm group and Anacardiaceae family, and the species is vera. Its Latin name is (*P. vera*). The people call this zone Pistaliq.
- It is located like a strip from northeast to west through Badakhshan, Takhar, Kunduz, Baghlan, Samangan, Balkh, Juzjan, Sairpul, Fariab, Badghis and Heart.

# Forests of Afghanistan



## **4- Pistacitum verum collective (con)**

- Rain fall is always in the spring and winter. Summer is always hot, and winter is cold.
- The climate is dry.

## **Benefits**

- Good producer of pistachio nuts
- Full of proteins and vitamins
- In 1979, Afghanistan's pistachio export was 200 Mt.
- Economically good production for the country

# Forests of Afghanistan



## 4- Pistacitum verum collective (con)

### Problems

- Collection of nuts is not technically done.
- The one year productive branches are cut during collecting of nuts causing a lost of next year's nuts.
- The trees loose their shape and finally die.
- The people clear cut the trees for fuel.
- Turn the area to rain fed agriculture land.
- Soil erosion occurs because of cutting trees.

# Forests of Afghanistan



## **5- Juniperetum trees collective (con)**

- The trees of this collective are located in the northeast, north and northwest of the country between 1800- 3200m from sea level.
- These trees occupy the very sloped areas of the mountains. Soil is shallow.
- Rain fall varies because of elevations.
- Climate is dry and semidry.

# Forests of Afghanistan



## **5- Juniperetum trees collective (con)**

- Juniperus in the north is *J. excelsa*, but in the northeast it is *J. semiglobosa*.
- Other trees in this collective are *Crateagus songarica*, *Periploca calophylla*, Khinjuk, and Almond kohi in the stage.

# Forests of Afghanistan



## **5- Juniperetum trees collective (con)**

### **Benefits**

- Prevent flooding and protect soil and water
- Good environment for wildlife
- Protect the environment, soil, and water for mountainous agricultural lands

# Forests of Afghanistan



## 5- Juniperetum trees collective (con)

### Problems

- It is does not coppice well.
- Clearcutting has destroyed the trees collective on sloped areas.
- Severe grazing also damages the environment.
- Those people who cut trees are enemies of the environment and the country.

# Forests of Afghanistan



## **6- Subtropicetum Siccum collective (con)**

- The plants of this collective are found between 580- 850m from sea level of eastern (Nangarhar, Kunar) and southern (Paktia, Paktica) provinces.
- Most plants of this collective are grown on slopes.
- Rainfall is 180-325mm, and the climate is dry and hot in the summer.
- This collective is not nominated to be a special tree or plant .

# Forests of Afghanistan



## 6- Subtropicetum Siccum collective (con)

- Plants of this collective are: *Rhazia stricta* (Gadirai), *Withania coagolensis* (Khamazorai), *Ziziphus moretiana* (Onabi dashti), *Calotropis procera* (Spalmi), *Dodonia viscosa* (Ghoraskai), *Periploca procera* (Oom), *Pistacia khinjuk* (Khinjuk), *Delbargia sissoo* (Shisham), *Pegonum haramala* (isfand), *Nerium oleander* (Gandirai asil), *Chemarups ritchiana* (Mazirai), *Corisa opacca* (Mamana), *Myrtus communis* (Mano) and others. They live as united with each other.

# Forests of Afghanistan



## **6- Subtropicetum Siccum collective (con)**

### **Benefits**

- Prevent flooding in the slopes of foothills.
- Keep soil and water on foothills.

### **Problems**

- The people cut them for fuel.
- They dig them up.
- Desertification is extended.

# Forests of Afghanistan



## 7- *Olea reptonetum* collective (con)

- The trees of this collective mostly grow on 850-1300m of sea level in the east, southeast and south of the country.
- Trees of this collective are *Olea cuspidata* and *Reptonia boxifolia*.
- Rainfall is 400mm annually.
- *Rosa moscata*, *Acacia modesta*, *barbaris* spp, *Vitis venefera*, *Romix*, *Cotoneaster macrophylla*, and others are the united of this collective.

