

SPECIAL REPORT
FAO/WFP CROP AND FOOD SUPPLY ASSESSMENT
MISSION TO TIMOR-LESTE

1 June 2003

Mission Highlights

- Cereal production in 2003, including cassava in cereal equivalent, is forecast at 123 000 tonnes, 21 percent lower than last year.
- Production of maize, the most important crop in Timor-Leste, is estimated to decline by about 34 percent to 70 000 tonnes from 106 000 tonnes last year.
- The main factors responsible for the decline include delayed onset of rains, below normal rainfall and reduced maize area due to shortages of seeds.
- Part of the shortfall in maize production will be offset by a forecast 12 percent increase in rice production, primarily due to an increase in the area under irrigation in 2003.
- Cereal import requirements in 2003/04 (April/March) are estimated at 62 000 tonnes, while commercial imports are anticipated at 48 000 tonnes of rice. This leaves an uncovered national food deficit of 14 000 tonnes.
- Based on vulnerability analysis, the mission provisionally estimates the number of vulnerable people requiring food at 150 000. The amount of food needed is estimated at 14 000 tonnes, to cover their needs over the lean period from October 2003 until March 2004.
- Close monitoring of key food security indicators (agricultural, health and nutrition) will be necessary to ascertain if at a later stage emergency food assistance is warranted.

1. OVERVIEW

An FAO/WFP Crop and Food Supply Assessment Mission visited Timor-Leste, the world's newest independent country, from 15 April to 5 May 2003 to review and analyze the food supply and demand situation in the context of the country's macro-economic situation, and to forecast import requirements including potential food needs in marketing year 2003/04 (April/March), with particular attention to the needs of the most vulnerable groups.



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The mission used satellite images for rainfall and high-resolution SPOT 4 satellite images to verify vegetation conditions. The timing of the mission was scheduled for a normal harvest time starting in March and peaking in April. However, due to a delay in the onset of rains in December 2002 the mission mostly observed crops not yet ready for harvest and inspected fewer already harvested crops than envisaged. The overwhelming majority of farmers are subsistence farmers, inter-cropping of maize and cassava is widespread, and rainfall and its distribution are the main limiting factors to agriculture production.

The overall agricultural performance in 2003 was poor. Total production of maize, rice and cassava (in cereal equivalent) is forecast at 123 000 tonnes, a decline of 21 percent on last year, due to late onset of rains, lack of maize seeds and other inputs and generally unfavorable rainfall. The drought occurred at the beginning of the season, adversely affecting mainly the maize crop. Farmers delayed rice planting until adequate water was available. An increase in area under irrigation by 15 percent from 29 853 hectares to 34 386 hectares and generally favourable soil conditions in Bobonaro, Oecussi, Baucau and Manatuto districts, is estimated to increase rice production by 12 percent to 39 300 tonnes up from 35 200 tonnes last year.

Cassava production in 2003 is projected to decline slightly (by 2 percent) compared to last year. The most affected areas are upland areas above 500 meters, as well as the eastern district of Lautem, the western enclave of Oecussi, and the island of Atauro, north of Dili.

As a result of the lower overall production, cereal import requirements for the marketing year 2003/04 are estimated at 62 000 tonnes. All of the rice import requirement of about 48 000 tonnes is expected to be met by private commercial importers. This leaves an uncovered deficit of about 14 000 tonnes. of cereals.

Household food security is highly heterogeneous across districts and the country although, food insecurity is generally a more pronounced problem in rural upland areas. After two consecutive years of drought, household food stocks have been strained. Food security continued to be hampered by limited market access, severe lack of purchasing power by subsistence farmers in rural areas, general declining purchasing, very high post-harvest losses, and shortages of secure on-farm storage capacity and a general lack of incentives to increase farm outputs as a result of very low prices for imported rice. Households face the greatest level of food insecurity during the lean period November to March (peaking in January). As a result of the poor harvest of maize it is expected that food insecurity will start a month earlier than normal, commencing in October 2003. The shift implies that the lean period will be more severe and prolonged, affecting a greater number of people in rural upland areas who are reliant on inter-cropped maize.

Vulnerability analysis indicates that provisional beneficiary numbers total about 150 000 to include 86 000 uplanders, 29 000 residents of Oecussi district, 20 000 other particularly disadvantaged rural inhabitants to include a number of households living in lowlands, 10 000 migrant populations and 5 000 repatriated refugees who are to be considered drought affected and food insecure.

2. OVERALL ECONOMIC SETTING AND AGRICULTURE IN TIMOR-LESTE

2.1 Macroeconomic situation¹

Timor–Leste, the youngest nation of the world, is a small mountainous country and is classified among the 10 percent poorest countries of the world and the poorest in Southeast Asia. The agricultural sector contributes 21 percent to GDP. Approximately 40 percent of the population of 864 000 is considered to be below the national poverty line of US\$ 1.5 per day. Life expectancy is around 57 years. Only about half of the population over the age of fifteen years is literate.

GDP in 2001 was US\$ 389 million, which declined to US\$ 369 million in 2002 and is expected to decline further to US\$ 345 million in 2003. Real GDP in 2002 is estimated to have contracted by 1 percent reflecting the continued effect of the reduced international presence and the adverse impact of a delayed rainy season on agricultural output. GDP per capita in 2002 declined to US\$ 432 from US\$ 467 in 2001.

¹ IMF data and is based on the concluding statement of the IMF Mission, 15 April 2003.

Economic activity has slowed down since May 2002 due to the winding down of UN agencies, which has negatively affected purchasing power in and around the capital, Dili. The inflation rate has been moderate and fell to 1 percent in 2002 (year on year basis) partly in response to the adoption of the U.S. dollar as the national currency in 2001. However, the inflation rate has risen again and was around 8 percent by March 2003, mainly due to drought-induced scarcity of agricultural goods. Inflation is projected to stabilize at around 5 percent by the end of 2003, assuming normal weather conditions.

With the beginning of oil/gas production in 1998, royalties reached US\$ 15 million by 2002. As a new nation its Government's policy is to avoid external borrowing and no external debt has been accumulated during the first year of independence. Development assistance of US\$ 28 million has been recorded in the government's budget for 2002/03. However, there is uncertainty as to whether all pledges made will be fully realized.

The overall balance of payments was US\$ 8 million in 2002 (end-September) and is expected to show a deficit of US\$ 8 million in 2003. Timor-Leste only major export is coffee and in 2002 total merchandise exports were worth US\$ 5 million (96 percent coffee). Coffee is also the main source of cash income for a sizeable proportion of the rural poor. However, coffee export revenues are depressed due to falling international coffee prices. Merchandise imports in 2002 were much larger at US\$ 170 million and the net trade deficit was US\$ 165 million. Imports have remained high largely because of donor-financed economic activities.

2.2 Population

The population of Timor-Leste is estimated at 864 000 people in 2003. This estimate is based on the village (Suco) survey in March 2001 adjusted for returnees during the years 2002 and 2003. There are some uncertainties about the population growth rate and a conservative rate of 2.5 percent has been used in this report. A population census is scheduled for 2004.

