

# **Alley Cropping**

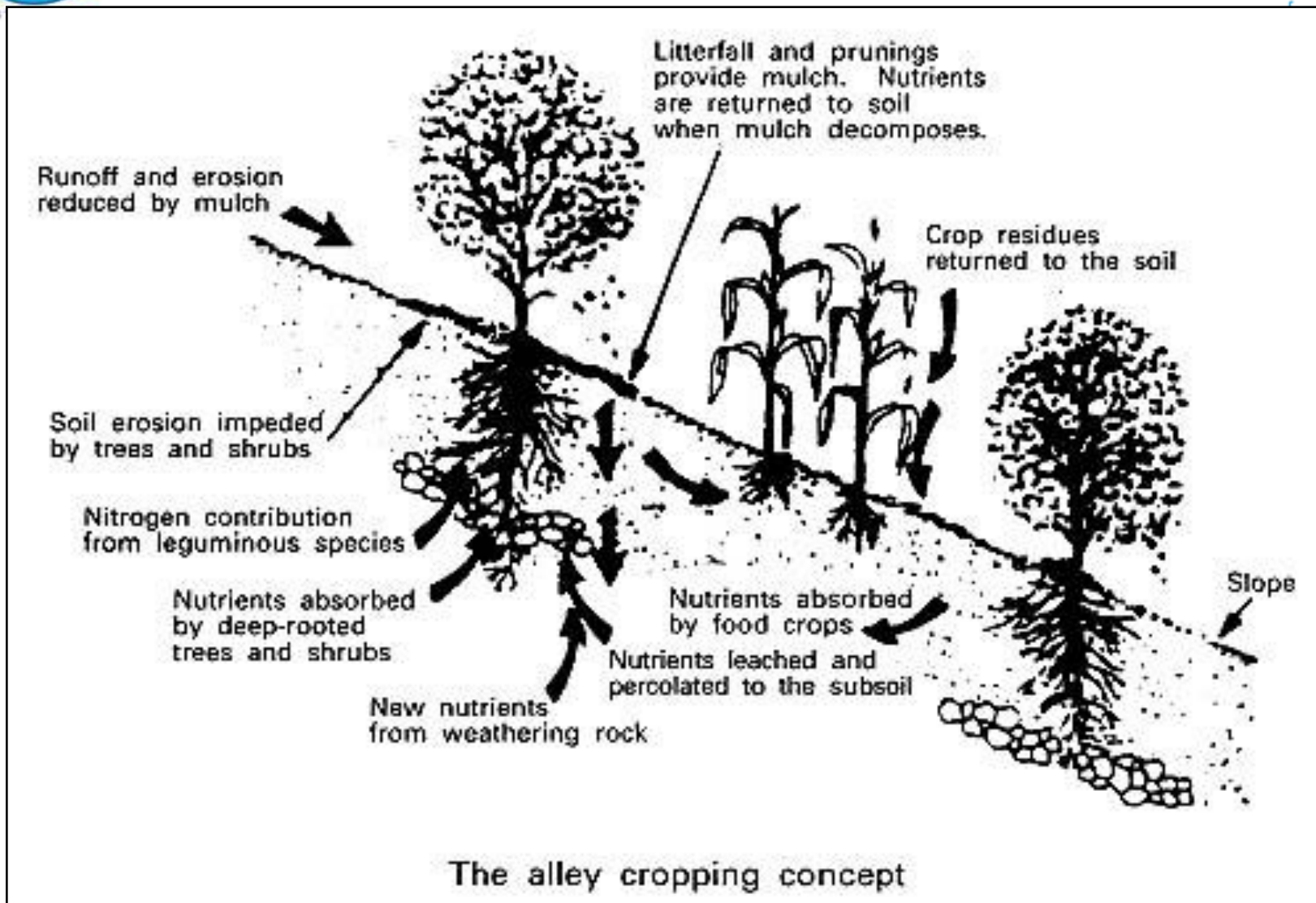
***Writer by: Robert Gray***



# What is Alley Cropping ?

- Trees (particularly legumes) are grown in wide rows, in between the rows ‘the alleys’ we can grow food or other forage crops.
- Sustainable production System. Perennial – forest farming
- Developed for Soil Management /conservation **How can alley cropping feed the soil?**

# What is Alley Cropping ?





# What is Alley Cropping ?



# The bush fallow system

- Traditional system of cultivation that maintain fertility for long periods.
- Changes in current practices of bush fallow— population pressures, market pressures – shortens fallow period.
- Problems – The land is not left to regenerate for long enough – This leads to Soil degradation.
- Alley cropping is a solution for these problems as it allows farmers to grow crops on the same land for long periods – but conserves the soil.