# Forests of Afghanistan



## 7- *Olea reptonetum* collective (con)

### Benefits

- Keep soil and water and prevent flooding.
- Fuel for household.

### Problems

- People clearcut the trees.
- People dig up the trees.
- Erosion damages the site and washes soil from the ground surface.

# Forests of Afghanistan



## 8- Quercitum trees collective (con)

- Situated between 1300- 2100m from sea level. Acacia, Olea & Reptonia are united tree collective.
- Rainfall is between 400-700mm per year.
- Most trees of this collective are oak and belong to the angiosperm family of Cupuliferae or Fagaceae.
- Oak forests consist of Quercus baloot, Q. deletata, and Q. semicarpifolia.
- These forests are located in Kunar, Nangarhar, Laghman, Nuristan, Paktia, Paktica, and Kapisa Provinces.

# Forests of Afghanistan



## **8- Quercitum trees collective (con)**

- This collective covers 130,000 ha.

### **Benefits**

- Trees coppice well.
- Good fodder for animals, especially in winter
- Control flooding and keep soil and water.

### **Problems**

- Heavy grazing, cutting of branches, and cutting of trees for fuel from the forest.
- Cutting of trees for charcoal, and severe erosion.

# Forests of Afghanistan



## 9- Pinetum trees collective (con)

- Most trees of this collective are *Pinus gerardiana* (1300-1800m above sea level) and *P. wallichiana* (2800-3300m above sea level).
- Rainfall in *P. gerardiana* forests is 400-600mm.
- These trees are situated in Kunar, Nuristan, Laghman, Nangarhar, Paktia, Paktica, and Kapisa.
- In Laghman, Paktia and Paktica, *P. gerardiana* forests are very important for Jalghoza fruit production which before 1978 was mostly exported abroad.

# Forests of Afghanistan



## 9- Pinetum trees collective (con)

### Benefits

- Good fruit (Jalghoza) producer.
- *P. gerardiana* wood is good for fuel.
- *P. wallichiana* wood is good for industrial works.

### Problems

- The people clearcut the trees for fuel and timber.
- Severe grazing and clearcuts cause flooding.
- Lose of soil and water in the area results.

# Forests of Afghanistan



## **10- Cedretum trees collective (con)**

- Most trees of this stage are cedar, which is one of the best conifer trees.
- These trees are located in Kunar, Nuristan, Laghman, Paktia, and Paktica Provinces.
- Stage in Paktia is around 2300-2800m, and in Kunar and Nuristan occurs between 1800-2800m above sea level.

# Forests of Afghanistan



## 10- Cedretum trees collective (con)

### Benefits

- Good wood for industrial works and economic gain.
- Good forest for soil and water conservation .
- Flooding control.
- Good environment for wildlife.

### Problems

- The people clearcut them for smuggling.
- Severe grazing and erosion (soil and water).
- Burning the forest for opposition and political reasons.

# Forests of Afghanistan



## 11- Abieto Pectinatum collective

- This forest is located between 2800-3200m above sea level in Kunar, Nuristan, Nangarhar, Laghman, Paktia, and Paktica Provinces.
- Rainfall is about 860-1100mm annually.
- Climate is moderate (temperate) and semi-cold.
- The trees are *Picea smithiana* and *Abies webiana*. *Ascalus indica* (jawz) and *Q. semicarpifolia* also grow in association with them.

# Forests of Afghanistan



## 12- Subalpinetum and Alpinetum stages

- These stages are on the elevation of 3200-4000m
- Subalpinetum stage consists of *Juniperus nana* (bushes), *Rhododendron afghanicum* (namir), and others.
- Alpinetum stage doesn't have trees, but it does have some other plants such as grasses which make summer pasture for livestock.
- This area is also under pressure of heavy grazing and removing of plant cover by fire.

