

*Enhancing resilience of forests to climate
change: Suggested management
strategies*





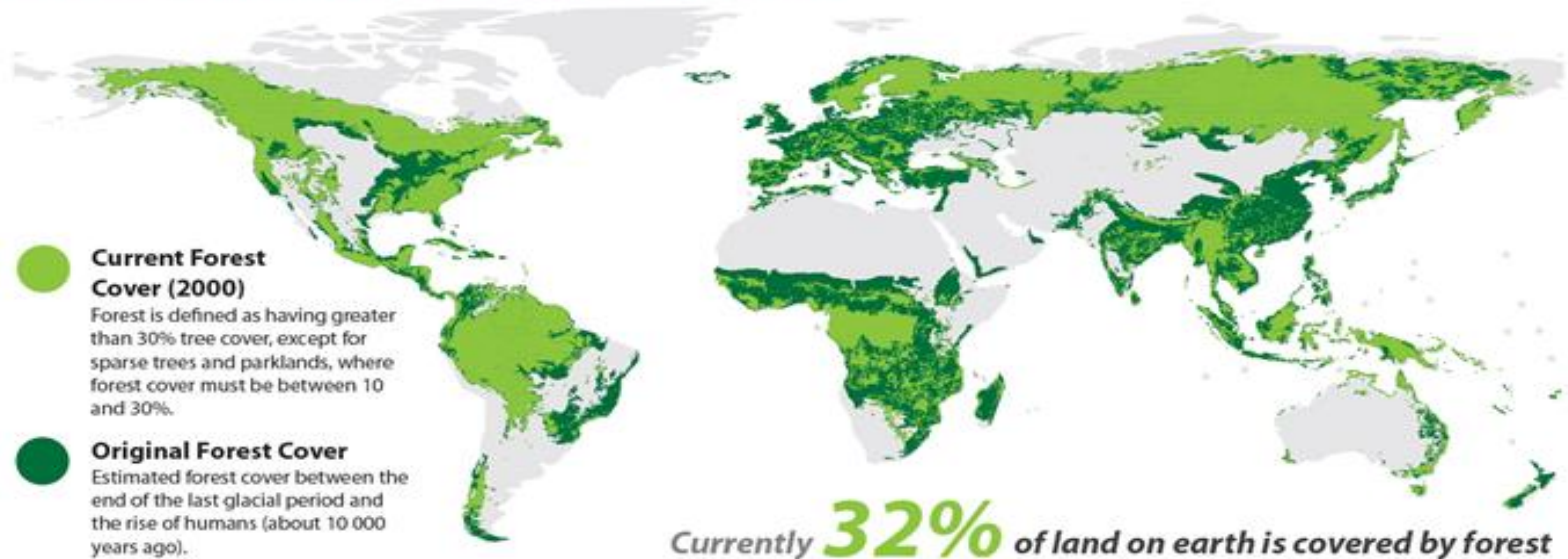
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Resilience

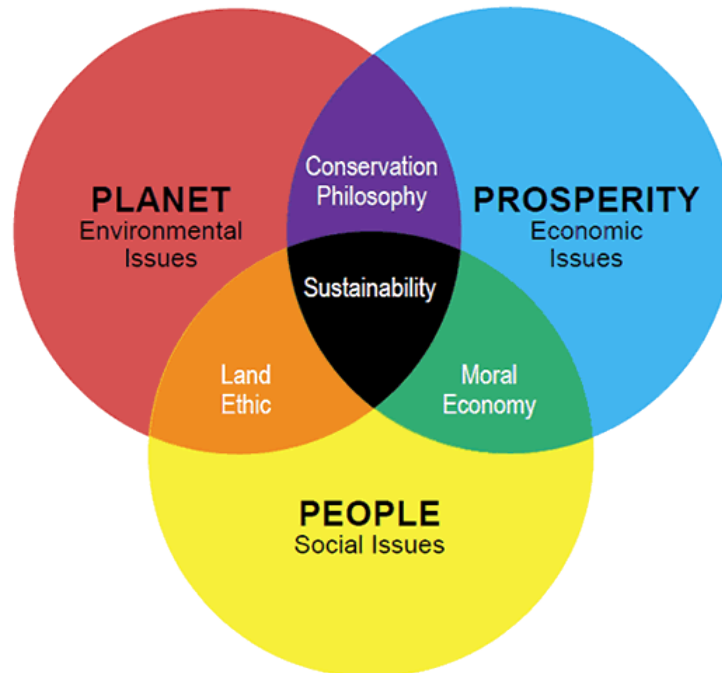
- Ability to **cope** up with stress
- Ability to **adapt** to the stress
- Ability to **recover** from effects of stress

How has global forest cover changed over time?