Table 1. Timor-Leste: Population by Gender and by District

District	Mid-year 2001			October 2003		
	Females	Males	Total	Females	Males	Total
Aileu	15 615	16 211	31 826	16 508	17 138	33 647
Ainaro	22 410	22 682	45 092	23 692	23 979	47 672
Baucau	50 721	50 796	101 517	53 622	53 701	107 323
Bobonara	35 079	34 853	69 932	37 085	36 846	73 932
Covalima	24 178	25 056	49 234	25 561	26 489	52 050
Dili	57 080	63 394	120 474	60 344	67 020	127 364
Ermera	43 630	44 785	88 415	46 125	47 346	93 472
Liquida	22 461	23 114	45 575	23 746	24 436	48 181
Lautem	26 739	26 727	53 467	28 268	28 256	56 525
. Manufahi	18 774	19 842	38 616	19 848	20 977	40 825
Manatuto	17 652	17 793	35 446	18 662	18 811	37 473
Oecussi	23 307	21 735	45 042	24 640	22 978	47 618
Viqueque	31 289	31 415	62 704	33 078	33 212	66 290
Sub-Total	388 935	398 403	787 342	411 179	421 188	832 371
Refugees/returnees			31 900			31 900
Tota;			819 242			864 271

Note: Estimated population derived from Suco Survey population for mid-year 2001 factored with an annual growth rate of 2.5 percent.

Refugee returnee population deemed constant due to unaccounted for recycling.

Numbers may not add up exactly due to rounding.

2.3 Agricultural sector

General

Timor-Leste has a total land area of approximately 14 500 sq. km, of which 600 000 hectares are suitable for crop and livestock production. It is estimated that around 174 000 hectares are arable with additional 124 000 hectares of bushed gardens. The overwhelming majority of farmers are subsistence producers, inter-cropping is widespread, and rainfall and its distribution are the main determinants of agriculture production. Agricultural activities start with the onset of the main northeast monsoon rainy season. Soils are generally poor, the climate is regarded as unreliable and sometimes erratic and the terrain is often steep to very steep in upland agricultural producing areas. Over centuries farmers have adapted to these conditions and selected crop varieties best suited for inter-cropping under prevailing conditions. The crop varieties have been selected more for coping with post-harvest losses than for increasing yields.

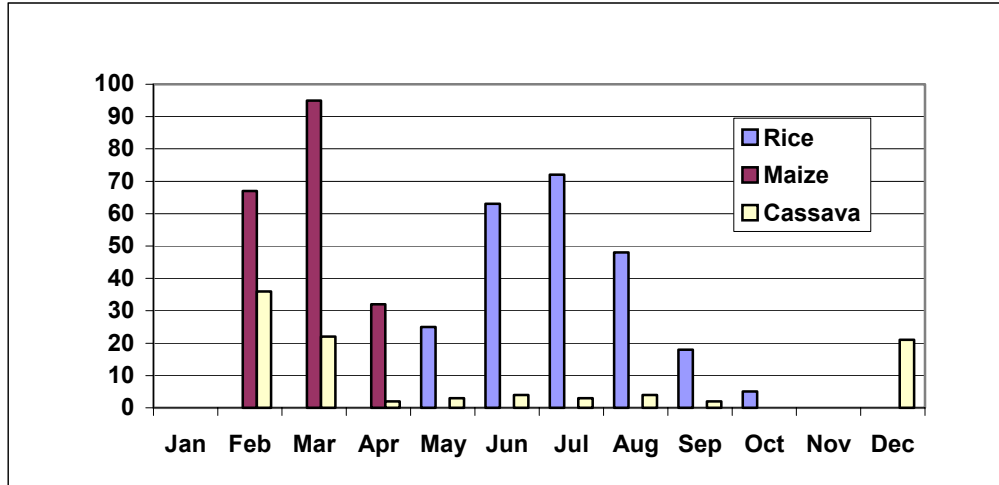
Climatic conditions

The general climatic conditions define two zones: northern areas and southern areas, divided by mountains into:

- The northern area characterized by one rainfall peak within four to six months in the wet season. The northern coastal areas have an average yearly rainfall from 500 to 1 500 mm, while higher altitudes above 500 m receive abundant rainfall from 1 500 to 3 000 mm.
- The southern areas characterized by two rainfall peaks that appear within seven to nine months in the wet season. The first peak appears between December and February and the second peak appears between May and June. The southern coastal areas have an average annual rainfall from 1 500 to 2 000 mm. The areas above 500 m receive more abundant rainfall from 1 700 to 3 500 mm.

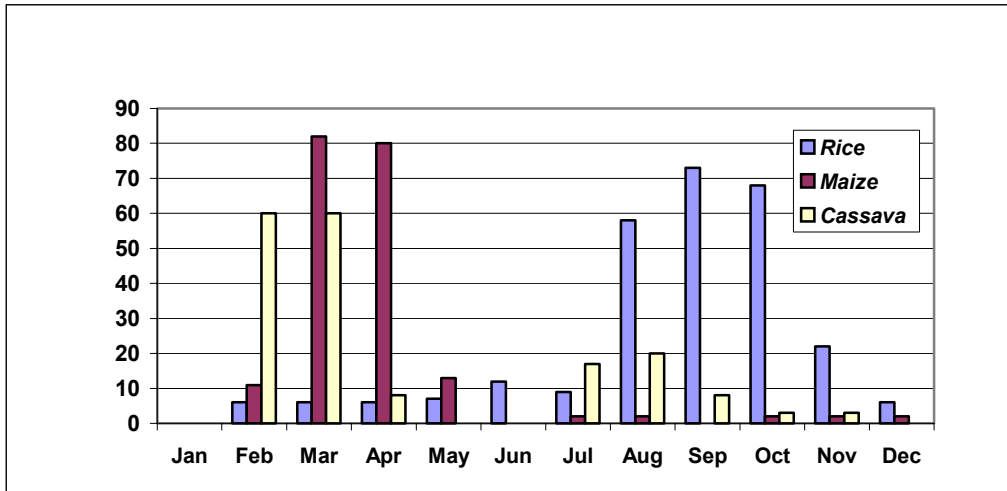
The agricultural cycle in Timor-Lest normally begins in November with land preparation and planting of maize in upland, followed by nursery preparation and transplanting of rice in lowland, in December/January in the northern part, and a month or two later in the south coast. These activities start with the onset of the main, northeast-monsoon, and rainy season. Maize is harvested in February/March/April and wet season rice around June/July in the north and August/September in the south. In the south where there is a second rainy season, and in areas with some supplementary irrigation, it is possible to grow a second crop of maize or rice. The relative importance of the second crop is however small, approximately 10 percent of the total production areas. The figures below show the harvesting months for the 3 main food crops in the northern part and southern part respectively. Planting is around 90 – 110 days prior to the harvesting of maize and rice while generally cassava is planted in December inter-cropped with maize.

