4.2 AGRICULTURE

4.2.1 Crops and Horticulture

1. Background

a) Overview

The types of crops and horticultures found in many places in Timor-Leste are paddies, maize, cassava, sweet potato, potato, mung bean, peanut and soya bean. The detailed distribution, cropping area and production of the respective type of crops show in Table 1 to Table 4. The data base of other horticultures does not seem to be properly updated. The data found are only the total area of the vegetables without further explanation about the type of plants.

Table 4.11 - Area and Production of Mung bean, Soya bean, Peanut, 2009

No	District	Mung bean		Soya bean		Peanut	
		Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)
1	Lautem	55	50	53	53	88	97
2	Baucau	38	30	70	63	1,702	3,574
3	Viqueque	875	1,050	762	1,143	578	1,503
4	Manatuto	204	143	38	30	33	36
5	Dili	7	5	8	6	12	11
6	Aileu	0	0	115	58	57	74
7	Manufahi	95	76	93	121	141	183
8	Liquica	6	3	37	22	85	77
9	Ermera	20	16	26	21	43	52
10	Ainaro	9	5	67	40	92	92
11	Bobonaro	447	402	242	242	166	216
12	Covalima	456	410	21	19	84	101
13	OeCusse	5	3	0	0	174	244
	Total	**2,217**	**2,193**	**1,532**	**1,818**	**3,255**	**6,259**

Source: MAF, 2010

Table 4.12 - Cassava, Sweet Potato, Potato, 2009

No	District	Cassava		Sweet Potato		Potato	
		Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)
1	Lautem	523	1,883	193	463	5	12
2	Baucau	1,369	5,202	1,454	4,507	93	242
3	Viqueque	952	2,761	492	1,476	115	288
4	Manatuto	543	2,009	250	525	29	70
5	Dili	324	1,134	46	110	0	0
6	Aileu	844	2,701	129	335	215	538
7	Manufahi	920	3,680	284	653	119	286
8	Liquica	426	1,363	125	250	28	62
9	Ermera	629	2,327	252	630	47	132
10	Ainaro	871	2,352	326	652	34	102
11	Bobonaro	967	3,675	342	958	76	182
12	Covalima	951	3,614	321	867	0	0
13	OeCusse	1,438	4,602	593	1,364	5	11
	Total	**10,757**	**37,302**	**4,807**	**12,791**	**766**	**1,922**

Source: MAF, 2010

Table 4.13 - Area and Production of Maize, 2006 - 2009

No	District	2006		2007		2008		2009	
		Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)
1	Lautem	16,111	32,222	17,470	24,458	17,470	24,458	11,360	26,128
2	Baucau	4,066	4,066	3,622	2,898	3,622	4,346	3,388	7,284
3	Viqueque	8,850	13,275	9,920	7,936	9,920	14,880	10,011	21,724
4	Manatuto	4,653	6,607	5,700	6,840	5,700	8,550	4,213	8,847
5	Dili	1,627	3,254	837	837	1,257	1,886	1,080	2,160
6	Aileu	3,725	1,863	1,504	752	1,506	753	2,720	2,720
7	Manufahi	4,872	5,944	3,108	3,730	5,108	6,130	4,367	8,734
8	Liquica	1,098	1,537	750	675	957	1,436	1,530	2,295
9	Ermera	2,621	2,097	1,982	1,586	1,982	1,586	2,710	4,878
10	Ainaro	6,635	6,635	2,441	1,221	2,442	1,221	2,500	3,750
11	Bobonaro	4,922	4,922	13,250	10,600	13,250	10,600	11,726	12,078
12	Covalima	5,396	6,475	5,396	6,745	6,064	9,096	8,295	17,005
13	OeCusse	6,645	3,323	6,500	3,250	10,155	15,233	7,440	17,112
	Total	**71,221**	**92,219**	**72,480**	**71,526**	**79,433**	**100,173**	**71,340**	**134,715**

Source: MAF, 2010

Table 4.14 - Area and Production of Paddy, 2006 - 2009

No	District	2006		2007		2008		2009	
		Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)
1	Lautem	6,250	9375	6,538	7,846	6538	7845,6	1580,75	3,952
2	Baucau	3,660	6588	4,971	7456,5	5071	10192,71	9200	29,440
3	Viqueque	4,209	6313,5	5,205	7,808	6057	12114	4953,6	15,604
4	Manatuto	4,091	8182	3,450	5175	3450	5175	4265	12,795
5	Dili	67	93,8		0	0	0	67	201
6	Aileu	574	574	561	561	750	900	745	1,863
7	Manufahi	1,095	2190	2,500	3750	3160	4740	1218,3	2,437
8	Liquica	241	289,2	310	465	310	465	870	2,175
9	Ermera	1,055	1371,5	1,055	1371,5	1055	1371,5	1191,6	2,705
10	Ainaro	1924	3848	1958	2937	1958	2937	1394	4,419
11	Bobonaro	3,120	7800	5,004	12510	6665	16662,5	4280,28	15,923
12	Covalima	2,848	5411,2	4,015	6022,5	4015	6022,5	4050	13,406
13	OeCusse	2,252	3378	3,015	4522,5	5966	8992,5518	5182	15,857
	Total	**31,386**	**55,414**	**38,582**	**60,424**	**44,995**	**77,418**	**38,998**	**120,775**

Source: MAF, 2010

Paddies are yielded from irrigated and non-irrigated land; they mostly can be harvested once a year. But the available data, as shown in Table 4, does not distinguish between irrigated and non-irrigated land. From the discussion in the irrigation sector (in SDP document become part of infrastructure), area presented in Table 4 is for irrigation field. Based on the table, it can be known, from 2006 until 2008, productivity of paddy is less than 2 tons/ha. Land productivity is certainly very low, considering the dry land agriculture, in Indonesia, for example, can reach 4.5 tons/ha. This situation is caused by a system of production facilities such as provision of seeds, fertilizers, pesticides and agricultural machinery equipment have not ordered. This became one of the causes of food production, especially rice, can not cover the national needs at the level of consumption 90 kg/capita/year (State of the Nation Report Volume IV, 2008). Lack of rice must be met through imports from Thailand, Vietnam, and Indonesia. In the period between 2000 to 2006, import of rice continues to increase every year; 10,600 tons recorded in 2000, 20,500 tons in 2001, 27,353 tons in 2003, 40,556 tons in 2005 and 38,455 tons in 2006 (State of the Nation Report Volume IV, 2008).

Conditions of food crops and horticulture became different after the facilitation to farmers and agricultural machinery equipment arrangement. Facilitation includes the provision of production facilities such as seeds, fertilizers, pesticides and assistance in land preparation. Facilitation provided has been able to increase productivity. From Table 4 can be calculated, the productivity of paddy in year 2009 rose to more than 3 tons/ha.

The demand for food is not merely be based on the total number of population but also determined by the income level, society's preferences, and income elasticity of demand. Even so, due to income elasticity of demand data constraints, the demand for food (especially rice) can simply be estimated from the total number of population; the more people there is, the higher the demand for food. Based on the consumption level as previously mentioned, the estimation for rice demand in Timor-Leste can be seen in Table 5. If the productivity of rice can be improved significantly, in the year 2014 is estimated to Timor-Leste will be able to meet the needs of rice. However, if the population growth rate is not well controlled, the excess food will go back down and the food deficit will be going back to the year 2020.

Table 4.15 - Population Projection and Rice Demand in Timor-Leste, 2011 – 2020

No	Item	2011	2012	2013	2014	2015
1	Population	1,193,386	1,232,231	1,272,298	1,313,646	1,356,340
2	Demand for rice (Ton)	107,405	110,901	114,507	118,228	122,071
No	**Item**	**2016**	**2017**	**2018**	**2019**	**2020**
1	Population	1,400,415	1,445,885	1,492,771	1,541,059	1,590,861
2	Demand for rice (Ton)	126,037	130,130	134,349	138,695	143,177

Source: Population Projections are derived from *Timor-Leste Census 2004*, demands for rice are calculated

b) Policy Framework

Crops and horticulture falls into the jurisdiction of the Ministry of Agriculture and Fisheries. The organizational structure and governance of the ministry is stipulated under Decree Law No. 4/2004 on the Structure and Rule of the Ministry of Agriculture, Livestock, Fishery and

Forestry. The decree is revised by the enactment of Decree Law No. 18/2008 (19 June 2008) on the Structure and Rule of the Ministry of Agriculture and Fisheries.

Moreover, the government has also enacted regulations governing the development of agriculture centers and its related activities as covered in: Executive Order No. 2001/10 on the Establishment of Agricultural Service Center of Bobonaro, Executive Order No. 2002/1 on the Establishment of Agricultural Service Center of Aileu and Executive Order No. 2002/2 on the Establishment of Agricultural Service Center of Viqueque.

Food security has become a serious national problem and therefore the Food Security Policy was enacted in 2005. The policy and regulation concerning crops and horticulture are currently being prepared, among them are: water and irrigation policy, seed and fertilizer policy, and national extension policy, land use and land management, decree law on the of pesticide and pesticide regulation.

- Realise and implement agricultural and horticultures policy to draw on the genetic resources of plants and to reproduce planting materials for production purposes;
- Encourage production increase, productivity, and quality of crops and horticulture;
- Promote and develop agricultural diversification;
- Encourage and develop innovation, agricultural mechanization and appropriate technology in order to increase competitive and sustainable production;
- Educate human resources and develop farmer's socio-economic condition to utilize natural environmental resources.

c) Problems and Challenges

Problems faced by the sub-sector of crops and horticulture in Timor-Leste are:

- Data regarding crops and horticultures has yet to be well organized and managed;

- The current nature of the agricultural activities is still in the subsistence level, resulting in low level of production and productivity; hence the shortage of food supply;
- Lack of farmer skills and weak of extension institution which could facilitating farmers in order to improve their agricultural production;
- Limited or no access for the farmers to raise funds and the restricted use of input materials (e.g. fertilizers, pesticides);
- The current farming activities have not been oriented on the agribusiness system which integrating on-farm and off-farm subsystem;
- Agricultural activities have not taken into consideration the comparative advantage of regions. Therefore, agricultural development has not been based on superior product of the districts;
- The scattered settlement pattern which hinders the organizing and development of farmer's association as well as facilitation.

2. Policy Direction

a) Short Term (2011 – 2015)

- Increase national food crops production capacity through the utilization of 30,000 ha of field which requires irrigation scheme rehabilitation. Paddy yield improvement in an irrigated field should reach at least 3 tons of rice/ha, while improvement in a non-irrigated field would yield 2 tons of rice/ha;
- Provide subsidy for input materials (i.e., land cultivation (in term of fuel for tractors), seeds, fertilizer, and pesticides) of food crops and horticultures. For the upcoming five years, chemical input materials are still considered imperative since: *Firstly*, it could trigger production and productivity growth in order to reach national food demand for import substitution; *Secondly*, mass-produced organic input materials are still not widely available to fulfil national demand;
- Improve human resources competency of agriculture apparatus; emphasis of which must be concentrated on technical skills and management;
- Improve extension services;

- Develop agriculture mechanized and extension centres;
- Increase the capacity of farmers in terms of agricultural skills and farming management;
- Develop the facility and infrastructure such as irrigation, farm access roads, and production equipments;
- Improve agricultural data and information management for crops and horticultures, especially in the delivery of crops and horticultures database;
- Establish zoning for crops and horticultures commodity in order that each district can have its own superior products or agricultural production which more dominant than others district;
- Begin the integration of farm activities with small industry (household industry). In this case, the agricultural product processing industry and agricultural waste industry for organic fertilizers and fodder need to be introduced;
- Develop regulation for operation and maintenance of agriculture machineries.

b) Medium Term (2016 – 2020)

- Ensuring food security and stocks availability as well as distribution and accessibility to food. In this context, it is necessary to build an agency or institution responsible for the national food problems;
- Increase diversification of production and consumption on bases of local resources which in this regard can be carried out by exploring and promoting cultivation of secondary food crops such as taro and other tubers;
- Develop technology and innovation of agricultural technology which are specifically intended to develop appropriate technology for land cultivation and post-harvest handling;
- Establish and develop paddies agribusiness areas which are modern, tough, and can provide security for the betterment of farmer's life;
- Develop institution and partnership which are mutually beneficial especially in relation to financing, processing and marketing;
- Expand business scale and managerial capacity of the farmers intended to direct the farmers in order to conduct business-oriented agricultural activities;

- Develop industrial cluster for superior commodities with the sole intention to enhance the industries according to the superior product of region;
- Promote farmers to be extension worker.

c) Long Term (2021 – 2030)

- Manage sustainable land resources to avoid excessive land exploitation and to prevent land damage due to the use of superfluous chemical input materials. Within this period, it is possible to develop organic agriculture by considering an improvement of income level of the society which would impact consumption preferences. Society consumption is expected to have shifted from quantity-oriented to quality-oriented consumption. In addition, it is also expected that the organic input materials production has been well-developed.
- Establish and develop rural agribusiness area to prompt the integration of on-farm and off-farm activities in order to provide marketing guarantee for agricultural products;
- Increase private investment by providing business incentives and investment in the field of agriculture;
- Develop and implement agriculture product processing technology to support off-farm activities;
- Provide significant contribution toward the economic growth through export, job creation and increase of income.

