

# Drivers of Deforestation and Land Use planning in Central Africa:

## Agroforestry as a Land Use Planning Tool to Protect Forest in Central Africa

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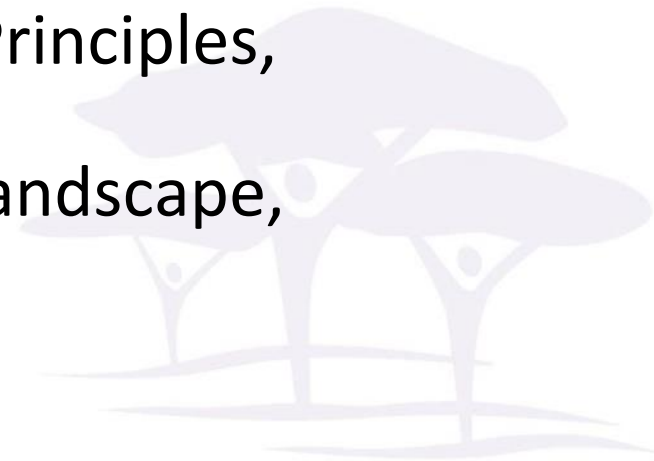
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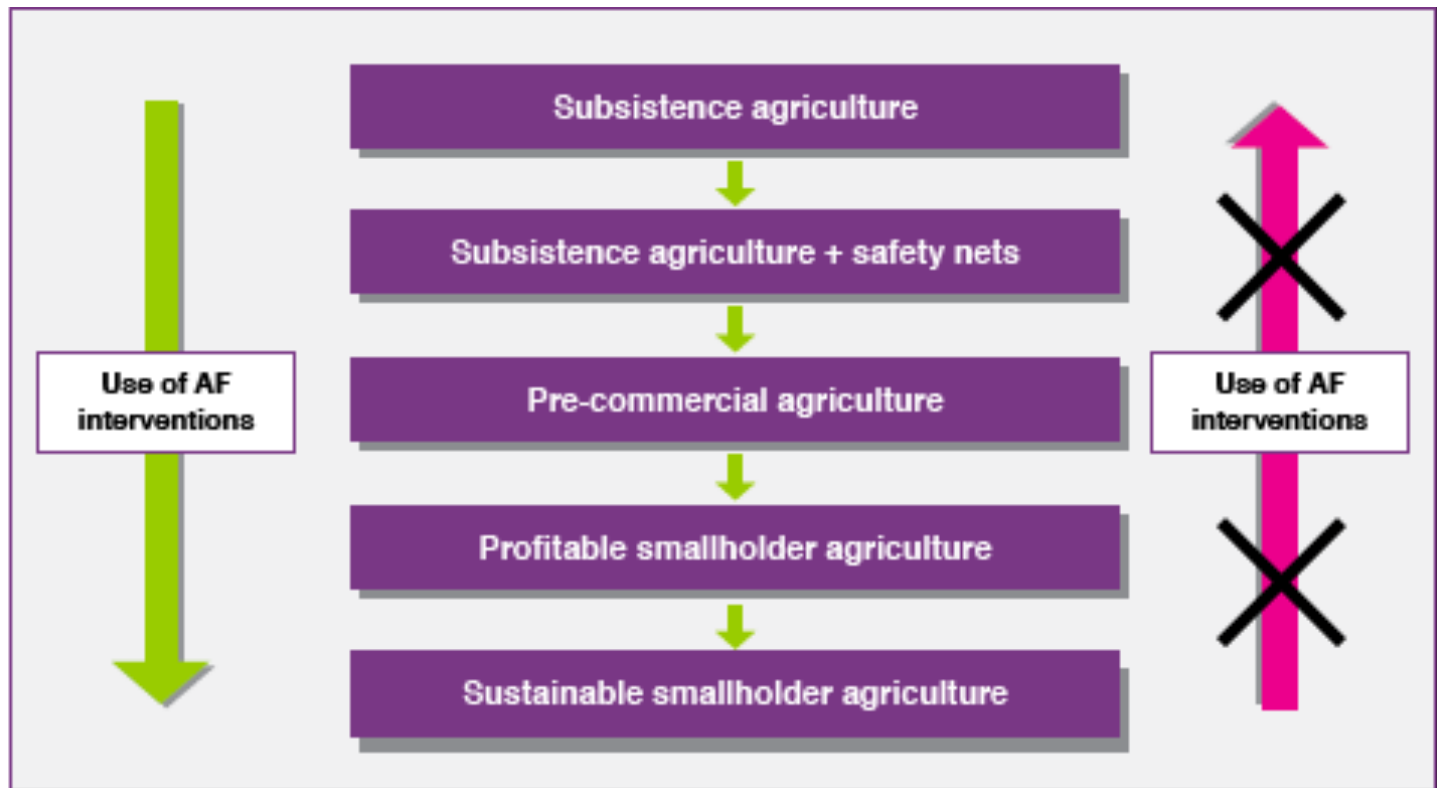
# Presentation outline

- World Agroforestry Perception of Land Use Systems,
- Key land uses in Central Africa,
- Drivers of deforestation (Direct and Indirect),
- Land Use Strategy to Protect Landscape,
  - Diversification via agroforestry: Principles,
  - Multifunctional agriculture and landscape,



# World Agroforestry Centre (ICRAF) and Land use

ICRAF works to transform lives and landscapes with trees in the developing world, to improve food security, nutrition, income, health, shelter, energy resources and ensure sustainability of environment.





