

## The Role of Traditional Land Use Systems in the Well-being of Rural Timor-Leste

Pedro Damião de Sousa Henriques  
CEFAGE and Department of Economics  
University of Évora - Portugal  
[pdamiao@uevora.pt](mailto:pdamiao@uevora.pt)

Vanda Narciso  
Independent research  
Portugal  
[vandanarciso@gmail.com](mailto:vandanarciso@gmail.com)

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### Abstract

Natural ecosystems and traditional land use systems have an important role in the life and well being of the rural population of Timor-Leste. Land, the support of natural ecosystems and subsistence agriculture of rural populations of Timor Leste, is the main focus of this research. The objectives are: 1) to identify the different land use patterns of Timor-Leste; 2) to identify the goods and services produced; and, 3) to relate the goods and services produced by land use patterns with the well-being of Timor-Leste rural population. This paper is based on a multidisciplinary approach incorporating contributions from several fields of knowledge, and uses documentary sources, field observations and interviews conducted in 2003, 2009 and 2010. The main land use patterns in Timor-Leste are: natural and semi-natural ecosystems, subsistence agriculture, sacred, housing, basic infrastructures and industries and services. These land use patterns produce a set of goods and services classified as supporting, provisioning, regulating and cultural which are essential for the survival and well-being of Timor-Leste rural communities.

### 1. Introduction

Land and water are the main supporters of almost every ecosystem in earth, either natural or semi-natural, including the traditional land use systems developed by the human being. The multidimensions of the services supplied by different land uses are essential resources for the majority of the population of the developing countries. Besides the economic value associated with those services, land services have also historical, cultural and sacred values that should not be ignored once, over time, they have shaped the social organization of communities. Land, as the most important natural resource, should not be analysed isolated but in its natural, social, economic and cultural context.

Ecosystems goods and services are the benefits provided by ecosystems that contribute to make human life both possible and worth living. These include the products and the services that are used and valued by human societies such as food, cultural services, nutrients and water cycling, soil formation and retention, resistance against invasive species, pollination of plants and regulation of climate. The Millennium Ecosystems Assessment (MEA) aggregates them in four categories: provisioning, regulating, cultural and supporting (MEA 2003).

Humans influence and are influenced by ecosystems through complex and multiple interacting pathways, existing an inextricable linkage between natural systems and human well-being. Human well-being refers to everything important to peoples' lives, ranging from basic elements required for human survival (food, water, shelter) to the highest level achievement of personal goals and spiritual fulfilment. According to the MEA, the components of human well-being are security, basic material for a good life, health and good and social relations. These four elements contribute to an ultimate well-being benefit of "Freedom of choice and action", or "development as freedom" in Amartya Sen words (MEA 2003).

The conceptual framework adopted by the MEA has at its core human well-being and poverty reduction, both dependent upon the conservation and sustainable use of earth ecosystems and key to achieve all eight Millennium Development Goals (MDG). People without minimum standards of well-being, are generally the most vulnerable to the deterioration of natural systems because they are more directly dependent on the resources and services provided by ecosystems.

Timor-Leste had an estimated population of 994,500 in 2005 of which about half were female and two thirds were less than 25 years old. The population is growing rapidly and the fertility rate (7 children per woman) is nearly the highest in the world. Life expectancy is low, infant mortality is high, utilisation rates of health services are low, and school repeat and dropout rates are high. Demographic projections, indicate that the Timorese population should increase by one-third by 2015 from its initial 2005 value, by four-fifths by 2025, and triple by 2050 (World Bank 2008).

The population is distributed in 2,300 villages and divided into 34 ethno linguistic groups. The majority of the population lives in rural areas (73.5 per cent), draws its livelihood from subsistence agriculture and have a low

standard of living. Timor-Leste society is mainly organised in a patriarchal, patrilineal and patrilocal clan system. The social order is very marked by cosmology and its dual nature in which a sophisticated exchanging system plays a central role (Traube 1986, Fox 1980 and others).

Since the majority of the population lives in rural areas, land is fundamental to meet basic needs and is central to livelihood strategies. The achievement of the eight MDG in Timor-Leste depends heavily on healthy ecosystems and sustainable management of land.

The main purpose of this paper is to identify the main land use patterns of Timor-Leste, to describe the flow of goods and services produced and to relate these with the well-being of the population.