3. Working Plan

a) Short Term (2011 – 2015)

- Increase production and productivity through intensification and extensification of food crops cultivation;
- Development human resources of agriculture apparatus through technical and managerial training;
- Institutional development of extension worker as well as farmer's association;
- Empowerment of farmers through facilitation to improve farmer capacity;

- Development of agricultural facilities and infrastructure, financial institution and marketing;
- Development of data base for food crops and horticultures.

b) Medium Term (2016 – 2020)

- Improvement of product quality and efficiency by means of mechanized technology to increase productivity and efficiency;
- Implementation of quality standard and food security;
- Development of production and consumption diversification through the development of local non-rice food consumption pattern;
- Alleviation of level of food insecurity through food trade system;
- Development of commercial agriculture through business-oriented agricultural activities;
- Development of agricultural products marketing;
- Development and dissemination of agricultural innovation.

c) Long Term (2021 – 2030)

- Enhancement of farmer's access toward productive resources;
- Development of rural agro industry;
- Poverty alleviation.

4. Project Implementation

a) Short Term (2011 – 2015)

- Intensification of paddies cultivation in irrigated and non-irrigated lands which have already been cultivated in an irrigated area of about 40,000 ha and non-irrigated area of about 4,000 ha;
- Extensification of paddy cultivation area through rehabilitation of irrigation area of about 10,000 ha;
- Optimization of paddy cropping area in an irrigated land by way of double planting, in an area of about 5,000 ha;
- Intensification through intercropping between paddies and maize.
- Intensification of mung bean cultivation;
- Intensification of peanut cultivation.
- Development and improvement of irrigation networks;

- Facilitation of availability of production facility,
- Provide subsidy for production inputs;
- Development of equipment and agricultural machinery services;
- Development of road for agricultural activities;
- Development of rural infrastructure, seed centre, mechanization centre, research and information technology centre;
- Education of human resources of agriculture apparatus;
- Technical and managerial training for human resources of agriculture apparatus;
- Empowerment of extension institutions;
- Development of advisory, training, and facilitation for the farmers;
- Empowerment and facilitation to establish farmer's association;
- Inventory and evaluation of agricultural resources potential;
- Semi-detailed survey of land suitability for food crops and horticultures in 12 districts;
- Preparation of zoning maps for commodities;
- Development of machineries maintenance and extension centres.

Figure 4.2 - Food Crops and Horticulture Development Plan

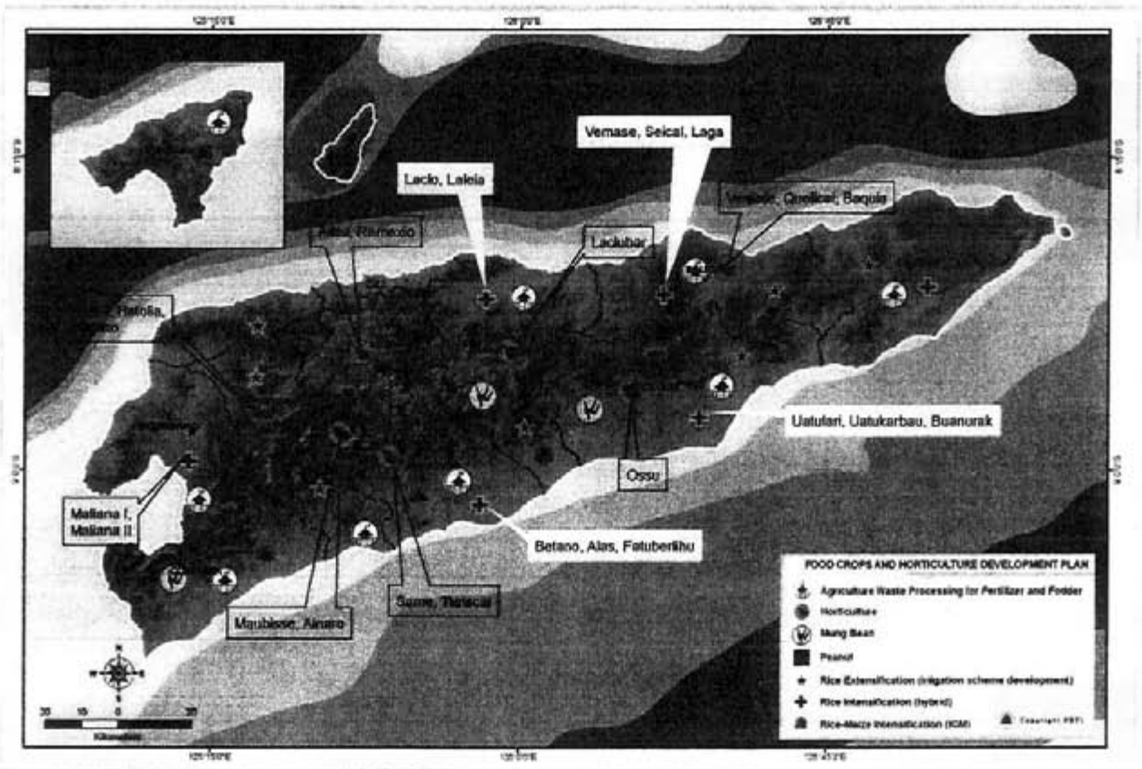


Figure 4.3 - Rice Production (2011-2012)

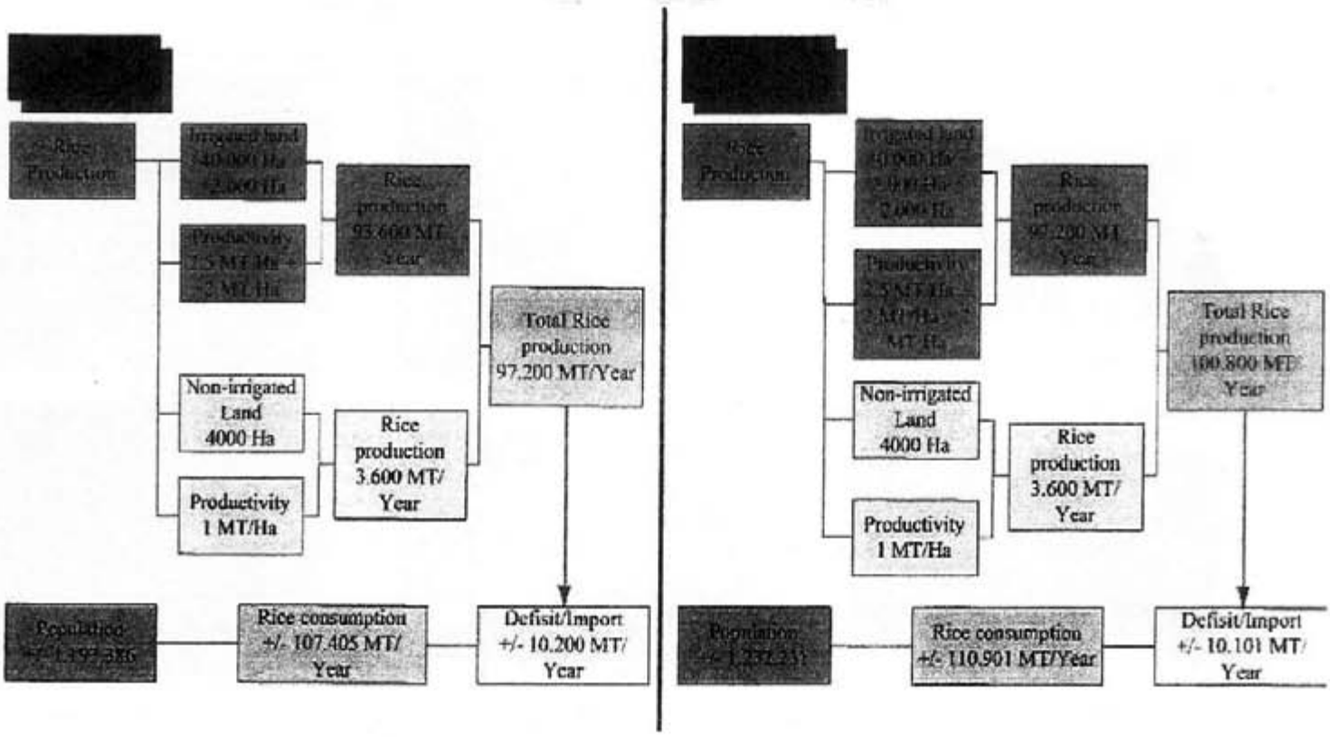


Figure 4.4 - Rice Production (2013-2014)