Strategy – Sustainable Forest Management

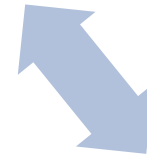
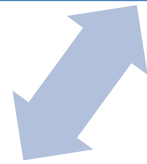
- SFM enhances resilience of forest to climate change by
 - Maintaining and enhancing the environmental , economical and social resources of forest



How SFM enhances resilience ?

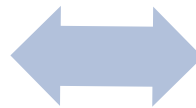
Environmental

Mitigation : absorbs Co2 from the atmosphere



Economical

Risk reduction from CC
Secures access to products & services for poor people



Social

Aesthetic Landscape provide livelihoods in the face of erratic weather, drought, floods & sea level rises

MANAGEMENT MEASURES IN



Healthy
forest
&
Plantations



Degraded
forest



Biodiversity
(including
wildlife)

Measures in Healthy forest & plantations

- **Characteristics of healthy forest**
 - Cover : Moderately dense to dense
 - Ecological : Maintaining its species composition, processes and function
 - Social : catering to present & future needs of the people



Impacts of climate change

- ✿ Decreased productivity
- ✿ Die back of trees from drought
- ✿ Sea level rise and salt water intrusion
- ✿ Wind erosion
- ✿ Water erosion
- ✿ Pest & disease outbreak
- ✿ Shortage of resources for people