## 2. Land use patterns in Timor-Leste

The land use patterns in Timor-Leste are profoundly marked by the topography of the territory, its geological origin, weather conditions and by human influence. From an ecological point of view, land occupation in Timor can be divided in the following categories: mountainous areas; highland plains; moist lowland areas (along the southern coast); arid lowland areas (along the northern coast); marine and coastal areas; and, urban areas (RDTL 2005a).

Table 1. Land use areas in Timor-Leste by category

| Land uses                 | Area (in hectares) | %     |
|---------------------------|--------------------|-------|
| Forest land               |                    |       |
| Lowland                   | 761,486            | 51.0  |
| Highland, coastal & other | 92,768             | 6.2   |
| Agricultural land         |                    |       |
| Estate crops              | 74,578             | 5.0   |
| Food & other              | 336,400            | 22.5  |
| Non-productive land       | 203,152            | 13.6  |
| Cities, towns villages    | 19,934             | 1.3   |
| Lakes                     | 5,080              | 0.3   |
| Total                     | 1,493,398          | 100.0 |

Source: RDTL 2005a

Data available collected in the nineties (Table 1), and possibly outdated nowadays, shows that forest land plus non-productive land plus lakes account for more than 71.1% of the total area of the country, agricultural land occupies around 27.5% and urban areas only 1.3% (RDTL 2005a; RDTL 2005c). The vast majority of agricultural land is used for traditional agriculture, which forms the basis of livelihood of most rural households in Timor-Leste. The area of estate crops is mainly dominated by the coffee plantations of arabica in the highlands and robusta in lowlands and coconut trees.

From an anthropogenic view point, each of the land use patterns observed not only corresponds to different uses given by the population but also to different intensities of human manipulation of the original ecosystems. The principal modification in Timor-Leste land use patterns due to the Portuguese presence or colonization was the intensive exploitation of sandalwood until its almost extinction at the end of the nineteenth century. Sandal extinction in terms of natural regeneration coincided with the introduction of coffee production. The Indonesian occupation of the territory in 1975 was characterized by a dramatic deforestation, principally of sandalwood trees preserved until 1975 and of other commercial timber species.

The main land use patterns and its most common uses that were considered relevant to analyze the relation between the set of goods services produced and the well-being of the people of Timor Leste are in Table 2. The first two types of land use pattern occupy the majority of the land of Timor-Leste. The natural and semi-natural ecosystems land pattern is utilized for primary and secondary forests, streams and lakes and coastal areas, while the land pattern of subsistence agriculture includes land for staple food crops, cash crops, livestock and fish ponds.

Table 2. - Land use patterns in Timor-Leste

| Land use patterns                   | Uses  |
|-------------------------------------|---|
| Natural and semi-natural ecosystems | Primary and secondary forests, streams and lakes and coastal areas        |
| Subsistence agriculture             | Staple food crops, cash crops, natural pastures, livestock and fish ponds |
| Sacred                              | Sacred houses, altars, forests and water sources                          |
| Housing                             | Urban and rural housing   |

|                         |   |
|-------------------------|---|
| Basic infrastructures   | Churches, schools, hospitals, roads and public services |
| Industries and services | Industrial and commercial activities                    |

The third type, sacred land, used for sacred houses, altars, forests and water sources, is very important in Timor-Leste in terms of the intangible goods. Land for housing provides shelter which sharply influences the level of well-being of the households. On the same line of thought is the land use for basic infrastructure, such as churches, schools, hospitals, roads and public services.

### 3. Services of land use patterns and the well-being of rural Timor-Leste

The functions or services of land use patterns are the capacity of each land use to provide, directly or indirectly, goods and services that satisfy human needs. These goods and services are aggregated in this study in four categories: provisioning, regulating, cultural and supporting, all contributing to the well-being of rural populations in the dimensions of security, basic material for good life, health, good social relations and freedom of choice and action (MEA 2003).

#### 3.1. Natural and semi natural

Natural and semi natural land use pattern includes the following land uses: primary and secondary forests, streams and lakes and coastal areas. As shown in Table 1, more than half of Timor-Leste (57.5 %) is covered by natural and semi natural ecosystems, mainly forests in lowland (51%), forests in highland, coastal and other areas (6.2%) and lakes (0.3 %) in a total of 859,334 hectares. The estimates of the area of primary forest are around 1.4 % of total area (Reis 2000).