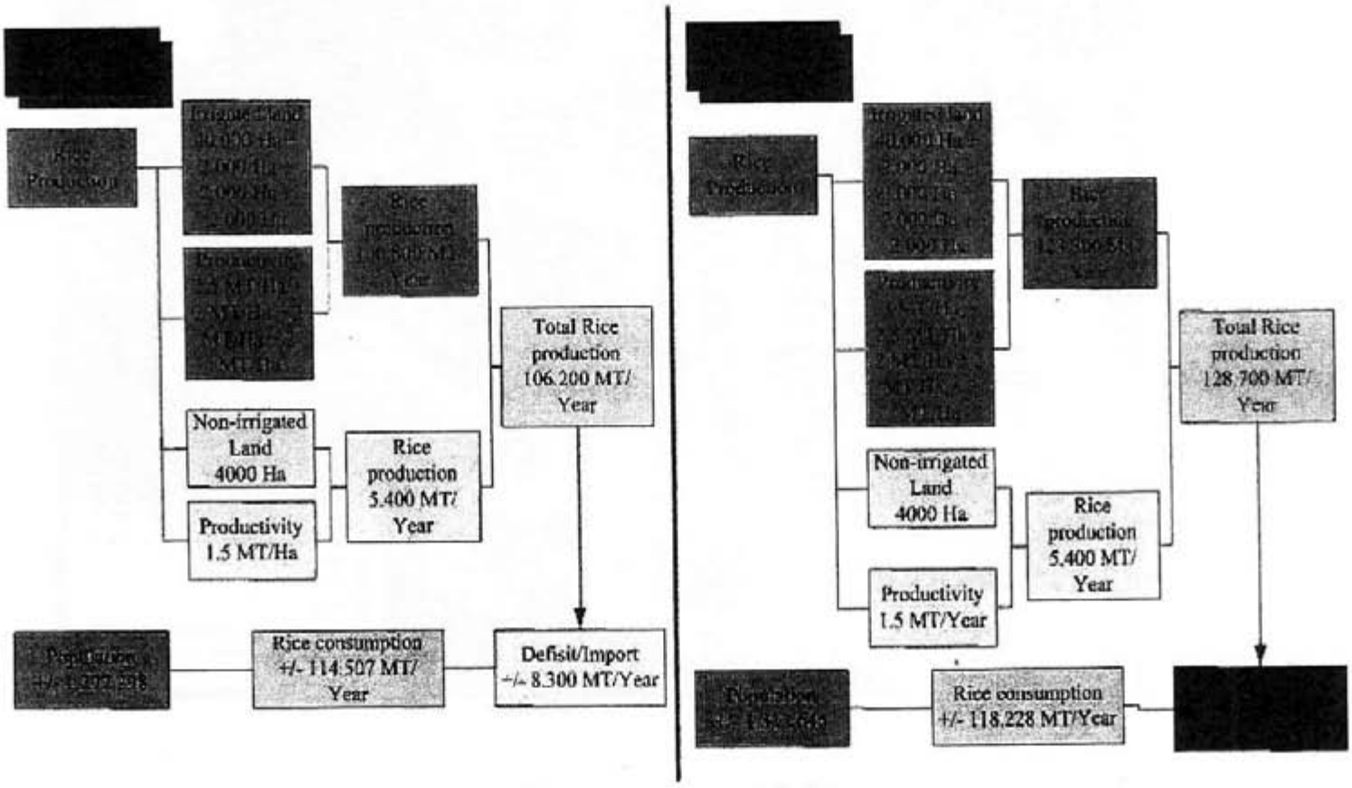
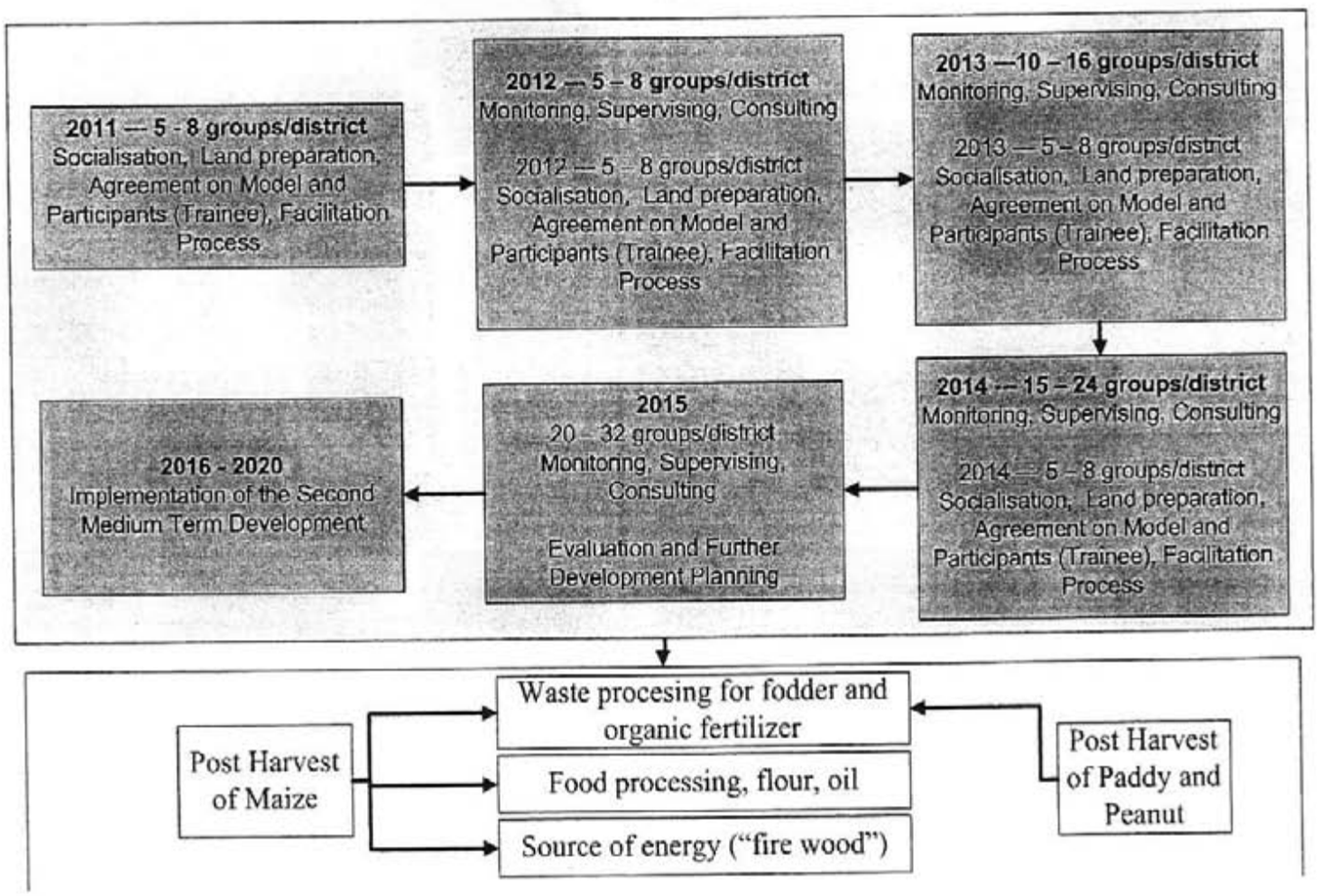


Figure 4.5 - Field School/Farmer Empowerment



Funds needed for implementation of development activities for food crops and horticulture during the first five-year period (2011 - 2015) estimated at U.S. $ 110,608,000.00. This is more or less 27% of the total requirement of funds for agricultural sector (excluded irrigation sector).

b) Medium Term (2016 – 2020)

- Development of seeds;
- Arrangement and implementation of quality standard and food security;
- Formation and determination of food price policy;
- Management of food trade system;
- Development of superior commodities based on commodities regionalization;
- Development of local alternative food resources;
- Development of consumption pattern for non-rice local foods;
- Development of traditional food processing technology;
- Development of technology for quality improvement and food security;
- Development of agricultural mechanized technology to increase productivity and efficiency;
- Implementation of post-harvest technology;
- Development of institutions and market information;
- Development of international trade and partnerships;
- Development of local-specific commercial commodities;
- Development of partnerships pattern for agricultural businesses.

c) Long Term (2021 – 2030)

- Development of agro industry and production centre areas;
- Development of financing network;
- Development of production centres for superior commodities;
- Development of businesses for the processing and marketing of agricultural products;
- Facilitation of investment and partnership in the field of agriculture.

4.2.2 Plantation

1. Background

a) Overview

There are three main commodities in the plantation sub-sector in Timor-Leste which are coffee, candlenut and coconut that employs around 50,000 farmers in 2006. Coffee is only planted in 6 out of 13 districts, especially in the Western area. It employs around 20,000 farmers. Table 1 shows the distribution and areas of coffee plantations from 2006 to 2009.

Table 4.16 - Area and Production of Coffee, 2006 – 2009

No	District	2006		2007		2008		2009	
		Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)	Area (Ha)	Production (ton)
1	Aileu	1,134	83	1,434	409	1,432	500	1,434	83
2	Manufahi	7,310	1,687	6,310	2,269	6,310	1,813	7,310	1,687
3	Liquica	6,756	1,244	6,266	1,898	6,466	2,320	6,768	1,244
4	Ermera	29,225	5,372	30,705	6,430	30,510	7,200	30,740	5,372
5	Ainaro	5,024	1,191	5,024	984	5,124	1,203	5,024	1,191
6	Bobonaro	2,540	546	2,340	796	2,340	973	2,540	546
	TOTAL	**51,989**	**10,122**	**52,079**	**12,786**	**52,182**	**14,009**	**53,816**	**10,123**

Source: MAF (Ministry of Agriculture and Fisheries), 2010

From the table, it can be seen that the total area and production tends to increase, but when compared between production and total plantation area, there is a fluctuation in productivity. The average productivity level is about 225 kg/ha; while according to the result of plantation researches, a standard coffee productivity ranges between 1,300 kg/ha to 1,400 kg/ha. Therefore, it can be inferred that coffee productivity in the country is relatively low.

Although Timor-Leste coffee production is not stable, but Timor-Leste can do export (Table 2). The largest export destinations are the United States, the British Indian Ocean Territory, Germany, Singapore, and Australia. Alas, Timor-Leste faces strong challenges in the International market, especially against quality coffees from Brazil, Colombia, Indonesia, and Vietnam. Such a development in the production of world

coffees has contributed to the surplus of coffee supplies in the international market.

Table 4.17 - Coffee Export from Timor-Leste, 2004 – 2009

No	Year	Net Weight/kg	Value (US $)
1	2004	7,688	6,889
2	2006	2,798.26	6,854,879
3	2008	21,042,914	12,632,391
4	2009	8,328,414	12,492,134

Source: MAF (Ministry of Agriculture and Fisheries), 2010

Another potential plantation crop that gives significant contribution to Timor-Leste's economy is candlenut. This plant is growing in 6 out of 13 districts in Timor-Leste, of which 4 districts are located in the East and the remaining 2 districts lie in the western part of the country. In December 2006, a third shipment of candlenut oil exports have been shipped to Hawaii with as many as 60 drums or about 10,800 liters; increased by 10 drums from previous exports shipment. In 1998, candlenut was reported to have a total land area of 1,462 Ha; which increased to 7,974 Ha in 2006, with production yields about 10,814 tons. The distribution, total area, and production of candlenut in the year 2006 to 2009 are shown in Table 3. Despite the additional acreage from year 2006 to year 2007 and 2008, but production still presented as the production in 2006; because candlenut is perennial crops that can not be directly harvested in the same year with the planting year. Candlenut takes 3.5 to 4 years to be harvested from the plant. Thus the new plant in 2007 and 2008 is expected to affect the volume of production in the year 2011/2012.

Table 4.18 - Area and Production of Candlenut, 2006 – 2009

No	District	2006		2007		2008		2009	
		Area (Ha)	Production (Ton)	Area (Ha)	Production (Ton)	Area (Ha)	Production (Ton)	Area (Ha)	Production (Ton)
1	Lautem	104	42	134	42	304	42	304	42
2	Baucau	963	185	998	185	998	185	998	185
3	Viqueque	188	52	188	52	188	52	188	52
4	Manatuto	162	44	162	44	162	44	162	44
5	Covalima	1,502	389	1,502	389	1,502	389	1,502	389
6	OeCusse	62	28	62	28	112	28	112	28
	Total	2,981	740	3,046	740	3,266	740	3,266	740

Source: MAF (Ministry of Agriculture and Fisheries), 2010

Another dominant plantation crop is coconut (Table 4). Despite the additional acreage from year 2006 to year 2007 and 2008, but production still presented as the production in 2006; because coconut is perennial crops that cannot be directly harvested in the same year with the planting year. Coconut takes 4 to 5 years to be harvested from the plant. Thus the new plant in 2007 and 2008 is expected to affect the volume of production in the year 2011/2012. It can be calculated that the productivity of coconut plantation are around 565 kg/Ha. The number is still far from the world productivity standard for coconut based on a plantation research in 2005, which is about 1,500 kg/Ha. Coconut can be found in almost all areas of Timor-Leste, in the lowland areas as well as in the highlands. The market for coconut and coconut products is very prospective in the global market. Nowadays, some of the major players in the global market are Indonesia and the Philippines. The demand and competitiveness of coconut lie in its downstream industry; no longer in its primary product in the form. The end-products that have already been developed and gaining market interest are the Desiccated Coconut (DC), Coconut Milk (CM), Coconut Charcoal (CCL), Activated Carbon (AC), Brown Sugar (BS), Coconut Fiber, Coconut Peat, Nata de Coco, Virgin Coconut Oil (VCO), and Coconut Wood. The global demand for processed coconut products shows an increasing trend.

