AGROFORESTRY IN SAVANNAKHET

TOWARDS MORE SUSTAINABLE FARMING SYSTEMS

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WHAT IS AGROFORESTRY?

Agroforestry can be defined as the inclusion of trees in farming systems and their management in rural landscapes to enhance productivity, profitability, diversity and ecosystem sustainability18.

Put more simply, agroforestry is where trees and agriculture interact. This may happen at field, farm or landscape scales, with trees occurring either as individuals, or in lines, clumps, blocks, woodlots or forests.

Trees provide multiple functions and services not only for farmers but also for the environment in which they live. Agroforestry improves rural livelihoods by producing more products of higher value from trees, crops and livestock while conserving biodiversity and soil fertility.

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TYPES OF AGROFORESTRY

There are many different agroforestry practices that farmers use to fulfil different functions:

- Fodder shrub/tree hedgerows are grown along the contour lines of the slope with annual crops such as rice on the terraces, timber trees are planted on the field boundaries and trees and shrubs are growing on the grazing land.
- **Rotational:** trees and crops grown at different times in rotation or partially overlapped. The taungya system in Myanmar is one example where crops are grown together with young trees for the first few years.
- **Spatially mixed:** a. groups or individual trees growing amidst crops (trees in crop land); b. tall trees above shorter trees, shrubs and crops that are above ground-cover crops (shade trees, multi-storey planting, e.g., in plantations); mixed trees and crops in home gardens.
- **Spatially zoned:** a. trees grown in rows with crops in between (alley farming); b. trees grown along the borders of fields (boundary planting); c. trees grown as fences (protect crops from livestock and also used for fodder); trees grown on rice-field bunds and on terraces (protect soil from erosion and provide nutrients); d. trees as windbreaks and shelterbelts (protect crops and livestock and for fodder).

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BENEFITS OF AGROFORESTY

Trees for food and medicine: trees provide many important sources of food in the form of fruit, nuts, berries, leaves, honey and fungi.

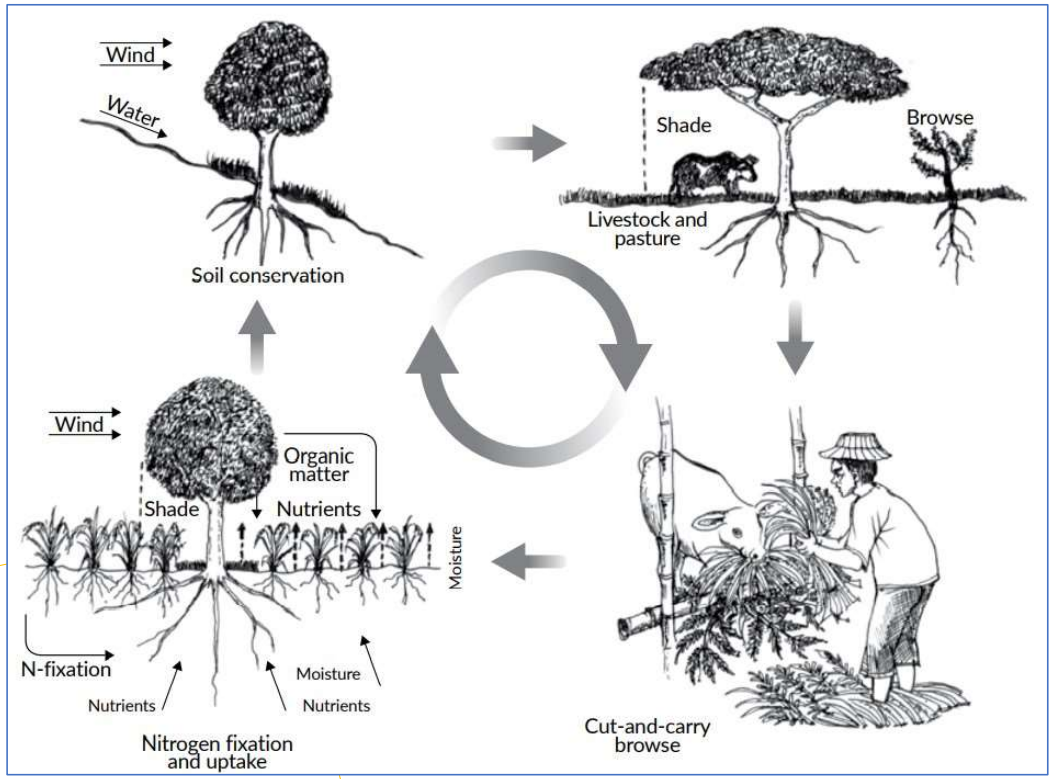
Trees for large and small timber: Large trees used for timber (beams, planks) are often hardwood species surviving from the original forest.

