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CONTRIBUTION TO THE STUDY OF TRADITIONAL AGRO-FORESTRY SYSTEMS IN THE OECUSSE DISTRICT

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Abstract

This work aims to contribute to the study of traditional agro-forestry systems in Oecusse, describing them in terms of composition, social organization, and cultural techniques. Existing problems in the exploitation of these systems, their geographical location, and possible guidelines for the evolution of traditional agro-forestry systems are identified. An inquiry method through interviews with farmers about agro-forestry systems was employed. Official documents, particularly region maps, were consulted to study traditional agro-forestry systems in the Oecusse district. Agro-forestry systems in Oecusse are characterized by a limited production area, low productivity of cultivated species, random distribution of plants without organization in any type of lines or patterns, and component crops of the system requiring minimal cultural care. The two types of traditional agro-forestry systems in Oecusse can be classified into the categories of agro-silvo-pastoral, agro-silvicultural, and agro-silvo-livestock. There are 44 species represented in most traditional agro-forestry farms in the Oecusse district. The traditional agro-forestry systems in the Oecusse district with Sesbania grandiflora, belonging to the leguminous family, offer advantages such as improving soil fertility, increasing water retention capacity, serving as green forage for animals, and providing firewood for self-consumption.

Keywords: *Contribution, Study, Traditional Agro-Forest Systems, Oecusse District.*

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INTRODUCTION

Agro-forestry systems are a land use approach where agricultural and forestry species are planted and managed in association, taking into account the structure and dynamics of the ecosystems they are part of. It represents a harmony between agriculture and forestry, combining production with the conservation of natural resources and sometimes allowing for the restoration of altered and degraded areas. These production systems involve ancient practices and knowledge, primarily used by traditional communities. Only relatively recently has science dedicated itself to the in-depth study of this knowledge and this land use approach (Silva, 1998).

In most cases, these can be broadly identified as agro-forestry systems, consortium production systems, where the tree component is combined with agricultural crops, rarely

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resembling a forest in either structure or function. The majority of traditional agro-forestry systems, without any influence from modern science, exhibit a relatively modest degree of complexity and diversity, limited dynamics, not fully exploiting the regenerative and productive potential of the system.

Caritas Australia in Oecusse, as outlined in its Strategic Plan, envisions expanding the intervention area of its agro-forestry program. This begins with studying traditional systems currently used by the community, enhancing their use as foundational models to be developed later into more complex systems that are technically suitable for the community's objectives and the Caritas Australia program. Throughout the last period of 2005, models of agro-forestry systems and models for the development of traditional agro-forestry systems suitable for the environmental, economic, and cultural conditions of Oecusse will be developed.

This work aims to contribute to the study of traditional agro-forestry systems in Oecusse, describing them in terms of composition, social organization, and cultural techniques. Existing problems in the exploitation of these systems, their geographical location, and possible guidelines for the evolution of traditional agro-forestry systems are identified.

RESEARCH METHODS

An inquiry method through interviews with farmers was employed to gather information on agro-forestry systems. Official documents, particularly regional maps, were consulted to study traditional agro-forestry systems in the Oecusse district.

Initially, the locations for observation and supplementary recording of present species, their characteristics, and utilization were decided. The information collection went beyond a simple survey, as much data were gathered through conversations held during periods spent in the communities. It was chosen to stay in the study locations for week-long periods, conducive to establishing relationships necessary for the exchange of information. The existing strong relationship between Caritas and the community facilitated the establishment of human connections, highlighting the significance of social aspects in the success of development work.

The collected data were subsequently analysed in collaboration with Caritas Australia's frameworks.

RESULTS AND DISCUSSION

Results

In the agricultural sector, the traditional system predominates, characterized by the utilization of a parcel of secondary or primary forest, which is cleared through deforestation. Roots are cleared with a machete, and the plant remnants are burned. Crops are then seeded in the created clearing with minimal soil preparation, receiving little

attention during growth. After the first harvest, young trees that have grown with water and horticultural care are left, and the plot is then left fallow.