Primary/Secondary  
forests



Rubber plantations



Cocoa plantations

## Some Common Land Use Options in Central Africa



Palm plantations



Slash & Burn Agriculture



Food crops



# Drivers of deforestation

## Direct drivers

### 1. Agricultural expansion

- Shifting cultivation for food and cash crops
- Expansion of annual crop systems in peri-urban area
- Large-scale plantations like oil palm and rubber plantations

### 2. Extraction

- Charcoal
- Fuel wood

### 3. Infrastructure

- Roads
- Markets
- Settlements

### 4. Industry

- Mining

## Indirect drivers

### 1. Demographic factors

Population increase

### 2. Economic factors

Poverty

### 3. Technological factors

More access to input for food and cash crops

### 4. Institutional factors

Agricultural policy

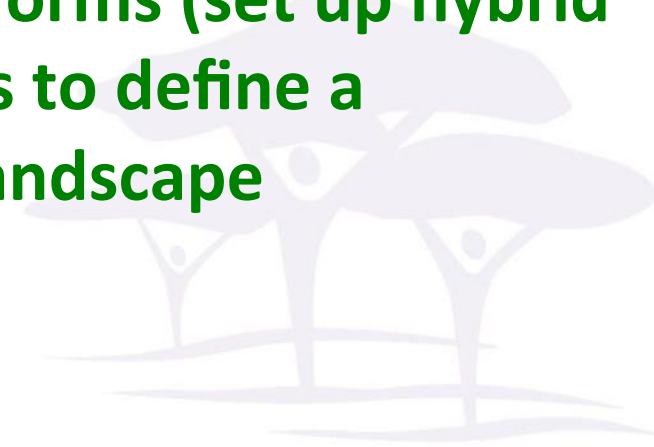


# How can we address these issues?

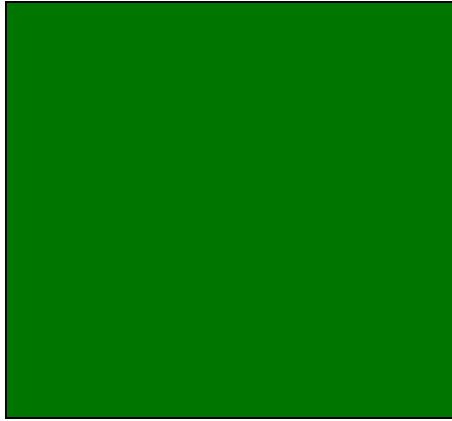
There is not a simple answer.

Need to simultaneously restore:

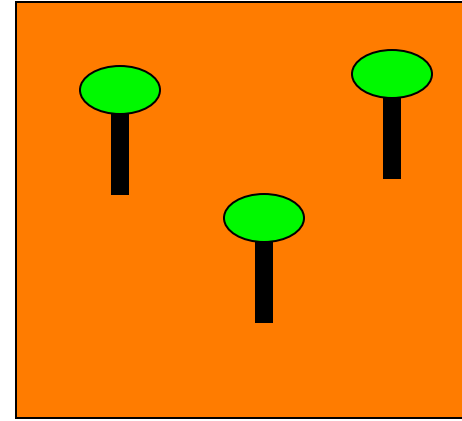
- **biological resources and natural capital (soil fertility, water, forests, pest and disease control, etc.),**
- **livelihoods (nutrition, health, culture, equity, income),**
- **Governance and institutional reforms (set up hybrid institutions with all stakeholders to define a common vision & strategy for landscape management).**