Table 4.19 - Area and Production of Coconut, 2006 - 2009

No	District	2006		2007		2008		2009	
		Area (Ha)	Production (Ton)	Area (Ha)	Production (Ton)	Area (Ha)	Production (Ton)	Area (Ha)	Production (Ton)
1	Lautem	4,203	2,315	4,281	2,315	4,437	2,315	4,437	2,315
2	Baucau	3,265	1,396	3,413	1,396	3,413	1,396	3,413	1,39
3	Viqueque	5,866	3,906	5,936	3,906	5,936	3,906	5,936	3,906
4	Manatuto	238	138	238	138	238	138	238	13
5	Covalima	513	211	513	211	599	211	599	211
	Total	14,085	7,966	14,381	7,966	14,623	7,966	14,623	7,96

Source: MAF (Ministry of Agriculture and Fisheries), 2010

Other than the three primary commodities stated above, Timor-Leste also has potential to develop other commodities such as cashew, cocoa, and vanilla. Cashew and cocoa plants are spread among coconut- and

candlenut-producing districts; while vanilla is found in coffee-producing districts.

b) Policy Framework

The plantation sub-sector falls under the jurisdiction of the Ministry of Agriculture and Fisheries. The organization and governance of the ministry is stipulated in the Decree Law No.4 /2004 on the Structure and Rule of the Ministry of Agriculture, Livestock, Fishery and Forestry; and revised in Decree Law No. 18/2008 (19 June 2008) on the Structure and Rule of the Ministry of Agriculture and Fisheries. Policy and regulation related to the plantation sub-sector which is currently being prepared is Land Use and Land Management.

Vision of plantation development is plantation as a basis for making economic development of Timor-Leste a productive, efficient and highly competitive for the welfare of the community, the integrity of the nation and the state. Missions to achieve the vision are:

- Improve/optimise the utilization of natural resources and human resources through spatial planning estates that can support the reliability of economic, poverty and unemployment, social and cultural resilience, and environmental sustainability,
- Increase the quantity, quality and value-added production of the plantation business through the implementation of sustainable agribusiness system to increase farmers' income and foreign exchange from the plantation sector,
- Optimise the plantation sector to support food security.

c) Problems and Challenges

Some problems faced by the sub-sector of plantation in Timor-Leste are:

- The lack of knowledge and skill of plantation farmers in cultivation and maintenance of crops;
- The role of existing extension institution is still relatively low and weak in providing facilitation and counselling;

- Most of the plants are already aged, which results in lower productivity;
- Plantations are yet to be managed based on an agribusiness system that integrated on-farm and off-farm subsystem;
- Lack of access towards capital.
- Land ownership is not clear, which hinders the development of plantation facilities;
- State-owned plantation area of about 12,000 ha which is utilized by the people could potentially lead to the land becoming an unproductive and conflict-prone.

2. Policy Direction

a) Short Term (2011 – 2015)

- Increase production capacity for plantation commodity through plantation rehabilitation, especially for coffee from an average productivity of 225 kg/ha to 500 kg/ha;
- Provide subsidies for plantation input materials (seeds, fertilizers, pesticides);
- Improve human resources competency of plantation apparatus in terms of technical as well as managerial aspects;
- Enhance the role of extension institution;
- Increase the capacity of plantation farmers;
- Support the establishment and development of rural financial institutions;
- Determine government land status and integrate it into the national budget.

b) Medium Term (2016 – 2020)

- Increase production capacity and plantation commodity productivity through rejuvenation programs especially for coffee;
- Optimization of land resources use, especially for yards;
- Support the development of various plantation products especially for high-value commodities such as vanilla and cocoa;
- Develop mutually beneficial institutions and partnerships;

- Develop technology to support plantation and plantation products processing;
- Enforce land laws and manage state-owned plantation area.

c) Long Term (2021 – 2030)

- Manage sustainable land resources;
- Establish and develop rural agribusiness areas based on plantation products;
- Increase private investments;
- Provide business and investment incentives in the field of plantation;
- Establishment of infrastructure, trade, and plantation industry

3. Working Plan

a) Short Term (2011 – 2015)

- Increase of production and plantation productivity (coffee, coconut, candlenut);
- Development of human resources of plantation apparatus;
- Development of institutions;
- Empowerment of plantation farmer
- Development of facilities and infrastructure for plantation business and financial institution.

b) Medium Term (2016 – 2020)

- Expansion of production and plantation productivity (coffee, coconut, candlenut, vanilla, cocoa);
- Development of financing networking;
- Development of production diversification;
- Development of business partnership pattern in the field of plantation;
- Development and dissemination of technology innovation.

c) Long Term (2021 – 2030)

- Development of rural agro industry based on plantation productions;

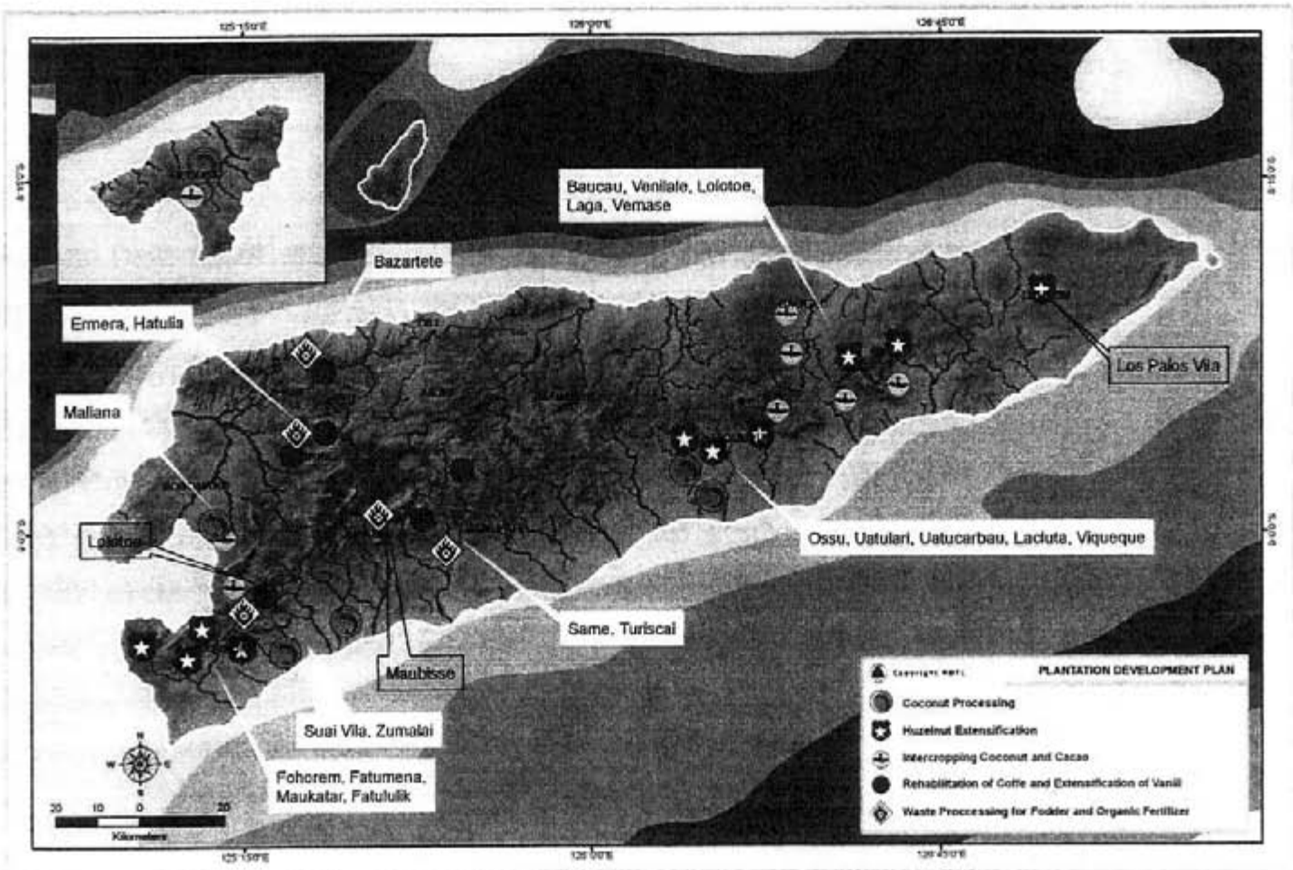
- Development of partnership management for state-owned plantation.

4. Project Implementation

a) Short Term (2011 – 2015)

- Improvement of plantation and plants treatment especially for coffee;
- Development of coffee and covering (layering) plants nurseries ;
- Extensification of candlenuts;
- Intercropping between coconut and cocoa;
- Intercropping between coffee and vanilla;
- Facilitation of availability for production facilities;
- Facilitation of subsidies for production inputs;
- Education of human resources of plantation apparatus;
- Technical and management training of plantation apparatus;
- Empowerment of extension institutions;
- Development of counseling, training, and facilitation for plantation farmers;
- Empowerment and facilitation of the establishment for plantation farmer's association.
- Promotion of household industry for processing plantation waste, particularly coffee, become organic fertilizer and fodder;
- Promotion of household industry for processing coconut plantation into materials and household goods

Figure 4.6 - Plantation Development Plan



Funds needed for implementation of development activities for plantation during the first five-year period (2011 - 2015) estimated at U.S. $ 66,270,590.00. This is more or less 16 % of the total requirement of funds for agricultural sector (excluded irrigation sector).

b) Medium Term (2016 – 2020)

- Development of intercropping between coconut and cocoa;
- Development of intercropping between coffee and vanilla;
- Development of financing networking;
- Development of plantation products processing technology.

c) Long Term (2021 – 2030)

- Rejuvenation of coffee plants;
- Development of processing business and marketing of plantation products;
- Facilitation of investment and business partnerships in the field of plantation.

4.2.3 Husbandry Sub-Sector

1. Background

a) Overview

The most important husbandry commodities in Timor-Leste are cattle, buffalo, horse, goat, sheep, pig, and chicken. For breeders in Timor-Leste, livestock are a valuable asset and can help them in time of economic difficulties, including for the needs of schools for the kids and get other foodstuffs (rice, etc.) during a bad season and a celebration culture, such as a family cemetery died. Farmers hardly ever consume the poultries themselves. Goats, sheep, and pigs are easily sold in the local market, while horses play an important role as means of transportation in rural areas. Livestock distribution and population is shown in Table 1; while the livestock population growth is shown in Table 2.

Table 4.20 - Livestock Population according to Districts, 2004

No	District	Population						
		Cattle	Goats	Pigs	Sheep	Horse	Buffalo	Chicken
1	Lautem	8.837	6.152	24.600	557	3.437	13.080	34.599
2	Baucau	8.292	18.332	45.876	16.248	9.577	20.489	71.415
3	Viqueque	22.584	4.166	53.579	16.047	6.676	22.615	59.042
4	Manatuto	8.521	5.708	12.887	1.763	2.823	8.390	17.327
5	Dili	6.835	19.015	30.997	334	968	790	90.732
6	Aileu	5.495	2.241	4.118	264	1.505	1.210	16.535
7	Manufahi	8.531	1.648	18.677	3.178	3.655	5.802	27.853
8	Liquica	9.957	9.014	45.190	904	1.458	2.595	97.514
9	Ermera	9.438	2.652	21.013	52	3.389	4.652	33.272
10	Ainaro	11.411	3.932	32.688	222	7.985	9.945	37.339
11	Bobonaro	27.457	7.539	34.545	10.156	3.162	6.950	84.616
12	Covalima	16.997	1.745	22.054	278	1.494	3.590	25.933
13	OeCusse	26.688	8.795	31.166	208	1.950	1.920	129.101
	TOTAL	**171.043**	**90.939**	**377.390**	**50.211**	**48.079**	**102.028**	**725.278**

Source : *Timor-Leste em Numeros 2003 – 2005*

Table 4.21 - Livestock Growth in Timor-Leste, 2004 - 2008

No	Type of Livestock	Year								
		2004		2005		2006		2007		2008
1	Cattle	133,577		136,382		139,426		142,354		145,343
	Production/year		*2,805*		*3,044*		*2,928*		*2,989*	
	Percentage		2.1		2.2		2.1		2.1	
2	Buffalo	95,921		97,552		99,21		100,897		102,216
	Production/year		1,631		1,658		1,687		1,319	
	Percentage		1.7		1.7		1.7		1.3	
3	Goats	126,977		129,517		132,107		134,749		137,444
	Production/year		2,54		2,59		2,642		2,695	
	Percentage		2.0		2.0		2.0		2.0	
4	Sheep	38,965		39,495		40,087		40,688		41,298
	Production/year		530		592		601		610	
	Percentage		1.4		1.5		1.5		1.5	
5	Horse	63,234		63,803		64,377		64,956		65,541
	Production/year		569		574		579		585	
	Percentage		0.9		0.9		0.9		0.9	
6	Pigs	331,895		345,171		358,978		373,337		388,27
	Production/year		13,276		13,807		14,359		14,933	
	Percentage		4.0		4.0		4.0		4.0	
7	Dairy Cattle	64		64		64		64		64
	Production/year	0		0		0		0		
	Percentage	0		0		0		0		
8	Native Chicken	659,066		685,429		712,846		741,36		771,014
	Production/year		26,363		27,417		28,514		29,654	
	Percentage		4.0		4.0		4.0		4.0	

Source: MAF, 2009

The husbandry practice in Timor-Leste is still traditionally managed, by utilizing savannah in an area of about 200,000 ha or about 10% of the overall country size. The existence of the savannah is very important for the sustainability of the husbandry production in the long run, although meat production from husbandry industry is still not optimal. On the other hand, the level of society's consumption of meat, eggs and milk is still low, i.e. consumption of meat as much as 9 grams/capita/day, egg consumption as much as 6 grams/capita/day and milk consumption as much as 0.5 grams/capita/day (calculated from Poverty in Young Nation, 2008). Compare with WHO standards where meat consumption

is 10.1 kg/capita/year, eggs 3.5 kg/capita/year and milk 6.4 kg/capita/year.