Tackling decreased productivity

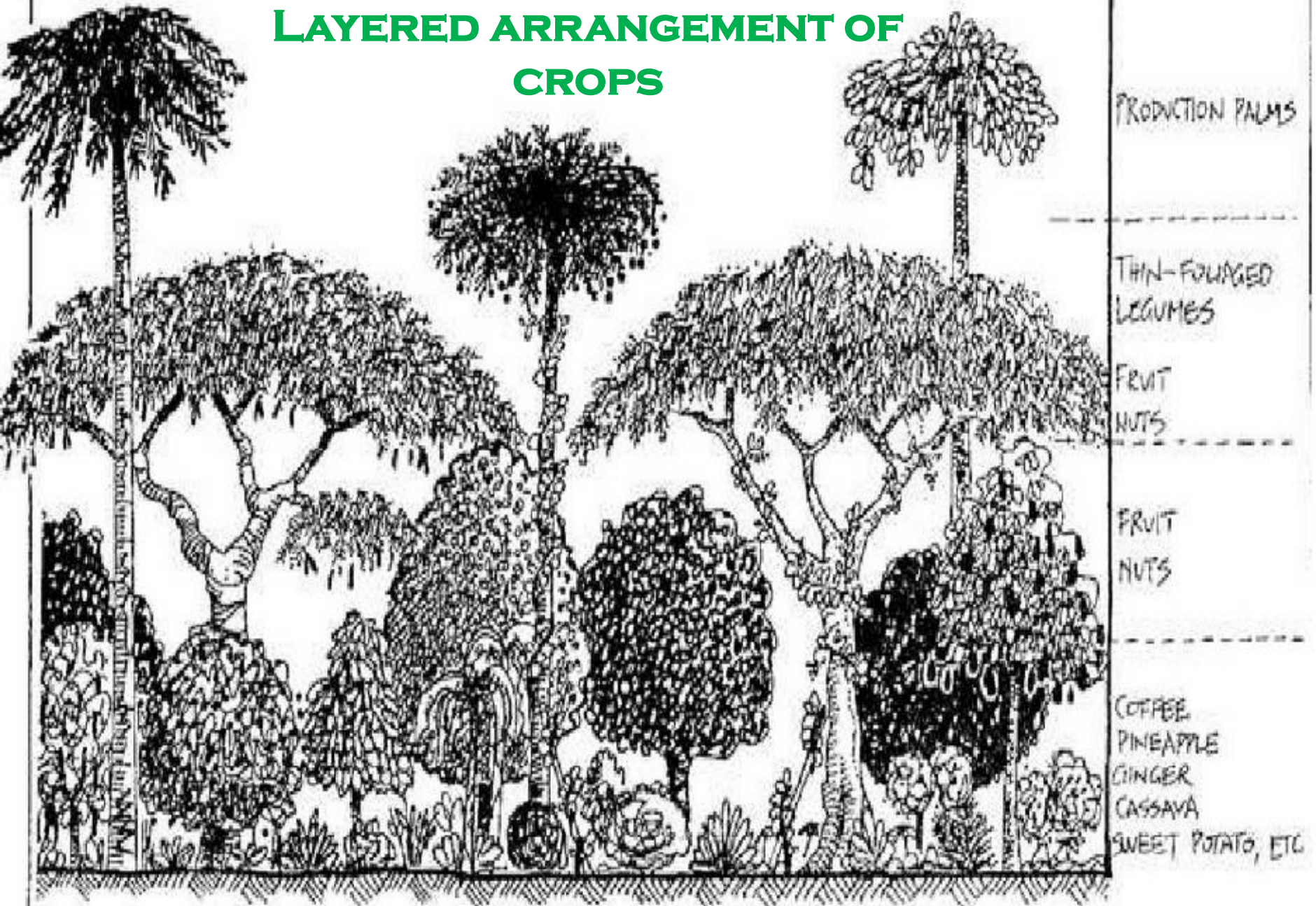
– Healthy forests

- Following suitable silvicultural practices
- Planting in open spaces
- Eradication of pests , diseases , weeds , invasive species

– Plantations

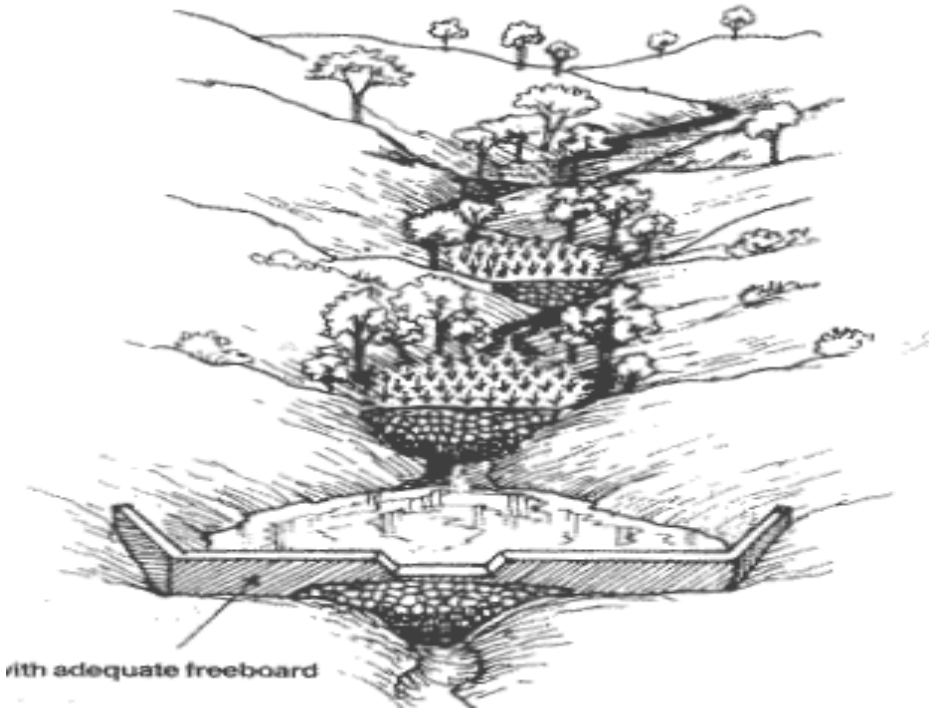
- Opting for short rotation crops
- Following layered crops than monoculture (permaculture)