Figure 1. Timor-Leste: Main Crop Harvest Months in Northern Areas (percentage of farmers engaged in harvesting)



Source: The study on integrated agriculture development of East Timor, JICA 2002

Figure 2. Timor-Leste: Main Crop Harvest Months in Southern Areas (percentage of farmers engaged in harvesting)



Source: The study on integrated agriculture development of East Timor, JICA 2002

Farming systems

The agricultural economy is dominated by low input/output subsistence agriculture. The farming system is based on shifting cultivation and shallow soils characterize the terrain. Important production areas for inter-cropped maize and cassava are situated on steep slopes in the northern area of the country and in the more fertile areas in the southern area of the country. Cowpeas and sweet potatoes are also cultivated at the onset of rains in November. In addition to cereals, cassava, sweet potatoes and potatoes, to a smaller extent, are important food security crops and constitute the main source of food in difficult years. The main lowland rice is generally grown under semi-irrigation and technical irrigation, and to a small extent rainfed, while upland rice is grown under rainfed conditions. Other crops include yam, kidney bean, mung bean, soy bean, taro (swamp and upland), squash, cabbage, onion, peanuts, sago, coconuts, varieties of vegetables, fruits, coffee, and tobacco. The availability of the produce varies according to the location, season and tradition.

Agricultural credit

Prior to independence agricultural credit was provided by Cooperative Units of Desa (known as KUD). Private traders of agricultural commodities also provided credit in agriculture. After the separation from Indonesia in 1999 most credit availability to agriculture stopped; of late NGOs have financed small credit schemes with low or no interest. The payback rate however has been poor. Short-term loans from local richer households are available to selected farmers with good payback records. Generally, these emergency loans carry very high interest rates with up to 100 percent per lending on occasion.

3. FOOD PRODUCTION IN 2003

3.1 General

The 2003 overall agricultural performance in Timor-Leste was affected negatively by the late onset of the rainy season and erratic rainfall. Timor-Leste has experienced drought like situations in two consecutive years. The insignificant rainfall in November/December 2002 delayed both land preparation and planting of inter-cropped maize and cassava for about one month. In some areas farmers planted maize 3-5 times and experienced shortages of planting material. The delay of the onset of rains also shifted/postponed the planting of rice. Some villages experienced severe damage/low yields and crop failures while neighboring areas obtained reasonable crops. The most affected areas are upland areas above 500 meters, as well as the most eastern district of Lautem, the most western district of Oecussi, and the island of Atauro. Several replantings created shortages of seeds thus limiting areas planted to maize. Mostly traditional varieties of maize and rice seed are used, and to some extent improved varieties of rice such as IR 64. Rice seed availability was adequate, mainly because of the good output from previous seasons. Although the preferred local varieties are physiologically more mainly adapted to conditions in Timor-Leste without proper storage facilities in the households, post-harvest losses due to rodents and insects are high, approximately 20-30 percent in maize, and 5 percent in rice.

3.2 Rainfall

Given the persistent lack of data on the quantity and distribution of rainfall in Timor-Leste, due to lack of basic meteorological equipment, the Mission used SPOT 4 Normalized Difference Vegetation Index (NDVI), Cold Cloud Duration (CCD) satellite images provided by FAO/JRC as indicators for rainfall. The information was verified during field observations and interviews. The general conclusion is that the 2003 rainy season has been unfavorable in terms of rainfall onset, volume and overall distribution. Timor-Leste experienced substantially reduced precipitation in most areas from November 2002 until April 2003. The onset of the rain in November was severely delayed in most areas; the most affected areas were the north coast, the most eastern part of the country and southern coastal areas. In December, the eastern part of the country received 20 percent of average rainfall and the south-western part received about 50 percent. The north coast experienced very erratic rainfall but normal levels in certain areas and much below average in others. The rainfall in January improved in all areas, but was still below average level. In February, rainfall in most areas was below normal. In March, although the rainfall had improved in all areas, it was still below average with a prolonged dry spell. In April some areas experienced dry spells early in the month while abundant rainfall was received in many areas.

3.3 Area planted

Due to the erratic nature of the onset of the rainy season, many upland farmers planted and replanted maize several times and many depleted their seed stocks. The area planted maize is, therefore, much lower than normal. The area planted to cassava was less affected by late planting in 2002/03.

The late onset of rains from the northeast monsoon also affected the planting of rice in rainfed and semi-irrigated areas. The production of lowland paddy rice was affected to a much lesser extent by the delay in the onset of rains than maize. The ongoing rehabilitation programme of non-functional irrigation schemes has increased the potential area for rice cultivation. Areas under upland rice cultivation increased slightly.

3.4 Factors affecting yields

Productivity and overall maize production remains constrained by low input use, especially fertilizers and improved seeds. Other yield enhancing technologies, such as mulching and nitrogen fixing legumes occurs, but

are rarely used. Consequently, yields generally remain low at around 1.3 to 2.2 t/ha. During drought conditions and water stress, yields are reduced to below 1.0 t/ha. Maize yields in 2003 are estimated at an average of 1.3 tonnes/hectare (Table 2).

Yields of rice differ with production methods. Yields are generally low from 1.3 to 1.5 t/ha. In areas with assured water during the cropping season, yields of around 1.8 t/ha are obtained, which is increased to 2.5 to 3 t/ha where fertilizers and improved varieties of seeds are applied. However, the use of these inputs is very limited due to the high prices, unavailability and the attitude of farmers towards using fertilizers. The districts of Bobonaro, Oecussi, and to some extent Baucau are among the districts where fertilizers are applied. Part of the harvest is usually reserved as seed for the next season. The average yield of paddy in 2003 is estimated at 1.5 tonnes per hectare.

Cassava is an important food crop in the diet, as a complement to cereals and provides security in adverse years. The crop matures in approximately one year but is usually harvested after 9 months. It has the advantages of drought tolerance and adaptability to poor soils. Although the root consists largely of starch, leaves are commonly used as vegetable provides protein and vitamins. The Mission noticed several districts over exploited cassava fields, high consumption of leaves and development of plants due to dryer than average conditions. An average yield of 2 t/ha seems realistic.

3.5 Production forecast of main crops (maize, rice and cassava)

Tables 2 and 3 show crop production in 2002 and 2003. Total production in 2003, in cereal equivalent, is estimated at 122 700 tonnes, 21 percent lower than last year's level of 154 800 tonnes. Maize is estimated to decline by about 34 percent to 70 200 tonnes from 106 100 tonnes. Rice production is estimated to 39 300 tonnes - an increase of 12 percent on last year, while cassava production is estimated to decrease slightly by 2 percent.

Table 2. Timor-Leste: Crop Production Forecast in 2003

District	Maize			Paddy			Cassava	Total
	Area (ha)	Yield (tonnes/ha)	Prod. (tonnes)	Area (ha)	Yield (tonnes/ha)	Prod. ^{1/} (tonnes)	Prod. (tonnes)	Cereal Equiv. ^{1/2/} (tonnes)
Aileu	1 200	1.5	1 800	190	1.5	285	1 200	2 355
Ainaro	550	1.5	825	1 500	1.2	1 800	550	2 081
Baucau	6 600	1.5	9 900	8 000	1.8	14 400	6 600	20 652
Bobonaro	5 500	2.0	11 000	6 000	2.0	12 000	5 500	19 960
Covalima	7 750	1.5	11 625	2 000	1.2	2 400	7 750	15 545
Dili	750	1.5	1 125	120	1.5	180	750	1 473
Ermera	2 500	1.5	3 750	1 500	1.2	1 800	2 500	5 630
Lautem	4 000	1.5	6 000	2 000	1.5	3 000	4 000	9 080
Liquica	1 350	1.5	2 025	290	1.2	348	1 350	2 665.8
Manatuto	800	1.5	1 200	4 200	1.8	7 560	800	5 992
Manufahi	1 150	1.5	1 725	600	1.5	900	1 150	2 633
Oecussi	5 750	0.6	3 450	1 100	2.0	2 200	2 875	5 690
Viqueque	6 500	1.5	9 750	9 200	1.2	11 040	6 500	18 454
Sub-Total	44 400	1.5	64 175	36 700	1.6	57 913	41 525	112 211
Upland				3 500	1.0	3 500		2 100
Second crop	6 000	1.0	6 000	3 350	1.2	4 020		8 412
Total	50 400	1.3	70 175	43 550	1.5	65 433	41 525	122 723

Note: Numbers may not add up exactly due to rounding.