In addition to fulfilling everyday household needs of the people, as earlier mentioned, the husbandry sub-sector has contributed to the national income through the export of cattle and buffaloes. During the year of 2005 to 2009, export of cattle, buffaloes and cattle skin from Timor-Leste to Indonesia (Table 3) constituted almost half of the entire country's export. In 2007, husbandry sub-sector along with forestry sub-sector could only contribute up to 6% toward the agricultural sector GDP. The potential husbandry export to Indonesia ranges between 2,000 to 3,000 living cattle and buffaloes annually worth US$ 0.6 - 0.9 Million. During the same period, the demand for meat from Indonesia increased by around 6-8 percent every year. At the same time, the demand for meat from Malaysia and other Asean countries also increased on a yearly basis.

Table 4.22 - Export of Cattle, Buffalo, and Leather to Indonesia

No	Year	Cattle	Buffalo	Leather
1	2005	2,913	99	
2	2006	2,473	151	
3	2007	2,022	410	
4	2008	1,201	260	400
5	2009	910	76	4,872
	Total	**9,519**	**996**	**5,272**

Source : MAF, 2010

b) Policy Framework

Husbandry sub-sector falls under the jurisdiction of the Ministry of Agriculture and Fisheries. The organizational structure and governance of the ministry is stipulated under Decree Law No. 4/2004 on the Structure and Rule of the Ministry of Agriculture, Livestock, Fishery and Forestry; revised in the Decree Law No. 18/2008 (19 June 2008) on the Structure and Rule of the Ministry of Agriculture and Fisheries. Moreover, the Government of Timor-Leste has also enacted regulations on husbandry in 2003 through the Decree Law on Quarantine. Furthermore, to promote small and medium husbandry enterprises, the government has passed the Livestock Regulation.

Refer to Decree Law 18/2008, missions of livestock development are to draw up, follow up, implement and enforce policies, plans, programs, projects, or any other matters relating to production, animal reproduction, and livestock breeding technologies and industry, as well as issues relating to veterinary medicine and the protection of public health and animal health, being the service invested with authority over national veterinary health functions.

c) Problems and Challenges

The existing problems in the husbandry sub-sector include:

- Local husbandry ranchers are still conducted traditionally (let loose in the open) and still not market-oriented);
- The absence of legislation and regulations on veterinary public health and other zoonotic diseases;
- Lack of knowledge about livestock management and animal health services on a regular basis;
- The absence of cultivation of fodder in the form of grass and leaves by farmers (still relying on nature);
- There has not been any existing financial institution to provide micro-financing for farmers;
- The availability of water and road infrastructure for the distribution of livestock production are still far from adequate;
- The human resources capacity (husbandry extension worker) is still very limited in terms of quality and quantity as well as their availability to the sub-district level;
- Weak role of extension agencies that provide assistance and counselling;
- Lack of society/breeder's awareness on animal healthiness (prevention and healing for livestock disease)

2. Policy Direction

a) Short Term (2011 – 2015)

- Determine regulation on livestock and animal healthiness in the development of husbandry sector;

- Improve human resources competency of husbandry apparatus; emphasis of which must be concentrated on technical and management aspects;
- Increase breeders' managerial capacity by focusing on the skills needed to manage a modern husbandry practice;
- Establish zoning for potential husbandry development which must be based on the land suitability for the provision of green fodder;
- Improving the institutional role of livestock extension worker is intended to further increase the role of breeder assistance;
- Improve animal husbandry facilities and infrastructure with the purpose of improving and/or providing production and marketing infrastructure such as clean water and road availability;
- Develop health system services for animals in an effective and efficient manner;
- Develop livestock waste processing to integrate animal husbandry sector with other sectors especially agriculture, specifically in processing livestock waste into organic fertilizer;
- Develop fodder processing technology to assure the availability of fodder which does not entirely dependent on nature by means of processing agricultural waste;
- Introduce the agricultural waste management to small and home industries.

b) Medium Term (2016 – 2020)

- Increase the scale and orientation of farm business to improve the size of activities which are commercial-oriented;
- Expand processing industry of husbandry products intended to ensure marketing of the husbandry products and to provide added value;
- Develop mutually beneficial institutional framework and partnership to strengthen breeders' association and establish cooperation with other stake holder particularly with respect to the effort to improve the scale and orientation of farm;
- Optimize quality health services for animals.

c) Long Term (2021 – 2030)

- Establish and develop rural agribusiness regions based husbandry products to set up integration between the upstream and downstream industries in husbandry sector, while systematically creating "rural-urban" as a means to prevent urbanization;
- Improve the condition to boost private investment to increase private sector roles in developing the husbandry sector;
- Provide incentives for businesses and investment in the husbandry sector;
- Reduce the morbidity and mortality rates of livestock.

3. Working Plan

a) Short Term (2011 – 2015)

- Development of human resources of husbandry apparatus through training and education;
- Institutional development by improving the role of extension institutions and establishing other related institutions;
- Empowerment of breeders through improvement of breeders capacity which can be done by using field school model;
- Development of facilities and infrastructure for husbandry activities through improvement and provision of production and marketing infrastructure;
- Development of rural financial institution while providing and simplifying access for breeders to obtain capital;
- Improve animal healthcare services to reduce morbidity and mortality level of the livestock (through survey, identification, prevention, and eradication of livestock diseases).

b) Medium Term (2016 – 2020)

- Development of financing networking by providing more access to financial institutions (especially to the existing banking sectors) and through cooperation with capital owners;
- Development of production diversification;
- Development of business partnership model in the field of husbandry;
- Development and dissemination of technology;

- Development of mini laboratory and animal medical centre. This is done to support the process of identifying/diagnosing livestock disease.

c) Long Term (2021 – 2030)

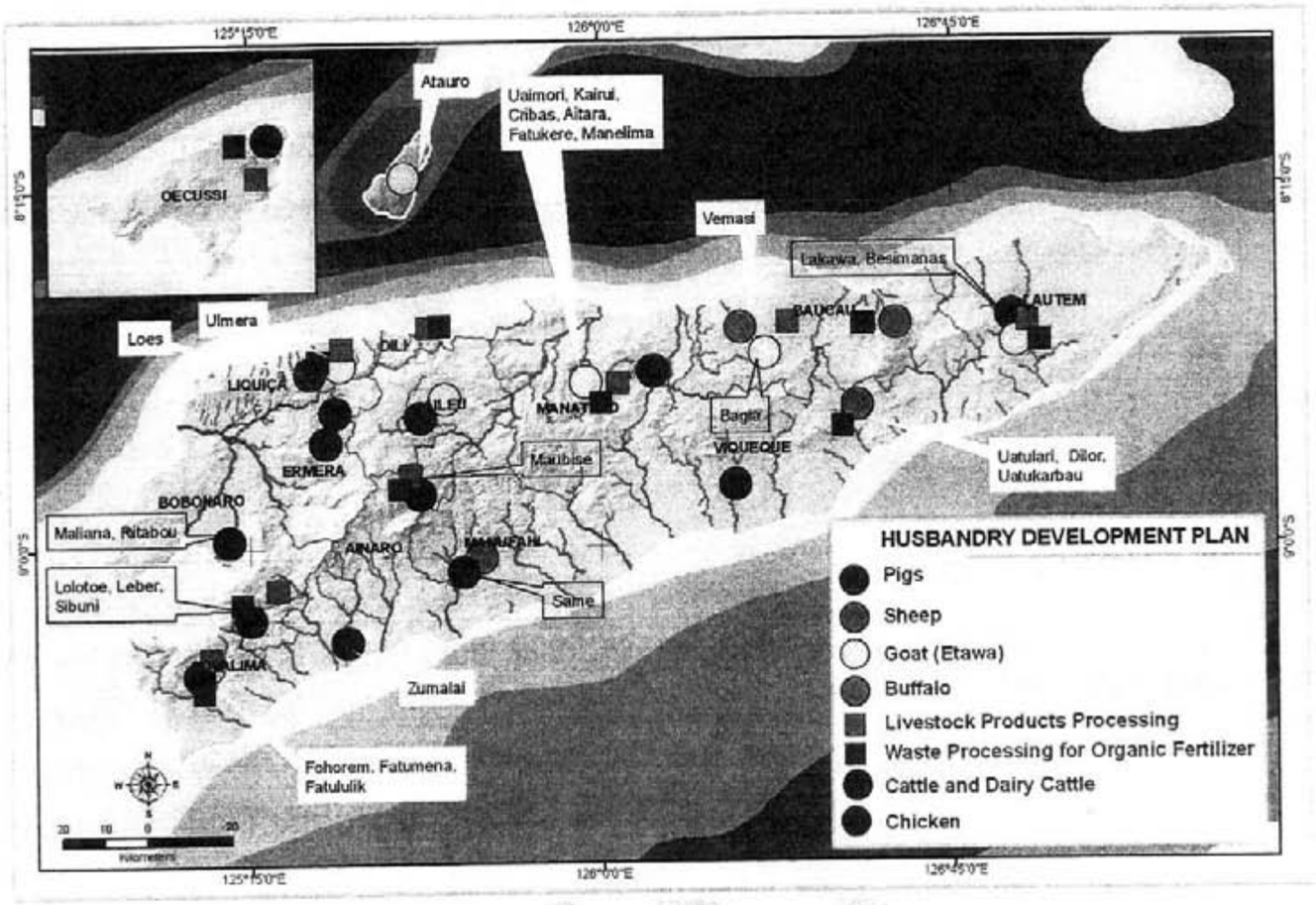
- Development of husbandry-based rural agro-industry;
- Significant contribution toward economic growth through exports;
- Develop/Establish livestock disease investigation centre in regional level.

4. Project Implementation

a) Short Term (2011 – 2015)

- Development of dairy cattle farm in group;
- Development of cattle farm in group;
- Development of Etawa goats farm in group;
- Development of pigs farm;
- Development of sheep farm;
- Development of buffalos farm;
- Development of poultry farm (chickens, ducks, geese);
- Development of healthcare services in an effective and efficient manner;
- Education of human resources for husbandry apparatus;
- Technical and management training of husbandry apparatus;
- Empowerment of extension institution for husbandry;
- Development of counselling, training, and facilitation for breeders;
- Empowerment and facilitation of breeder's institution;
- Establishment of demonstration plot of husbandry waste processing for organic fertilizer;
- Establishment of demonstration plot for fodder processing.