LAYERED ARRANGEMENT OF CROPS



Tackling Drought

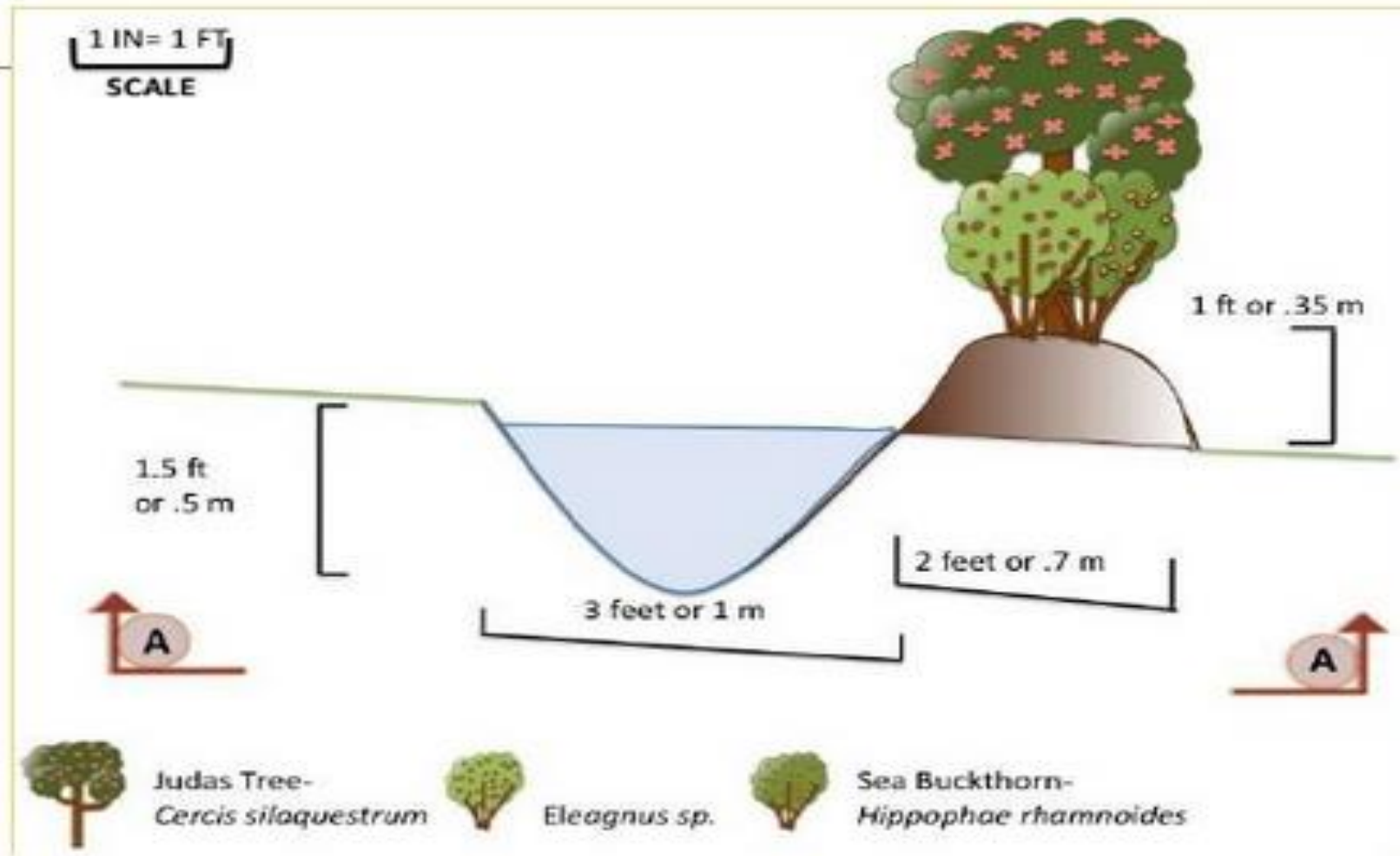
- Healthy forests
 - Building water conserving structures (check dams & storage tanks)



Tackling Drought (ctd..)

