

Agroforestry opportunities for Timor-Leste

Forage banks and forage gardens

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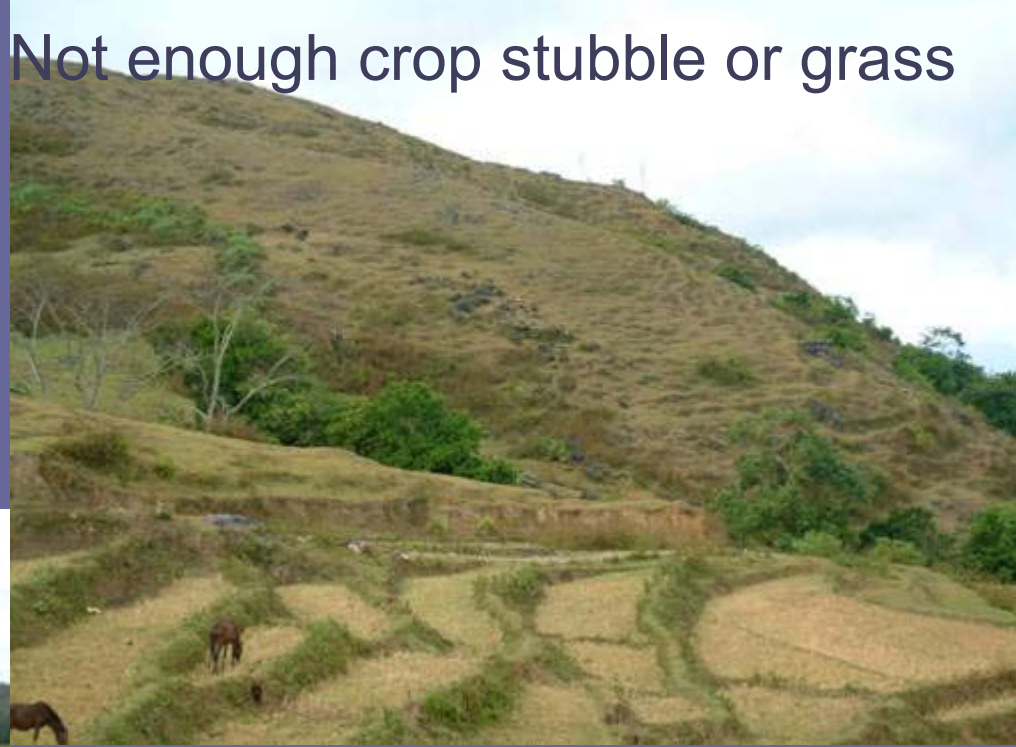
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Not enough crop stubble or grass

Large areas of land taken over by *Chromalena* and other weeds



No green grass during dry season; trees browsed

Many species of trees in Timor are used around the world as nutritious forage for animals

animals

Dryland species



Acacia leucophloea



Albizia lebbek



Hibiscus tiliaceus, ai-fau



Prosopis



Gliricidia, gamal

Species adapted to moderate and high rainfall climates



Sesbania, ai-turi

Samanea saman,
ai-matan-dukur



Leucaena, ai-kafe

Other possible forage trees



Flemingia macrophylla



Calliandra calothyrsus



Albizia chinensis,
samtuco fuik

Paraserianthes falcataria,
ai-samtuco



Why trees for forage?

- Trees stay green during at least part of dry season
- Legume tree leaves high in protein and highly palatable to livestock
- Branches may be used for firewood after leaves are used as forage
- Nitrogen-fixing trees improve soil fertility
- Trees grow rapidly and can compete with weeds
- Branches from trees can be harvested repeatedly
- Trees are easy to grow
- Reforesting areas with forage trees may help decrease grazing pressure and improve watershed health



Forage gardens: supply both grass and legume tree forage for confined animals

- Improved animal nutrition
- Confined animals gain more weight, stay healthy, don't destroy crops



Forage garden of napier grass, flemingia, and cassava in Bandung, Java

Forage banks: trees which can be cut to supply forage during the dry season

- Animals may be free-ranging some of the time
- Legume trees are protein reserves
- Grass banks are energy reserves



Trial of different *Leucaena* (ai-kafe) selections for forage in Hawaii

Demonstration feed garden and confined goat house at the International Institute of Rural Reconstruction in the Philippines



Feed garden includes *Gliricidia* (gamal) and napier grass



Contour hedgerow farming system including livestock component

Working farms in Cebu, Philippines



Contour hedgerows of napier grass prevent erosion and some are cut daily for animal forage