Figure 4.7 - Husbandry Deveopment Plan



Funds needed for implementation of development activities for husbandry development during the first five-year period (2011 - 2015) estimated at U.S. $ 46,654,200.00. This is more or less 12% of the total requirement of funds for agricultural sector (excluded irrigation sector).

b) Medium Term (2016 – 2020)

- Development of financing networking;
- Development of husbandry production processing technology;
- Development of processing activities and product marketing;
- Development of fodder industry;
- Development of organic fertilizer industry;
- Development of mini laboratory and animal medical centre. This is done to support the process of identifying/diagnosing livestock disease.

c) Long Term (2021 – 2030)

- Facilitation for investment and business partnership in the field of animal husbandry;
- Development of animal husbandry-based agro industry regions;
- Development of international trade and partnership;
- Develop/Establish livestock disease investigation centre in regional level.

4.2.4 Fisheries Sub-Sector

1. Background

a) Overview

Fisheries activities can be done both inland and offshore. In Timor-Leste, inland fisheries, better known as freshwater fisheries, is developed according to the available water potential. The main potential of fisheries in Timor-Leste lies in the coastal and offshore areas, since Timor-Leste has a shore line of more than 730 km with around 72,000 km^2 of Exclusive Economic Zone. Out of the 13 districts in Timor-Leste, only 2 districts that do not have seawater; i.e., Aileu District and Ermera District. Table 1-6 show the fishing and fishery cultivation condition in Timor-Leste.

Table 4.23 - Fisherman in Timor-Leste 2004 - 2009

No	District	Fisherman					
		2004	2005	2006	2007	2008	2009
1	Aileu	0	0	0	0	0	0
2	Ainaro	25	25	25	25	25	25
3	OeCusse	370	370	370	370	370	370
4	Baucau	252	252	252	252	550	550
5	Bobonaro	315	315	315	315	315	315
6	Covalima	254	254	254	257	257	257
7	Dili	2.039	2.039	2.039	2.039	2.039	2.039
8	Ermera	0	0	0	0	0	0
9	Liquica	541	541	541	541	541	541
10	Lautem	460	460	460	460	460	460
11	Manatuto	370	370	370	370	370	370
12	Manufahi	121	121	121	121	121	121
13	Viqueque	217	217	217	217	217	217
	TOTAL	**4.964**	**4.964**	**4.964**	**4.967**	**5.265**	**5.265**

Source : MAF, 2010

Table 4.24 - Motorised Boat Distribution 2004 – 2009

No	District	Motorised Boat											
		2004		2005		2006		2007		2008		2009	
		OBE	IBE	OBE	IBE	OBE	IBE	OBE	IBE	OBE	IBE	OBE	IBE
1	Aileu	0	0	0	0	0	0	0	0	0	0	0	0
2	Ainaro	1	0	1	0	1	0	3	0	5	0	8	0
3	OeCusse	22	0	22	0	22	0	22	0	43	0	43	0
4	Baucau	36	0	36	0	36	0	36	0	46	0	81	0
5	Bobonaro	38	0	38	0	38	0	38	0	50	0	116	0
6	Covalima	9	0	14	0	14	0	14	0	40	0	67	0
7	Dili	155	11	155	11	155	11	158	25	230	25	311	30
8	Ermera	0	0	0	0	0	0	0	0	0	0	0	0
9	Liquica	50	0	50	0	50	0	51	0	54	0	141	0
10	Lautem	36	0	36	0	36	0	36	0	43	0	62	0
11	Manatuto	51	0	51	0	51	0	53	0	89	0	89	0
12	Manufahi	5	0	5	0	5	0	11	0	37	0	37	0
13	Viqueque	23	0	28	0	28	0	28	0	51	0	51	0
	Sub total	**426**	**11**	**436**	**11**	**436**	**11**	**450**	**25**	**688**	**25**	**1006**	**30**
	Total		**437**		**447**		**447**		**475**		**713**		**1.036**

Source : MAF, 2010 *Note :OBE : Out Boat Engine, IBE : In Boat Engine*

Table 4.25 - Non-motorised Boat Distribution 2004 – 2009

No	District	Non-motorised Boat					
		2004	2005	2006	2007	2008	2009
1	Aileu	0	0	0	0	0	0
2	Ainaro	6	6	6	6	13	13
3	OeCusse	187	187	187	187	189	189
4	Baucau	49	265	265	265	265	265
5	Bobonaro	295	295	295	297	297	168
6	Covalima	149	158	158	144	146	71
7	Dili	989	989	989	834	841	841
8	Ermera	0	0	0	0	0	0
9	Liquica	356	356	356	446	451	328
10	Lautem	88	88	88	52	59	59
11	Manatuto	153	153	153	102	104	104
12	Manufahi	124	124	124	149	151	127
13	Viqueque	92	92	92	69	71	71
	TOTAL	**2488**	**2713**	**2713**	**2551**	**2587**	**2236**

Source : MAF, 2010

Table 4.26 - Area of Freshwater Fisheries, 2004 - 2009

No	District	Area (Ha)					
		2004	2005	2006	2007	2008	2009
1	Aileu	0,5	1	1	2	4	4
2	Ainaro	1	2	2	3	4	4
3	OeCusse	0,5	1	1	1.5	1.5	1.5
4	Baucau	1	1,5	2	2	3	3
5	Bobonaro	1	1.5	2	2.5	4	4
6	Covalima	0.5	1	1	1.5	1.5	1.5
7	Dili	0.5	0.5	0.5	0.5	0.5	0.5
8	Ermera	2	3	4	5	7	7
9	Liquica	0.5	0.5	0.5	0.5	0.5	0.5
10	Lautem	1	2	3	4	6	6
11	Manatuto	0.5	1	1.5	1.5	2	2
12	Manufahi	1.5	1.5	2	2.5	4	4
13	Viqueque	0.5	1	1.5	2	3	3
	TOTAL	**11**	**17.5**	**22**	**28.5**	**41**	**41**

Source : MAF, 2010

Table 4.27 - Area of Brackish Water Fisheries, 2004 - 2009

No	District	Area (Ha)					
		2004	2005	2006	2007	2008	2009
1.	OeCusse	2	2	2	4	4	4
2.	Covalima	0.5	0.5	0.5	0.5	0.5	0.5
3.	Liquica	1.5	1.5	1.5	1.5	1.5	1.5
	TOTAL	**4**	**4**	**4**	**6**	**6**	**6**

Source : MAF, 2010

Table 4.28 - Area of Seawater Fisheries, 2004 - 2009

No	District	Area (Ha)					
		2004	2005	2006	2007	2008	2009
1.	Baucau	-	-	-	1	0	0
2.	Dili	1	2	3	15	20	20
3.	Liquiça	1	2	3	5	10	10
4.	Manatuto	-	0.5	0.5	1	0	1
	TOTAL	**2**	**4.5**	**6.5**	**22**	**30**	**31**

Source : MAF, 2010

From the tables above it can be observed that the total number of fishermen has an upward trend. Other noticeable tendency that can be seen from the table is the total non-motorised boats which have a downward trend; while the total number of motorised boats tends to increase. However, the ratio between total number of fishermen and motorised boats is increasing from about 11 fishermen per 1 motorised boat to become 5 fishermen per 1 motorised boat.

The contribution of fisheries sub-sector toward national budget is still low. In 2007, the fisheries sub-sector together with the sub-sectors of forestry and husbandry could only contribute 6% toward agricultural GDP. Even so, Timor-Leste managed to export about 941 kg fish in 2005. Unfortunately, it dropped to 492.546 kg in 2006. The number plunged further to 323.379 kg in 2007, only to nose-dive to 55.416 kg in 2008 and 15.527 kg in 2009.

The average estimation of fish consumption level between 2002 – 2007 in Timor-Leste is still very low at 4.2 kg/capita/year (calculated from State of the Nation Report Volume IV, 2008); compared to Indonesia (19.6 kg/capita/year), Portugal (60 kg/capita/year), and Japan (80 kg/capita/year). To date, the fisheries sector in Timor-Leste is still very much dominated by fishing, but not the aquaculture.

Until now, the fisheries sector of Timor-Leste still relies on fish production from fishing. Freshwater, brackish water and seawater aquaculture are not well developed, although it has begun introduced; such as catfish, goldfish, milkfish (bandeng in Indonesia), shrimp, and seaweed. Potential for development of brackish water aquaculture is actually quite high, especially in the area of mangrove forests and other marginal lands that are physically suitable for fish ponds. But for freshwater aquaculture is still facing constraints of water availability.

b) Legal and Policy Framework

Legal Framework

Fisheries sector falls under the jurisdiction of the Ministry of Agriculture and Fisheries. The organization structure and governance of the ministry is stipulated in the Decree Law No. 4/2004 on the Structure and Rule of the Ministry of Agriculture, Livestock, Fisheries and Forestry; and has been revised in the Decree Law No. 18/2008 (19 June 2008) on the Structure and Rule of the Ministry of Agriculture and Fisheries.

According to the decree law, missions of fisheries development are to draw up, coordinate, schedule, execute and enforce policies, plans, programs and projects for fishing, aquaculture, the transformation

industry and other allied with it, as the service invested with authority over fisheries on the national level.

The fisheries sector has few regulations such as:

- Law 12/2004 on Fishing-Related Offences,
- Decree-Law 4/2005 on General Bases of the Legal Regime for Fisheries and Aquaculture Management and Regulation.
- Decree-Law 21/2008 on Implementing a Satellite System for the Monitoring Fishing Vessels,
- Decree No. 5/2004 – General Fisheries Regulations, Promulgated 28/07/2004
- Decree No.2/2005 – Establishment of Tariff on Fishing License, Inspections and Related tasks in Fishing Activities, promulgated on 2005
- Decree No.4/2006- (Amendment for Decree No.2/2005) promulgated on 15 November 2006
- Ministerial Diploma No. 04/115/GM/IV/2005- List of Protected Aquatic Species, Promulgated 2005
- Ministerial Diploma No. 06/42/GM/2005/- Penalties for fishing Infringements, Promulgated 2005
- Ministerial Diploma No. 02/04/GM/ I/2005 on Principal Fishing, Promulgated 2005
- Ministerial Diploma No. 05/116/GM/I/2005 - on Size Minimum Weight of Captured Species, Promulgated 2005
- Ministerial Diploma No. 03/05/GM/I/ 05 – Percentage of Tolerated Catching, Promulgated 2005
- Ministerial Diploma No. 01/ 03/GM/ I/ 05 - Definition of Fishing Zone, Promulgated 2005

Policy Framework

The fisheries sector is governed by several policies as covered in:

- Strategic Policy for the Fisheries Sector;
- Fisheries Strategic Plan for 2007/2012.

c) Problems and Challenges

Problems in the fisheries sub-sector are the following:

- Difficulty in monitoring and protection of fisheries areas across the country due to limited human resources;
- Lack of facility and infrastructure for fishing and aquaculture as supporting factor;
- Boat ownership level and other fishing equipments are still relatively low;
- Necessary fisherman skills are still inadequate; fishing is still done traditionally and has yet to be aimed at commercial purposes.
- Supervisory ability and quality control for fisheries production are still limited;
- Aquaculture of brackish, fresh, and seawater is still underdeveloped;
- Data/information on fishing and aquaculture potential is still not available.