In the past, Timor-Leste was well-endowed with natural forests and in the middle age was known by Portuguese navigators that arrived to its coasts as the land of sandalwood. The 16<sup>th</sup> century Portuguese poet that chanted the Portuguese epopee of maritime discoveries, Luis de Camões, wrote in his master piece of poetry “Lusiadas”

Ali também Timor que o lenho manda  
Sândalo salutífero e cheiroso

Over there is Timor, where the forest of  
Salutary and scented sandal reigns  
(Camões, Canto X, 134)

In those times when the population was lower, shifting cultivation in the forests was the traditional and a sustainable land management system. With the increased population and the exploitation of its forests during the colonial and occupation periods, the area of forests has been reduced in its extent and in its condition, partly through clearing for agricultural purposes and partly through uncontrolled timber harvesting.

As Timor-Leste is an island, the coastal areas are important in social and economic terms. The fragile coastal ecosystems include the coral reefs, seaweed and sea grass beds, beaches and seashores. The seashores include the beach forests of mangrove and also river and lakes estuaries. The available information suggests that the coastal resources are largely unspoiled, compared to other countries in the region and that eastern littoral area lies within the Coral Triangle, an area with the greatest biodiversity of coral and reef fish in the world (BirdLife International 2010).

Natural and semi natural ecosystems contain several species of palm trees, eight species of bamboo, four species of rattan and are house for reptiles (crocodiles, snakes and lizards), mammals (deer, wild pigs, cuscus and monkeys) and birds species (lorikeets, land and sea eagles and pigeons). Some of these fauna species are endangered and one of them is a lorikeet (*Philemon inornatus*) a colourful parrot, once very common in the Timorese forests. At least 17 of the wild species are commonly hunted such as deer (*Rusa timorensis*), wild pig (*Pork sp*), wild buffalo (*Bos savaanicus*), cuscus (*Phalenger orientalis*), and laco (*Paradoxurus hermaphrodites* or mussanga). Hunting is practiced throughout the year and uses traditional methods such as spear, dog, bow and arrow and trap (NDFWR 2004 and Gusmão 2003).

Timor-Leste forests produce a set of direct goods and services that have been harvested by its population since remote times and a set of indirect services. The most important product is timber from various species: sandalwood, redwood, red cedar, teak and white and black eucalyptus. Regarding non-timber products, the most important products are: fuel wood, rattan, bamboo, palm tree building materials, medicinal plants, honey, bee wax, palm flour, palm wine, wild fruits and plants (betel nuts, mushrooms, tamarinds, roots, tubers, sprouts, leaves and flowers), and animals for meat (deers, monkeys, birds, marsupials), materials for handicrafts and jewellery, fodder for animals and fertilizers to agriculture. The main products and services produced by the coastal areas ecosystems are fish and aquatic pants and recreational activities connected to diving. The majorities of the fish captures is made with traditional fishing techniques and canoes and are an important source of protein and income for coastal communities. All these products are included in the provisioning function.

The relevant indirect services supplied by timor-Leste forests are: protection of watersheds and flood regulation; soil formation, stabilization of soil cover and erosion control; control of waste degradation; water purification and supply of water for domestic consumption and agricultural irrigation; waste treatment; nutrient cycling; primary production; and shelter and nursery for the species of wild fauna and flora of Timor Leste. The beds of rivers and streams provide sand and gravel. All these services are mostly included in the regulating and supporting services.

With respect to the cultural role that the forest plays for the East Timorese, the poem *Velhas Florestas de Agora* (The Old Forests of Nowadays) written by the East Timorese linguist and poet Fernando Sylvan, helps us to understand the cultural values that the East Timorese give to their forests such as aesthetic, spiritual, educational and recreational.

|                         |                                    |
|-------------------------|------------------------------------|
| ...                     | ...                                |
| A paz da casuarina      | The peace of casuarinas (beefwood) |
| A flor do cafeeiro      | The coffee flower                  |
| ...                     | ...                                |
| O estilo dos bambus     | The bamboo style                   |
| Os laços dos cipós      | The lassos of lianas               |
| Os ecos dos toques      | The echoes of lizards              |
| O riso dos macacos      | The laughter of monkeys            |
| O salto dos veados      | The leap of deer                   |
| O canto dos loricos     | The singing of birds               |
| ...                     | ...                                |
| As florestas serviam    | The forest served                  |
| Desde séculos e séculos | For centuries                      |
| Como templo sagrado     | As a sacred temple                 |
| ...                     | ...                                |
| E ainda servem agora    | And it still serves                |
| A heróis guerrilheiros  | To warrior heroes                  |
| Como templo sagrado     | As a sacred temple                 |
| De rezar liberdade      | To pray for freedom                |

(Sylvan 1981).