^{1/} Milling rate of paddy is 60 percent.

^{2/} Cereal equivalent of cassava is 32 percent.

Table 3. Timor-Leste: Production of Main Crops - 2003 Compared with 2002 ('000 tonnes)

	Maize	Rice^{1/}	Cassava^{2/}	Total
2003	70.2	39.3	13.3	122.7
2002^{3/}	106.1	35.2	13.5	154.8
Percent Change (%)	-34	12	-2	-21

1/ Milling rate of paddy to rice estimated at 60 percent.

2/ Cereal equivalent estimated at 32 percent for cassava.

3/ Maize and rice production estimates from the FAO/WFP Rapid Food Needs and Agricultural Assessment Mission to Timor-Leste, 2002.

Aerial observations and ground visits confirmed that the rice crop was proceeding well and the production of paddy is estimated to increase proportionally with the increase in area planted. The secondary crops of both maize and rice are expected to be slightly below normal as a result of the erratic nature of the rainfall and the delay in planting during 2003.

3.6 Livestock

Livestock production is predominately on a small scale and integrated into individual household farm systems with no commercial livestock in rural areas. Except for large herds of cattle, buffalo, sheep and goats, typical animal holdings per household are from one to several heads for all types, including chicken and pigs. Animals are generally raised through extensive feeding with little or no supplementation. Small animals and pigs are an important source of cash whereas the larger animals are considered as family assets.

Ministry of Agriculture figures for 2001 indicate livestock populations to be: 79 400 goats, 23 700 sheep, 343 100 pigs, 670 900 chickens, 7 000 pedigree chicken, 11 200 ducks, 166 200 cattle, 101 700 buffalo, and 45 200 horses.

4. AGRICULTURAL OVERVIEW BY DISTRICT

Aileu district producing mainly maize and cassava, while rice is less important. The district is also a big producer of vegetables and fruits. Main livestock are chicken, pigs and goats. The maize crop this year was severely affected by the delay and shortage of rain at the beginning of the growing season, especially in Remexio and Liquidoe sub/districts. Problems with rodent infestation were also reported in many areas. Coffee, vegetables and fruits, which are income-generating commodities for many farmers, were also affected by drought.

Ainaro district produces mainly maize, and to a limited extent rice and coffee. In the uplands several high value horticultural crops (Irish potatoes, carrots, beans and cabbages) are grown. Main livestock are cattle, pigs and goats. Drought affected maize production while rice cultivation is ongoing.

Baucau district is an important food-producing area, where rice accounts for nearly half of aggregate cereal production, the remainder being maize. In addition, the district is an important producer of beans, groundnuts, cassava, sweet potatoes, copra and candlenut. Main livestock are buffalo cattle and goats. Compared to other districts, Baucau is agriculturally more developed with surplus production. It has some 15 000 hectares under irrigation schemes, of which 9 600 hectares are operational, the largest in the country. As a result, maize is rarely cultivated under traditional slash and burn systems. Population density is also comparatively high in the district. Due to improvements to irrigation in the recent years, the rice crop seems to be good with expected yields well above the 2.5 tonnes per hectare. However, the effect of drought in small areas on slope/terraces in Laga sub-districted were observed during the mission. Production this year is likely to be slightly below average for maize and normal for rice.

Bobanaro is one of the most productive districts in Timor-Leste both for crops and livestock. The district is made of 6 sub-districts and is an important maize producing area, though rice is predominant in the sub-districts of Maliana, Atabae and Cailaco with surplus production yearly. This district is also a big producer of red bean, mung bean and peanut and to a little extent coffee. Main livestock are cattle, buffalo and goat. In the current season, maize planting commenced in early December with rice planting following from January to April. The district has nearly 3 600 hectares of functioning irrigation schemes. In some area of approximately 900 hectares,

a second rice crop will be planted in late April/May. During the current year, irregularities in rainfall were reported as affecting maize crops in the sub-districts of Cailaco, Bobonaro and Lolotoe. Seed availability in the area was generally good, mainly from household stocks. Maliana has cross-border trade with Indonesia and therefore agricultural inputs are widely available, at cheaper prices than in the rest of the country.

Covalima district is made of seven sub-districts and produces a second crop of maize in addition to the main crop planted in November/December. Rice is cultivated in the lowlands under irrigation, with 2 000 hectares of planted area to be harvested from May to October. The district is also an important producer of soybean, mung bean and groundnuts. Main livestock are buffalo cattle and goats. The main maize season experienced a delay and shortage of rain at the beginning, especially in the sub-districts of Fatumean and Fatululik.

Dili district is not agriculturally important, having very limited land area. The total overall area planted to food crops is close to normal. A prolonged dry spell was reported in the Island of Atauro.

Ermera district produces maize, cassava and to a less extent rice. Maize output was severely reduced by the drought and the population has already reverted to coping strategies such as increasing cassava consumption and/or increasing sales of fuel wood. Main livestock are horses, buffaloes and goats.

Coffee production is an important cash crop and 29 000 hectares are under the crop often on steep slopes. More than 60 percent of organic coffee in the country is produced from coffee plantations in this district. A dry spell at coffee flowering stage reduced last year's output in Railaco and Atsabe sub-districts. The shortage of rainfall in 2003 will similarly decrease the coffee crop, to be harvested in June-August.

Lautem district is not a major food producing area even though it has 3 500 hectares of functional irrigation schemes. The main crop is maize generally cultivated under slash and burn system. Rice is mainly cultivated in the southern flatland around Illomar and accounts for approximately 30 percent of district cereal production. In contrast, cassava, beans, and vegetables are extensively cultivated. The district is also an important livestock and fish producing area. Main livestock are buffalo, cattle and goats. Food crop production, especially maize, was severely affected by the delay and shortage of rains, particularly in Tutuala sub district, while in Illomar, inadequate water availability in irrigated schemes slightly effected rice production.

Liquica is not an important food crop producing area, relying mainly on coffee as a source of income. The district can be divided into two production zones: the uplands where coffee is produced, and the lowlands where maize is cultivated. There is only limited rice cultivation, around Maubara sub-district. Main livestock are buffaloes, cattle and goats. This district is a chronically food deficit area. This year the coastal area was dryer than usual and maize production was below average. Extensive logging for fuel wood sale was noted as a clear indication that farmers are looking for additional income.