2. Policy Direction

a) Short Term (2011 – 2015)

- Improve fisheries data and information management intended for the provision of fisheries resources database, especially marine fisheries;
- Improve facility and infrastructure for the protection of sea area to preserve marine resources;
- Develop capacity of the fisherman and farmer to enhance skills;
- Provision of infrastructure and facilities for fishing and aquaculture;
- Increase human resources capacity of fisheries apparatus in order to improve technical and managerial capability;
- Improve distribution of fisheries production intended for the expansion of fisheries production marketing;
- Support the enhancement of fisheries production quality.

c) Problems and Challenges

Problems in the fisheries sub-sector are the following:

- Difficulty in monitoring and protection of fisheries areas across the country due to limited human resources;
- Lack of facility and infrastructure for fishing and aquaculture as supporting factor;
- Boat ownership level and other fishing equipments are still relatively low;
- Necessary fisherman skills are still inadequate; fishing is still done traditionally and has yet to be aimed at commercial purposes.
- Supervisory ability and quality control for fisheries production are still limited;
- Aquaculture of brackish, fresh, and seawater is still underdeveloped;
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2. Policy Direction

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- Improve facility and infrastructure for the protection of sea area to preserve marine resources;
- Develop capacity of the fisherman and farmer to enhance skills;
- Provision of infrastructure and facilities for fishing and aquaculture;
- Increase human resources capacity of fisheries apparatus in order to improve technical and managerial capability;
- Improve distribution of fisheries production intended for the expansion of fisheries production marketing;
- Support the enhancement of fisheries production quality.

b) Medium Term (2016 – 2020)

- Support the creation of financial institution for fisherman and fish farmer community to provide financing access;
- Develop mutually beneficial partnership framework intended for the strengthening fisherman and fish farmer community to establish partnership with other entities who are interested in the fisheries sector;
- Develop fish processing technology to enable a more sustainable fisheries production and to simplify distribution;
- Standardization of fisheries production quality.

c) Long Term (2021 – 2030)

- Develop fish processing technology in order to support the expansion of fish processing industry;
- Increase private investment to expand private participation in the fisheries sector.

3. Working Plan

a) Short Term (2011 – 2015)

- Inventory of the potential for cultivation of brackish water, freshwater and seawater fisheries;
- Inventory of marine fisheries potential;
- Empowerment of fisheries apparatus, fisherman, and fish farmers;
- Institutional development;
- Development of facilities and infrastructure for fisheries activities;
- Development of the conservation and supervision for fisheries resources;
- Marketing development.

b) Medium Term (2016 – 2020)

- Development and dissemination of fish preservation technology;
- Development of mutually beneficial partnerships;
- Development of financing networking;
- Improvement of supervisory and protection of fish resources.

c) Long Term (2021 – 2030)

- Development of fisheries-based agro industry;
- Development of the scale and orientation of the fisheries activities.

4. Project Implementation

a) Short Term (2011 – 2015)

- Conduct survey and establish potential areas to cultivate brackish water, freshwater and seawater fisheries;
- Survey and creation of zoning map potential of the fishing;
- Facilitate the formation and empowerment of fisherman and fish farmer community;
- Facilitate the infrastructure for fishing (in groups), quality control and supervision of fisheries resources;
- Facilitate the formation of policy framework for fishing and cultivation;
- Educate human resources in the field of fisheries;
- Technical training and management of fisheries apparatus;
- Development/improvement of fishing port and cultivation infrastructure;
- Development of fisheries market.

Figure 4.8 - Fisheries Development Plan

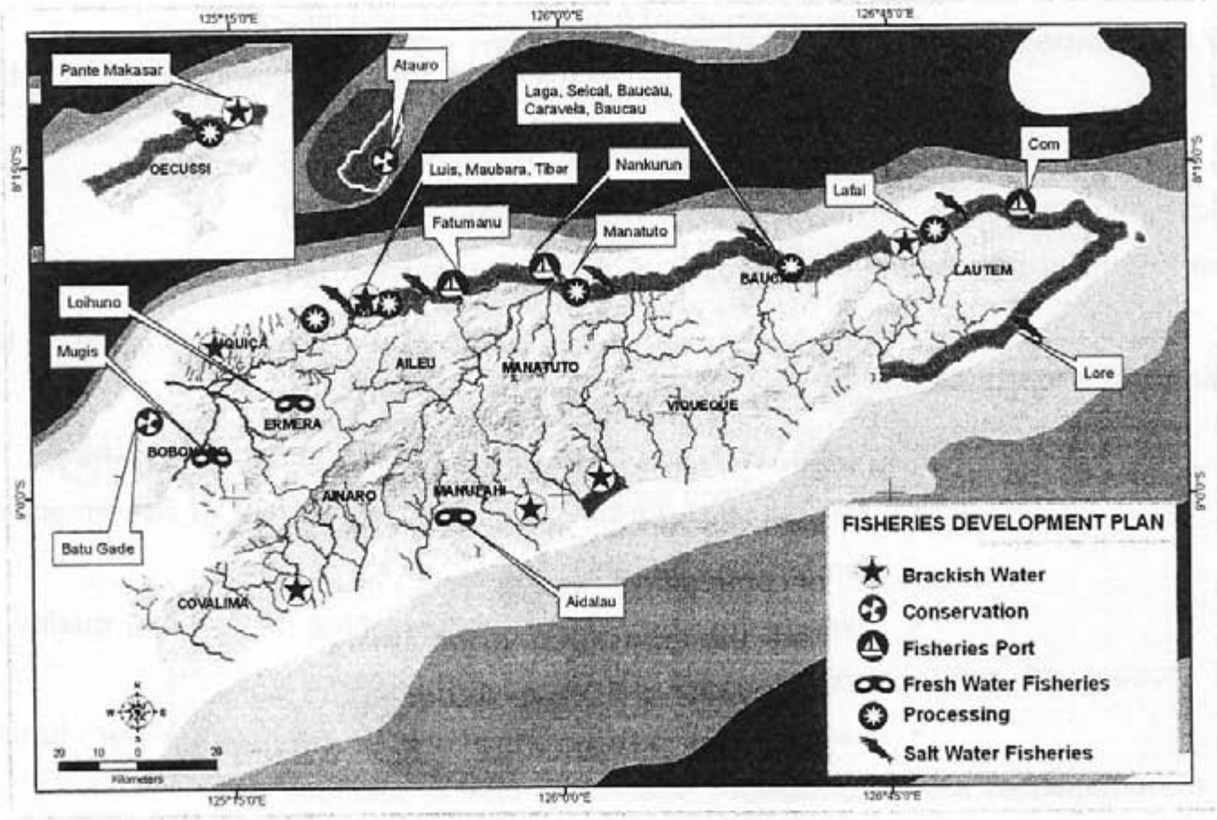
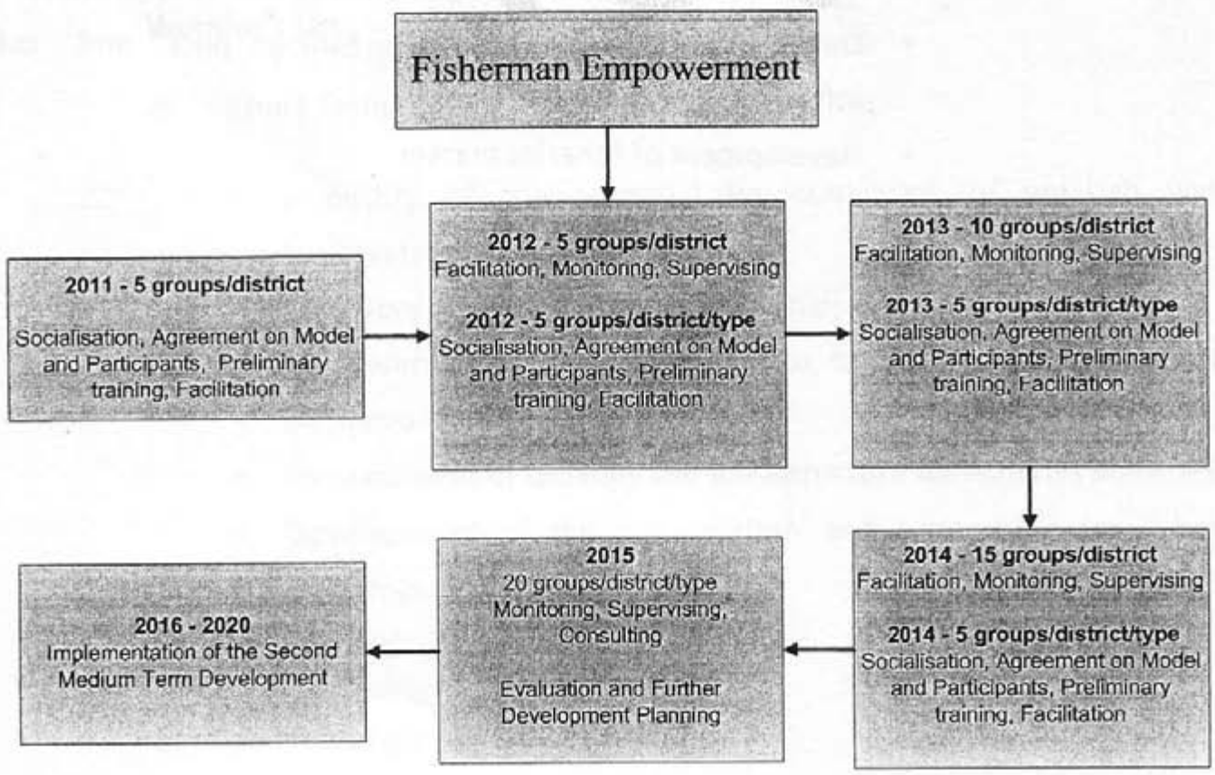


Figure 4.9 - Fisherman Empowerment



Funds needed for implementation of development activities for food crops and horticulture during the first five-year period (2011 - 2015) estimated at U.S. $ 53,467,750.00. This is more or less 13% of the total requirement of funds for agricultural sector (excluded irrigation sector).

b) Medium Term (2016 – 2020)

- Development of supervisory technology, utilization and management of industrial-based fisheries resources;
- Development of financing system.

c) Long Term (2021 – 2030)

- Technological advancement in the fisheries industry;
- Enhance investment and partnership in the field of fisheries.

4.2.5 Forestry Sub-Sector

1. Background

a) Overview

Timor-Leste is rich with forest. It is estimated that the total forest area of the country is around 745,174 ha or about 49% of the total land area of Timor-Leste. Out of the total area, around 418,749 ha (56%) is dedicated as protected forest. Forest resources at this time is in critical condition due to extensive logging for firewood and agriculture, spreading forest fire, growing demand for land and resources, increasing exploration and forest conversion. According to Ministry of Agriculture and Fisheries (2010) forest damage and soil erosion in Timor-Leste reached about 14,000 – 15,000 ha/year. In other word deforestation rate per year accounted for 1.1 %/year. Table 1 shows forest distribution according to forest function.

Table 4.29 - Forest Functions, 2005

No	District	Classifications/Functions (Hectares)					
		Production Forest	Limited Production Forest	Conservation Forest	Protection Forest	Wildlife Sanctuary	Total Area
1	OeCusse		2.639		33.904		36.543
2	Bobonaro	9.056			56.022		65.078
3	Covalima	20.715	2.853	6.778	17.944	12.800	61.091
4	Ainaro	1.431	1.566		40.468	2.000	45.465
5	Ermera		7.296		5.422		12.718
6	Liquisa		14.056		9.160	4.000	27.216
7	Aileu		8.717		23.135		31.852
8	Manufahi	5.546	9.433		49.675	3.000	67.654
9	Dili		2.332		5.638	5.559	13.529
10	Manatuto	1.810	25.733		90.464	15.000	133.006
11	Baucau	1.513	11.772		38.552		51.837
12	Viqueque	69.195	8.514		38.480		116.189
13	Lautem	12.424	24.687		9.885	36.000	82.996
	Total	121.690	119.598	6.778	418.749	78.359	745.174

Source : Timor-Leste em Numeros 2003 – 2005; MAF, 2010

The main economic forest products are timber, which has some indirect benefits, including its function as season controller, pollution reducer, wildlife preserver, and as part of forest ecosystems. In addition, non-timber forest production saw an increase in number. Some important timber species in natural forests have a high economic value, including Ai na (Ptecarpus indicus), Ai Teka (Tectona grandis) and Ai Kameli (Santulum album), Mutin Ai Teka (Gmelina arbore), Ai Kamii (Auleritus mullocana), Kaisoti (Cassia siamea), Samtuku (Paraserianthes falcataria), and Mahoganiy (Swetenia macrophylla). Aina can be found throughout the Districts of Covalima, Manufahi and Lautum, while Ai Teka are scattered in the Districts of Manufahi and Viqueque. Ai Kameli are native in the Districts of Covalima, Lautum, Liquica, Bobonaro and Oecussi. Data from the Ministry of Forestry of Indonesia showed that an area of about 4,660 ha has been developed as Industrial Forest Plantation/social forestry.