Subsistence agro-forestry systems dominate. Observations across various locations indicate that the cultivated area per family implies that the production is primarily intended for consumption. Depending on the quantity produced, a small portion may be sold in the local market.

Agro-forestry systems in Oecusse are characterized by: i) limited production area; ii) low productivity of cultivated species; iii) random distribution of plants – without organization in any lines or patterns; iv) component crops of the system requiring minimal cultural care. The two types of traditional agro-forestry systems in Oecusse can be classified into the categories of i) Agro-silvo-pastoral type (Table 1) and ii) Agro-silvicultural type (Tables 2 and 3) and agro-silvo-livestock.

Table 1: Agro-Silvo-Pastoral System

System	Description	Components	Function	Location
Agricultural Crops with Natural and/or Planted Shrubs for Fodder Production	Fodder: Natural or artificial regeneration in agricultural areas.	Agricultural crops: corn, rice, cassava, and other products, legumes, vegetables, and *Sesbania grandiflora* species.	Agricultural crops for human consumption and selling fodder for animals.	Sub-district: Pante Makassar Suco (Administrative village): Costa Aldeia (Hamlet): Cutete Area: Nafeto

Table 2: Agro-Silvicultural System

System	Description	Components	Function	Location
Agricultural crops, planted and natural trees.	Trees: natural regeneration and planted in forested areas.	*Areca catechu*, Coconuts, Cinnamon, Jackfruit, Pomelo, Orange, Mango, Jackfruit, Jambul, Guavas, Taro, Watercress, and other important vegetation.	For consumption, sale, and traditional ceremonies.	Sub-district: Pante Makassar Suco (Administrative village): Costa Aldeia (Hamlet): Cutete Area: Oe-naek and Bikomi

Table 3: Agro-Silvicultural System (Another Example)

System	Description	Components	Function	Location
Agricultural crops, planted, and natural trees.	Trees: natural regeneration and planted in agricultural areas.	Agricultural crops and forest species: Teak and Nitas.	Consumption, sale, and wood production.	Sub-district: Passabe Suco (Administrative village): Malelat Aldeia (Hamlet): Malelat Area: Nuanfo Molo

Discussion

Agro-Forestry System of Agro-Silvo-Pastoral Type

In the traditional agricultural system, various crops such as corn, rice, cassava, horticultural crops (mustard, tomato, cabbage, and lettuce), and leguminous crops (peanut and whip beans) are planted in association with *Sesbania grandiflora* in the same field (Figure 1). In this system, farmers do not plant in rows, and different plants are mixed and scattered across the surface of the field. The dominant crops in this system are corn and rice.

Figure 1: Traditional Agro-Forest Gardens of Cutete with *Sesbania grandiflora*, 2005

This system can be referred to as Taungya, where more than one species is cultivated in an area. The crop density depends on the associated species. Farmers divide the cultivated area into two parts. In one area, they cultivate corn, rice, horticultural crops, and leguminous crops in combination with Sesbania. The spacing for corn is slightly larger (1.75 x 1.75m) to allow rice to receive the necessary sunlight for photosynthesis. There is no defined spacing for Sesbania, as it can grow spontaneously in cultivated areas. Sesbania can be broadcast-seeded or planted in holes and transplanted at the beginning of the rainy season.

In the other area, they do not plant rice, only corn, horticultural crops, and leguminous crops with Sesbania. Here, the spacing for corn is narrower to achieve higher yields. For example, in the Malelat administrative village, farmers cultivate rice and tomatoes in the same pit, and for corn, they sow in the terrace lines made before cultivation. The cassava stake is planted in the middle of the germinated rice. In the cultivated areas, palm species such as coconut, Areca, and other forest species, notably Teak, are present. After harvesting agricultural products, farmers leave the land fallow (uncultivated) so that the *Sesbania grandiflora* species can grow and serve as food for animals. The land is left fallow for three to four years to restore its fertility. Farmers recognize the Sesbania's ability to improve the soil (leguminous, atmospheric nitrogen fixation).