Manatuto is the only district that extends from the north coast to the south coast, encompassing all Timor-Leste agro-ecological zones. In the northern part of the district, rice is extensively grown (5 000 hectares) due to the rehabilitated irrigation schemes recently. Approximately 300 hectares are used for a second rice crop with planting in late April/May. In the central uplands subsistence agriculture is practiced based on maize inter-cropped with cassava, beans, pumpkins and other crops. Rice is also cultivated on a small scale in rain-fed area of Natarbora, closer to the south coast. At higher altitudes coffee is also cultivated to a limited extent. Main livestock are buffaloes, pigs and goats. Even though the shortage of rain has affected the northern coastal areas, maize and rice production is considered satisfactory. Rice planting in southern parts of the district, which starts normally in March/early April, was delayed due to the collapse of the Caraulun Irrigation Scheme

Manufahi district produces maize in all 4 sub-districts, but rice production is predominant in Betano and in the sub-district of Same. The district is also producer of beans, vegetables, fruits and other horticulture crops, and to a limited extent coffee and candlenut. The main livestock are cattle, buffaloes and goats. Due to drought maize production was lower than average, especially in Alas sub-district. Rice planting was delayed.

Oecussi, an enclave district, is a main cereal-producing area, with maize accounting for around 65 percent of aggregate cereal production, while rice production is mainly concentrated in the rehabilitated irrigated area around Pante Macassar. Due to active trans-border trade, agricultural inputs are more readily available at lower prices than in the rest of the country. The district also produces peanuts and sweet potato. Historically, trade with neighboring West Timor was mainly in livestock and, this trade has been revived in recent years at a lower level.

The main livestock are cattle, buffaloes and goats. The shortage of rainfall resulted in crop failures and the overall maize production has been severely reduced, particularly in the coastal areas. Rice production is expected to be normal. A second season rice crop will be cultivated in June for some 800 hectares. The population of the district is facing food shortages and the selling of animals is increasing. However, livestock owners are concerned about enforcement of the new visa regulation starting April 2003, which is adversely affecting trade across the border.

Viqueque district is a major maize and rice producing area. Rice is predominant in Uatu Lari and Uatu Carbau sub-districts. The district is also a big producer of coconut and candlenut as well as livestock (cattle, buffaloes, pigs, and chickens). The overall production of maize and rice is expected to be near normal.

5. FOOD SUPPLY AND DEMAND SITUATION

5.1 Access to food and prices

As a result of the unrest in 1999, a vacuum in marketing and transport was created after major traders left the country. The situation has improved since independence, but is still below the previous level of marketing, especially in rural areas, where barter is common due to a shortage of cash.

Markets in the capital, Dili, show adequate supply of most commodities except for locally produced rice. During market visits in Dili the Mission observed imported rice from India, Thailand, Indonesia, and Vietnam, and only in two stalls was Timorese rice available in small quantities.

Most commodities are sold using a tin can (volume for weight) or a pile at a fixed price. Surprisingly, all stalls kept uniform prices and there was no visible price competition. The same pattern of uniform prices was observed in district markets even though the price levels were slightly lower than in the Dili markets for a few commodities. Rice, beans and to some extent maize seem to be available at adequate levels in the markets visited in Dili and in districts. The National Statistics Office is making undertaking surveys regularly in the Dili general market and the price of maize was generally lower than both cassava and rice from January 2000 up to October 2002, but from November 2002 onwards maize seems to be more expensive than the other two.

5.2 Food supply/demand balance

The projected supply/demand balance for the marketing year 2003/04 is summarized in Table 4. It is based on the production estimates of maize harvested in April 2003 and a forecast of both the main rice production and secondary crops in 2003. It is also based on the following population, consumption and utilization parameters.

- A mid-marketing year 2003/04 population of 864 271 people (see Table 1.)
- Consumption rates for maize, rice and cassava are estimated at 90 kg/caput/year, 75 kg/caput/year and 15 kg/caput/year respectively. These are based on historical apparent consumption and the current shift from maize to rice. On average this level of consumption provides about 84 percent of the daily calorie requirements for the population.
- Seed and post harvest losses: in general, precise seeding rates for maize are difficult to estimate given the predominance of inter-cropping systems in Timor-Leste. A seed rate of 20 kg/ha would be reasonable. Paddy seed rate of 40 kg/ha is used. Post harvest losses in maize vary substantially, but an average of 25 percent is assumed, while in rice they are assumed at around 5 percent. Very small amounts of grain are used as feed. However, part of rice, about 5 percent, left in the husk due to a poor milling process is assumed to be used as feed for animals.

Total staple crop production is estimated at 122 700 tonnes. Opening stocks are estimated at 6 250 tonnes and closing stocks forecast at 9 000 tonnes. A small increase in ending stocks of rice is assumed due to a better rice harvest this year.

Commercial imports for Timor-Leste are based on information from traders and a major shipper. Presently, rice imports average 4 000 tonnes per month, or 48 000 tonnes annually. This level of rice import into the domestic market is expected to continue in 2003/04. Reportedly, more rice comes into the country but is destined for re-export to Indonesia on an informal basis. No reliable estimates were available to the Mission. The commercial

imports of maize have been banned by the Government hence the maize deficit of 27 353 tonnes is anticipated to be covered with commercial imports of rice.

Table 4: Timor-Leste Food Supply/demand Cereal Balance Sheet (April 2003 - March 2004)

	Maize	Rice^{1/}	Cassava	Total
Total Availability	72 175	43 510	13 288	128 973
Opening Stocks	2 000	4 250	0	6 250
Production	70 175	39 260	13 288	122 723
Total Utilization	99 528	77 746	13 288	190 562
Food Use	77 784	64 820	13 288	155 893
Seed, feed and Losses	19 744	5 926	-	25 670
Closing Stocks	2 000	7 000	-	9 000
Cross-commodity substitution	-27 353	27 353	-	0
Import Requirement	0	61 589	-	61 589
Commercial Imports	0	48 000	-	48 000
Uncovered deficit	0	13 589	-	13 589

Note: Numbers may not add up exactly due to rounding.

1/ Milling rate of paddy to rice is estimated at 60 percent

6. HOUSEHOLD FOOD SECURITY

6.1 General

According to the UNDP Human Development Report for 2002, approximately three-quarters of Timor-Leste's population can be categorized as rural dwellers with one-quarter of the population residing in urban areas. Rural households are headed by parents with low literacy rates (rural literacy rates on whole are at a meagre 37 percent), owing to historical poor school attendance (many families report that they do not have enough money to pay for tuition) and high drop-out rates, where most households are engaged in subsistence agriculture. Households relying on subsistence level agricultural activities, notably those with rice, maize and cassava as main production crops, do not make substantial food purchases and this is attributable to a lack of income and high levels of poverty. Of these, poorest groups are to be found in families that have many children, those with small landholdings and little livestock, those living at extreme altitudes and those that live in areas that are prone to flooding and soil erosion. Rural populations that are primarily engaged in coffee production (notably the districts of Ermera, Liquica, Manufahi, Aileu and Ainaro) appear even during years of global depressed coffee markets, to fare better as they are believed to have more accumulated resources; their houses are generally better constructed and have more assets. Rural household economic status can oftentimes be defined in terms of patterns of food consumption rather than in terms of income. Households with more economic stability consume a greater variety of foods and do not consume what is regarded as non-traditional coping mechanism foods during gaps between harvesting periods.