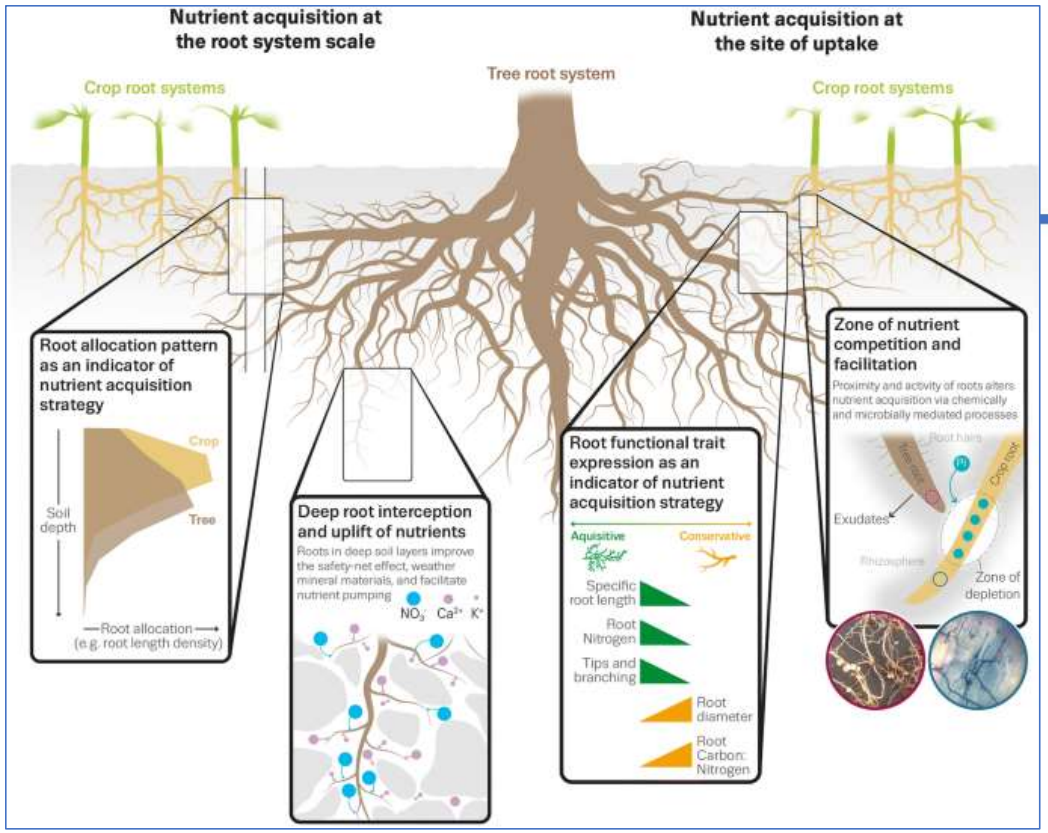
Trees for fodder: Leaves, branches and other parts of a tree, such as pods and fruit, can be used as fodder.

Trees for conserving soil: On sloping land, trees can be grown along the contours as biological soil-conservation measures called “tree strips”.

Trees for improving fallow: In both upland and lowland rice landscapes, a fallow period is often used to restore soil fertility through adding nitrogen and organic matter.

Trees for providing shade: Shade for livestock, people (e.g. farm workers) and crop diversification is important, especially as climates become hotter.





