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Food Systems Assessment Timor-Leste

August 2023



UNITED NATIONS
TIMOR-LESTE



FOREWORD

It is with a sense of urgency and commitment that I present this Food Systems Assessment report, a pivotal document that not only outlines the current challenges facing Timor-Leste but also illuminates a pathway towards a more secure and sustainable future.

Timor-Leste, like many nations grappling with food insecurity, stands at a critical juncture. The convergence of external shocks, from the global pandemic to natural disasters and geopolitical tensions, has underscored the fragility of our food systems and the urgent need for strategic intervention.

As the Vice Prime Minister II of the Timor-Leste Government, I am acutely aware of the profound impact that food insecurity has on our nation. With one-third of our population experiencing varying degrees of food insecurity, it is imperative that we take bold and decisive action to address this pressing issue.

This report is not merely a catalogue of challenges; it is a blueprint for transformation. Drawing upon the insights gleaned from assessments conducted by esteemed organizations such as WFP, FAO, the European Union, and CIRAD, as well as lessons learned from our regional counterparts, we have identified key areas for intervention.

Our vision is clear: to build a resilient and inclusive food system that ensures food security for all Timorese, now and for generations to come. To achieve this vision, we must prioritize investments in production, transport, processing, distribution, and consumption—fundamental pillars that underpin the resilience of our food systems.

The recommendations outlined in this report are not abstract ideals; they are pragmatic steps grounded in evidence and informed by the voices of stakeholders across our nation. From bolstering agricultural productivity to promoting nutritious diets and strengthening food storage and distribution networks, each recommendation represents a critical building block in our journey towards food security.

As we embark on this collective endeavour, let us remember that there is no one-size-fits-all solution. Rather, our approach must be adaptive, responsive, and rooted in the unique context of Timor-Leste. By aligning our priorities with targeted investments and strategic interventions, we can chart a course towards a future where every Timorese has access to an adequate and nutritious diet.

I extend my sincere gratitude to WFP and all those who contributed to the development of this report, from the dedicated researchers and experts to the resilient communities who are the heartbeat of our nation. Together, let us seize this opportunity to build a brighter, more food-secure future for Timor-Leste.

Sincerely,



Mariano ASSANAMI Sabino
Vice Prime Minister II
Government of Timor-Leste

Abbreviations

AML	Anti-Money Laundering
ASEAN	The Association of Southeast Asian Nations
ASF	African swine fever
CFT	Combating the Financing of Terrorism
CIRAD	French Agricultural Research Centre for International Development
CSA	Climate-smart agriculture
EU	European Union
FAO	Food and Agriculture Organization
FAW	Fall armyworm
FFH	Female headed households
GDP	Gross Domestic Product
GoTL	Government of Timor-Leste
GDS	General Directorate of Statistics
IFI	International Finance Institution
IMF	International Monetary Fund
IPC	Integrated Food Security Phase Classification
LNG	Liquified natural gas
MAF	Ministry of Agriculture and Fisheries
MPI	Multidimensional Poverty Index
NDV	Newcastle Disease Virus
SDG	Sustainable Development Goal
UN	United Nations
UNDP	United Nations Development Programme
UNSDCF	United Nations Sustainable Development Cooperation Framework
USAID	United States Agency for International Development
WB	World Bank
WFP	World Food Programme

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Executive Summary

Timor-Leste is a food deficit country and one third of its population of 1.3 million suffers from food insecurity that could be classified as crisis or stressed food situation. Results from food systems assessments undertaken by FAO, the European Union, and CIRAD in 50 countries show that many countries with similar topography face similar food production and productivity challenges. Conventional wisdom has dictated a prescriptive remedy to food systems at the production side while encouraging private sector to take care of the rest, with a little bit of public sector nudging and support. Lessons can be drawn from other Asian countries, such as Bhutan and Nepal, that could be relevant to improving food systems in the Timor-Leste context.



The economy of Timor-Leste has recently gone through some significantly difficult years, thus undoing much of the progress made between 2002-2019. COVID-19, a major cyclone, and the Russo-Ukraine conflict have dealt severe blows. As articulated in the Economic Recovery Program 2020, the Government of Timor-Leste has realized that some basic national food stocks and reserves must be built by raising agricultural productivity and encouraging establishment of quality storage and warehousing at household, municipality, and national levels. Hydro-carbon based revenues supporting food import policies are not a solution in the long-term and the country needs to boost its non-oil GDP by increasing investments in the food sector. Thereby export of quality agricultural items (cash crops) are equally important as nutritious and safe agri-food products. The current budget proposal to allocate 2% for agriculture surely needs to be revisited.

Priorities of Government contained in the SDP 2011-2030, the ERP 2020, and the Food System Pathway Commitment clearly indicate vision and targets. In particular, the Food Systems Pathway Commitment of the Government of Timor-Leste identifies: (i) Production; (ii) Transport and Warehousing; (iii) Processing; (iv) Distribution; and (v) Consumption as main areas requiring interventions and investments

to address challenges effectively and sustainably transform its food systems across all demographic groups.

This food systems assessment report examines the status of the five pathways in Timor-Leste and concludes that there is room for significant improvement in all five pathways. The list of investments is sheer endless but indicative investments could be categorized in a long and short list. It is important to note that indicative investments recommended by the assessment are in line with priority activities proposed by UNMICS under the PMO as well as MAF. The national and subnational dialogue workshops held to document feedback of stakeholders on the food systems pathways have in their key recommendations validated the findings of the food systems assessment. These are the very interventions that have benefited other countries in Southeast Asia, which have emerged from a previously food-insecure situation to a food secure situation today. Such investments need to remain consistent and long-term in order to bear fruit. There is no silver bullet or quick fix; food imports are expensive and prices fluctuate; there is high volatility in the food market and some basic protection against spikes in food prices is essential and a good strategy.

Matching government priorities with indicative investment recommendations shows us a picture that has been consistent over two decades: rice is important for Timor-Leste; hence, an increase in production is essential and there is room for that through increases in productivity (yields), reducing post-harvest losses, and efficiently utilizing available arable land that has been abandoned, providing irrigation by repairing and maintaining existing systems, and putting in place policies that encourage local production and acceptance of local products as opposed to imported goods. A long and a short list of indicative investments have been identified; the long list has emerged from priorities identified by Government; the short list is the result of the food systems assessment study undertaken during this assignment.

Nutritious rice is important; hence, fortified rice needs to be part of school children's diet.

Enhancement of household level production of greens, spices, and dried foods is essential to boost food security at household level in rural areas. They need strong support in establishing water security and sustainable storage facilities to prepare for and overcome lean seasons. Cash for food vouchers launched during COVID-19 could become a useful instrument (permanently) as a support to mostly vulnerable, rural and urban households that allows them to procure basic food items. However, there is always an alternative to traditional belief: the choice of **Best Things First** suggested by Lomborg and Team (Copenhagen group of economists) focuses on nutrition, agricultural research, and secure land tenure by arguing that it is necessary to achieve the biggest bang for the bucks instead of sprinkling scarce financial resources all over the place. And he argues it is affordable and will achieve targets by 2030.



1. Introduction

Timor-Leste

The Democratic Republic of Timor-Leste is located on the eastern half of the island of Timor, with an exclave of Oecusse-Ambeno municipality situated in the western half and administered by Indonesia and minor islands of Atauro (now a municipality) and Jaco. The total land area of Timor-Leste is approximately 14,874 km², of which the total cultivated area is approximately 216,000 ha. The average size of household farms is 1.53 hectares and 96% of the holdings are individually owned. Two percent of the arable land is communal land and nearly one percent is leased-in.¹ East Timor came under Portuguese influence in the sixteenth century and remained a Portuguese colony until 1975 followed then by an Indonesian invasion and annexation. On 20 May 2002, Timor-Leste became a sovereign state. It officially submitted its request to become a full member of the Association of Southeast Asian Nations (ASEAN) in 2011 and was accepted in principle as the 11th member state of ASEAN. Timor-Leste seeks closer ties in the region and is upgrading its Presidente Nicolau Lobato International Airport in Dili, plans to upgrade tourist and conference facilities and is ensuring a safe communication network through underwater optic cables.² Integration in ASEAN will open new opportunities for Timor-Leste in tourism, trade and economic growth.



Food Systems Assessment

The Food and Agriculture Organization (FAO) of the United Nations embarked on food systems assessments in eight pilot countries (Bhutan, Burkina Faso, Colombia, Dominican Republic, Madagascar, Malawi, Nepal, and Senegal) under the premise that the current food systems cannot fulfill their purpose to provide nutritious and healthy food to all and contribute to enhanced livelihood opportunities in an environ-

mentally sustainable way.³ The food systems are being challenged by several factors such as changing diets, technology, urbanization and climate change. Under a partnership between the European Union (EU), FAO and the French Agricultural Research Centre for International Development (CIRAD) and in cooperation with national food systems stakeholders, the pilot assessment was expanded to a large-scale assessment and consultation on food systems in

1 Timor Leste.2020:

2 Antara News Agency 10 May 2023 at: <https://en.antaranews.com/news/281109/timor-leste-ready-to-fulfill-obligations-to-gain-full-asean-membership>

3 FAO Investment Centre. Food Systems Assessment at: <https://www.fao.org/support-to-investment/our-work/projects/fsa2021/en/>

more than 50 countries. Farming, fishing, live-stock rearing, storing, processing, transporting, trading, eating, and disposing of food are said to be all part of a complex system.⁴

Initial findings⁵ on strategic food system sustainability issues that are emerging from the assessments undertaken by FAO / EU / CIRAD that may be of importance for Timor-Leste, particularly results emanating from Bhutan and Nepal, two countries with mountainous terrain in South Asia with difficult access for farmers to services in rural areas.