Animal wastes recycled and used as fertilizer

Working farms in Cebu, Philippines



Calliandra as forage

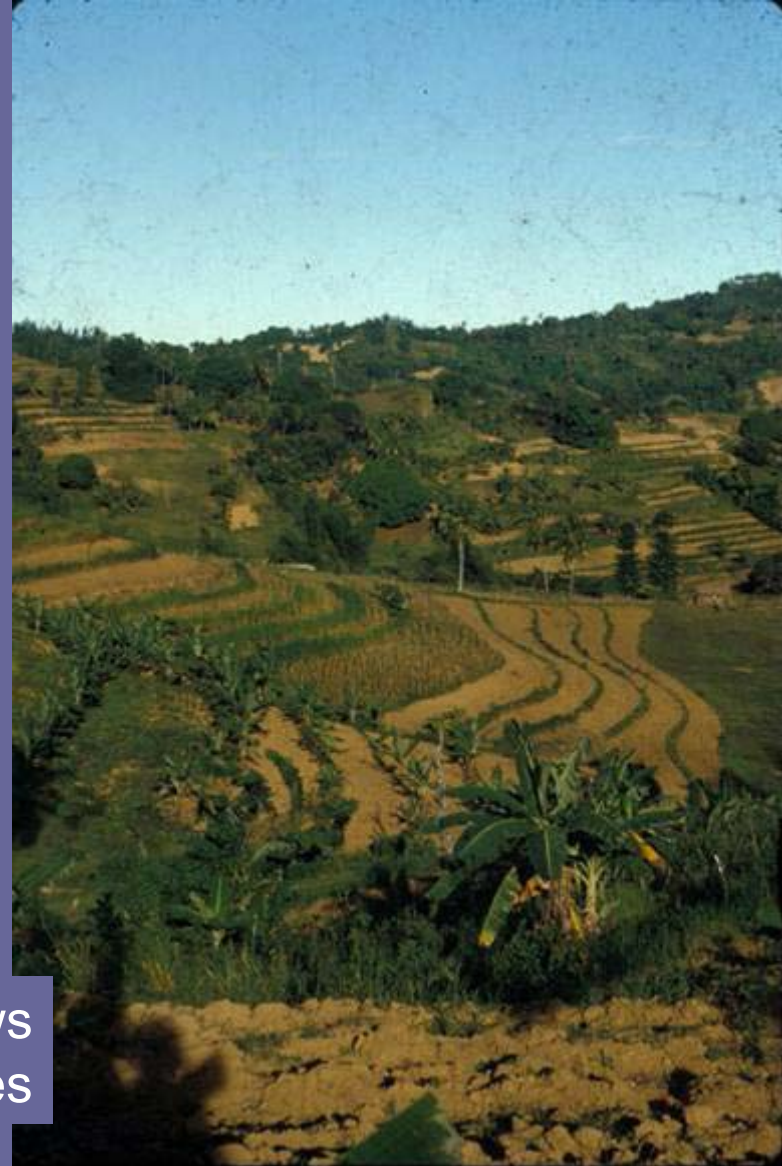


Look how healthy the corn below the goat house is!