Forest products which are potential and highly valuable are sandalwoods that contribute to the country's revenue from exports. In 2007, the forestry sub-sector together with sub-sectors of fisheries and

livestock could only contribute up to 6% of the overall agricultural GDP. Aside from being contributors to national income, sandalwoods also indirectly play a significant role as a rainwater catchment and soil water providers. Such a feat must be able to support the production accomplishments in other related fields.

Some of the major outcomes of the development in forestry sub-sector until July 2009 are among others: eradication of illegal logging, (prevention of) timber theft in the state forests and illegal timber trade, rehabilitation and conservation of forest resources and stabilization of forest area, as well as economic empowerment for the society living in and surrounding the forest area.

Climate and season are very influential on the reforestation program. Rainfall volume and the number of wet months every year will affect cropping patterns and reforestation activities. The reforestation activities are also influenced by soil type and structure as well as the lithology of the area which effectively limit the selection of plant species to be used for reforestation. Another thing affecting the forestry sub-sector would be the fact that there are still some people who perform shifting cultivation which wreak damage to the forests.

b) Policy Framework

Forestry sector falls under the jurisdiction of the Ministry of Agriculture and Fisheries. The organization structure and governance of the ministry is stipulated in the Decree Law No. 4/2004 on the Structure and Rule of the Ministry of Agriculture, Livestock, Fishery and Forestry; which has been revised through the introduction of Decree Law 18/2008 (19 June 2008) on the Structure and Rule of the Ministry of Agriculture and Fisheries. The draft for forestry law has been prepared and has gone through consultation phase to every district in Timor-Leste and currently has been sent to the Board of Ministry to be approved and enacted as Law. Other policies/regulations which have been passed are the following:

- UNTAET no. 17/2000 concerning the ban on forest logging and export;

- UNTAET no. 19/2000 concerning the protected areas in Timor-Leste;
- Resolução do Governo (government regulation) No. 9/2007 concerning National strategy and policy for forestry;
- Resolução do Governo (government regulation) No. 8/2007 concerning the establishment Nino Konis Santana National Park.

The vision of forestry development is ensuring forest sustainability and improving people's wealth, and the missions are:

- Ensuring the existence of the forest with sufficient area and the proportional distribution;
- Optimising the various functions of forest and aquatic ecosystem functions including conservation, protection and production to achieve the environmental benefits of social, cultural and economic well-balanced and sustainable for the people of Timor-Leste;
- Increasing the carrying capacity of watershed
- Encouraging public participation;
- Ensuring equitable distribution of benefits and sustainable;
- Strengthening the central and regional coordination.

c) Problems and Challenges

- Illegal logging which causes damage to the forest;
- Erosion and landslides causing land degradation and damage to watersheds;
- Lack of information on forestry and biodiversity;
- The number and capability (experience and skills) of the personnel are still lacking.
- Inadequate regulation.

2. Policy Direction

a) Short Term (2011 – 2015)

1) Improve the human resources capacity of forestry officials in order to improve technical and managerial capability;
2) Increase capacity of the people living surrounding the forests to enhance their socio-economic aspects;
3) Strengthen forest protection to provide safeguard for the forest resources from possible damage caused by illegal logging, forest fires, and area destruction;

4) Improve forestry data and information management.

b) Medium Term (2016 – 2020)

- Conduct watershed conservation to provide protection of water catchments areas;
- Improve society participation in managing the forest;
- Increase the protection of the ecological and biological system to preserve balance of nature and protect biodiversity.

c) Long Term (2021 – 2030)

- Increase private investment by employing environmental perspective for forest management and utilization.

3. Working Plan

a) Short Term (2011 – 2015)

- Inventory of forest resources, to be used as the basis of planning and decision making. (Timber and non timber products)
- Prepare a forestry master management plan and develop action plans based on that Plan.
- Promote reforestation and sustainable land management practices in Timor-Leste for erosion control, soil rehabilitation, watershed protection and subsistence use;
- Development of forestry human resources;
- Institutional development;
- Community empowerment for the people living surrounding the forests
- Supervision of forest areas.

b) Medium Term (2016 – 2020)

- Management of watershed;
- Development of community-based forests;
- Management of Nino Konis Santana National Park;
- Conservation of flora and fauna.

c) Long Term (2021 – 2030)

- Development of industrial timber.

4. Project Implementation

a) Short Term (2011 – 2015)

- Determination of forest borders;
- Survey and mapping of forest potential, especially non-timber;
- Education of forestry human resources;
- Technical and management training for the forestry human resources;
- Establishment of forestry training and development centre;
- Empowerment of forestry advisory institutions;
- Forestry consultation;
- Joint operation;
- Inspection of forest products transportation;

Figure 4.10 - Forest Management Plan

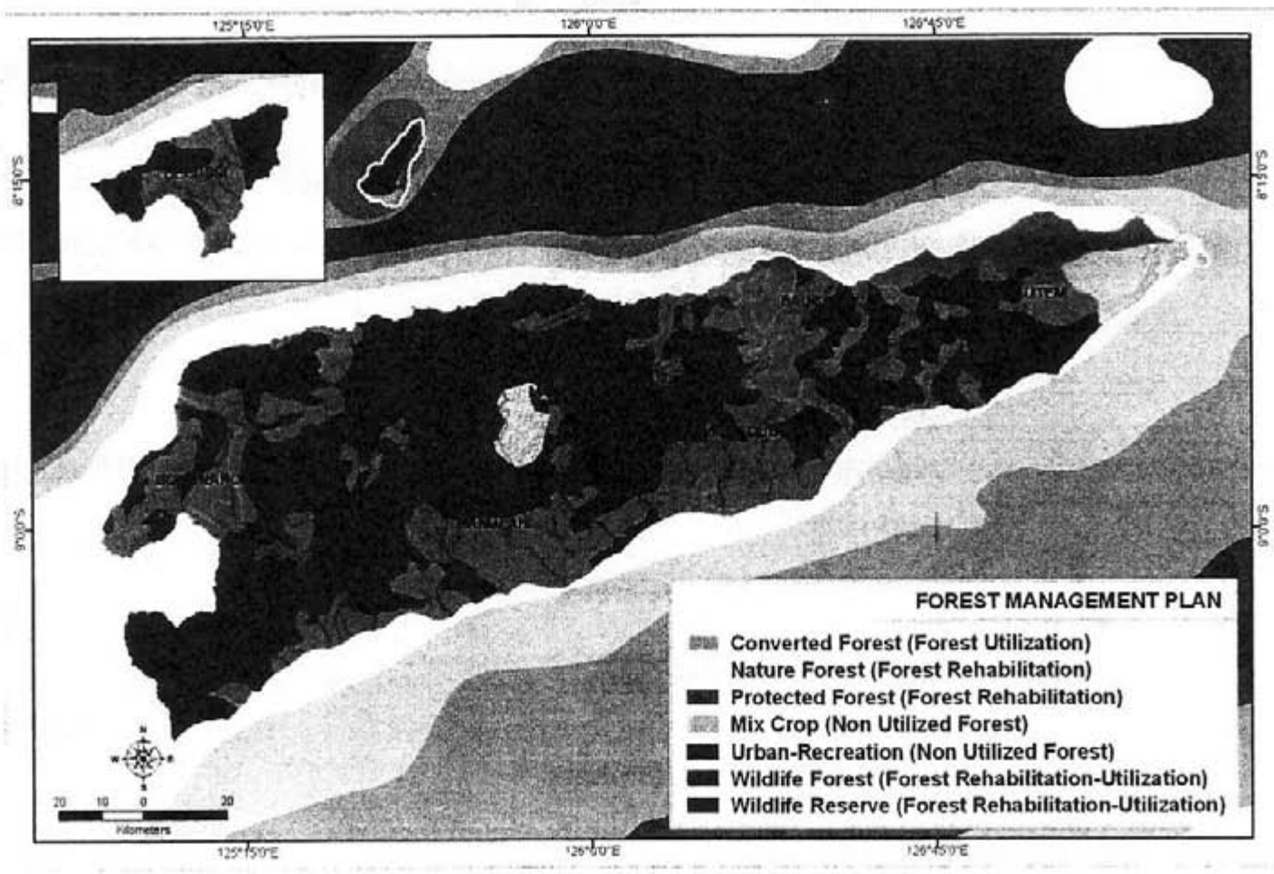
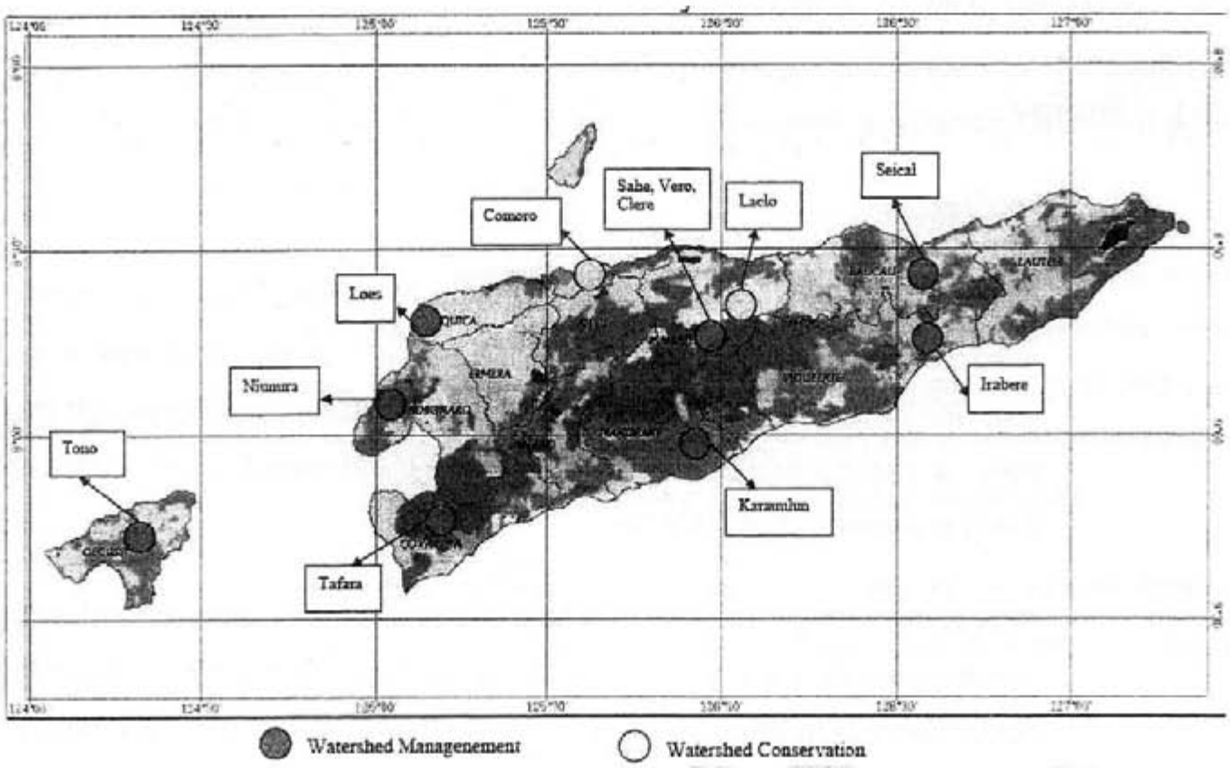


Figure 4.11 - Development Plan: Watershed Management and Conservation



Funds needed for implementation of development activities for food crops and horticulture during the first five-year period (2011 - 2015) estimated at U.S. $ 128,191,000.00. This is more or less 31% of the total requirement of funds for agricultural sector (excluded irrigation sector).

b) Medium Term (2016 – 2020)

- Management of Nino Konis Santana National Park;
- Development of community-based forests;
- Establishment of arboretum, herbarium and seed bank;
- Rehabilitation of mangrove forests;
- Rehabilitation of watersheds;
- Afforestation and reforestation.

c) Long Term (2021 – 2030)

- Development of sandalwoods;
- Development of timber industry.