In **Bhutan**⁶, despite limited arable land (three percent of total area), it achieves 37% self-sufficiency in rice production, and one quarter of land is left fallow. Farmers lack access to support services and landholdings are small, fragmented and not well connected to the market in some areas. Its import of food represents 17% of the total import bill and imports of processed food items underwent a six-fold increase between 2005 and 2019. While average caloric intake exceeds the recommendations, one out of five children under the age of five suffers from stunting. Key messages from the assessment in Bhutan are that achieving food self-sufficiency is a challenge; farmers have limited means and incentives to produce, while the absence of aggregators hinders the achievement of economies of scale and competitiveness. Furthermore, rural-urban migration, particularly among young people, has led to shortages in farm labor and more land being left fallow.⁷ Hence, farming needs to be made much more attractive by improving production and market infrastructure and transport networks to facilitate market access by supporting and strengthening the participation of the private sector in supply-chain services.

Nepal⁸ faces low productivity in the agricultural sector and is unable to compete with products from neighboring India. In addition, inadequate infrastructure in the country makes

it difficult for inputs to reach producers and for harvested products to reach markets. Although food security has improved in recent years, there are still high rates of stunting (40% in rural areas), while anaemia and food-borne diseases, such as diabetes, obesity and hypertension, are on the rise.⁹ Agriculture is the main source of livelihoods for nearly two-thirds of Nepal's people; low productivity of small plots, inadequate infrastructure and access to markets impacts farmer returns, and the large-scale out-migration creates a shortage of agricultural labor. In addition, climate parameters are becoming unfavorable for agricultural production. These examples are being cited here to underline that Timor-Leste shares similar problems with other countries and investments required may also be of a similar nature.



4 FAO Investment Centre. Food Systems Assessment. Agri-food systems Assessments (FSA) First Step (Video) at: <https://www.fao.org/support-to-investment/our-work/projects/fsa2021/en/>

5 FAO. 2021. Food Systems Assessment. Working Towards the SDGs. Interim Synthesis Brief, September.

6 FAO European Union and CIRAD. 2022. Food System Profile – Bhutan. Catalyzing the sustainable and inclusive transformation of food systems.

7 Ibid.

8 FAO European Union and CIRAD. 2022. Food Systems Profile – Nepal. Catalyzing the sustainable and inclusive transformation of food systems.

9 FAO. 2021. Food Systems Assessment. Working Towards the SDGs. Interim Synthesis Brief, September.

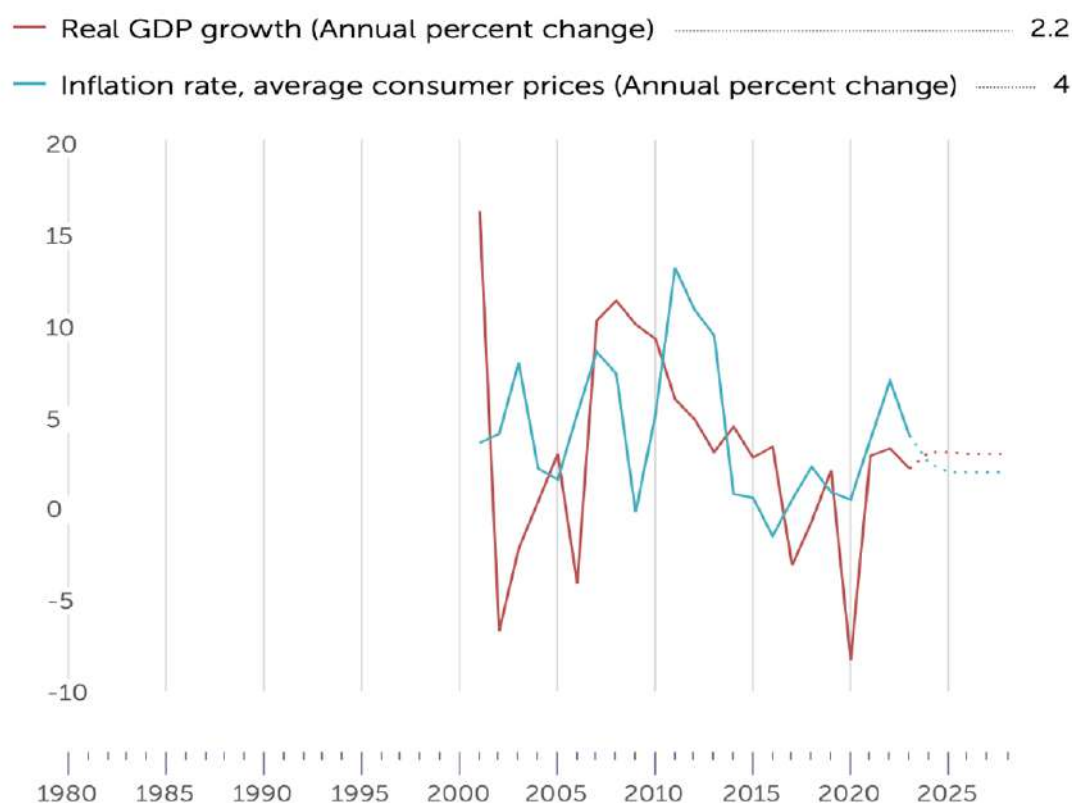
Scope of the assignment

This report is a result of mapping and desk review of the food system of Timor-Leste, analysis and review of information, data and statistics along different food chains; review of national priorities, policies, programs and projects. The assessment aims to encourage discussion within the Government in Timor-Leste, as well as among UN agencies under the UNSDCF regarding the Government's priorities and how to match these with indicative investments that could help achieve the SDGs. While the report is not exhaustive, it must be noted that tackling improvement of food systems is a complex task as it entails various sectors and sub-sectors of the economy. It requires a much closer and intensive coordination and integration of activities of various sectors. Concentration of investments in a cohesive manner needs to be undertaken across all sectors and subsectors required for improvement of food systems. Many countries in South and Southeast Asia have undergone transformations in food systems, and some of which are still having to cope with multifarious issues. Sectoral investments that have been ignored over the past two decades will need a reset, especially because of added impacts of climate change. It will be a long and arduous struggle before any signs of success may appear to prove that the food systems approach is the best way to proceed. Until then the Government will continue to focus on importations, supply chains, deliveries, and reacting to emergencies instead of putting sustainable solutions in place.

2. The Economy

Since independence, Timor-Leste's economic growth has not had an easy ride; GDP growth and inflation seem to be chasing each other up and down between 2002 and 2023 (see IMF figure below). IMF projects real GDP growth at 2.2% while consumer prices (Inflation) are projected to hover around 4%, while currently the inflation rate is reported to be at 8.6% (in April 2023), having come down from 9.6% in March 2023.¹⁰

Figure 1: GDP and Inflation 2002 – 2023



Source: IMF, at: <https://www.imf.org/en/Countries/TLS#ataglance>

However, according to the World Bank¹¹, Timor-Leste's economy is slowly recovering despite the steep challenges confronting the global economy. Against the backdrop of the war in Ukraine, which continues to disrupt the global economy, fueling inflation, especially food prices, and COVID-19 economic slump followed by devastating impacts of Cyclone Seroja, Timor-Leste's economy rebounded to 2.9% growth in 2021 and is expected to drop and stabilize at 2.2% growth in 2023.

Reportedly, revenues from the petroleum sector account for approximately 70% of the country's GDP and more than 90% of total exports. In fact, historically, it has been covering 80% of the state's annual revenue.¹² The Petroleum Fund Act of 2005 is a policy measure of the government modelled on the Norwegian Government Pension Fund to mitigate social, economic and political impacts and wisely manage Petroleum Fund Revenues.¹³

¹⁰ Trading Economics at: <https://tradingeconomics.com/east-timor/inflation-cpi>

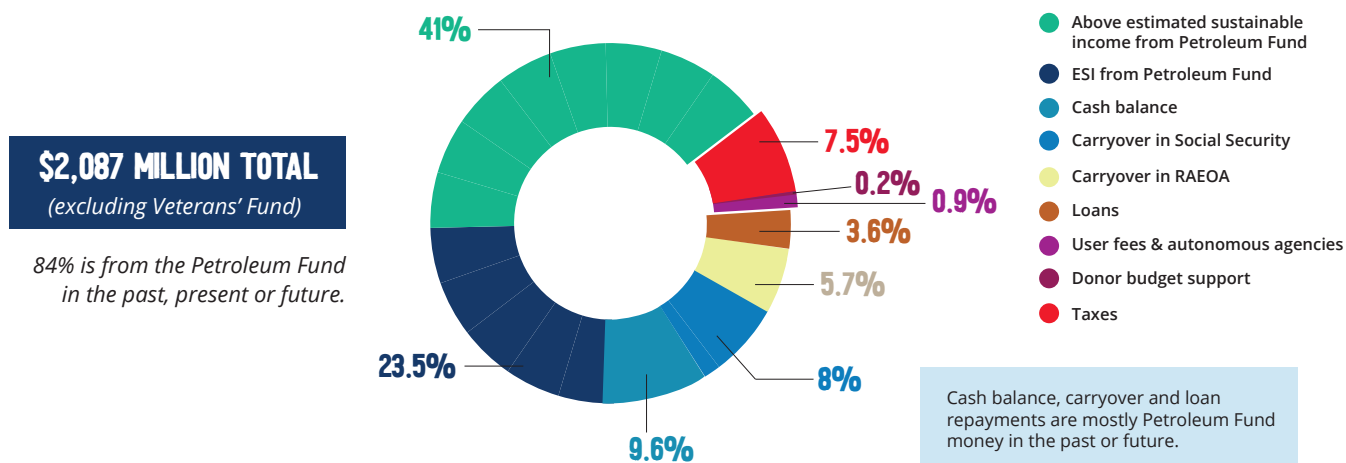
¹¹ WBG. 2022. Timor-Leste Economic Report. Honoring the Past, Securing the Future. World Bank Jakarta and Timor-Leste Offices. December 2022

¹² Neves, Guteriano *Timor Leste's Petroleum Revenues: The Challenges of Managing 'Easy Money'* Heinrich Böll Foundation, Southeast Asia Regional Office, 21 March 2022.

¹³ Law No. 9/2005 of 3 August. Petroleum Fund Law. Preamble contains: "The Petroleum Fund shall contribute to a wise management of the petroleum resources for the benefit of both current and future generations."