# The Benefits of alley farming

- Nutrients for Crops – bigger yields (Corn 1.9 t – 3.5 t / Ha)
- feed the soil – organic matter – Mulch (Benefits of Mulch).
- Reduce the use of chemical fertilizers.
- On sloping land trees are a barrier to run off, stop erosion - create mini terraces.
- Multiple functions – firewood, forage.
- Weed control – Shading and mulch
- Attract birds and beneficial insects
- Windbreak



# Effects on the Soil

- Prevents leaching of nutrients from the soil surface – nutrient recycling – deeper roots take nutrients from deeper down under the soil.
- Encourages Micro-organisms, life in the soil (through mulching).
  - Design Principle: Feed the soil
- Woody mulch – increased fungal growth.
- Soil structure, lower temperature, retain soil moisture

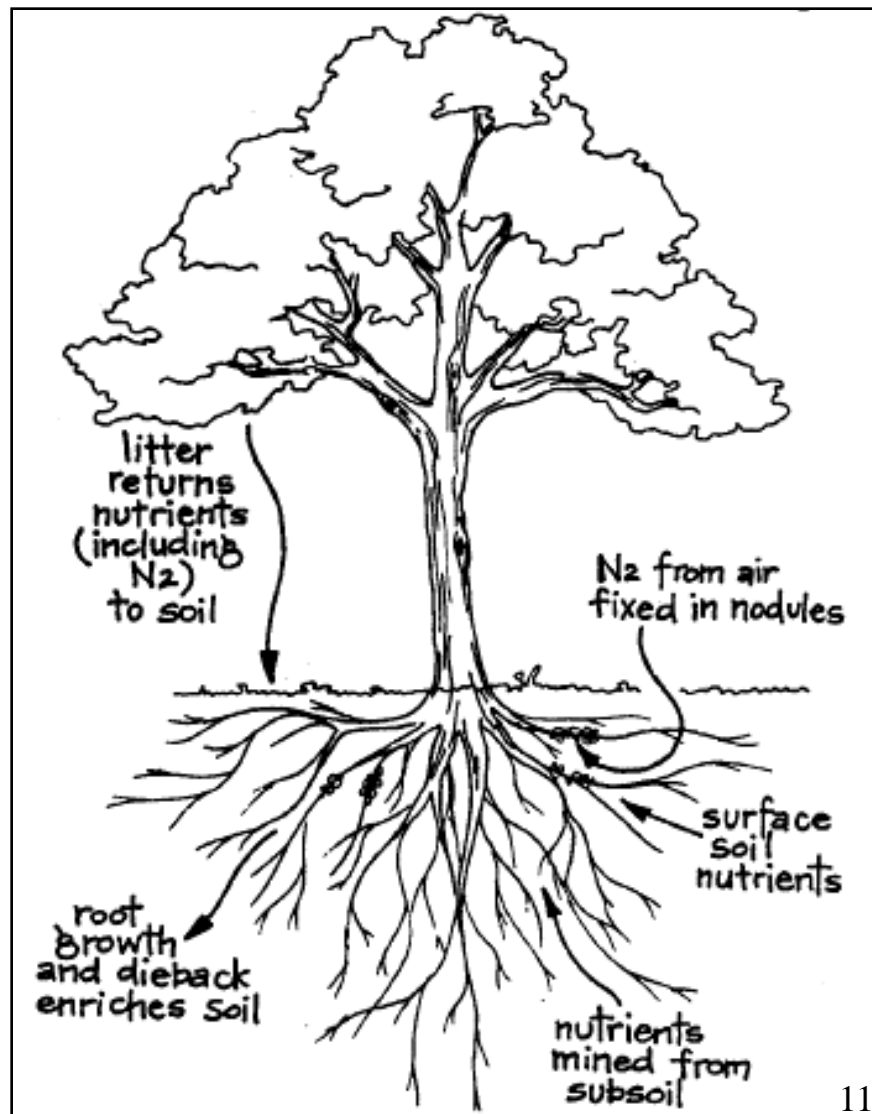
Species	Biomass of leaves & twigs	Nutrient content of leaves and twigs (kg/ha/year)				
	(t/ha/year)	N	P	K	Ca	Mg
<i>Leucaena leucocephala</i>	7.4	247	19	185	98	16
<i>Gliricidia sepium</i>	5.5	169	11	149	66	17 9

# Erosion Control

- Alley crops planted along contour on a slope can control erosion.
- Three month trial *Desmanthus* (legume), 1,424 mm of rain, soil loss - 127 t / Ha control, 41 t / Ha, Alley cropped, 0.2 t / Ha – mulched, no till.
- Due to a barrier effect and mulch prunings.
- Mulch can limit raindrop impact erosion and sheet flow erosion.