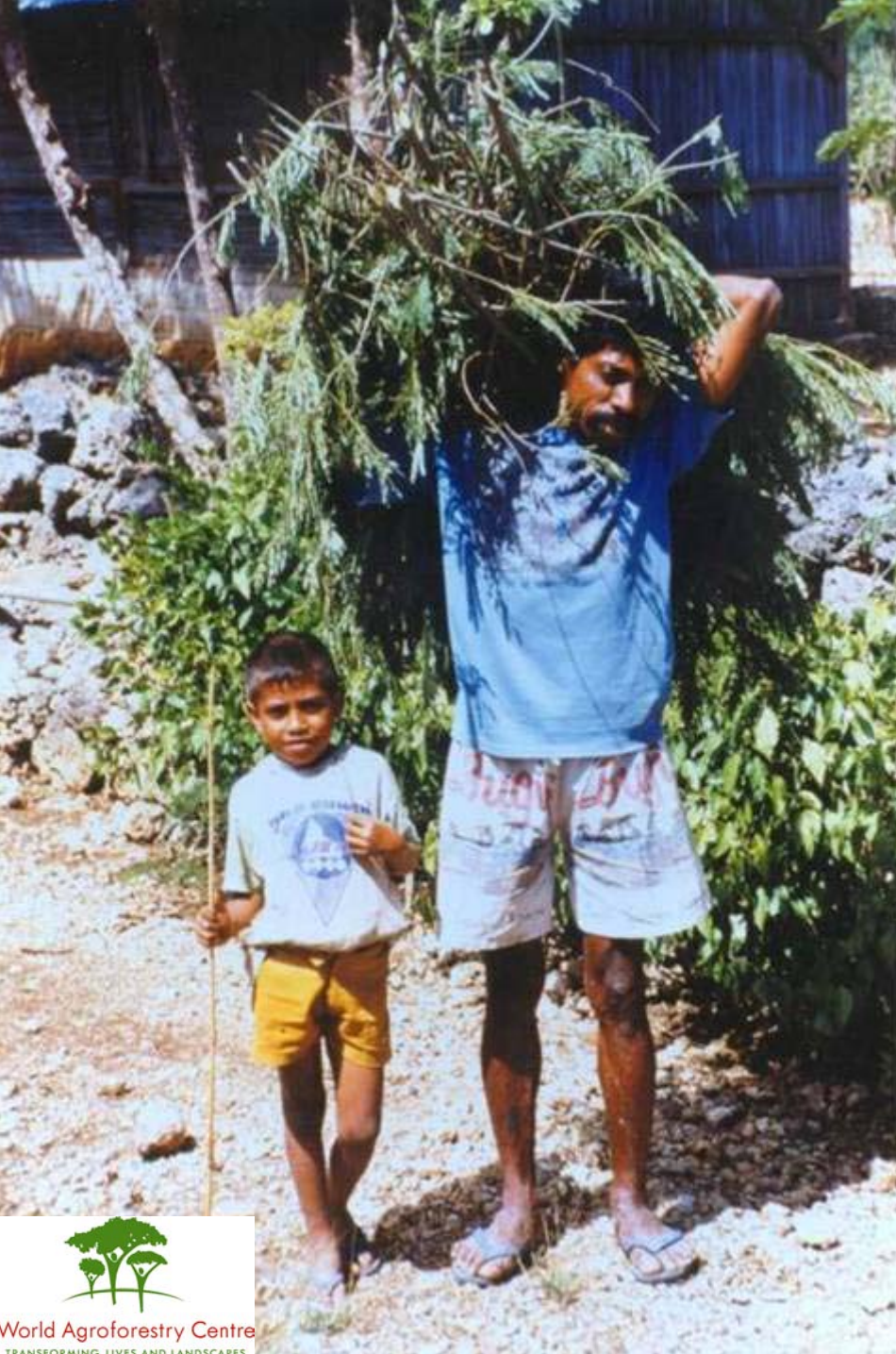
Forage trees on farms

- Contour hedgerows across slopes
- Boundary trees
- Living fence posts
- Windbreaks
- Along roads
- Separate wood lots
- Scattered trees on crop lands
- Shade trees with plantation crops like coffee or tea
- Scattered trees on range lands

Working farms with contour hedgerows of forage trees and grasses in Cebu, Philippines







Forage trees as a fallow crop in West Timor

Improved fallow of *Leucaena leucocephala*, ai-kafe, is planted after crops are harvested and fields are fallow. The trees fix nitrogen for crops, and yield a high quality forage. Cattle are confined and fed on a cut-and-carry system.
Photograph © Tony Djogo





Leucaena leucocephala, ai-kafe, as a fallow crop in West Timor

Photo by Malcom Cairns © ICRAF Southeast Asia



Feeding livestock

- One part tree leaves to two parts grass
- Supplement with meal, minerals
- If feeding free animals, tie branches together and suspend above the ground for the animals to eat them
- Some animals must “learn” to eat tree leaves
- Some tree leaves are more palatable to livestock if they are wilted first



Maintaining forage trees

- Let grow 12 to 18 months before cutting
- Cut trees at 1 meter height
- Cut green shoots up to once per month; less often in the dry season
- Cut shoots before leaves start to fall during the dry season
- Don't let animals browse the trees continuously: they'll kill them
- Use leftover branches for firewood



Possible Difficulties

- Will farmers cut and carry forage to livestock?
- Will farmers be able to protect seedlings so that livestock don't destroy them?
- Will farmers confine livestock?
- Do farmers know how to plant trees?
- Can farmers get seeds or cuttings to plant trees?
- Can farmers get pots and potting mix?



The farmers have the answers

Development of forage banks or any other agricultural system needs to come from the farmers.

We professionals can facilitate but they are the ones who decide.



Photograph by Harold McArthur