Between 2005 and mid-2021, the Petroleum Fund received more than USD 23 billion from revenues and generated more than USD 8.9 billion in investment return.¹⁴ In the current 2023 General State Budget (updated 11 April 2023) of USD 2.087 billion, 84% of the revenue is to be funded from the Petroleum Fund.¹⁵

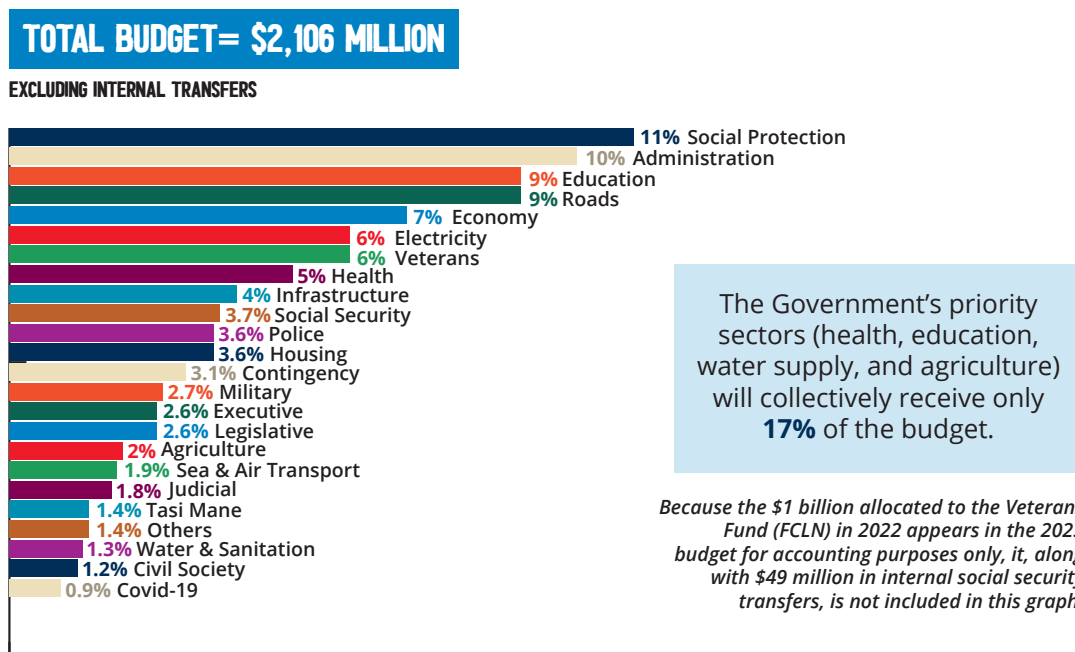
Figure 2: Revenues in proposed State Budget 2023



Graph by La'o Hamutuk based on the proposed State Budget for 2023. October 2022

Source: La'o Hamutuk, 2022

Figure 3: Sector breakdown in proposed State Budget 2023



Source: La'o Hamutuk, 2022

But it is the sector breakdown in the proposed budget 2023 that shows a paltry 2% allocation to agriculture and the government's priority sectors (health, education, water supply and agri-

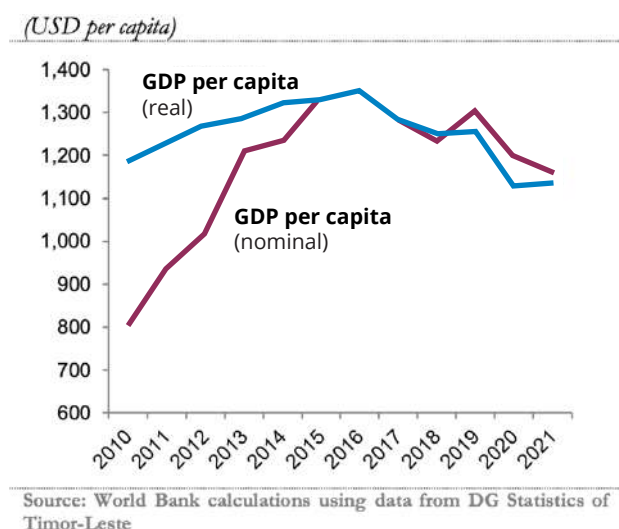
14 Neves ibid.

15 The Timor-Leste Institute for Development Monitoring and Analysis (La'o Hamutuk) at: <http://mail.laohamutuk.org/econ/OJE23/22OGE23.htm>

culture) are getting only 17% of the budget allocation overall. While public spending has been the principal driver of economic growth, it certainly does not look like budget allocations to agriculture will be sufficient to enhance food security anytime soon.

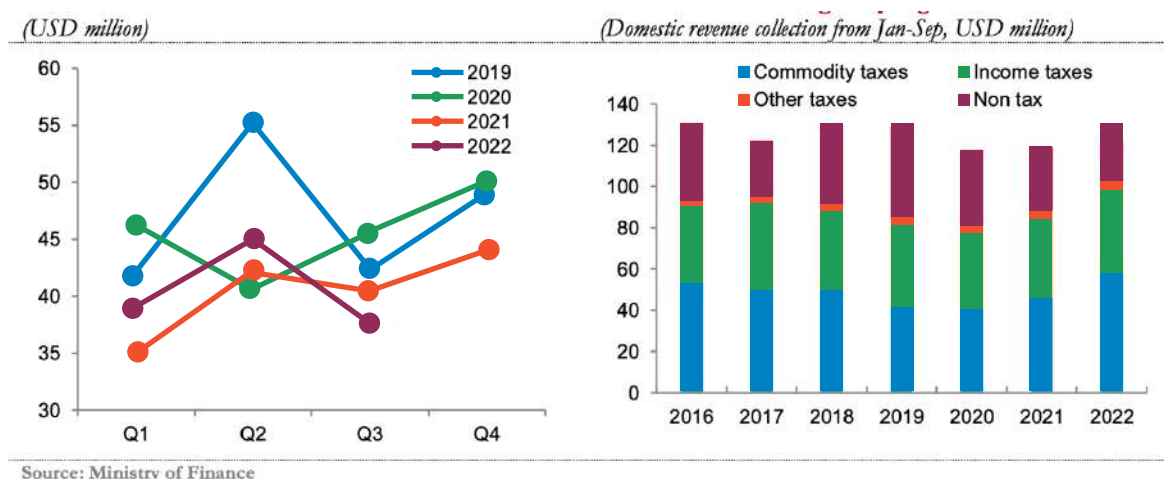
The economy has experienced three years of negative growth in non-oil real GDP (2017, 2018, and 2020). A period of political uncertainty followed by a global health emergency, and a natural disaster (2021) have battered the fragile economy. Non-oil real GDP and GDP per capita have not returned to pre-pandemic levels.¹⁶

Figure 4: Non-oil GDP per capita decline since 2016



By the third quarter of 2022, domestic revenue was on the decline although the year-to-date total revenue collection was marginally higher.

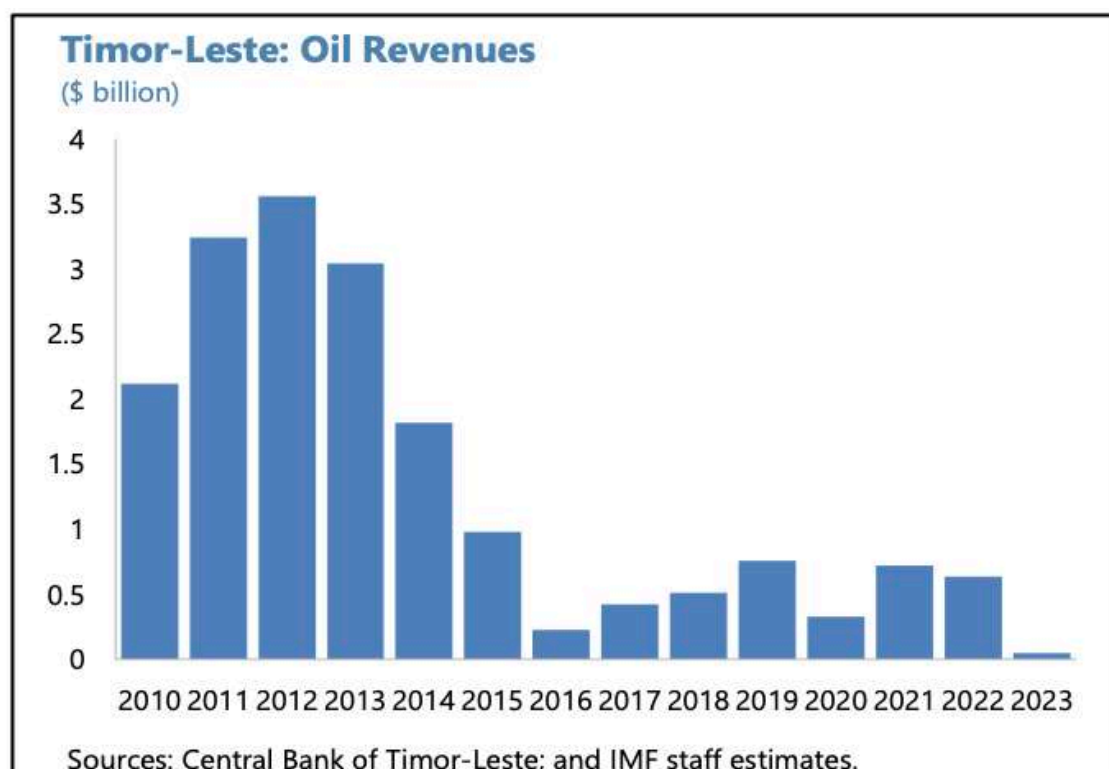
Figure 5: Domestic revenue decline in 3rd Quarter 2022



In the light of a not too rosy situation, it may be prudent for the Government of Timor-Leste to turn the rudder around by increasing budgetary allocations to agricultural growth, thus reducing hunger and malnutrition in the short, medium and long-term. Simultaneously, extending the life of the Petroleum Fund through fiscal consolidation is essential to delay falling off the fiscal cliff as the flow of petroleum revenue is projected to cease shortly (end 2022)¹⁷, unless new oil fields are auctioned for continuation for drilling operations (which is highly likely).