- Plantation
 - Using drought resistant varieties
 - Increasing drought hardiness of seedlings in the nursery
 - Effective water utilization
 - Mounds & depressions

Swales (mounds & depressions)



Tackling sea level rise

- Mangroves
 - Acts as buffer b/w land and sea and protects land from sea level rise



Tackling Sea Level Rise

- captures Co2 100 times faster
- 150 mn to 1 bn tonnes of CO² - comes from to the destruction of mangrove forests globally
- Coastal wetland destruction = 1-3% of industrial emissions
- Measures
 - Protection of already existing mangrove forests
 - Plantation of mangroves across 7500 km long India's coastline

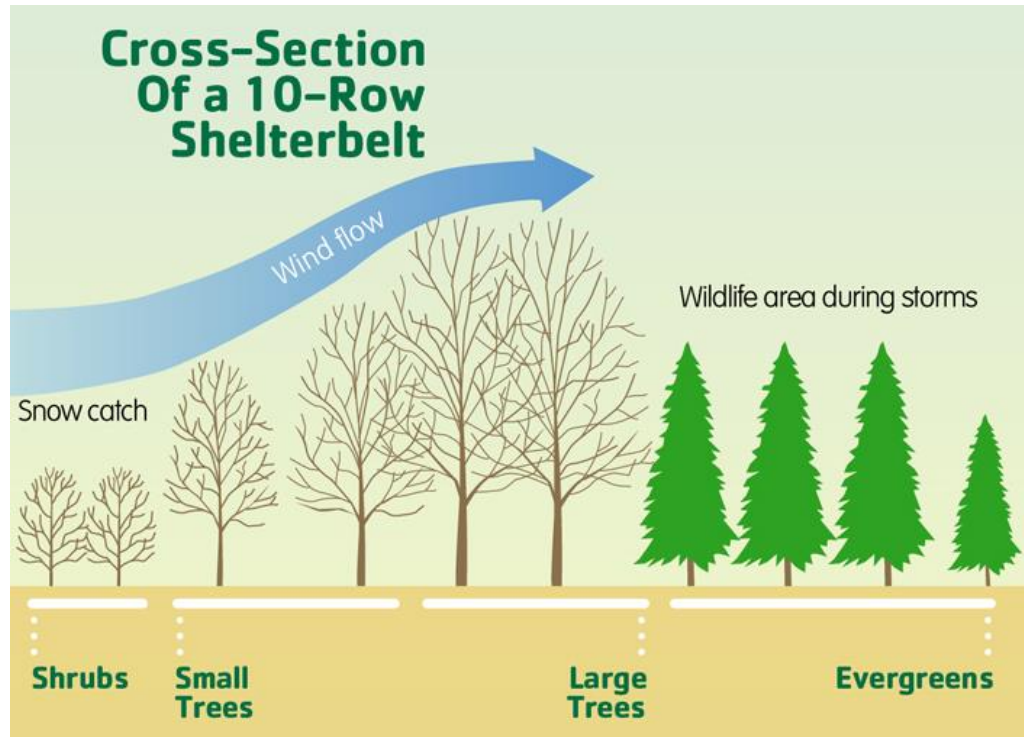
Tackling soil erosion

- Healthy forests
 - Slope stabilization using worn out tires
 - Gabion structures
 - Riprap plantation across river banks inside forests
- Plantations
 - Close spacing of trees



Tackling wind erosion

- Healthy forests
 - Effects of wind erosion will be less
- Plantation
 - Close spacing
 - Shelter belts
 - wind breaks