After two consecutive years of drought, a significant number of the rural populace, most notably those relying on subsistence level agricultural activities, are encountering problems related to household food security. Exacerbating their fragile predicament is the movement of family members, mostly young adults, to urban areas in search of income earning opportunities. This has resulted in a diminished capacity of rural households to maintain adequate labour inputs during peak agricultural periods. Hence, there is a propensity that maintaining even normal levels of agricultural pursuit will become more problematic and that the expansion of small-scale rural agricultural activities will not be feasible. Most rural families interviewed indicated that at least one of their family members resided in an urban centre, most notably Dili and extended assistance either in the form of cash or food is sometimes provided. Most rural households have been less concerned with maximizing their yield than with reducing their vulnerability to the vulgarities of the climate to include the El Nino related phenomena that brings a potential for drought and flood.

Urban populations are generally comprised of households that are headed by parents with higher literacy rates (urban literacy rates on whole are at 82 percent and problems of attendance and drop-outs are not believed to be caused by a lack of food within households) who have access to income earning employment opportunities in

business and trade sectors as well as the Government civilian service sector. Urban dwellers employment prospects, especially in Dilli, have been augmented by the large presence of United Nations missions as well as international relief organs. Urban populations purchase staple food commodities such as rice and maize which is often complimented by backyard garden production and are generally maintaining an acceptable level of household food security which is not subject to climatic variants as commercial prices for cereal imports have remained relatively stable. A number of urban families also benefit from remittances, most notably from Australia, Portugal and Ireland. According to UNFPA, East-Timorese who were born in 1975 or before are entitled to Portuguese citizenship which allows them to openly travel and work in any European Union member country; an increased trend in migrations out of Timor-Leste has been observed over the past couple of years. Urban households maintain an average size of 6.0 to 6.3 members, being unexpectedly larger than rural families which average 5.6 members. It is believed that this anomaly is largely the result of the migration from rural to urban areas wherein family members accommodate each other for employment and educational pursuit. Eventful reduction of United Nations and international relief organ presence in urban areas will no doubt reduce the number of available jobs within an enclave economy which will subsequently adversely affect household economies.

Poverty is less in urban areas at 26 percent as compared to rural areas where it stands at 46 percent. It is lowest in Dili/Baucau at 14.4 percent and highest in rural the centre and the rural west at 51 percent. Since over three-quarters of Timor-Leste's population reside in rural areas, it is clear that poverty is a rural phenomenon: 85 percent of the poor live in rural areas. Poverty levels however do not properly illustrate the great variance that exists in rural areas of Timor-Leste where the economic status of families living within the same village can be drastically different owing largely to not only land access but also to the nature of land terrain. Consequently, although patterns of poverty can be identified as being more acute in certain rural districts of Timor-Leste, severe economic impoverishment and accordant household food insecurity can be found throughout all rural areas.

6.2 Nutrition and health

Health standards are low with overall life expectancy at 57 years which is much lower than most ASIAN countries. Many people die from avertable diseases such as malaria, respiratory tract infections, and diarrhea. Infant mortality stands at around 80 deaths per 1 000 live births with under-five mortality at 144 deaths per 100 000 live births. Maternal mortality rates indicate that 420 women die for every 100 000 live births.

Low health standards are partly the result of a lack of essential services (i.e. clean water) and poor access to health facilities; a problem particularly endemic to rural areas. Overall, 55 percent of the population has access to safe water, with urban areas faring better at 70 percent compared to rural areas at 50 percent. Health provision is weak. A majority of doctors along with many other health staff who were Indonesian, left during the conflict of 1999. Nursing capacity seems to have fared better as most nurses were East Timorese. However, nurses are overwhelmingly male, making it culturally difficult for females to solicit medical advice on gender sensitive matters to include pre-natal and post-natal care. It is believed that only 30 percent of births have any skilled birth attendance.

Proper nutritional education remains a problem in rural areas, especially in households headed by parents who are illiterate and cannot in practical terms be expected to neither understand nor change traditional means of food preparation and dietary consumption. A correlation exists in Timor-Leste wherein households headed by illiterate parents have been found to have higher levels of malnutrition.

According to a UNICEF Multiple Indicator Cluster Survey (MICS) report for 2002, 12 percent of children under the age of five are moderately to severely wasted, 47 percent are moderately or severely stunted and 43 percent are moderately or severely underweight according to WHO standards.

Median duration of breastfeeding is just over 15 months and the introduction of solid or mushy food comes early. About 72 percent of households have access to adequate quantities of iodized salt (> 15 grams ppm), with a noted drop to below the 60 percent level in western regions of Timor-Leste. Two weeks preceding the MICS, an overall 56 percent of children experienced some form of illness to include malaria, diarrhea and acute respiratory infections. According to most interviews conducted with local health care workers during field visits, malnutrition is usually not a problem directly associated with a shortage of food for rather, it is more attributable to disease and pitiable management and use of household food stocks (low intake of protein rich consumables). While malnutrition data indicates a more perverse occurrence in rural areas, it is also an unexpected problem, although

of a lesser magnitude, in urban areas such as Dili which are believed to be generally economically advantaged and more food secure.

During the lean season a substantial number of rural households develop an over reliance on cassava. It should be noted that cassava is low in fat - or lipids and it is not a rich source of fat- soluble vitamins. Cassava is low in some essential amino acids and it is therefore important to mix cassava with a wide variety of other foods such as vegetables, cereals, fish or other animal products.

6.3 Gender and household food security

Women in rural areas are particularly in a disadvantaged position as they usually live far from health facilities, are subject to domestic violence and run a risk of pregnancy complications (radical and presumptive prenatal treatment often practiced); owing to inordinately high maternal death rates. Women bear the brunt of the impact of polluted water and poor sanitation and have to spend time looking after sick children and other family members. Female headed households in rural areas tend to occupy the lowest level of educational achievement and the greatest level of economic impoverishment. Among females in the 35-44 year old age group (prime age for workforce participation), 87 percent have less than a primary education. An anomaly exists within population data for Timor-Leste in that there are more men than women at all age spectres of the population. Global statistics indicate that on average 105 men are born to every 100 women. However, women usually overtake men in overall numbers commencing 25 years old and greater.

Women have less power in familial and community structures. This is in part attributable to their lack of cash income and low participation in the work force; only 40 percent compared to 60 percent for men. Women are therefore unable to properly contribute to family incomes and food purchases. Women while assuming the role of providing food to children are less likely to eat their share of household food resources; with 26 percent of all women being categorized with Chronic Energy Depletion (CED). According to UNDP 2001 figures, Timor-Leste's Gender Development Index of 0.347 for 2001 lagged 12 percent behind Human development index largely as a result of women's income being estimated at only one-eighth that for men.

Low household food security reserves coupled with extremely high fertility rates usually equates to pregnant and lactating females, along with newborns, experiencing a greater level of malnourishment compared to male household members.