For most of the products and services produced by the natural and semi natural ecosystems, the data available to measure the income generated or the quantity of the goods produced is scarce or non-existent.

In the past, the most valuable source of income was sandalwood. Sandalwood is used to extract oil that is famous for its fragrance. Nowadays there are few occurrences of sandal which means that the income from sandal is scarce or non-existent. In some areas of Bobanaro, sandal is a sacred tree which has helped, to a certain extent of its preservation. The island of Timor is the center of origin of the sandal tree (*Santalum album*) and an important source of genetic resources and biodiversity that is internationally valued. The other timber species such as redwood (*sequoia sempervirens*) red cedar (*Juniperus virginiana*) and teak (*Tectona grandis*). are important sources of materials for local manufacturing industries and for exports. Due to lack of transparency of timber markets, domestic market prices are well below international prices, leading to the use of fine timber, with exporting value, for domestic uses that were better suited with other timber types. Forest, as a supplier of building materials, provides income for households and materials for the family houses.

Forest vegetation is an important source of animal feeding, mulching and organic fertilization contributing to food production. Forest and coastal products provide important materials for the handicraft industry that in certain zones, like Maubara and Ataúro, are important sources of income for the households involved in its production. The beds of streams and rivers supply the building and construction industry with gravel and sand materials through small scale enterprises.

From an economic and social perspective, the recreational and ecotourism services, if properly managed, can be an important source of income for households in the future. Examples already in place are the eco resorts of Com, Ataúro and Jaco Island managed by local communities. The creation of the national park Nino Konis Santana can be considered, an important measure to preserve the old forest reserve of Loré and the coastal ecosystems of Jaco island, and to induce sustainable recreation and ecotourism activities.

All the above goods contribute income and/or food for the constituents' well-being called basic material for good life.

Wild plants and honey have been, and are, used to prevent, treat and cure diseases by the population of Timor-Leste. The study of Frei Alberto de São Tomás (1969), Dominican missionary, made in the 18<sup>th</sup> century titled "Virtues of some plants on the island of Timor" shows the medicinal importance of plants of Timor-Leste for

the traditional medicine that is widely practiced by rural communities. This service is included in the health constituent of the well-being.

The cultural services have an important role in the security constituent of the well-being. For example, it has provided in the past, during the times of instability and fight against Indonesia, the places for refuge of the warrior heroes as suggested by Fernando Sylvan in his poem (Sylvan 1981). But it also contributed to the constituent of good social relations, due to the fact that spiritual, aesthetic, inspirational and educational values transmitted by natural and semi natural ecosystems can make an important contribution to the social and character development of human beings.

From the indirect services that forests perform, the most important in the short run is water supply for domestic consumption and agricultural irrigation. Both of these services have significant contributions to the constituents' well-being basic material for good life. Another important indirect service is the waste treatment performed by natural and semi-natural ecosystems once the majority of the country waste is left in the hands of nature to be treated. Regarding the other indirect services described above, they all contribute directly or indirectly to the well-being of the constituents particularly security, because it will ensure access to natural resources in the future and will prevent the occurrence of disasters.

### **3.2. Subsistence Agriculture**

Subsistence agriculture uses land to produce crop, livestock, and fishing activities. The most important food crops are coffee, maize, rice, cassava, beans, peas, peanuts, coconut, candlenut, cocoa, vanilla, sisal, fruits (banana, papaya, orange, mangoes, pineapple, tangerine, avocado, water melon), vegetables (tomatoes, onions, pumpkins, cucumber, chu-chu), and root crops (sweet potatoes, yams.) With exception of rice and coffee, all the other crops are produced by the majority of the households. The most important food crops are maize and cassava while the cash crops are mainly coffee and rice. Besides providing food supply for the households, vegetables and fruits cultivated in the home garden, are often an important source of occasional income.