# What Land Use Plan for the Landscape? ..1/3

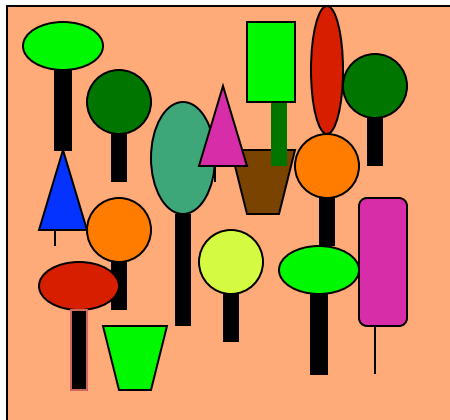


Natural forest



Lightly shaded  
monoculture

## Land Uses on the landscape

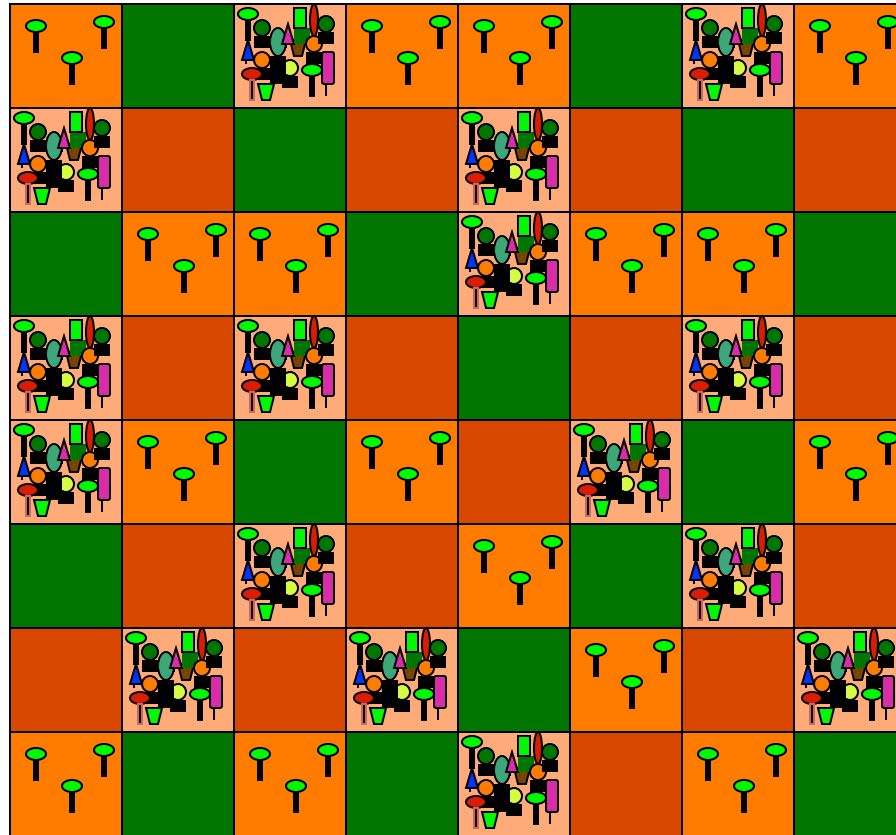


mixed farming  