¹⁶ WB. 2022. Timor-Leste Economic Report

¹⁷ Ibid.

Figure 6: Dwindling oil revenues 2023

In: IMF. 2022. Democratic Republic of Timor-Leste. Selected Issues.
IMF Country report No. 22/308. September 2022. Washington D.C.

While the important final section of Lafaek-1 is said to be looking promising¹⁸ the Australian LNG project may shut down as production rates make liquefaction commercially unviable and could instead supply Bayu-Undan gas to the domestic market.¹⁹ But it is reported that between February 2022 and January 2023, Timor-Leste crude oil reserves remained stable at around 14,000 barrels per day.²⁰ Without oil revenues, the Petroleum Fund could be rapidly depleted; however, the Greater Sunrise remains an important source of untapped revenue in the form of deep-water hydrocarbon fields. Nonetheless, as the world undertakes a substantive shift towards renewables, Timor-Leste remains overly reliant on hydrocarbon production for sustaining its economy.²¹

In its key issues to be addressed by the Government of Timor-Leste, the IMF²² has indicated the following priorities:

- transforming the predominantly subsistence-oriented agricultural sector into a commercially viable sector, raising productivity, and enhancing food security;
- improving the business environment and strengthening AML/CFT and anti-corruption effectiveness to foster private investment;
- investing in climate-resilient infrastructure as key to building resilience to natural disasters, as adaptation plans need to be integrated into budgetary planning; and
- accessing external grant-financing.


18 Upstream at: <https://www.upstreamonline.com/exclusive/timor-leste-latest-well-in-landmark-campaign-looks-promising/2-1-1410569>

19 Upstream at: <https://www.upstreamonline.com/lng/australian-lng-project-could-shut-down-within-weeks/2-1-1452932>

20 Koema at <https://knoema.com/atlas/Timor-Leste/topics/Energy/Oil/Crude-oil-reserves>

21 WB. 2022. Timor-Leste. Economic Report

22 IMF. 2022. Democratic Republic of Timor-Leste. 2022 Article IV Consultation-Press Release and Staff Report. IMF Country Report No. 22/307, September 2022, Washington D.C.



The contribution of agriculture to non-oil GDP is estimated at 20% with an estimated 60% of the population employed directly or indirectly in the agriculture sector. Under such circumstances improving agricultural production and increasing productivity is essential. While it will be imperative for the Government of Timor-Leste to raise the budget allocation to agriculture to at least 10% - to enhance production and raise productivity over a sustained period of time -, without expertise in infrastructure, market facilities development, storage, transportation, agribusiness and value chain development, most of the budget increases may come to naught. It is, therefore, important to consider a few focused but intensive interventions in the agriculture sector that could be supported by the government and IFIs to improve food security and reduce malnutrition.

3. Population, poverty and food security

Population and poverty

The 2022 Population and Housing Census recorded a total population clocking at 1,340,434 million of which 678,087 are male and 662,347 are female, reflecting a gender distribution of 102.4 males per 100 females. Between the 2015 Census and 2022 there was an annual growth rate of 1.8%, the highest among Southeast Asian countries.



Table 1: Population 2015-2022

	Municipality	Population 2015 Census	Population 2022 Census
1	Aileu	48,837	54,631
2	Ainaro	63,136	72,989
3	Baucau	123,203	133,881
4	Bobonaro	97,762	106,543
5	Covalima	65,301	73,909
6	Dili	277,279	334,571
7	Ermera	125,702	138,080
8	Liquica	71,927	83,689
9	Lautem	65,240	69,836
10	Manatuto	45,615	50,989
11	Manufahi	53,691	60,536
12	Viqueque	76,033	80,726
13	RAEOA	68,913	80,054
	Total	1,182,639	1,340,434

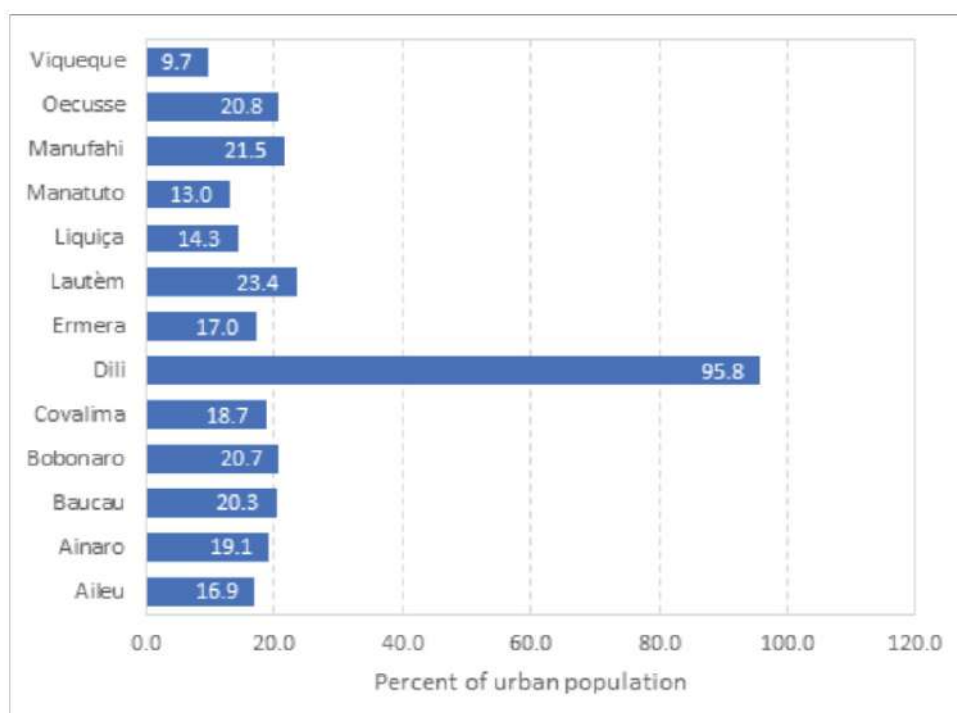
Source: General Directorate of Statistics, Ministry of Finance. 2023.
Timor-Leste Population and Housing Census 2022. Preliminary Results.

Table 2: Population by gender by municipality 2022

Municipality	Sex			Sex ratio
	Male	Female	Total	
Aileu	28,077	26,554	54,631	105.7
Ainaro	37,231	35,758	72,989	104.1
Atauro	5,158	5,144	10,302	100.3
Baucau	67,359	66,522	133,881	101.3
Bobonaro	53,579	52,964	106,543	101.2
Covalima	37,472	36,437	73,909	102.8
Dili	163,978	160,291	324,269	102.3
Ermera	69,893	68,187	138,080	102.5
Lautem	34,647	35,189	69,836	98.5
Liquica	42,361	41,328	83,689	102.5
Manatuto	25,926	25,063	50,989	103.4
Manufahi	31,387	29,149	60,536	107.7
Oecusse	40,794	39,932	80,726	102.2
Viqueque	40,225	39,829	80,054	101
Timor-Leste	678,087	662,347	1,340,434	102.4

Source: General Directorate of Statistics, Ministry of Finance. 2023.
Timor-Leste Population and Housing Census 2022. Preliminary Results.

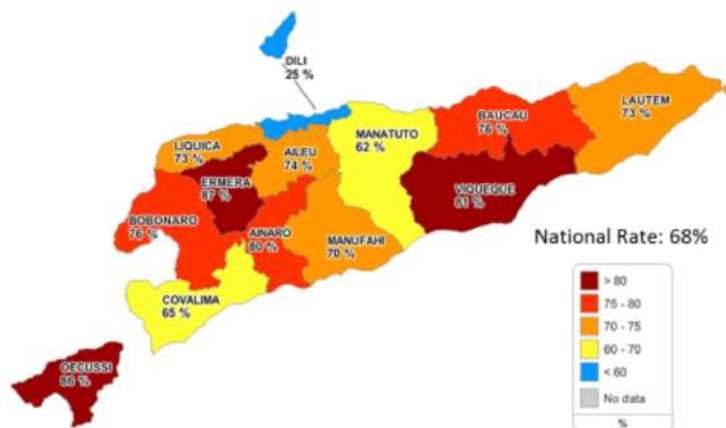
Except for Dili, all other municipalities show a majority of the population living in rural areas.

Figure 7: Percentage of population in urban areas, 2022

Source: General Directorate of Statistics, Ministry of Finance. 2023.
Timor-Leste Population and Housing Census 2022. Preliminary Results.

Based on the 2014 National Poverty Line, which is \$1.54 per person per day or \$46.37 per person per month, the poverty headcount is 41.8% using the 2007 Survey of Living Standards. This has been challenged by some using the Demographic and Health Survey for 2009/2010²³ to estimate multidimensional poverty to be at 68% of the national population.

**Figure 8: Multidimensional Poverty
Poverty Rate by District (DHS 2010)**

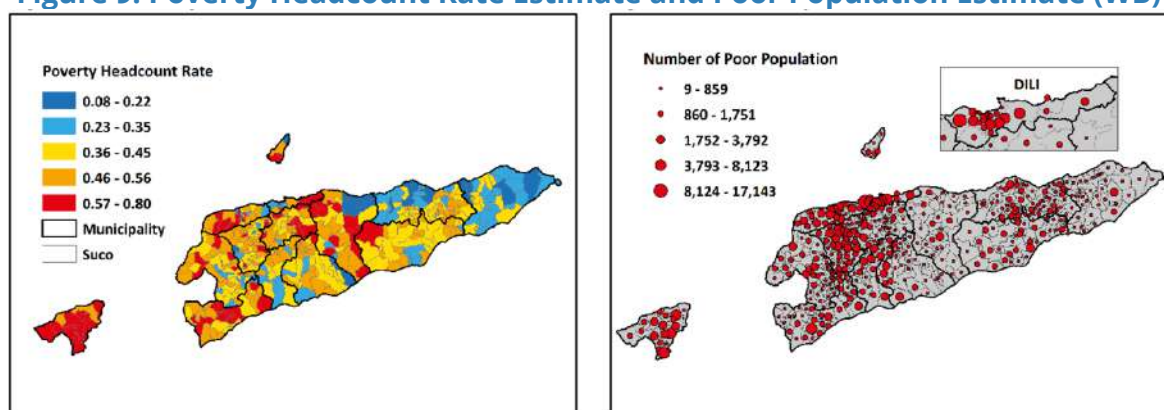


Source: Inder, Brett at: <http://monashintimor.blogspot.com/2016/05/confused-about-poverty-measures-for.html>

The 2010 Human Development Report introduced the Multidimensional Poverty Index (MPI) and since 2018 the Human Development Report Office (HDRO) and the Oxford Poverty and Human Development Initiative jointly produce and publish the MPI estimates.²⁴

In 2019, the World Bank developed a *Gender-Sensitive Poverty Mapping for Timor-Leste*,²⁵ which employed a small area estimation (SAE) approach to link the data in the 2015 Population and Housing Census with the 2014 Survey of Living Standards and the 2016 Demographic and Health Survey. These exercises were complemented by suco-level sex-disaggregated maps of indicators to produce suco-level poverty maps.

