## Typology and dynamics of agroforestry systems in the mountains of Timor Leste

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**Background**: In Timor-Leste, a country located in the south-east of the Indonesian archipelago, GIZ has initiated a project with the aim of developing agroforestry systems (AFS) that are productive, profitable and preserve natural resources. Since 2020, CIRAD researchers join the project and wish to describe the diversity of traditional AFS existing in the country.

**Methods**: In the Baucau region, located in the north-east of the country, at altitudes 0-1500 m, with rainfall 1000-2000 mm/year, first inventories and surveys have identified 5 types of AFS which vary greatly in function of their tree density. From the lowest to the highest tree density system: i) Crop system including a Fallow phase (3 months to 10 years), ii) SylvoPastoral system; iii) Young Agroforest; iv) Home Garden; v) Forest Garden. Further biomass inventories, soil observations and sampling, participative mapping activities along with Peeble Score Methods and semi-structured interviews contributed to characterize the AFS at a socio-economic, ecological and agricultural practices level.

**Results:** AFSr description is resumed in the Figure 1 below:

Typology reference adapted from "An Introduction to Agroforestry", P.K.R Nair (1993)	CROP SYSTEM INCLUDING A FALLOW PHASE	SYLVOPASTORAL	YOUNG AGROFOREST	HOME GARDEN	FOREST GARDEN
System	Agrosylvopastoral	Sylvopastoral	Agrisylviculture	Agrosylvopastoral	Agrosylvopastoral
Subsystem (Practices)	Multipurpose trees and shrubs on crop land (Trees scattered haphazardly or according to some systematic patterns on bunds, terraces or plot/field boundaries)	Trees on rangelands or pasture (Trees scattered irregularly or arranged according to some systematic pattern)	Plantation crop combination ((i) Integrated multistorey (mixed, dense) mixtures of plantation crop, (ii) Intercropping with agricultural crops)	Homegarden involving animals (Multistorey combination of various trees, crops and animals around homesteads)	Multilayer tree gardens (multispecies, multilayer dense plant associations with no organized planting arrangements)
Temporal arrangement of trees	Intermittent	Coincident	Interpolated	Interpolated	Coincident
Species diversity					
Density of trees inside the plot (low,	Low	Medium	Medium-Low	Medium-High	High
Tree biodiversity : number of tree species invoried with more than 32cm	18	13	17	25	28
Tree biodiversity : number of tree species invoried with a diameter between 9 and 32cm	5	14	17	21	13
Social land use regulation					
Land ownership	Household	Кпиа	Household	Household	Knua or household
Labour	Household or Exchange of services (neighbours, relatives)	No specific labour	Household	Household	No specific labour
Resources ownership	Household or exchange services (neighbours, relatives)	Common and <i>knua</i> (tree trunk)	Household	Household	Knua or household
Infrastructure					
Water availability	No	No	Depend	Yes	Depend
Fence/Hedgerow	Depend	No	Yes	Depend	No
History track					
Date of installation (crop and/or					
livestock system)	0 to 3 years	> 50 years	2 to 10 years	> 5 years	> 50 years
Precedent crop system	Sylvopastoral land (pasture, savana or secondary forest)	Savana, forest	Crop system including a fallow phase, Sylvopastoral land (pasture, savana or secondary forest)	Crop system including a fallow phase or Young agroforest	Home garden
Number of fire/year	0 to 2	1 to 3	0 to 1	1	0 to 2
Mean size of the plot (ha)	0,3 to 1,25	200 to 500 (village scale)	0,2	0,3	0,5

Figure 1 : Typology of 5 agroforestry systems in the region of Baucau, Timor Leste, 2021

**Discussion & conclusion**: The AFS evolution hypothesis is that they become denser over time, with an increase in biodiversity. However, it has been observed that home and forest gardens are often managed by older people for varied but self-consumed crops, whereas young people are looking for crops that are more marketable and easier to cultivate in non-agroforestry systems. In order to avoid the clearing of these AFS, it is necessary to look for methods to intensify production, adapt it to the needs of young people and valorise the products. Finally, AFS are also markers of the complex social order between families in the same village or with other villages, concerning the sharing of tasks, ownership and exploitation of land products. It is essential to take these factors into account if continued external support is to be provided.