system

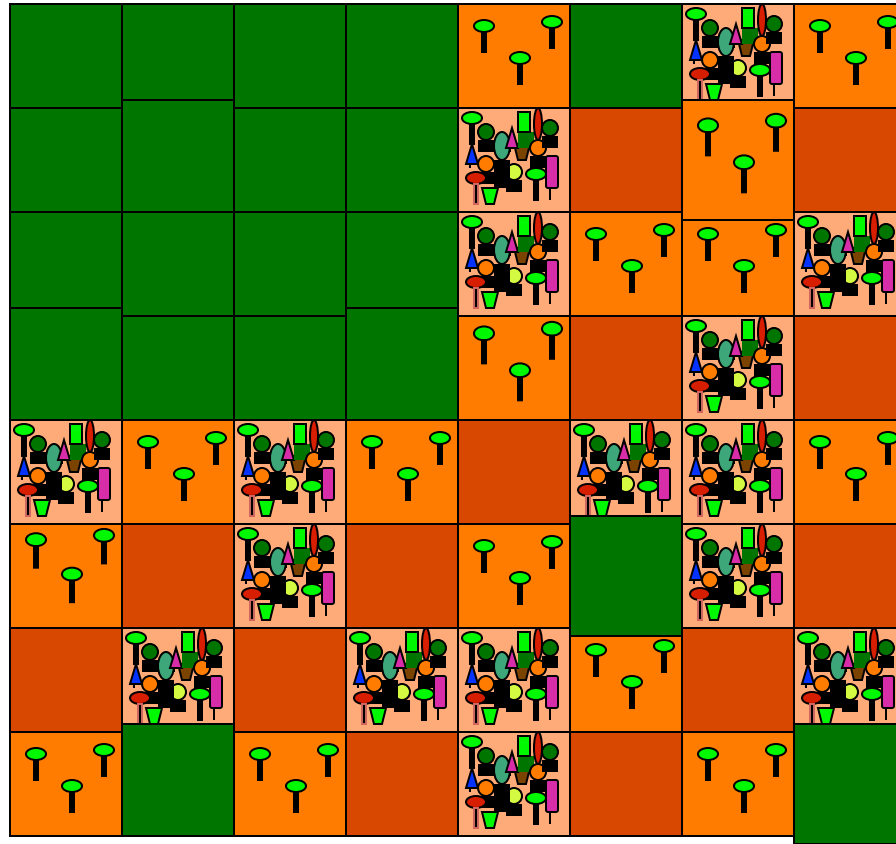


monoculture

# What Land Use Plan for the Landscape? ..2/3

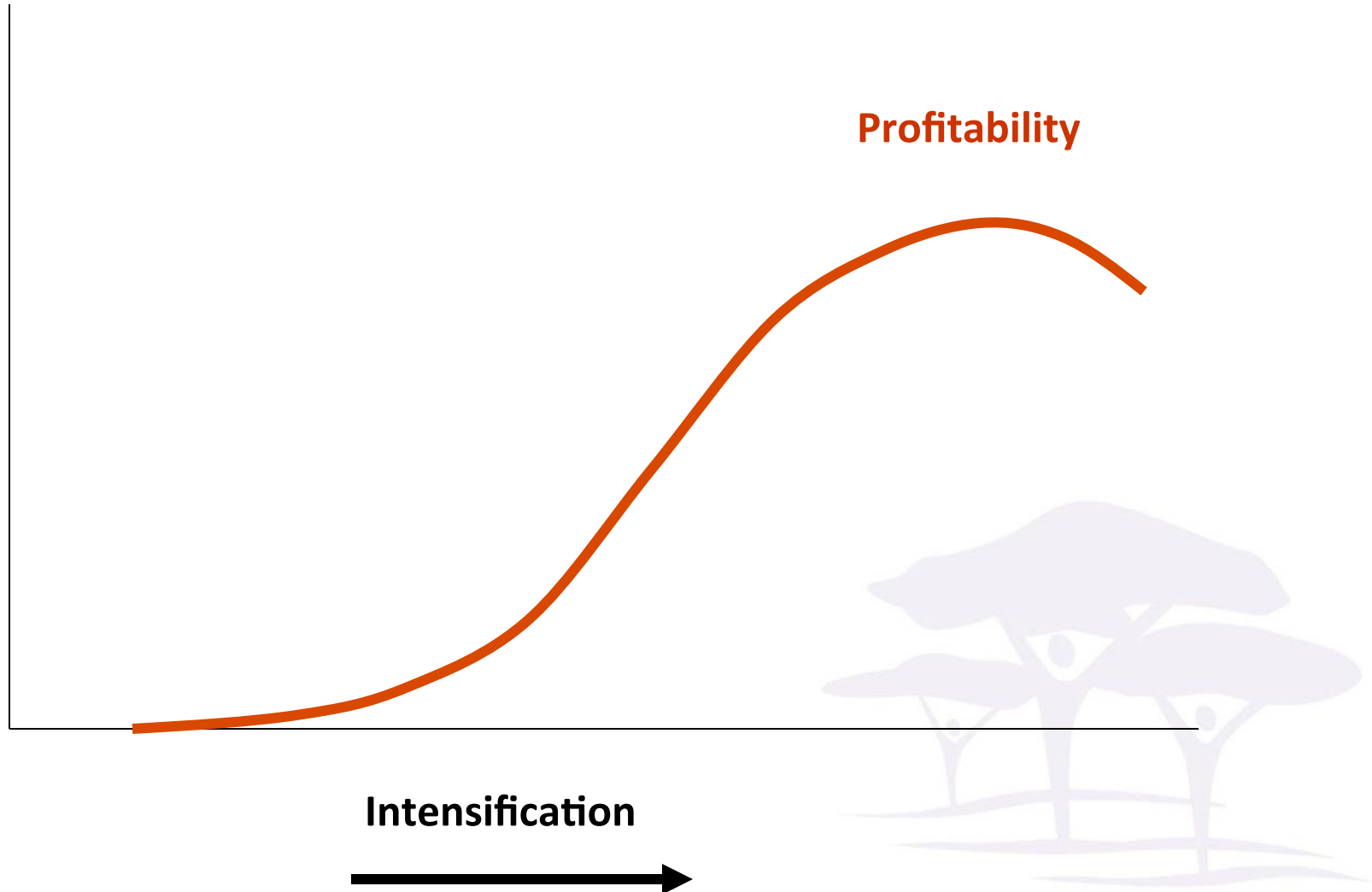


# What Land Use Plan for the Landscape? ..3/3

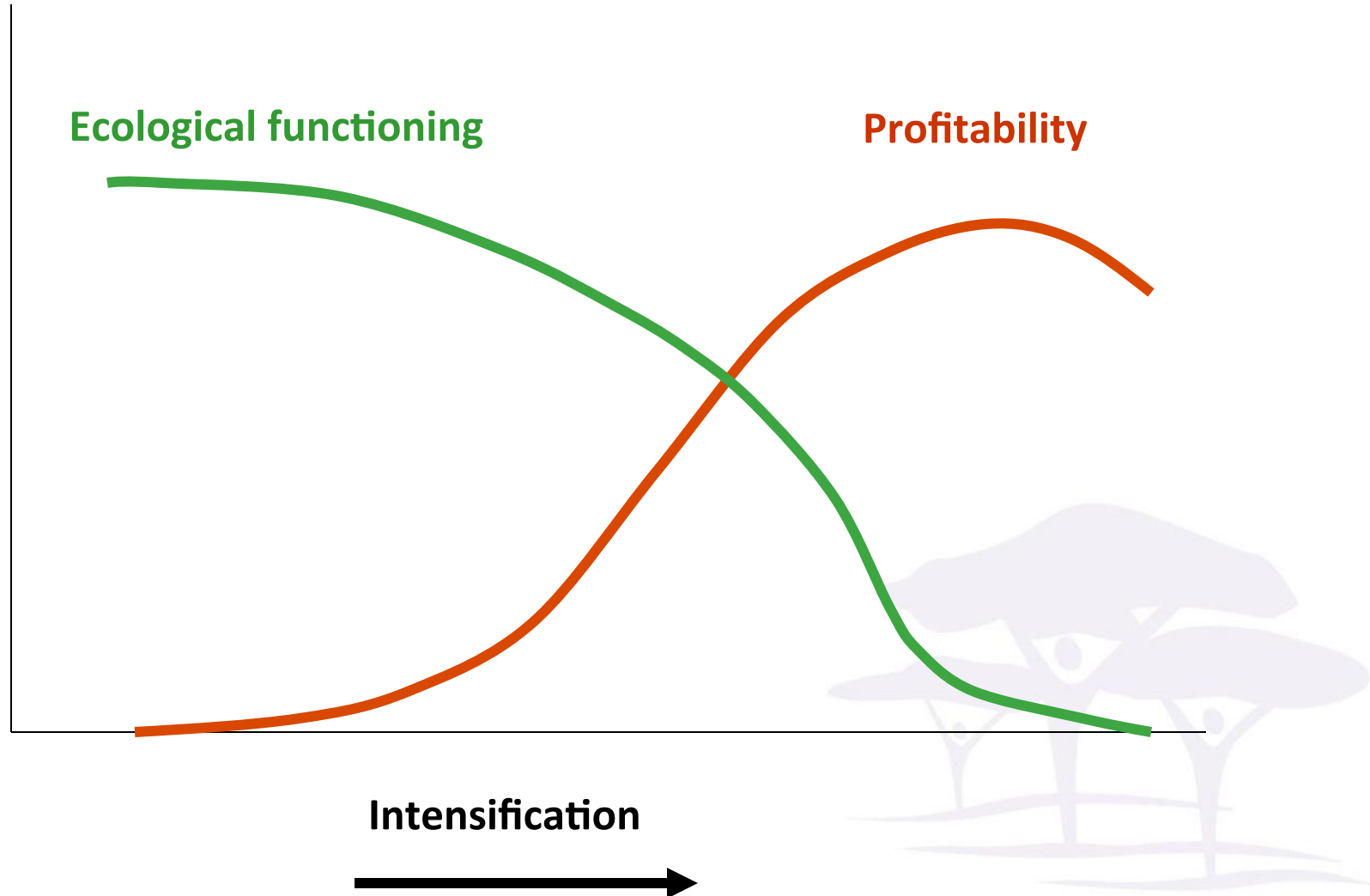