Figure 9: Poverty Headcount Rate Estimate and Poor Population Estimate (WB)



Source: World Bank. 2019. Gender-Sensitive Poverty Mapping for Timor Leste

23 Inder, Brett. 2016. Confused about Poverty Measures for Timor Leste? May 18, 2016. Monash in Timor Blog: Ekonomi aba Komunitade

24 UNDP. 2022. Multidimensional Poverty Index. Unpacking deprivation bundles to reduce multidimensional poverty. Briefing note for countries.

25 WB. 2019. Policy Note – Gender-Sensitive Poverty Mapping for Timor-Leste, Washington D.C.

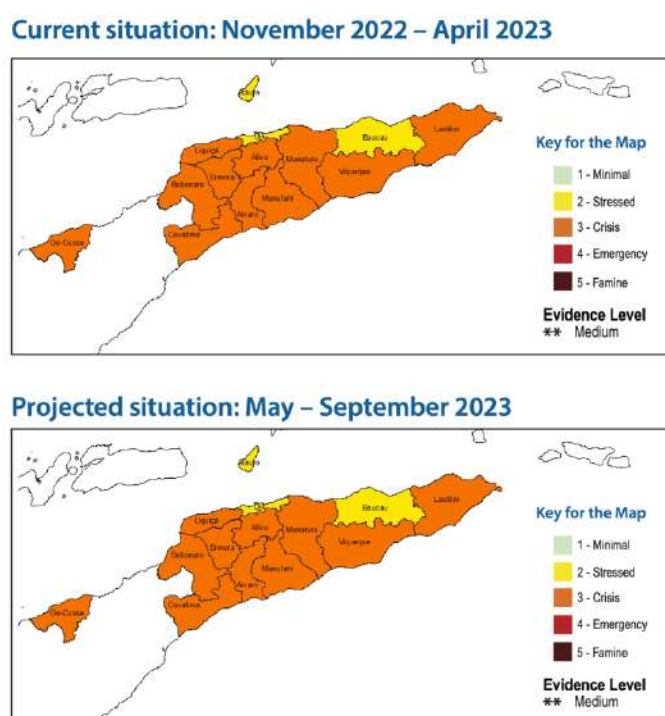
Poverty headcount rates are much higher in western areas. They reveal that there is more variation in poverty rates within municipalities. For example, while the Dili municipality-level poverty rate is at 29%, its suco-level rates range between 8 to 80%. Almost 16 percent of census households across Timor-Leste are female headed. The 2014 TLSLS indicates that female headed households (FHHs) are less likely to be poor than male-headed households (MHHs).²⁶

The 2015 Census (GDS 2015) estimated 70 percent of the population to have been living in rural areas. In 2022, except for Dili where over 95% live in the urban area, the majority of the population in other municipalities (76.1%) are still rural-based, which means that two-thirds of Timorese households still practice agriculture.

Food Security

IPC Acute Food Insecurity Analysis²⁷ classifies 286,000 (21%) people in crisis by April 2023 and 13,000 (1%) people in emergency out of a population of 1.34 million. Overall, **44% of the population finds itself in a stressed situation (i.e. chances are highly likely that some may slip into the crisis phase)**. The three consecutive crises – COVID-19 (starting in 2020), cyclone Seroja (2021), and the food prices crises following the outbreak of Russia-Ukraine armed conflict (2022) - have jeopardized achievement of SDGs by 2030. According to the 2021 Socio-Economic Impact Assessment (SEIA-2) Report²⁸ led by UNDP, the Ministry of Finance, and the General Directorate of Statistics (GDS), COVID-19 has significantly diminished household income levels, harvests, livelihoods, and purchasing power.

Figure 10: Projected IPC Acute Food Insecurity Situation



26 WB. 2016. Poverty in Timor-Leste 2014. Washington, DC at: <http://documents.worldbank.org/curated/en/577521475573958572/Poverty-in-Timor-Leste-2014>

27 IPC.2023. Integrated Food Security Phase Classification. Timor-Leste. IPC Acute Food Insecurity Analysis

28 UNDP. 2021. Socio-Economic Impact Assessment of COVID-19 in Timor-Leste. Round 2, 2021.

In the period November 2022 – April 2023, the Acute Food Insecurity Analysis (IPC), which is a standardized, global scale that provides strategically relevant information to prevent, mitigate or decrease severe food insecurity threatening lives or livelihoods in the short term, classifies 22% (300,000 people) of the total population in IPC Phases 3 or 4 (Crisis or Emergency).

Table 3: Acute Food insecurity Phases (IPC) November 2022 – April 2023

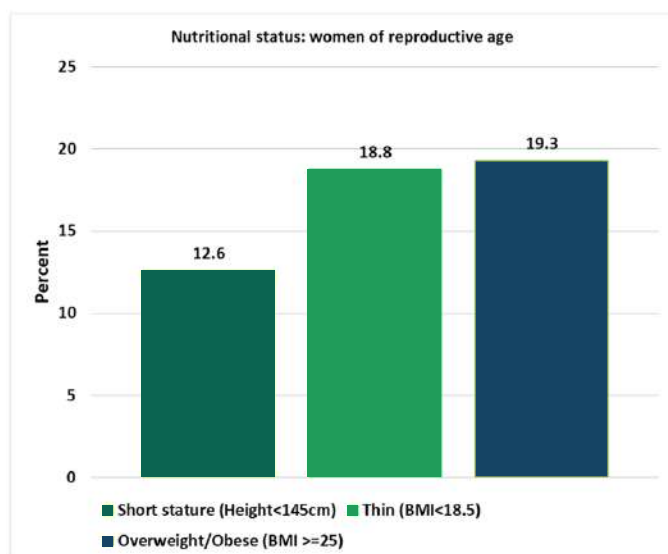
Current population table: November 2022 - April 2023												
			Phase 1		Phase 2		Phase 3		Phase 4		Phase 3+	
Municipality	Area Phase	Total # (pp)	# of people	%	# of people	%	# of people	%	# of people	%	# of people	%
Aileu	3	54,631	16,389	30	24,584	45	13,658	25	0	0	13,658	25
Ainaro	3	72,989	25,546	35	32,845	45	14,598	20	0	0	14,598	20
Atauro	2	10,302	5,666	55	3,091	30	1,545	15	0	0	1,545	15
Baucau	2	133,881	40,164	30	73,635	55	20,082	15	0	0	20,082	15
Bobonaro	3	106,543	42,617	40	42,617	40	21,309	20	0	0	21,309	20
Covalima	3	73,909	22,173	30	29,564	40	18,477	25	3,695	5	22,172	30
Dili	2	324,269	113,494	35	162,135	50	48,640	15	0	0	48,640	15
Ermera	3	138,080	34,520	25	55,232	40	41,424	30	6,904	5	48,328	35
Lautem	3	69,836	27,934	40	24,443	35	17,459	25	0	0	17,459	25
Liquica	3	83,689	29,291	35	29,291	35	25,107	30	0	0	25,107	30
Manatuto	3	50,989	20,396	40	15,297	30	12,747	25	2,549	5	15,296	30
Manufahi	3	60,536	21,188	35	24,214	40	15,134	25	0	0	15,134	25
Oe-cusse	3	80,726	36,327	45	24,218	30	20,182	25	0	0	20,182	25
Viqueque	3	80,054	24,016	30	40,027	50	16,011	20	0	0	16,011	20
Grand Total		1,340,434	459,721	34.30	581,193	44	286,373	21.36	13,148	0.98	299,521	22.35

During this period, which corresponds to the lean season, 34% of the population is classified in Phase 1 (No Acute Food Insecurity), 44% in IPC Phase 2 (Stressed), 21% in IPC Phase 3 (Crisis) and 1% in IPC Phase 4 (Emergency). Out of 14 municipalities, 11 (Aileu, Ainaro, Bobonaro, Covalima, Ermera, Lautem, Liquica, Manatuto, Manufahi, Oe-cusse, and Viqueque) are identified as Crisis (IPC Phase 3), while three (Atauro, Bacau, and Dili) are classified in IPC Phase 2 (Stressed).²⁹

These observations are in line with the findings of WFP's Food Security Assessment Survey conducted in 2022. According to the 2020 TL-Rapid Food Security Assessment (TL-RFSA) led by MAF, Mercy Corps, and Oxfam, households rely on agriculture (92%), livestock (53%) and pensions (18%). Household savings and food stocks were limited prior to the storm and floods. With little cash savings and hardly any crops or other food stocks stored at household level, it becomes extremely difficult for rural households to cope with crises. As 66% of the total population relies on agriculture-based activities³⁰ it is imperative to increase investments in the agriculture sector, particularly targeting households, improving home gardens, water security, food processing, and increasing shelf-life and household storage.

²⁹ UN. 2023. IPC Acute Food Insecurity Analysis. Timor-Leste 2022-2023.