TREES FOR FIXING NITROGEN, INCREASING NUTRIENTS AND INCREASING SOIL STABILITY:

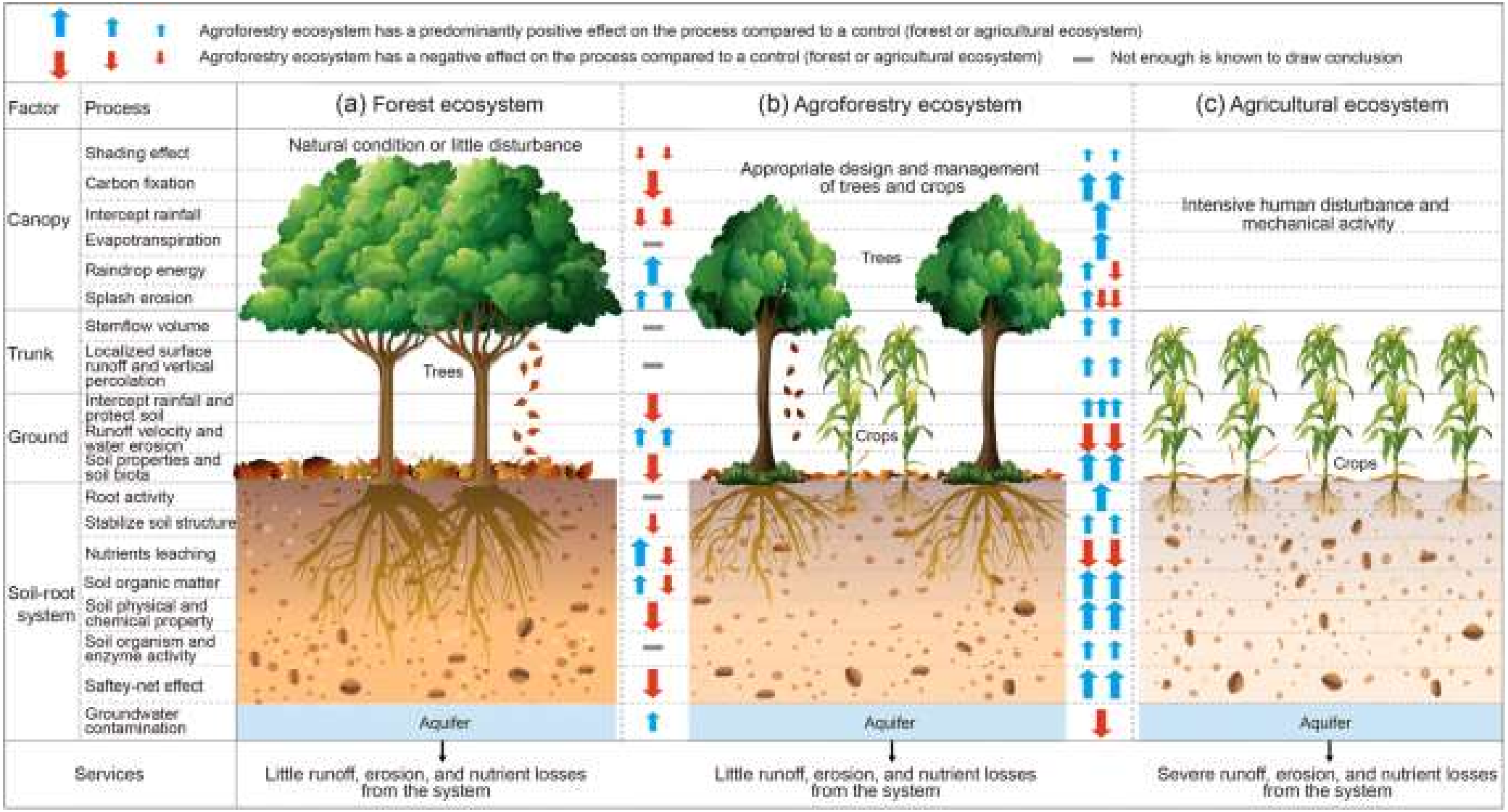
Trees enhance the chemical and physical properties of soils in numerous ways:

(i) Nitrogen input via biological nitrogen fixation.