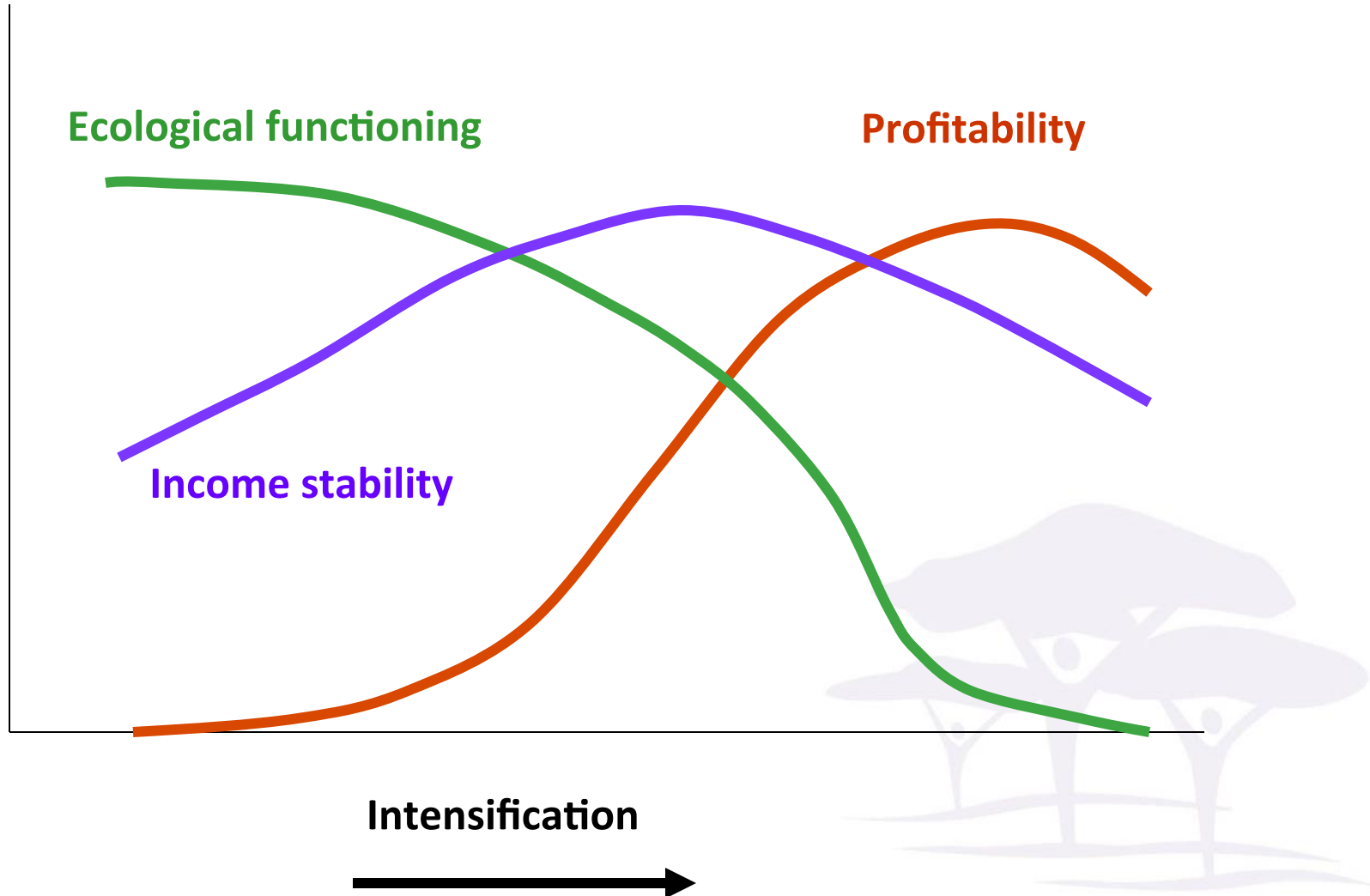
# What Land Use Strategy to Protect the Forest?..1/4



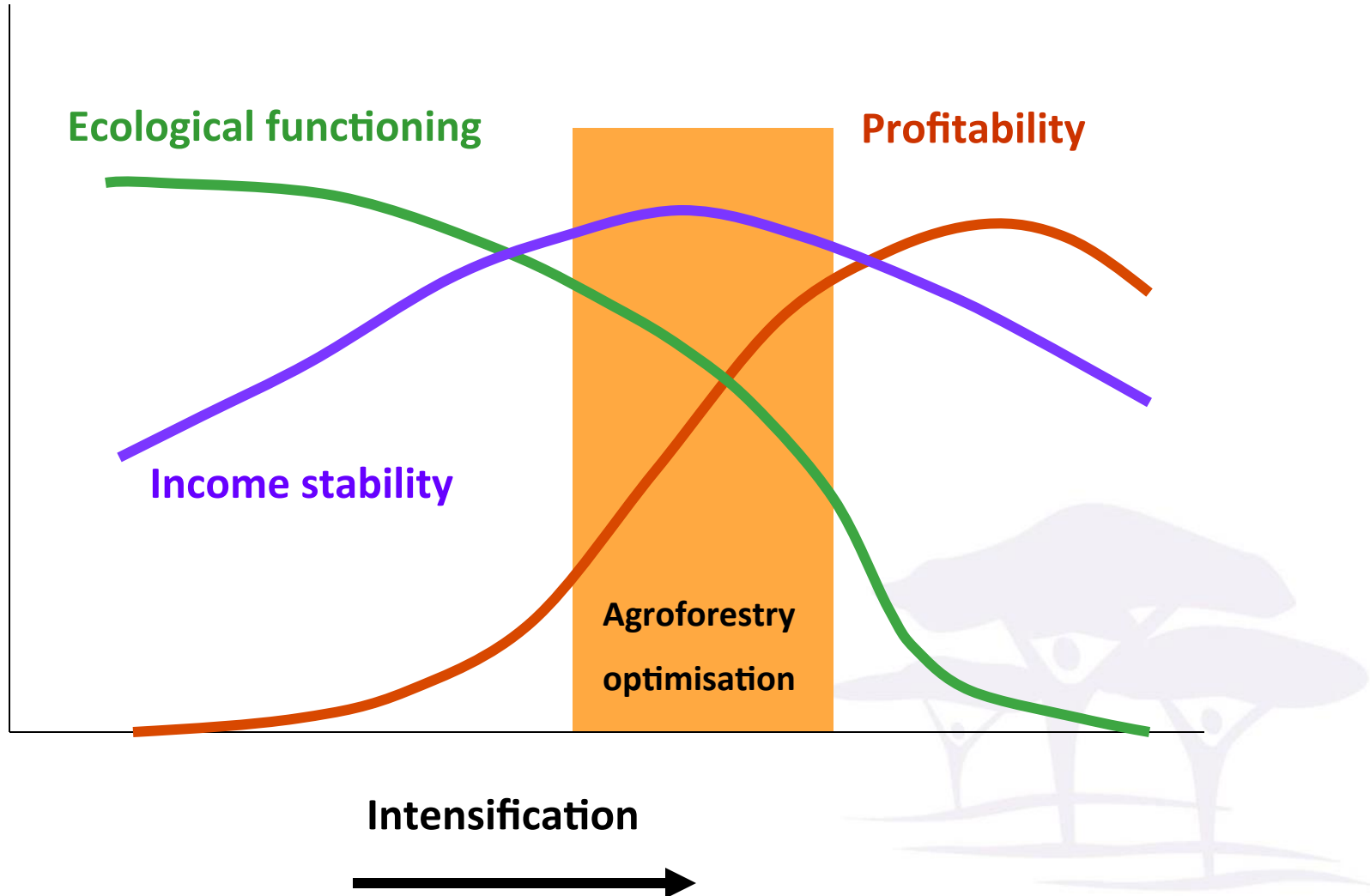
# What Land Use Strategy to Protect the Forest?..2/4