Majority of rural households own some livestock. The most important livestock species are chickens and pigs in more than 70% of the households. Sheep production is done by only 4.1% of the households and 11.3% raise buffalos while horses, cattle and goats account for around 20% of the households.

The agricultural activities from subsistence agriculture provide provisioning services through the production of food and fibre that are mainly for family consumption with the surpluses being sold at local markets. However, some agricultural activities directly related with natural and semi natural ecosystems, supply fuel wood through the pruning of coffee and other trees, and are a source of genetic resources especially that many of the species used are already adapted to the region. During the first half of the 20<sup>th</sup> century, a fluke of nature created a hybrid that resulted to an unlikely cross between the arabica and robusta coffee species.

Subsistence agriculture is the main contributor to the well-being of the rural populations of Timor-Leste either in terms of food supply for own family consumption or cash income. Food production for self consumption helps to satisfy a sufficient diet while cash income creates conditions for access to manufactured and other goods such as radios and services such as higher education for the children. The main sources of cash incomes are coffee, rice, vanilla and livestock and in a lesser extent the surpluses generated by fruits and vegetables activities. As the East Timorese coffee technician Mario Tavares defends, subsistence agriculture is also an important source of fuel wood for household consumption and for selling. Thus, a significant contribution to farm income and to satisfy fuel domestic needs (Tavares 2010). All these goods contribute decisively to the well-being of the constituents called basic material for good life.

For majority of the households, animals are valuable assets acting as a sort of monetary reserve, to help offset a crisis, to provide education for children and fulfill social obligations of families such as weddings and funerals. This last task has an important role on the good social relation constituent. Both create conditions for families to have an adequate livelihood and contribute decisively for their freedom of choice and action.

Subsistence agriculture and food production highly depend on the favourable weather conditions for agriculture, determining the proportion of population that is food insecure and highly vulnerable to food insecurity. With good weather conditions for agriculture, the amount of available food can be enough to feed the household but the proportion between the different components of diet is not balanced. Food insecurity and inadequate diet are threats to the ability to be adequately nourished and thus to the health constituent of the well-being.

Food and cash income contribute also to reduce the vulnerability of the population to shocks and stresses, while the forestry system of coffee production contributes to reduce ecological disasters, both playing a role on the security constituent of the well-being.

The technologies used by subsistence agriculture are traditional with low use of inputs or improved seeds, fertilizers and plant protection products for crops, or concentrated foods and drugs for animals. Consequently, the productivity is low, as well as the income generated, which have a direct effect in the well-being of rural populations of Timor-Leste.

### 3.3. Sacred land

One of the principal land use patterns observed in Timor-Leste, due to its value to the populations, is what we designate as sacred land use pattern, i.e. the *lulic* occupation of land. The concept of *lulic* which means holy or sacred is a force that can be simultaneously and paradoxically dangerous or favourable. For most of the East Timorese, land is the core of all spirituality and this relationship is central to the issues that are of great significance to daily life.

Sacred areas may vary from a few trees to a mountain range, and their boundaries may not be fixed. Ground considered as *lulic* is presented all over the country. However, there is no estimate of the area of *lulic* land. These spaces are characterised by their cultural status as sacred, taboos associated, rules of behaviour and local communities' rules of management. The sacred spaces/grounds have different uses such as sacred houses, land, forest, grooves, trees and water and altars associate with them, and there are also totemic species of animals and plants, namely trees.

Sacred sites have significant economic, social and cultural value among local communities. They contribute to the regulating and provision of services, but, more importantly, they provide goods for ritual and cultural purposes.

Cultural services can be considered as the major contribution of the sacred land use pattern to the well-being, among other reasons, because they have no easy substitutes, especially for rural and poor communities.

The cultural services provide key elements that serve as the founding pillars of the cosmology and of the traditional society features such as land tenure, management rules of natural resources, marriage and settlement patterns.

The "sacred house" represents the most important piece of the Timorese social structure, thus it and is the focal point of all life. All members of one lineage are linked to one sacred house. Marriage and *barlaque* (bride's wealth or dowry) also play a central role in the complex system of family alliances that form the structure of Timorese society. In Timor Leste, two kinship systems coexist. These are patrilineal and matrilineal, which are associated with two rules of residence, patrilocality and matrilocality, corresponding to two systems of land inheritance. In most rural areas, the patrilineal system dominates, where land is passed according to the male line and only for sons. There are no more than 12% matrilineal communities that belong to Bunak and Tetun-Terik, where land is transferred through the female line.