(ii) Nutrient uptake by deep roots. Root decay is also important for providing nutrients.

(iii) The physical condition of soils can be improved by better aggregation (soil structure).

(iv) Some trees are able to fix nitrogen from the air, providing a form of natural fertilizer when the roots, leaves or other residues decompose, releasing nitrogen into the soil.


Agroforestry ecosystem has a predominantly positive effect on the process compared to a control (forest or agricultural ecosystem)
Agroforestry ecosystem has a negative effect on the process compared to a control (forest or agricultural ecosystem)
Not enough is known to draw conclusion
Factor
Process
(a) Forest ecosystem
(b) Agroforestry ecosystem
(c) Agricultural ecosystem
Canopy
Shading effect
Carbon fixation
Intercept rainfall
Evapotranspiration
Raindrop energy
Splash erosion
Trunk
Stemflow volume
Localized surface runoff and vertical percolation
Ground
Intercept rainfall and protect soil
Runoff velocity and water erosion
Soil properties and soil biota
Soil-root system
Root activity
Stabilize soil structure
Nutrients leaching
Soil organic matter
Soil physical and chemical property
Soil organism and enzyme activity
Saftey-net effect
Groundwater contamination
Natural condition or little disturbance
Trees
Aquifer
Appropriate design and management of trees and crops
Trees
Crops
Aquifer
Intensive human disturbance and mechanical activity
Crops
Aquifer
Services
Little runoff, erosion, and nutrient losses from the system
Little runoff, erosion, and nutrient losses from the system
Severe runoff, erosion, and nutrient losses from the system

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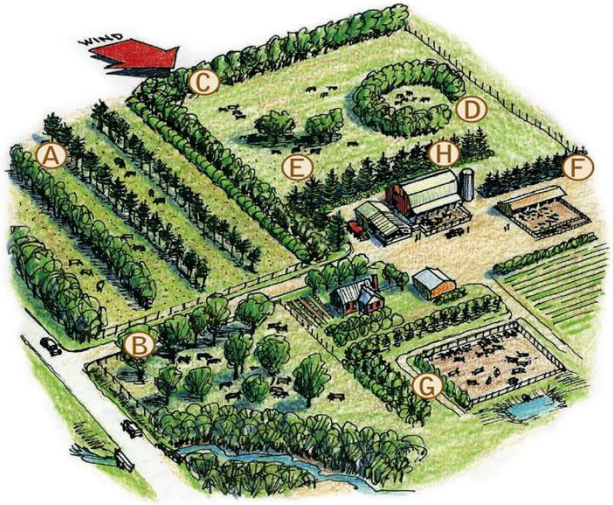
PERI-URBAN (VILLAGE) TREE PLANTING SITES

- Public areas in villages suitable for planting will be selected.
- Such areas include: schools, health centers, community halls and even private homes.
- This will also consider planting at roadside areas where appropriate and safe.
- The aim of this strategy will be to plant trees in spaces that have been needlessly deforested and can serve to the benefit of the community.
- Trees should be planted at all appropriate an available public spaces provided they do not: (i) block public transportation routes, (ii) disrupt livelihood activities, or (iii) become a safety risk.
- Potentially, instead of native species, fruit tree species could be planted in peri-urban areas such as: Jackfruit, Mango and Tamarind.