# What Land Use Strategy to Protect the Forest?..3/4



# What Land Use Strategy to Protect the Forest?..4/4



Agroforestry is 'A dynamic, ecologically based, natural resource management system that, through integration of trees on farms and in the agricultural landscape, diversifies and sustains production and builds social institutions'

[www.worldagroforestry.org](http://www.worldagroforestry.org).





# How to achieve diversification?

1. Empower small scale farmers to use **high-value** but long time neglected **improved indigenous fruit trees**
2. Develop and vulgarize the techniques of domestication of high-value indigenous fruit trees
3. Develop the marketing and the value chain of high-value indigenous fruit trees







*Calliandra* for fodder banks



Erosion control, contour bands

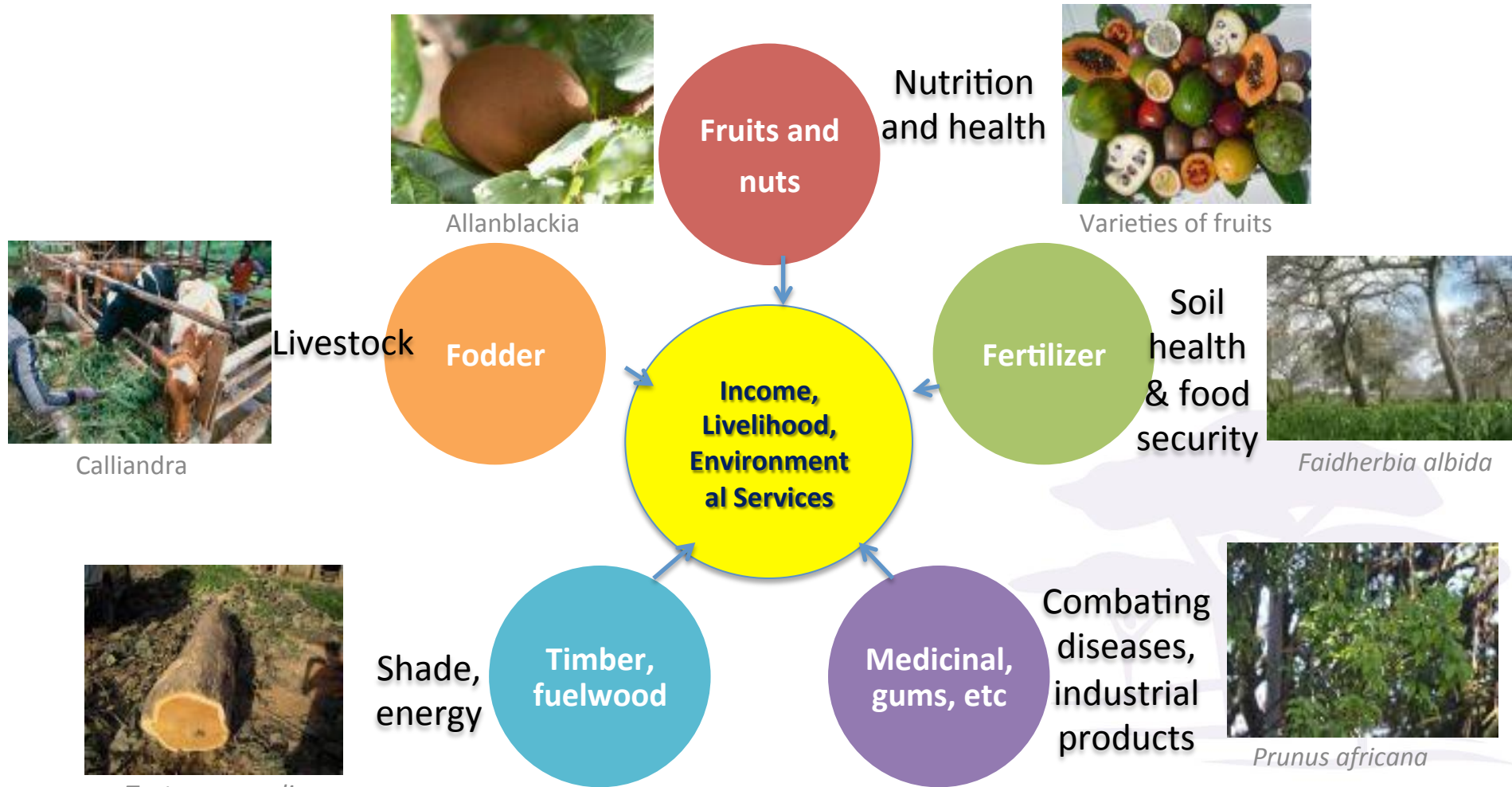


*Inga edulis* for soil fertility

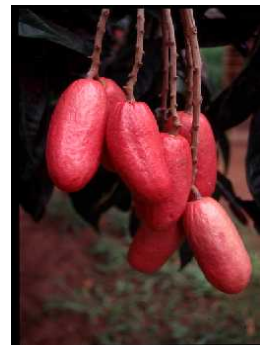




# Agroforestry Products









# Tree Domestication

Simple vegetative propagation techniques:

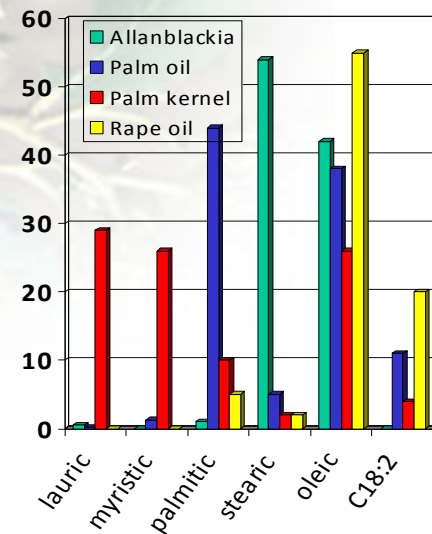
- Rooting juvenile cuttings
- Grafting matured species
- Marcotting high-value species











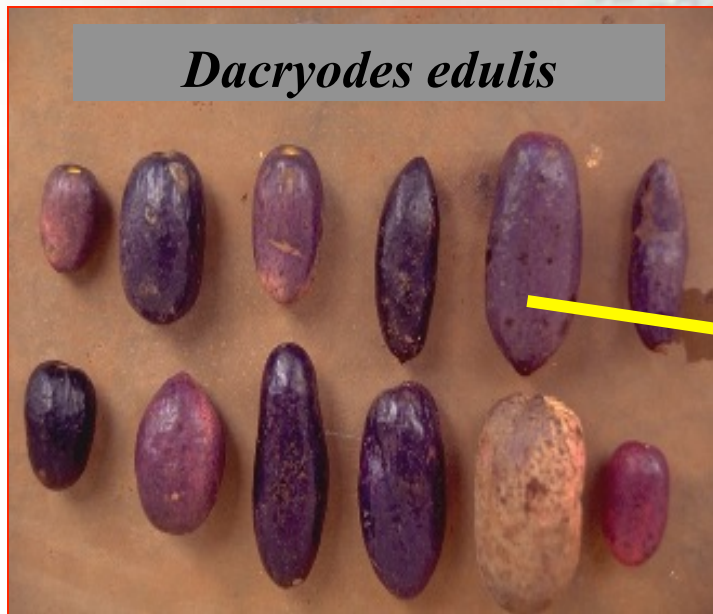


# A young Allanblakia fruiting six years after planting

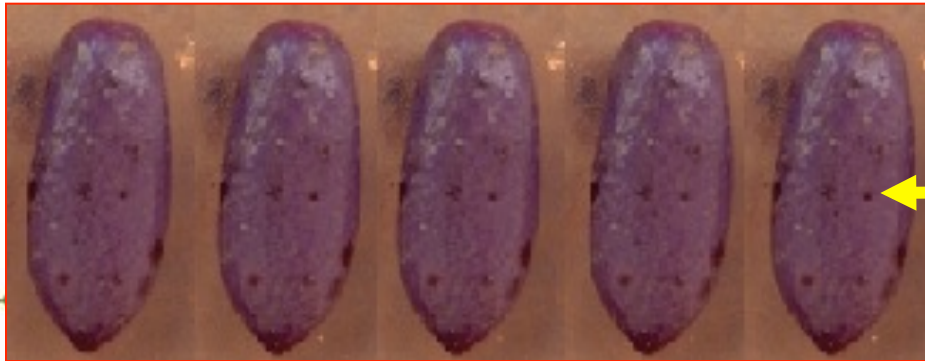




# Creation of a cultivar



**Earlier fruiting, smaller trees and uniform quality**













# Rehabilitation of old cocoa farms

Improved variety grafted to old cocoa tree

- Success rate 59-73 %
- Variation on growth
- Variation among clones



**4 weeks after grafting**

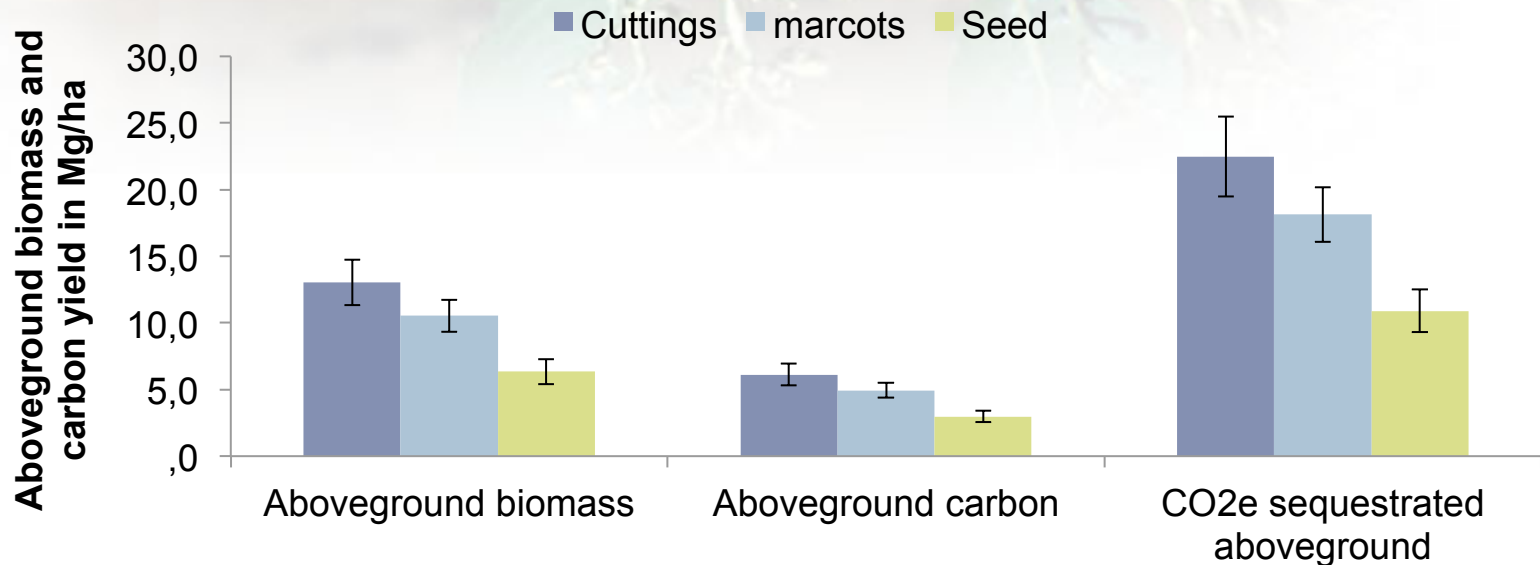








# Effect of propagation methods on carbon storage potential in *D. edulis* trees of seed and vegetative origins



**Biomass, carbon and CO<sub>2</sub>e sequestered aboveground in 10 years old *D. edulis* trees of seed and vegetative origins (mean  $\pm$  s.e.d Mg ha<sup>-1</sup>)**

- *D. edulis* trees of vegetative origin produced significantly ( $P \leq 0.05$ ) more biomass and carbon aboveground than trees of seed origin.