Customary land tenure is heavily dependent on the societal systems (matrilineal x patrilineal) and on settling pattern after marriages (matrilocal x patrilocal). The majority of land is communitarian, owned and managed by communities according to customary law based on rules of social and cultural behaviour.

Within the management rules of natural resources, *tara bandu* is an important customary law recognized as traditional ecological wisdom according to Demetrio do Amaral de Carvalho from Haburas Foundation. It involves a kind of agreement within a community to protect a special area for a period of time, usually prohibits the use of certain places as sacred areas, but is not exclusively applicable to sacred sites (Carvalho 2004).

The customary systems, including customary land tenure, remain alive and strong, showing its high degree of resilience. All features of social organisations in Timor-Leste are inextricably linked to the cosmology and the cosmology, in turn, is inextricably linked to the perception that land is sacred.

Furthermore, the sacred land use pattern produces, among others, a wide range of cultural services, less tangible than material services, which contribute to people's quality of life including: identity/sense of place/feelings of "being at home"; spiritual and religious values and enrichment; knowledge system and learning, education, and scientific opportunities; and aesthetic enjoyment and leisure and recreation. Such services are highly valued by all communities in Timor-Leste and examples are:

- The "affiliation" to a specific sacred house and its territory;
- The cultural diversity produced by the dynamic interaction between topography, biological diversity and people leading to more than 30 ethnic groups dispersed in this half of tinny island;
- The traditional knowledge associated with sacred sites has been passed down from the ancestors and is learned through a process of initiation in order to gain a progressive understanding of customary law and is also an opportunity to learn about land uses, agricultural practice and land tenure rules;
- Many places as forests, mountains and other particular landscapes have been protected and avoided from degradation and destruction due to the fact they are sacred.

Within the framework of sacred land use, special attention should be paid to the sacred houses, *uma lulic*. As Trindade said "The importance of the *uma lulik* in relation to the people of Timor Leste cannot be overstated. The sacred house embodies the ethos of communal unity and the binding relationships between the people, the land and their ancestry..." (Castro 2007:38). Timorese sacred houses which represent important social spaces and local cosmologies, link extended families and are the prerequisite and guarantee of the "flow of life". Therefore, sacred houses are a key piece of all cultural services provided by land.

Houses are pivotal to social organisation. They represent the social hierarchies and define marriage systems and forms of ritual exchange that reproduce Timorese society, including patterns of political leadership and power. McWilliam (2005) stresses the cultural significance of these houses as repositories of knowledge representing

the moral order of society and its role as “houses of origin and alliance” and illustrates this idea with the case of clandestine resistance structures. Besides the social cohesion, house affiliation is very important to secure resource access and ensure personal safety.

The rebuilding of sacred houses (many of them burnt in 1999) and the ceremonial rituals around it, which are practices that re-enforce the legitimacy of ancestral spirits, should be stressed. These reconstructions require a huge effort of all members of the house. All household members must contribute goods, like animals, rice or even cash, absorb resources and time, and the reconstruction is one of the few reasons socially accepted to sell land. The reconstruction of sacred houses is a prerequisite and symbol of collective post conflict identity work and can play a key role in the peace-building process. On the other hand, these and other rituals are means of recognizing the marks left by years of conflict and a way to overcome the traumas of Indonesian occupation and freedom fight, and thus improve mental health of people.

The ceremonies which take place in any sacred place are for the well-being of the local community ensuring the fertility of their crops and livestock, and providing protection and spiritual assistance for constituent households. Agricultural crops are the embodiment of ancestors and farming rituals are held throughout different cultivation phases.

To be able to express their faith and values, they perform their traditional ceremonies in public demonstrations, which increase the feeling of security and reduces people’s vulnerability and also act as tool to empower the people.

Sacred places are closely linked to the security and good social relations constituents of well-being. Traditional practices linked to land services play an important role in developing social capital and enhancing social well-being, e.g. the loss of important ceremonies contributes to the weakening of social relations in a community. On the other hand, affiliation with an *uma lulic* is a safety network, e.g. ensuring access to natural resources. Sacred places also provide a basic material for a good life, such as food and water necessary to the livelihoods of local people.