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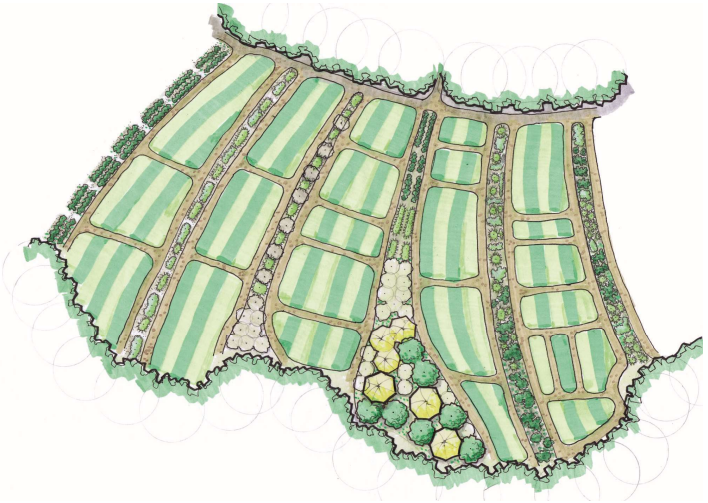
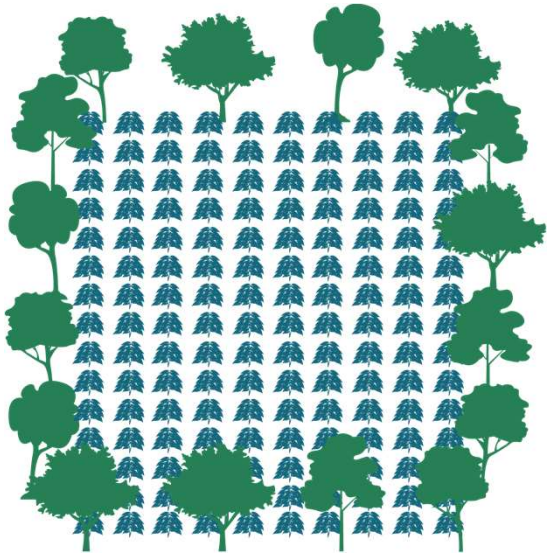
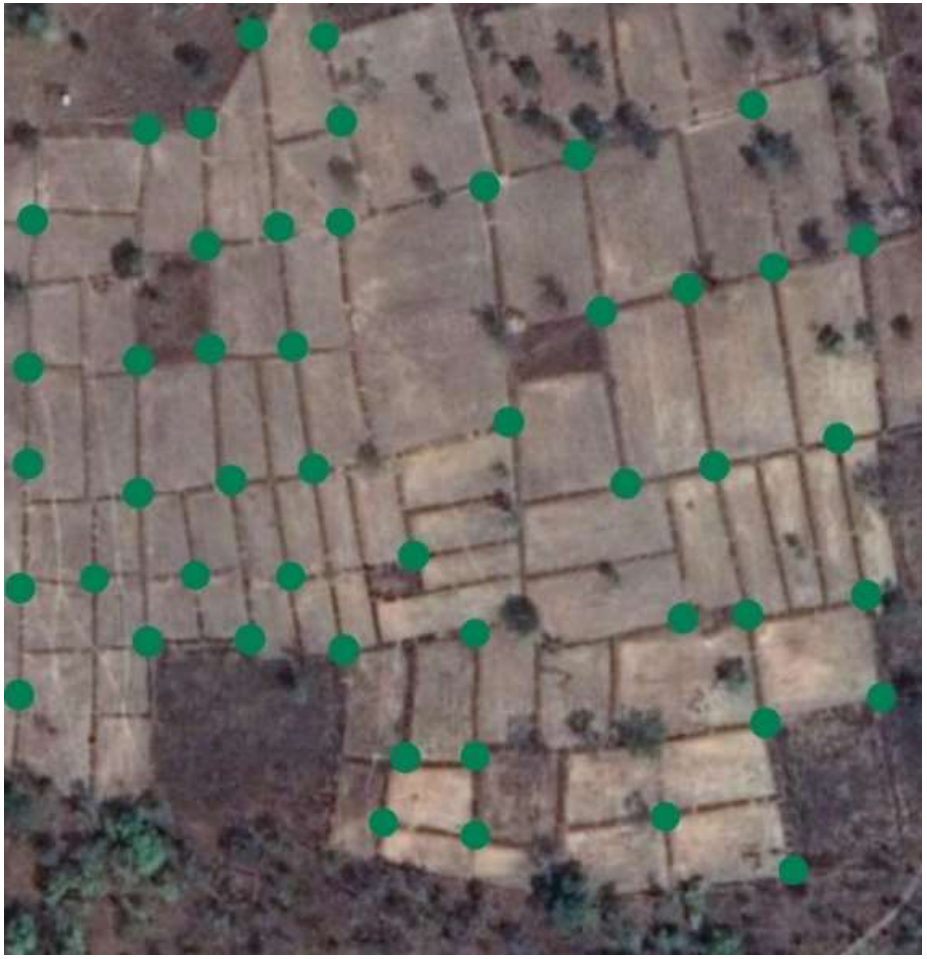
AGROFORESTRY PLANTING IN RICE PADDY AREAS