# Forests of Afghanistan



## **Types of forests in Afghanistan (con)**

- Classification of woody plants is done according to ecology and successional stages.
- In the classes each formation shows the specific bush, and each stage shows a specific tree.
- As all the formations and stages grow naturally, if some other associated plants have the same morphology. They are also taken to that combination or composition.

# Forests of Afghanistan



## **Types of forests in Afghanistan (con)**

### **A- Ever green coniferous forests**

- Collectives of *P. gerardiana*, *P. wallichiana*, *Cedrus*, *Picea*, and *Abies* are nominated as ever-green coniferous and cover 1.3 m ha of land.
- These forests are in the gymnosperm group and the conifereae family. These type of trees are extensively found in Afghanistan. *P. gerardiana* trees produce good fruits (Jalghoza) and are also good timber for housing.

# Forests of Afghanistan



## Types of forests in Afghanistan (con)

### A- Ever green coniferous forests

- The largest ecosystems of these forests are: Chalas in Dewagal valley and Asmar of Kunar Province; Darin and Kamdish of Nuristan Province; Gardiz, Said Karam, and Jaji of Paktia Province; Jani khil and Tanai of Khost Province; and Spira and Jadran in Paktica Province.
- 25,000 ha of Mandahir were destroyed in the conflict.
- Dawlat Shah of Laghman and Nazian in Nangarhar were also destroyed.

# Forests of Afghanistan



## **Types of forests in Afghanistan (con)**

### **B- Ever green fleecy leaves forests**

- Juniperus excelsa and Cupresus torolosa are of the Cupressaceae family and are extensively found in Afghanistan.

# Forests of Afghanistan



## Types of forests in Afghanistan (con)

### C- Broad leaved deciduous forests

- Called deciduous trees (lose their leaves in autumn).
- Huge broad leaved forests are Pistachio forests.
- *Juglans regia* and *Diospyros lutea* (Amlok) forests also occur. Their fruits are important, but this forest does not cover as much area and the trees are found mixed with conifer forests.

# Forests of Afghanistan



## Types of forests in Afghanistan (con)

### D- Other broad leaved forests

- *Cercis griffithii*, *Fraxinus* spp, *Haloxilon*, *Acacia*, and others are found scattered in all Afghanistan.
- Covers 70,000 ha of land.
- Good wood for fuel.

# Forests in Afghanistan (con)



## Types of forests in Afghanistan (con)

### **E- Man made forests (artificial forests)**

- There are very few artificial forests in Afghanistan. There are 70,000 ha only of this forest which consists of different trees.
- Mostly poplar and willow of the Salicacea family are planted. These are two important genus.
- In different provinces you can find them beside canals, rivers, and picnic sites
- The people cut most of them during the war, but traditionally some remained and are very scattered.

# Forests of Afghanistan



## **Types of forests in Afghanistan (con)**

### **E- Man made forests (artificial forests)**

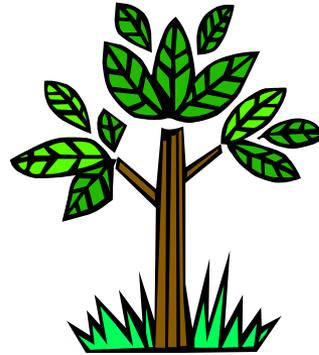
- They are very sensitive to insect and disease.
- Environment is completely disturbed.
- The underground and surface water are decreased.
- Strong flooding and land creep occur.
- Range lands are destroyed.
- Scarcity of wood (fuel/construction) will be provided from other countries.

# Forests of Afghanistan



## **Result of discussions**

- 50% of the natural and artificial forests are destroyed and damaged.
- Rehabilitation is not easy and may be impossible.
- Good policy and planning, forest law, sufficient budget, specialists and experiments, technology and sufficient time are needed to solve this problem.
- Implementing of projects (establishment, rehabilitation, management of catchments) and regular practical works are necessary.



Hope this was useful.

Thanks for your attention.