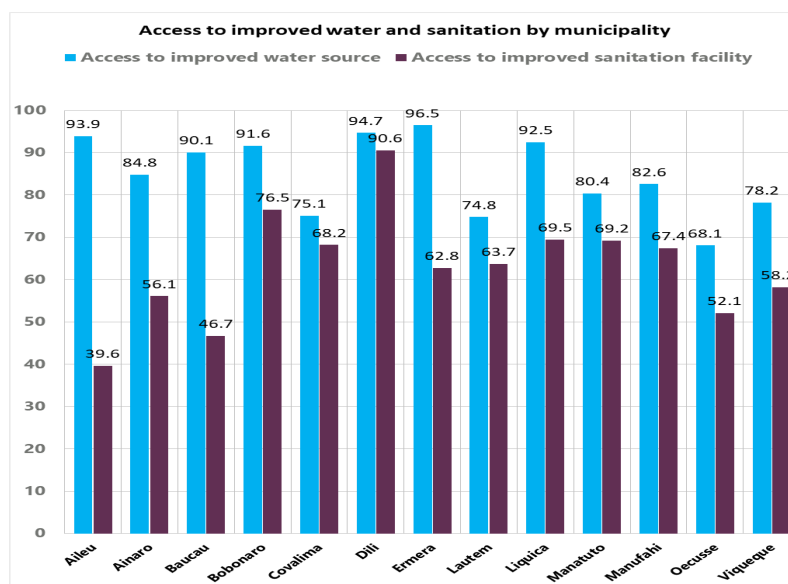
³⁰ MAF. 2019. Timor-Leste Agriculture Census.

Figure 11: Nutritional status of women 15-49 years

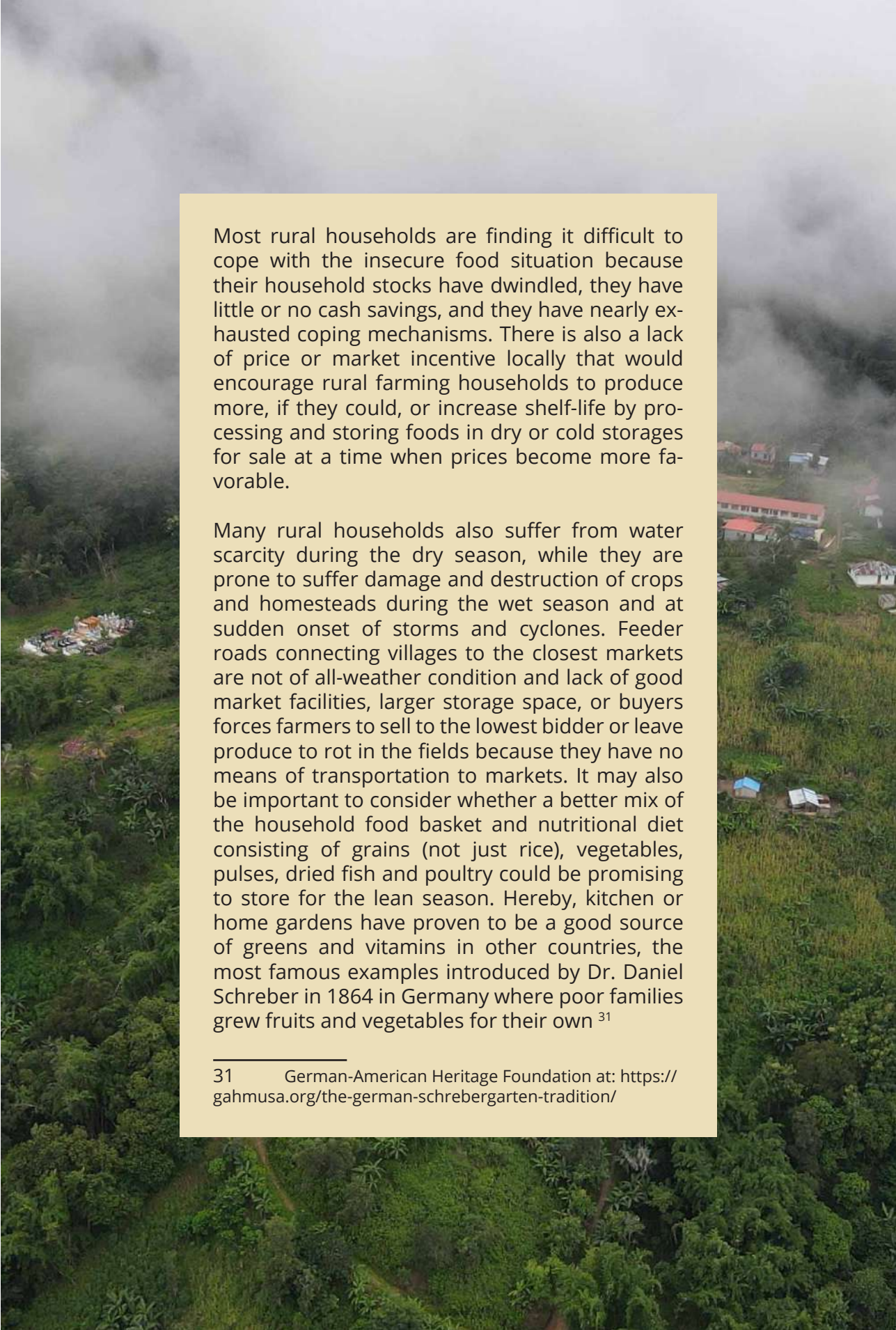
- Women 15-19 yrs are taller than women from older age (30-49 years)
- Women living in rural areas were thinner compared to urban
- Women living in rural areas has short stature than those in urban areas
- Adolescents are thinner compared women > 20 years
- Overweight/obesity is higher among women above 30 years and those living in urban
- Overweight/obesity has increase 4 times from 2013 (from 5.1% to 19.3%)
- Overweight/Obesity is higher among highest wealth quintiles

Source: Ministry of Health. 2020. Timor-Leste Food and Nutrition Survey 2020. Preliminary Findings. 27 November 2020

The nutritional status of women aged 15-49 years shows marked generational differences as well between rural and urban areas. Younger women aged 15-19 years are taller than women from older ages (30-49 years), and women from rural areas are thinner and have a shorter stature compared to urban areas. Overweight and obesity has increased four times since 2013 (from 5.1% to 19.3%) in urban areas. Moreover, access to improved water and sanitation across municipalities has also led to improved health status of men and women in rural areas.

Figure 12: Access to water and sanitation

Source: Ministry of Health. 2020. Timor-Leste Food and Nutrition Survey 2020. Preliminary Findings. 27 November 2020



Most rural households are finding it difficult to cope with the insecure food situation because their household stocks have dwindled, they have little or no cash savings, and they have nearly exhausted coping mechanisms. There is also a lack of price or market incentive locally that would encourage rural farming households to produce more, if they could, or increase shelf-life by processing and storing foods in dry or cold storages for sale at a time when prices become more favorable.

Many rural households also suffer from water scarcity during the dry season, while they are prone to suffer damage and destruction of crops and homesteads during the wet season and at sudden onset of storms and cyclones. Feeder roads connecting villages to the closest markets are not of all-weather condition and lack of good market facilities, larger storage space, or buyers forces farmers to sell to the lowest bidder or leave produce to rot in the fields because they have no means of transportation to markets. It may also be important to consider whether a better mix of the household food basket and nutritional diet consisting of grains (not just rice), vegetables, pulses, dried fish and poultry could be promising to store for the lean season. Hereby, kitchen or home gardens have proven to be a good source of greens and vitamins in other countries, the most famous examples introduced by Dr. Daniel Schreber in 1864 in Germany where poor families grew fruits and vegetables for their own³¹

³¹ German-American Heritage Foundation at: <https://gahmusa.org/the-german-schrebergarten-tradition/>

4. Priorities

Government of Timor-Leste

Timor-Leste's Strategic Development Plan (SDP) 2011-2030³² emphasizes building of its social capital, education and training, improving health, and social inclusion. It is an integrated package of strategic policies that set out a pathway to long-term, sustainable, inclusive development. The SDP is the primary vehicle for achieving the SDGs; however, Timor-Leste's progress towards the SDGs requires consolidation and rapid acceleration.³³ The SDP calls for food self-sufficiency and more nutritionally balanced diets; it has laid out some specific targets to be achieved by 2030. These are worth noting here as the food systems assessment contained in this report recommends some important interventions and investments that should be considered in the light of supporting achievement of **SDP priority targets**. Recommendations include the following:

- Tonnage for rice (grain adjusted for losses) will have increased from 37,500 tonnes to 61,262 tonnes;
- The area of irrigated rice will have increased by 40% from 50,000 ha to 70,000 ha;
- Average maize yields will have increased to 2.5t/ha;
- On-farm rice storage losses will have reduced from 20% to about 5%;
- Coffee production will have doubled following the rehabilitation of 40,000 hectares of coffee plantations; and
- The Timor-Leste Research and Development Institute will be guiding and planning additional investment into research, development and extension for all major agricultural sub-sectors.

The Economic Recovery Plan 2020 of the Government of Timor-Leste states: "A strong agricultural sector will be the key to improving food security and protecting our economy from future crises. The threat of COVID-19 has taught us to place greater importance on high food production, to meet the population's basic needs and to ensure that there is sufficient and affordable food for citizens."³⁴ Thus, the Economic Recovery Plan 2020 has underlined the need to make Timor-Leste's economy more resilient to withstand future shocks. The ERP also identifies measures by sector, inter alia **agriculture**, which should receive increased budget support. Selective important measures mentioned below are in line with what the food systems assessment is proposing, such as to:

- Encourage national production, through seeds supply and market/support to the production flow guarantee (a program of State purchase and production distribution);
- Create "productive seed banks" and make them available to farmers;
- Intensify the use of power tillers (but not tractors) in rice cultivation;
- Encourage planting of trees for firewood to avoid indiscriminate logging; improve the quality of rural extension; introduce livestock education;
- Develop forestry exploration, namely sandalwood and teak, supported by the law approved in 2017;
- Set a renewal policy of Timor-Leste's coffee plantation, with subsidies for growers who replace old plants with newer and more productive ones; and
- Support the private sector in increasing meat production, with animal confinement and health control.