6.4 Household access to food

Most rural households (outside of coffee producers) rely on subsistence level agricultural activities and have less income to spend at fewer and further spread markets and shops. Market opportunities in rural areas are constrained by seasonally effected secondary and tertiary road networks which cause inflated transport tariffs. Subsequently, rural households have opportunities to purchase a lesser variety of items at a higher cost. During field visits most local markets offered imported rice for sale but at costs that were up to 25 percent higher than those to be found in urban markets. Rural households outside of a community system of sharing, also perform small scope localized trading and bartering.

A limited number of households own a cow or buffalo while most households own several chickens and pigs. However, households interviewed during field visits did not indicate consumption of these assets over the past six months with the exception of processing animals for significant social occasions such as marriage. Visits to local market revealed that usually only chickens and pigs were being sold with cows and buffalos being retained as household assets.

Urban households have access to purchase a wide variety of food items from local shops and markets. Visits to urban markets revealed abundant supplies of live and dressed beef and pork along with both fresh and frozen (imported and less costly) poultry products. Various tubers, local pulses and a wide array of fresh vegetables and fruits were also observed. Urban households normally purchase readily available imported rice (Indonesian, Thailand, Indian and Vietnamese origin) at prices which are normally 8-10 percent lower than locally produced rice of limited availability. Most urban households grow seasonal vegetables in backyard gardens. Livestock and poultry are present in urban households but not normally at substantial numbers. Shops visited have a number of imported non-perishable food items most of which have been imported from Indonesia. General retail food

prices in urban areas, with the exception of rice and sugar, are generally inflated and not commensurable with income levels.

Marine resources are underutilized, especially when compared to pre-conflict times. A Poverty Assessment Project for 2001 estimated that around 3 800 MT of fish was harvested in Timor-Leste. Numbers of individuals engaged in full-time fishing has decreased by more than 80 percent since early 1999 according to the Japan International Cooperation Agency (JICA) in a survey conducted during March 2001 to March 2002. Average fish consumption in some south pacific tropical islands is purported to be around 80 kg per capita whilst the populace of Timor-Leste is believed to consume less than 4 kg per capita. Rural highlanders consume very small quantities of dried fish while fresh fish is consumed more in urban areas of the north coast. Underdeveloped fish marketing, underdeveloped fishing gears, and a shortage of fishing vessels contribute to a very low exploitation of marine resources.

Access to food in Timor-Leste must take into consideration culturally dominated dietary habits wherein some areas there is a refusal to consume fish, pigs and poultry.

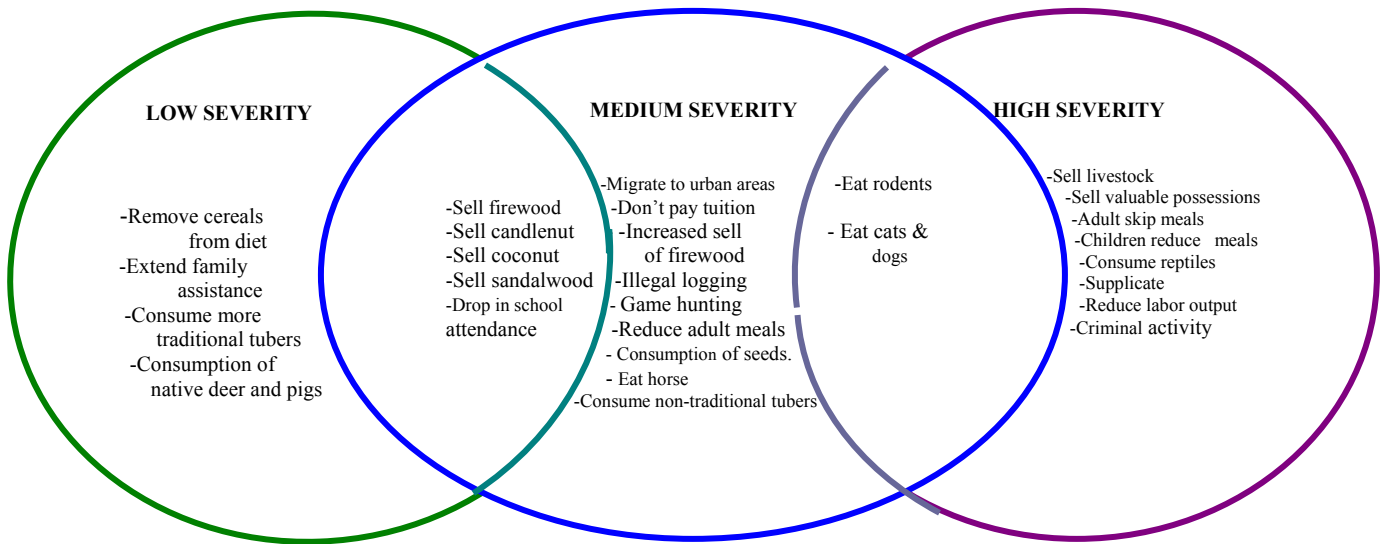
6.5 Household coping mechanisms

Traditional coping mechanisms utilized by poor families during seasonal periods (i.e. November to February), normally referred to as "lean season" or "hunger gap", at which time household reserves of preferred staple commodities (rice or maize) become depleted, can be derived by drawing upon historical precedence. However, caution must be exercised to ensure that a distinction is made between pre-conflict and post conflict coping mechanisms. Income earning possibilities, marketing vents and efficiency, roads and transport systems, and public services such as health and education were all adversely affected during the conflict of 1999, coupled with the eventful withdrawal of Indonesian workers and assets. During pre-conflict times, extensive subsidized rice assistance and fertilizer was provided to vulnerable populations in East-Timor, which while mitigating household food insecurity, also created a certain level of dependence. Following the conflict of 1999, substantial tonnages of food assistance, most oftentimes in the form of gratuitous blanket distribution programs, further ingrained food dependency. A number of responders of household interviews conducted in rural locations stated that they expected the Government to provide rice in the event that they were unable to make ends meet. It has been reported that rural farmers only plant about 47 percent of available land. A natural coping mechanism of planting greater areas when previous harvests have been less than satisfactory has been somewhat abated. Whereas a societal based communal sharing of resources during periods of distress remains in tact, there is a general lack of motivation to undertake community works.

Traditional seasonal coping mechanisms for a majority of the rural populace consists of shifting from rice or maize to tubers (i.e. cassava/sweet potatoes/yam/taro) depending upon crop availability and/or purchasing power. An increased reliance on tubers will normally be accompanied by increased consumption of bananas and sago in areas where they are grown and the complete consumption of backyard garden products. In more extreme situations, households will perform distress sales of livestock and pursue forest foods such as non-traditional tubers and fruits. Men will also seek wildlife such as boar, deer, monkeys, tree kangaroos and fish.

Coping strategies are regionally determined with some areas relying upon the sale or use of coconut, talipot palm, sandalwood and candlenut as a source of food and income. Depletion of forests due to firewood collection is not a recent phenomenon and continues to serve as a source of income.