Tackling pest & disease attacks



Tree attacked by

***Hoplocerambyx
spinicornis***

Timli

Managing Pests & Diseases

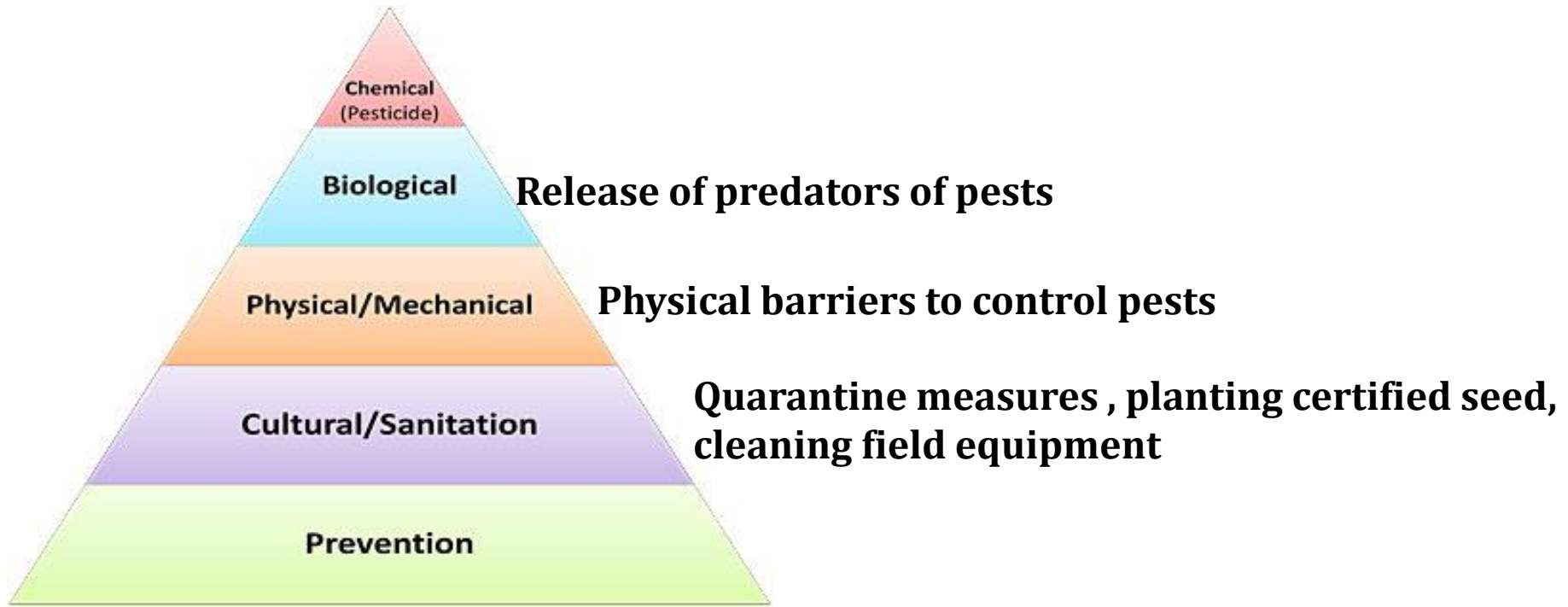
- Healthy Forests

- Early detection : Network of trained volunteers appointed by forest dept (ex : Britain)
- silvicultural methods – ex: Hoplo attack in Sal
 - Regulate timing of felling (winter-no pests)
 - removal of logging debris
 - monitoring to detect infested trees
 - trap tree method
- Data collection & research on new diseases and pests

Managing Pests & Diseases

- Plantations

- Using pest and disease resistant varieties
- Using Bio-insecticides and Bio-pesticides
- **Integrated pest management**



Dealing with Shortage of resources for people

- Successful implementation of all the above will reduce the resource shortage risk
- Agro forestry
- Social forestry
- community reserves – Ex: Kesheopur in Punjab
- Conservation reserves

Measures in degraded forest- Restoration

- India has 2.788 lakh sq.km of degraded forest
- Sustainable management of degraded forest
 - Passive restoration – protecting the site & allowing natural succession
 - Enrichment planting – introducing key species & enhancing plant density
 - Plantations after mining in mining areas

Restoration of degraded areas(ctd..)

Steps for the implementation of direct sowing in the forest restoration process.



I - Zone diagnosis;



II - Soil preparation;



III - Seed plantation, e.g. *Erythrina velutina* Wild;

DIRECT SEEDING



VI - Plant of *Erythrina velutina*, 240 days after direct sowing.



V - Seedling of *Erythrina velutina* 30 days after the implementation of direct sowing;



IV - Emergence of seedling of *Erythrina velutina* 8 days after direct sowing;

Restoration of degraded forest(ctd..)

- Measures undertaken by GoI
 - Bonn challenge(2011) – India pledged to restore 13 million hectares of degraded forest
 - Compensatory Afforestation bill(2015)
 - Municipal corporations & Schools for afforestation drive

Enhancing resilience of **wildlife** to CC

- Maintaining **landscape** & current ecosystems
 - Ex: Maintaining Mangroves in Sundarbans to save Bengal Tiger from impact of Sea Level Rise
- Restoration of damaged ecosystems
- **Reducing fragmentation** of forests – so that migration is not affected
- Adequate **veterinary care** – risks from diseases due to temp increase
- Construction of **water storage** structures – during drought

Let's Save Our Future!



THANK YOU