32 GoTL. 2010. Timor-Leste. Strategic Development Plan 2011-2030

33 UNSDCF.2021. Timor-Leste 2021-2025

34 GoTL. 2020. ERP Section 2.3.1.1 Agriculture and Food and Cash Crops

The IPC Acute Food Insecurity Analysis³⁵ classified 286,000 (21%) people in crisis by April 2023 and 13,000 (1%) people in emergency from a population of 1.34 million. The Government has committed to a Food Systems Pathway at the Food Systems Summit in 2021.³⁶ The Food Systems Pathway Commitment of the Government of Timor-Leste identifies: (i) Production; (ii) Transport and Warehousing; (iii) Processing; (iv) Distribution; and (v) Consumption as main areas requiring interventions and investments to address challenges effectively and sustainably transform its food systems across all demographic groups. The Food Systems Pathway Commitment and school meal coalition targets to: (i) Increase coverage of the national school feeding program from 150,000 to 300,000 children in five years; (ii) Promote Home-Grown School Feeding, linking schools and local agricultural production; and (iii) Increase universal access to health services for 55% and 100% of children under five and pregnant and lactating women, respectively.

In order to achieve the above-mentioned priority targets, Timor-Leste needs financial support to: (i) continue and expand the national

school feeding program across the country; (ii) establish a grain reserve that can be used to buffer against price shocks; (iii) rehabilitate and make operational warehousing capacity of up to 300,000 metric tons, spread out geographically around the country, thus reducing transport costs; (iv) increase milling capacity for fortified rice and other cereals; and (v) establish Home-Grown School Feeding agricultural production / agri-food production centers across the country (selective grouping of productive sucos and post-administratives) for provision of secure water supply and seeds, increased production of nutrient-rich foods, capacity building in food processing with timely delivery in reliable quantity and to standards of food safety establish by government. These priority financing interventions can be augmented by development agency support (including investment projects through IFIs) to improve agricultural productivity, reduce post-harvest losses, improve access to markets, improve storage (at household level and markets), and link profitable value chains among producer associations, wholesalers and retailers (including use of contract grower arrangements).



35 IPC.2023. Integrated Food security Phase Classification. Timor-Leste. IPC Acute Food Insecurity Analysis
36 GoTL.2021. Food systems Pathway Commitment and Position Statement



The United Nations

The United Nations Sustainable Development Cooperation Framework (UNSDCF) in its Joint Steering Committee Meeting on April 13, 2023 has confirmed under Result Group 1 (RG) on Nutrition, Food Security and Sustainable Agriculture that the UN will (i) present to government investment cases prioritizing nutrition-specific and -sensitive interventions linked to food systems; (ii) continue to support MAF in building their capacity to scale up climate-smart agriculture (CSA) practices, and improving the efficiency of fishing and aquaculture farming. Together as One UN under the UNSDCF with contributions from 20 UN agencies, it completed two years of coherent, effective and efficient support to the people of Timor-Leste.³⁷

Other Stakeholders and partners:

Diverse stakeholders, including prominent IFIs such as the World Bank or the Asian Development Bank (ADB) or other traditional donors such as USAID, the European Union (EU), JICA, KOICA, and China (amongst others) are active in the development / improvements of food systems in Timor-Leste. These stakeholders bring experience from different countries, resources and expertise. Historically, IFIs like the World Bank and ADB have played crucial roles in supporting Timor-Leste's development efforts. The World Bank, for instance, has focused on initiatives ranging from agriculture and rural development to social protection and governance, contributing to the country's overall economic growth and poverty reduction. ADB's involvement has been marked by investments in key sectors such as infrastructure, energy, and water supply, bolstering essential services and enhancing livelihoods. Similarly, donors like USAID and the EU have supported various initiatives aimed at strengthening education, health, governance, and economic growth, including food security. USAID's interventions have included programs that promote sustainable agriculture, while the EU has provided support for rural development, governance, and infrastructure projects, contributing to Timor-Leste's sustainable development objectives. All these projects are aligned to the purpose of this food systems assessment as well as to the proposed interventions.

International NGOs such as Care International, World Vision, CRS, Mercy Corps, OXFAM, Plan International etc... have demonstrated their commitment to the nation's development through projects that target vulnerable communities, with a variety of projects focused on enhancing livelihoods and food systems, community development, agricultural projects, with the overall objective of addressing high levels of food insecurity and malnutrition. The involvement of these stakeholders in partnerships with the government of Timor-Leste and the agencies of the United Nations can create a powerful platform for improvements of the food system in Timor.

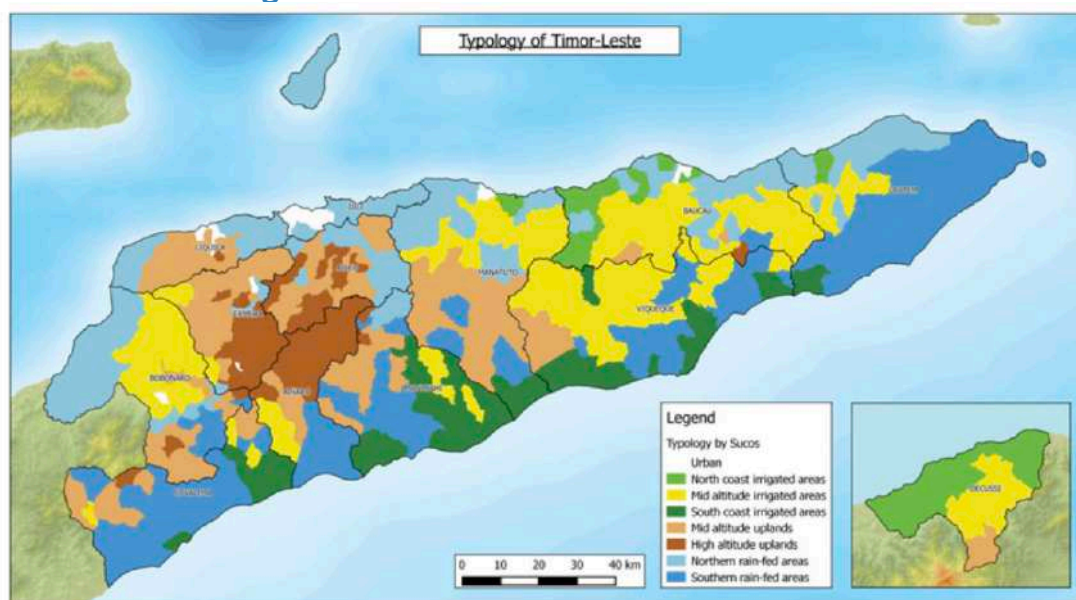
5. Agro-ecological zones and soils

As two crustal plates continue to converge, the island of Timor is being thrust upwards. This results in very steep slopes representing the equilibrium between geological uplift and erosion, with exceptionally high sediment loads in the rivers. About 44 percent of the land has a slope of 40 percent or greater, and a major portion of this slope has only a thin cover of productive soil.³⁸

Extensive steep slopes and high rainfall lead directly to extensive soil creep and downhill slumping and soil erosion, which often gives rise to major landslides in severe cases. The country is very mountainous, with four peaks above 2200 m within an area approximately 240 km long by 60 km wide. The wide topographic diversity of Timor-Leste supports a wide range of crops despite its small area.³⁹ Unsustainable slash and burn farming practices on steep slopes are a common feature.



Figure 13: Livelihood Zones of Timor-Leste



Source: Williams Robert L. et al 2018

³⁸ Thomson, S.J. 2011. Geology and Soils in Timor-Leste

³⁹ Williams, Robert L. et al. 2018. An Approach to Characterize Agricultural Livelihoods and Livelihood Zones using National Census Data in Timor-Leste in: *Expl Agric* (2018) 54(6), pp.857-873

6. Production

Food Crops

The Agriculture Census of 2019⁴⁰ reports the total area cultivated in that year was 509,226 ha with 13 major crops accounting for 70% of total area cropped; corn 18%; rice 7.6%; cassava 7.4%; coffee 6.3%; coconut 5.8%; banana 5.4%; teak 4.2%; mango 3.6%; sweet potatoes 2.8%; papaya 2.4%; candlenut 2.1%; taro 2.0%; and Areca nut 1.9%. The remaining 56 crops and plants account for 30% of the gross cultivated area. In 2021, MAF reported⁴¹ that the cultivated 30,529 ha of rice only reflected 38% of potential rice area, while the area not cultivated was estimated at 50,050 ha or 62% of potential rice area.

The latest census (2022) has recorded changes in crop production across the country shown in the below table. Current production levels of two staple crops, maize and rice, provide 68kg of maize and 106kg of rice per capita. In spite of steady increases in production of rice and maize, there is a deficit in rice production of 56,281mt and 7,886mt in maize. Herein is significant room for improvement and should be one of the top priorities.

Table 4: Rice and Maize-production and consumption 2018-2022

Crops	2018	2019	2020	2021	2022
Rice production	40,275	53,600	49,983	72,081	85,805
Rice annual consumption	125,360	125,360	125,360	125,360	142,086
Rice deficit/surplus	- 85,085	- 71,760	- 75,377	- 53,279	- 56,281
Maize production	83,643	119,167	77,606	85,627	86,037
Maize annual consumption	80,419	80,419	80,419	80,419	93,923
Maize deficit/surplus	3,224	38,748	- 2,813	5,208	- 7,886

Source: Ministry of Agriculture and Fisheries (unpublished census data 2023).

The unofficial figures of 2022 show a steady growth in production of rice and maize. The annual consumption of rice for 2022 is estimated at 142,086 tons, while that of maize is at 93,923 tons. This indicates a deficit of rice by **-56,281** tons and maize by **-7,886** tons. The deficits in rice and maize production in 2022 do not show a very large shortfall, although good production figures may have been due to early onset of rains in 2021. Productivity remains low compared to other countries in the region⁴². Average productivity for maize in 2021 was estimated at 2.6 tons per ha, ranging from 1.6 tons in RAE OA to 3.3 tons in Manufahi municipalities. Average rice productivity is estimated at 1.8 tons/ha, ranging from 1.2 tons in Lautem to 2.1 tons in Covalima and Manufahi (or 2.0 to 3.5 tons/ha of paddy).