# The right tree for the right place

## 1. Trees for Products



fruit



firewood



medicine



income



sawnwood



fodder

## 2. Trees for Services



soil  
fertility



carbon  
sequestration



soil  
erosion



watershed  
protection

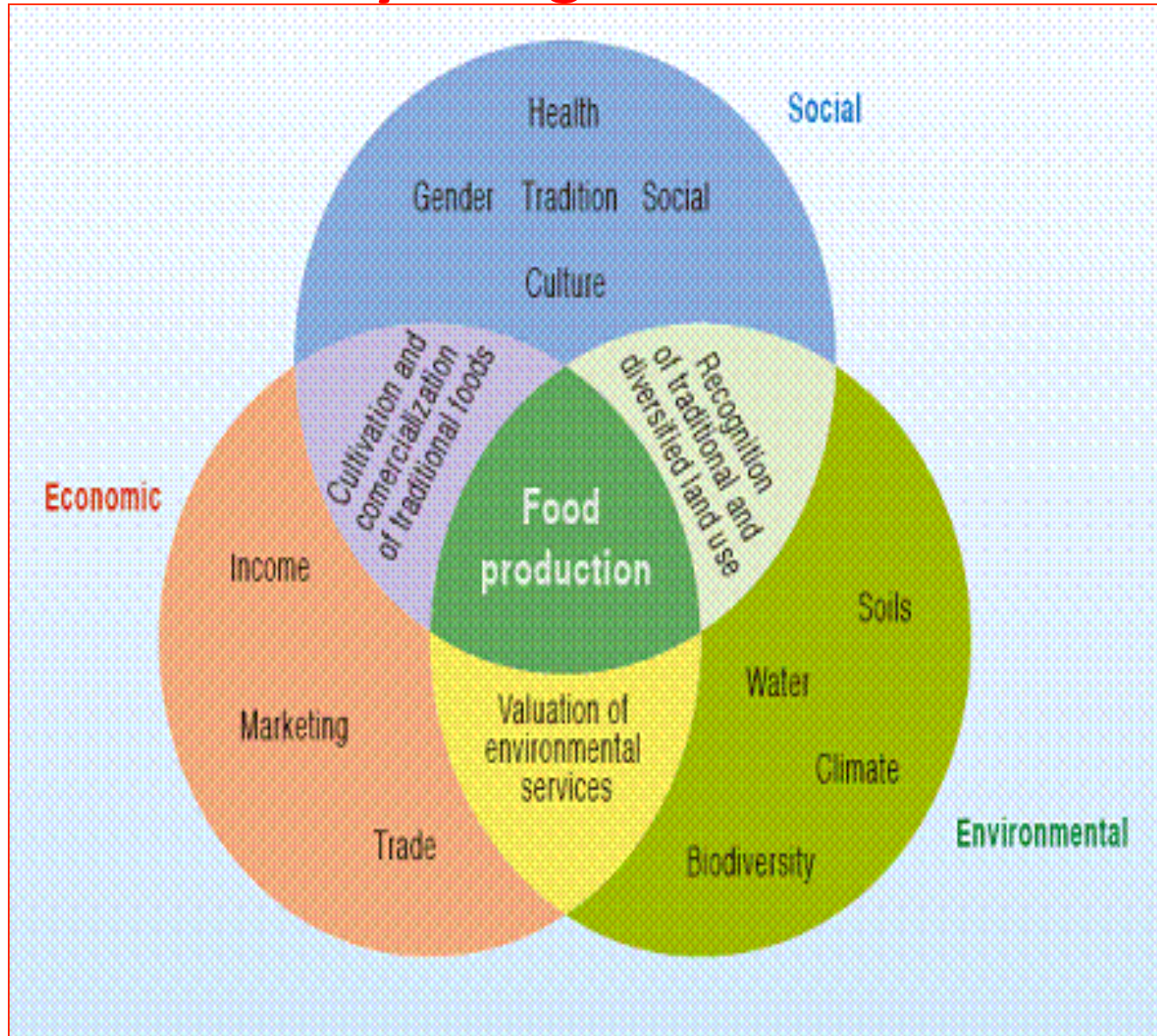


shade



biodiversity

# Multifunctionality of Agriculture & Landscapes



# Conclusion

- The integrity of the rainforest in Central Africa needs to be secured,
- Diversification of **Food Crop Land Use Systems** with trees through **Agroforestry** could reduce the need for new forestland,
- Farmers are willing to manage **biodiverse multi-strata agricultural systems** if they are competitive,
- Rewards schemes for environmental services need to be realized,
- Need for hybrid institutions at local, national, and the global levels to continue being engaged.