Figure 3. Timor-Leste: Coping Mechanisms according to Levels of Food Insecurity



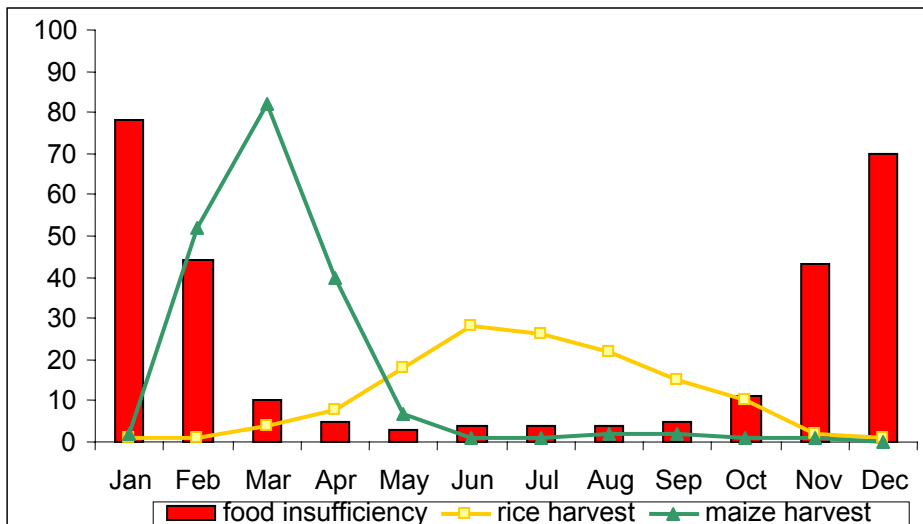
Source: Household interviews - April 2003.

7.0 VULNERABILITY ANALYSIS

7.1 General

Historical reference coupled with household interviews indicates that households in a typical year face the greatest level of food insecurity during the period November to March (peaking in January) whereas households face the lowest level of food insecurity during the months of April to September.

Figure 4. Timor-Leste: Harvest and Patterns of Food Insecurity



Note: The bars indicate the percentage of sucos reporting insufficient food in that month. The lines indicate the percentage of sucos reporting a maize or rice harvest in that month.

Source: Suco Survey (2001)

Whilst a number of rural households having passed the lean period are now finding themselves with minimal food resources (little or no stocks of maize or rice), interview respondents and field visits did not denote any significant incidence of *high severity* stress coping mechanisms such as the sale of livestock, use of non-traditional tubers, or foraging through forests in search of wild foods. However, limited incidences of *low severity* to *medium severity* coping mechanisms were observed and in a couple of instances, maize normally reserved as seed stock was reportedly being eaten. Owing to delayed and repetitive planting activities, prominence and consumption of traditional tubers (i.e. cassava) is ongoing but is expected to somewhat subside with the realization of current and mid-year harvesting activities. In acknowledging that two agricultural cropping seasons have been negatively impacted by drought, those considered as vulnerable will encounter major difficulties in maintaining food security during the upcoming normal lean period of October 2003 to March 2004.

Commercial imports are expected to upwardly adjust during hunger gap periods and at the time of the mission, an abundance or relatively inexpensive imported rice were observed in most major markets with smaller quantities to be found in more isolated and logistically difficult to access localities. However, more disadvantaged rural populations will have little if any purchasing power.

7.2 Vulnerable groups/targeting

The following populations are believed to be vulnerable and will face difficulty in meeting household food requirements just prior to and during the lean season (November 2003/March 2004).

- Populations in upland areas (> 500 meters) reliant on agricultural activities which concentrate primarily on maize.
- Oecussi District.
- Population pockets in rural areas with land holdings of less than 0.5 hectares, which have minimal livestock and cash crop access, along with households not receiving remittances or off the farm income.
- Population pockets in rural areas which are distant from main road networks and accessible on seasonably affected roads that are of poor condition and neglected in terms of maintenance.
- Migrant populations along with refugees who have returned over the last year.

Socio-physiological groups such as female headed households, large single headed households, and the elderly are considered specific groups which are vulnerable but not in the context of drought affected food shortages.

7.3 Provisional beneficiary numbers

Provisional beneficiary numbers total 149 564 to include 85 994 highlanders, 28 570 residents of Oecussi District, 20 000 other particularly disadvantaged rural inhabitants to include a number of households living in lowlands, 10 000 migrant populations and 5 000 repatriated refugees who are to be considered drought impacted and food insecure.

8. EMERGENCY PREPAREDNESS

8.1 Institutional capacity

The National Disaster Management Office (NDMO) within the Government's Ministry of Internal Affairs serves to support the coordination of humanitarian relief and disaster-affected populations. However, at the time of the mission it was observed that a general lack of basic information collection systems as related to key food security indicators (i.e. agricultural, health and nutrition data), made it difficult for the NDMO to adequately identify/target vulnerable groups in the context of drought; hence prompting the mission to develop provisional beneficiary numbers. NDMO in acknowledging its limited institutional capacity, earlier this year launched a Technical Assistance Appeal for the 2002-3 Timor-Leste Drought Management. Technical assistance, perhaps by means of a technical mission, remains crucial in terms of not only augmenting the capacity of the NDMO, but also for purposes of ensuring appropriate mechanisms of targeting and program intervention. Effective means to monitor basic food security indicators remains an outstanding matter of paramount importunity.

8.2 Logistics

Overland transport capacity in Timor-Leste appears to be impaired by a limited number of 3-to-10 MT available for commercial carriage to and from rural markets at reasonable rates. It is generally believed that a void in overland transport capacity occurred during the 1999 conflict period, when Indonesian truck owners moved their assets to Indonesia. Most supporting technical staff to include mechanics are also believed to have left.

Outside of limited transport capacity, high transport costs (approximately US\$ 30 per ton per km in urban and peri-urban areas and 40-50 cents per ton per km in rural areas) are also attributable to the poor condition of secondary and tertiary road systems which are neglected in terms of maintenance and subject to the adverse effects of rain. It has been estimated that 63 percent of main village roads are in poor condition. According to an Asian Development Report for 2002, a total network in Timor-Leste of 5 159 km would require routine and periodic maintenance costs of US\$ 18 million per year. Movement of market items to and from rural localities is most oftentimes undertaken with the use of mini-buses which are locally referred to as "mikro-lets" and generally have a payload capacity in the range of 600-to-750 kilograms. Miko-lets generally perform cartage type operations in which small quantities of food and livestock are transported over short distances. Most transporters who were interviewed indicated that they performed one-way hauls, with no return cargo loaded.

There are seven major ports in Timor-Leste that can accommodate commercial vessel discharge. They include **Dili Port** (wharf face 300 meters long and 20 meters wide), **Tibar Port** (concrete jetty and a timber deck) located 12 km west of Dili, **Hera Port** (wharf face 80 m long and 30 m wide) located 14 km east of Dili, **Com Port** (80 m in length with a T-head jetty) linked by an L-shaped causeway to the road lying within 20 km of Los Palos, **Caravela Port** (a concrete pier 100 m long and 9 m wide) located on the north coast midway between Manatuto and Bacau and originally built as a RoRo terminal to serve the Indonesian transmigration program, **Oecussi Port** (15 m wide concrete landing yard) located close to town center, and **Atauro Port** (80 m long concrete jetty) near Beloi. At the present time, only Dili Port is being utilised for the discharge of commercial rice imports.

This report is prepared on the responsibility of the FAO and WFP Secretariats with information from official and unofficial sources. Since conditions may change rapidly, please contact the undersigned for further information if required.

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