# Use of Legumes

- Legumes fix Nitrogen from the atmosphere (N - fixing bacteria live on the roots).



# Use of Legumes

- Legumes can be used for multiple functions.
  - Some species of legumes act as good forage with a high protein (N) content.
  - Can coppice well due to strong root system.
- Tephrosia
  - Insecticide
  - Mulch crop



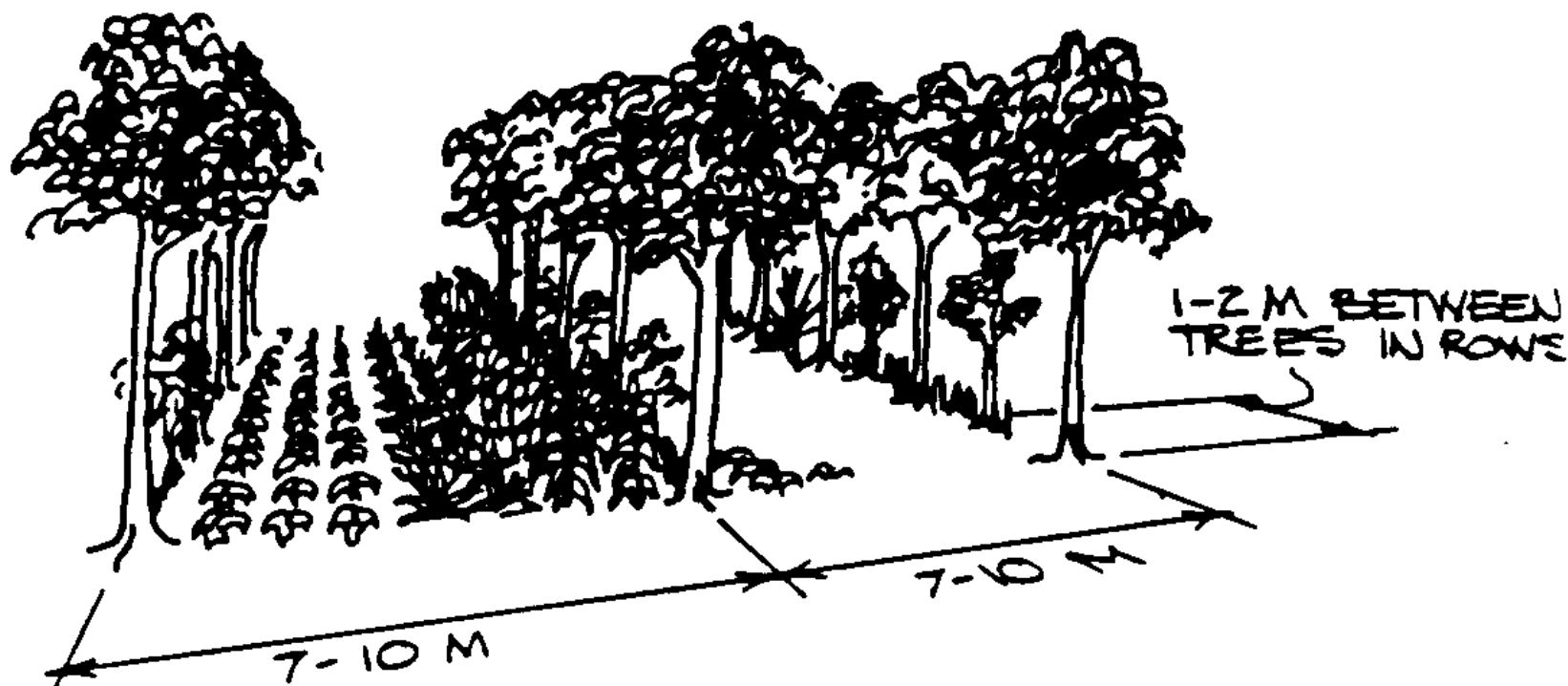
# Tree species selection

- What species are available?
- What will suit climatic / environmental conditions? (soil type, Rainfall).
- Do you want to feed animals?
- Do you want other products? Seeds, firewood, etc.