Regarding the health constituents of well-being, sacred land makes its contribution through the provisioning services as food production and plants used in popular medicine and regulating services, including those that influence the distribution of disease. Cultural services play also an important role through the contribution of recreational and spiritual benefits to the physical and mental health.

All these elements have important contributions to an ultimate well-being benefit of “freedom of choice and action”, even when they seem contradictory to it. Protecting sacred places in Timor-Leste is necessary for the strength of its culture, and could have a fundamental impact in its cultural identity and status as sovereign nation.

### 3.4. Housing

Land provides a suitable substrate for infrastructures, including housing. Housing satisfies people's fundamental need for shelter and satisfies other human needs. It is a place where individuals can enjoy privacy, sleep, eat and keep possessions.

The housing category provides space for urban and rural housing with different shapes, dimensions and materials. As shown by Cinatti et al. (1987) Timor-Leste traditional housing architecture is very rich in terms of design and materials and provides individuals with a key means for expressing their identity (Figure 1).






















| SINAIS  | REGIÃO   | PLANTAS E ALCADOS   |   | ALTITUDE         |
|---|----------|---|---|------------------|
|  | BOBONARO |  |  | MONTANHA         |
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|  | BAUCAU   |  |  | COLINAS PLANALTO |
|  | LAUTEM   |  |  | COLINAS PLANALTO |
|  | VIQUEQUE |  |  | PLANICIE         |
|  | SUAI     |  |  | PLANICIE         |
|  | OCUSSI   |  |  | PLANICIE         |

Figure 1 – Main profiles of Timor-Leste traditional houses  
Source: Cinatti et al. 1987

The Census 2004 reveals that about 1.3 percent of all land in Timor-Leste is classified as urban. In 2004, just over 206,000 people, 22.3 percent of the population, lived in urban areas with Dili accounting for over 80% of it. There are many aspects of housing that are associated with individual well-being, among them, whether or not occupants own their home and housing conditions. Housing conditions are generally poor and there are huge disparities in access to services between urban and rural areas. About 50% of houses in urban areas have access to piped water supply, 58% to a private toilet and 74% to an electricity supply. Corresponding figures in rural areas are significantly lower, 40%, 14% and 10% percent, respectively.

The housing use of land contributes to the basic material for a good life through the provision of living space, ranging from isolated houses to large urban areas. Housing is closely linked to the security and to the basic material for good life constituents of well-being. Regarding security it is worth note that every human being has a right to adequate housing: “right of all to a secure place to live in peace and dignity” (CESCR) which is also part of the basic material for good life.

Housing is also linked with the health component since poor housing conditions have a direct relationship with health problems such as mental illness, accidents, and respiratory diseases. This last one is very common in Timor Leste due to inadequate house cooking conditions.

#### 4. Final Remarks

Land performs a crucial role in the development of rural areas in Timor-Leste and leads the path to achieve a higher level of well-being. The diversity and complexity of the cultural matrix has been determinant for the patterns of land use observed in the country.

This paper highlighted some of the relationships between land use patterns and well-being of Timor Leste population, through the identification of services supplied by land uses and their contributions for the constituents of well-being. The main land use patterns in Timor-Leste are natural and semi-natural ecosystems, subsistence agriculture, sacred, housing and basic infrastructures and industries and services.

Due to cosmology and heavy dependence to natural resources, the people of Timor-Leste have established a very close and holistic relationship with nature, which provides them with essential goods and services such as water, land, food, firewood, building materials and spiritual enrichment. Thus, land provides to the population not only economics benefits but also important cultural services and plays a central role within families' and communities' well-being.

People in Timor-Leste are poor, and poor people are the most vulnerable and severely affected when the environment is degraded or their access to natural resources, namely land, is limited or denied. This research recognizes the essential role that land performs in the development of rural areas of Timor-Leste and the importance of focusing and keeping in mind that many of the goods and services supporting peoples' well-being, have a public or common pool good nature, thus without a market value and not subject to commodification. This fact should be considered when elaborating, adopting and implementing policies and laws. In sum, as shown above all the networking between land uses, land services and constituents of well-being are interconnected and contribute to the ultimate well-being benefit of “Freedom of choice and action”.

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