During fallow years, and when the trees are one and a half years old, farmers harvest Sesbania leaves and make cuts every three months until four years. Animals that consume this plant include cows and goats. In general, farmers are satisfied with this plant because it promotes the improvement of the quality of domestic animals and thus the family's economy. Vegetable gardens are used for cultivating crops only in the first year. After four years, farmers return and fell the trees to cultivate crops again.

Agro-Silvicultural and Agro-Silvo-Livestock System

Example of Agro-Silvicultural System Owned by the King of Cutete

In this Agro-Forest system, the population is responsible for the entire cycle. The plants in the system were planted in the mid-20th century before the Indonesian occupation in Timor-Leste. Part of the vegetation in the system is planted, while the rest is of spontaneous origin, including Nitas and Canário. Cultivated plants include Areca catechu, coconut, cinnamon, jackfruit, pomelo, orange, mango, jackfruit, jambul, and guavas, among the main ones.

The King of Cutete is responsible for assigning roles and distributing tasks. In this working system, for one to two weeks, a specific group of ten people takes responsibility for the garden. This traditional system worked until 1975, beginning to disappear with the Indonesian occupation. In recent years, with the restoration of normalcy, it has been gaining strength again.

Figure 2: Areca catechu Plantation of King Cutete, 2005

Before 1975, the production of Areca catechu, coconuts, and other important products was the exclusive property of the King. After 1975, the productions were divided into two, allocating half of the quantity produced to the population of Cutete. Under the main plantation, farmers cultivate annual crops, namely taro, watercress, and betel (a climbing plant planted at the base of Areca or other trees). The productions of these plants do not belong to the King.

Private Agro-Silvicultural and Agro-Silvo-Livestock Types

The majority of the population also owns private land, often cultivated. Areca catechu, coconut palms, Belimbe, jackfruit, jambul, mango, and pomelo can be found on these plots. Under these plants, farmers cultivate annual crops such as watercress, taro, and, if there is enough water, engage in fish farming. Near the houses, there are palm trees and fruit trees, which are also considered ornamental plants.

Function of Species

There are 44 species represented in most traditional agro-forestry farms in the Oecusse district. Regarding their use, it is observed that they are distributed, with the same plant sometimes serving various functions, for wood production (4 tree species), food production (19 species), medicinal purposes (4 species), aromatic uses (5 species), animal feed (6 species), production of fermented beverages (1 species), horticulture (14 species), and other functions such as house construction, soil improvement (atmospheric nitrogen fixation), and fence construction (8 species). Areca and betel are used in traditional ceremonies, holding high value for the population.

Despite a considerable diversity of species, traditional agro-forestry farms in Oecusse are characterized by a low soil occupancy rate. The small overlap and discontinuity of the canopies leave parts of the soil unprotected, exposed to erosive processes, and do not fully utilize the effective capacity of physical space. Through field observations, it can be said that most observed agro-forestry farms basically present four distinct strata, even though they are often not present simultaneously. The first is composed of herbaceous species 0-0.5 meters in height, represented by vegetables. The second stratum is formed by sub-shrubs 0.5-1.5 meters in height, where the predominance of creeping and horticultural species is observed. In the third stratum, shrubs with a height of 1.5 – 5 meters appear, with a small number of fruit and shrub species. The fourth stratum is formed by fruit and wood-producing species with a height exceeding 5 meters.

CONCLUSION

It is considered that the traditional agro-forestry systems in the Oecusse district with *Sesbania grandiflora* belong to the Leguminosae family, resulting in several advantages such as improving soil fertility conditions, increasing water retention capacity, and serving as green forage for animals and firewood for self-consumption.

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