# Row Spacing – Light and shade

- Rows can be from 2 – 6 Meters apart depending on the crop that you want to grow in the allies.
- Rows can be pruned to manage light intensity in the allies.
- Crops close to the tree rows may suffer a little from shading.

# Row Spacing – Light and shade



*Line Plantation Spacing*

# Tree Management - Pruning

- Different species respond differently to pruning.
- Re-growth has three phases after cutting, slow growth, high leaf productivity (until full light interception), leaf productivity steady, increase in height and wood.



# Tree Management - Pruning



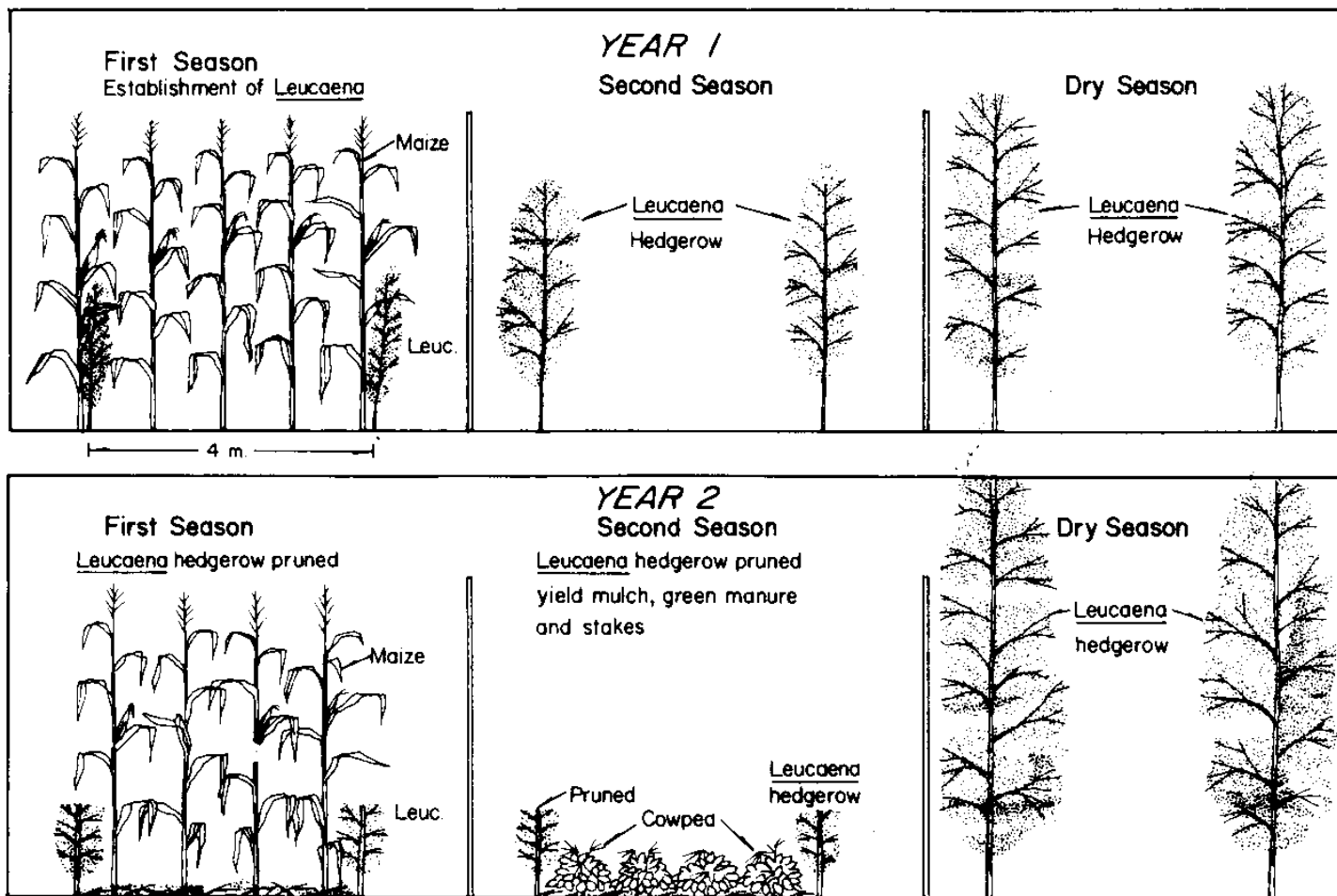
- Cutting interval – leaf yield increases to a point, after which yield increases are due to woody material.
- You could leave some leaves to support re-growth, sugars in the stem also supports re-growth.