- Nitrogen fixation is the process by which atmospheric nitrogen is converted either by a natural or an industrial means to a form of nitrogen such as ammonia. In nature, most nitrogen is harvested from the atmosphere by microorganisms (see above) to form ammonia, nitrites, and nitrates that can be used by plants.
- If planting these species on the edges of agricultural areas or rice paddy area, it is possible that soil conditions could be improved naturally. Planting such trees combined with other soil improvement actions (i.e. natural fertilizer, mulching, composting, etc.) could increase agricultural yields and quality.







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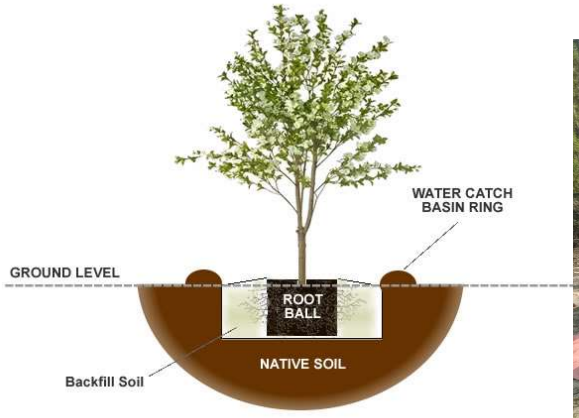
AGROFORESTRY REQUIREMENTS

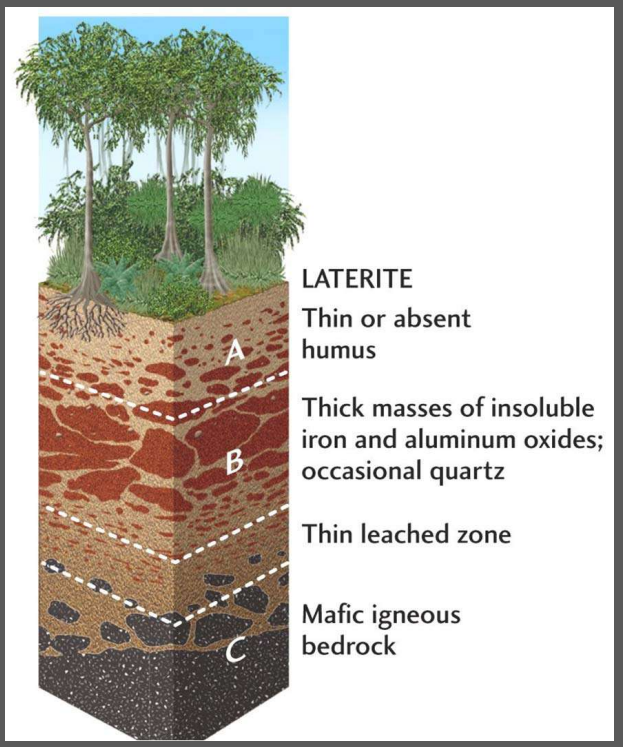
The project should pilot such agroforestry tree planting methods directly with families committed to this process a process of improved agricultural practices. Such practices include:

- No burning of agriculture areas during the dry season.
- Mulching of rice stocks when preparing fields
- Applying organic fertilizer and compost
- Implementation of SRI rice growing techniques.
- Where applicable, interspersing legumes and other appropriate plants and vegetables which can improve soils and diversify crops.

- Participating farmers must:
  - Dig a large hole to plant seedlings inside (50 cm diameter + 50 cm deep) and create basin rings to catch water.
  - Prepare compost soil to fill the hole around the seedling.
  - Build a sturdy tree cage for each seedling to prevent grazing made from wood posts and bamboo bars.



WHY COMPOST SOIL AND WATERING IS CRITICAL FOR GROWING TREES



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THANK YOU

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