# Tree Management - Pruning

- Higher cutting may support an improvement in re-growth.
- You could leave some leaves to support re-growth, sugars in the stem also supports re-growth.
- It is better to leave trees for a longer time before the first Harvest – at least 12 months (Uni students).
- When to Cut – shorter periods – maximize leaf production. Longer – more woody material..
- Beginning of the wet season. (consider fungus, soil moisture, flower development)
- Prune side branches for fruit and wood production

# Tree Management - Pruning

## ALLEY CROPPING



Source: King, et al 2.6

# Weed control

- Rows of trees can shade out weeds, when left to fallow. Weed species composition changes in shady environments.
- Mulch can suppress weeds, limits seed germination.
- When trees are establishing you may need to weed.



# Planting

- Sow seed at the beginning of the rainy season.
- On slightly mounded strips.
- Clear weeds from the strip.
- Soak seeds 24 hours before sowing.
- Use of buffalo and plow.

- Increased costs; establishment – planting and weeding, Seedling / seed cost - transport, Pruning Labour.
- Benefits; Increased crop yields, Increased Livestock productivity, Increased fuel wood availability.

# Alleys on Poovzoov





# Alleys on Poovzoov





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# The use of Vetiver

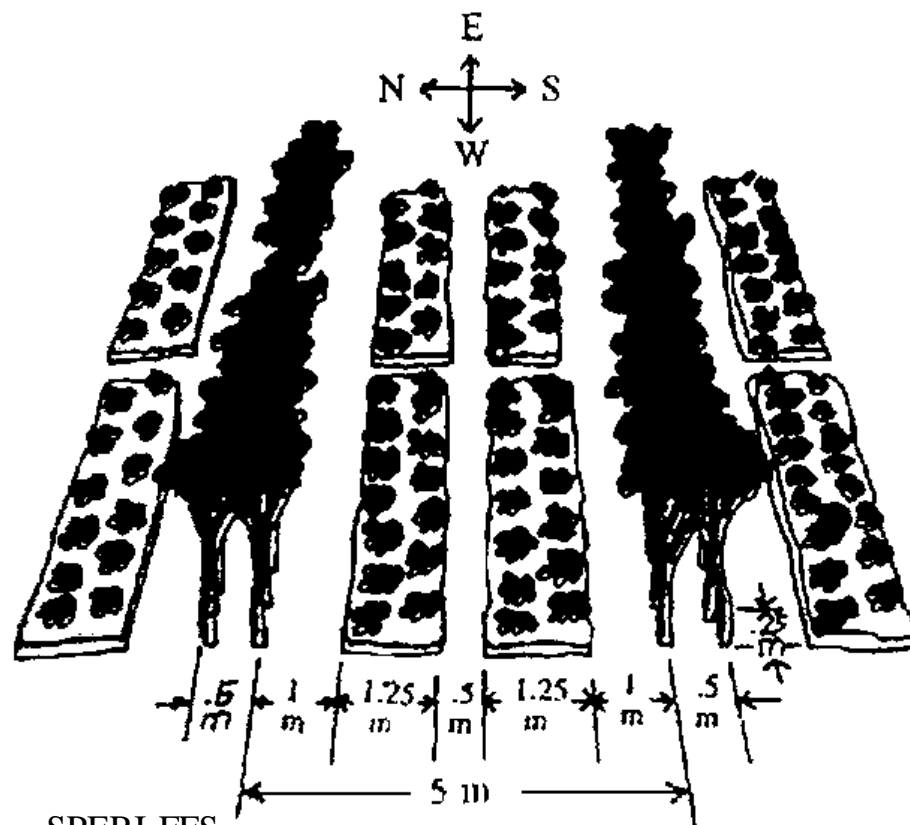
Vetiver can be used for erosion control and animal forage. It can also be planted in row to form allies. (video if possible)



# Design Activity

## Alley Crops at Linh Moc

- Where
- What principles are involved
- Row spacing
- Forage systems



# What Principles are involved?

# Eco-farming Core Values

## *Nine Design Principles:*

1. Diversity
2. Connection
3. Feed the Soil
4. Natural succession
5. Use the edge
6. Save energy
7. Multiple Functions
8. Small and slow solutions
9. Use biological / Local Resources