The 2021 FAO crop and food supply assessment mission (CFSAM)⁴³ estimated the 2021 crop production areas and assessed the impacts of the tropical storm and outbreaks of the Fall Armyworm (FAW) and the African Swine Fever (ASF) on the agriculture sector. FAO estimated average productivity of maize at municipality level in 2021 to be 2.6 tons per hectare, ranging from 1.6 tons in RAE OA to 3.3 tons in Manufahi. Average rice productivity is estimated at 1.8

40 GDS. 2020. Timor-Leste Agriculture Census 2019. National Report on Final Census Results.

41 MAF cited in: WFP.2022. "Strategic Grain Reserve in Timor-Leste" Presentation by David McKee.

42 FAO.2021. Special Report. 2021 FAO Crop and Food Supply Assessment Mission (CFSAM) to the Democratic Republic of Timor-Leste.

43 FAO. 2021. Special Report. 2021 FAO Crop and Food Supply Assessment Mission (CFSAM) to the Democratic Republic of Timor-Leste. 16 June 2021. Rome

tons per hectare, ranging from 1.2 tons in Lautem to 2.1 tons in Covalima and Manufahi (or 2.0 to 3.5 tons per hectare of paddy with milling rate of paddy at 60 percent).

The overall crops, vegetables, livestock, fish, and crustacean production is improving except in areas where the FAW or ASF had an impact in 2021. This can be seen from the below table. It seems, however, that between 2020-2022, production of water spinach, eggplant, garlic, onion, chili, cucumber, and lettuce suffered setbacks in production (also due to COVID-19 measures). With livestock, the populations of pigs and Balinese cattle decreased significantly. While production of beans went down, mung beans spiraled up manifold.

Table 5: Crop production 2018-2022

Production (tons/livestock heads)						Data availability
	2018	2019	2020	2021	2022	
Rice	40.274	53.600	49.983	72.081	85.805	ALL MUNICIPALITIES
Maize	83.643	119.167	77.607	85.627	86.037	ALL MUNICIPALITIES
Peanuts	2.296	1.863	2.014	1.905	2.504	Bobonaro, Covalima, Liquica, Lautem
Long Beans	3.062	4.270	3.164	3.257	3.289	Bobonaro, Ermera, Oecusse
Mung Beans	3.538	3.665	3.279	3.375	88.610	Bobonaro, Covalima, Ermera, Liquica, Lautem, Viqueque
Beans	19.622	27.588	280	352	370	Bobonaro, Covalima, Ermera, Liquica, Lautem
White Mustard	7.943	7.066	2.755	3.557	2.540	Bobonaro, Covalima, Liquica, Lautem, Viqueque
Black Mustard	190	165	152	176	165	Bobonaro, Liquica, Lautem
Water Spinach	118	34	5.532	36	-	Bobonaro, Liquica, Viqueque
Eggplant	126	18				Covalima
Garlic	8	55				Covalima
Onion	3.423	2.908				Covalima
Chilli	73	38				Covalima
Cucumber	305					Covalima
Lettuce		18				Covalima
Cabbage	7.061	5.002	-	7.000	7.750	Bobonaro, Covalima, Liquica
Buffalo	61.889	58.973	58.612	57.003	52.617	Aileu, Ainaro, Bobonaro, Covalima, Dili, Ermera, Lautem, Viqueque
Balinese cattle	112.961	112.478	124.707	104.092	73.219	Aileu, Ainaro, Bobonaro, Covalima, Dili, Ermera, Lautem, Viqueque
Domestic Goat	64.911	62.037	45.541	46.291	31.850	Aileu, Ainaro, Bobonaro, Covalima, Dili, Ermera, Lautem, Viqueque
Sheep	11.514	9.224	7.634	7.758	6.474	Aileu, Covalima, dili, Ermera, Lautem, Viqueque
Pig	201.318	163.113	96.311	97.504	76.930	Aileu, Ainaro, Bobonaro, Covalima, Dili, Ermera, Lautem, Viqueque
Local chicken	454.196	410.518	338.270	-	-	Aileu, Ainaro, Bobonaro, Covalima, Dili, Ermera, Lautem, Viqueque
Horse	17.688	18.906	18.488	-	-	Aileu, Ainaro, Bobonaro, Covalima, Dili, Ermera, Lautem, Viqueque
Fresh water fish	273.418	464.164	147.857	289.596	148.225	Bobonaro, Ermera, Lautem
Salt water fish	3.071	2.471	2.824	3.997	3.679	Bobonaro, Lautem
Shrimp	10.127	9.655	6.247	13.341	15.341	Bobonaro

Source: Ministry of Agriculture and Fisheries (unpublished census data 2023)

Constraints. According to FAO⁴⁴, the main factors affecting agricultural productivity in Timor-Leste are the following:

- **Very low use of farming inputs:** The use of fertilizers and improved seeds is marginal, and farmers rely on shifting agriculture and burning biomass before planting to boost yields. However, this practice has a great environmental cost and yields decline every year due to land degradation, prompting farmers to move and slash new forest or bush land.
- **Lack of mechanization:** Farming is essentially hand-powered and several farm operations, such as weeding, are often not implemented on time.
- **Inadequate irrigation systems:** The deterioration of irrigation infrastructures due to recurring flash floods, silting up of canals and the lack of effective management of water resources by the users is limiting paddy yield increases.
- **Limited access to markets:** Lack of processing equipment, high transportation costs and fragmented aggregation systems result in high transaction costs for local farmers whose products compete with imported food commodities (rice, maize grit, and beans) that benefit from very low import tariffs. As a result, the national agricultural sector attracts limited investments which, coupled with limited agricultural inputs, leads to low outputs.

Post-harvest losses

FAO carried out two studies, one on rice⁴⁵ and one on maize⁴⁶, to estimate percentage of post-harvest losses in Timor-Leste. Losses occurred at all stages of the selected rice supply chains; critical loss points (CLP) identified were the stages of harvesting (3.5%), threshing (5%), milling (10%) and storage (5%) at the warehouse, with total losses of paddy rice estimated at 21 percent⁴⁷ equivalent to a loss of US\$350 per farmer. In the case of maize, where CLPs are harvesting (5.5%), drying (2.5%) and farm storage (2.5%), the total estimated losses are at 15.4 percent of total annual maize production equivalent to US\$98 per farmer.⁴⁸ Currently there is no data available on post-harvest losses of fruits and vegetables. However, most of the causes of losses of rice and maize are attributable to: lack of labor and equipment, rain during harvesting, inadequate or inefficient harvesting or production practices, lack of drying and storage facilities, poor management of these facilities, lack of transport equipment and poor road conditions. In addition there are quantitative and qualitative losses due to moulds, damage by rodents and chickens, spillage and germination.⁴⁹

In addition to post-harvest losses, the limited availability of arable land coupled with land degradation (on arable soils as well as on steep slopes and watersheds) lead to removal of fertile topsoil. Inadequate storage at farming household levels as well as inadequate dry and cold storages in the markets, poor condition of farm-to-market roads, and weakly developed value chains inhibit a nationwide boost in production and productivity. Agricultural extension, technical assistance with irrigation, feeder roads, and market infrastructure are essential to assist Timorese farmers in their quest for sustainable growth.

44 FAO. 2021. Special Report. 2021 FAO Crop and Food Supply Assessment Mission (CFSAM) to the Democratic Republic of Timor-Leste. 16 June 2021. Rome

45 FAO. 2018. Food loss analysis: causes and solutions. Case study on the rice value chain in the Democratic Republic of Timor-Leste

46 FAO. 2018. Food loss analysis: causes and solutions. Case study on the maize value chain in the Democratic Republic of Timor-Leste

47 FAO. 2018. Food loss analysis. Rice *ibid*.

48 FAO. 2018. Food loss analysis. Maize *ibid*.

49 FAO. 2018. *Ibid*.

Indicative interventions that could be considered are as follows:

- Promote pooling of cultivable land to improve land preparation, inputs, irrigation, and harvesting;
- Increase use of certified seeds/seed multiplication, hybrid crops;
- Increase use of fertilizers;
- Increase mechanization;
- Rehabilitate and maintain irrigation infrastructure (also small irrigation schemes that have fallen into disuse);
- Increase availability of processing equipment, promoting processing technology, and capacity building;
- Improve local markets, facilities and storage (dry and cold);
- Promote farmer groups/associations that deliver to local markets to bulk storage;
- Attract value chain buyers to local markets, promoting market information and agriculture product price information (seasonal and out-of-season) and bulk purchases;
- Establish system of permanent agriculture statistics;
- Conduct market data collection and statistical integration; and
- Attract development agency funding / co-financing.

Cash crops: Coffee

Coffee is the most important agricultural cash crop in Timor-Leste. The average annual production is estimated at 88,000 kgs (in 60kg bags)¹, which ranks 37th in world production. The common Arabic varieties grown are: Catimor, Typica, and Timor Hybrid (Hibrido de Timor). The key coffee growing areas are Ermera, Ainora, Aileu and Same. Coffee is believed to have been first cultivated in Timor-Leste in the 17th century. As early as 1860, coffee accounted for at least 50% of the total export value. The National Coffee Sector Development Plan 2019-2030² was prepared by the Ministry of Agriculture and Fisheries with the support of a diverse group of stakeholders and ADB.

¹ Sucafina Specialty at: <https://sucafina.com/apac/origins/timor-leste?price=USD>

² Ministry of Agriculture and Fisheries. 2019. National Coffee Sector Development Plan 2019-2030

Table 6: Percentage of HH growing coffee and estimated coffee growing area, 2016

District	Percentage of households that grow coffee for cash	Percentage of households that grow coffee as non-commercial	Percentage of households that do not grow coffee
Alieu	44.0%	38.2%	17.8%
Ainaro	29.9%	36.0%	34.2%
Baucau	10.5%	13.5%	76.0%
Bobonaro	18.1%	21.8%	60.1%
Covalima	15.9%	18.1%	66.0%
Dili	6.6%	1.7%	91.7%
Ermera	43.0%	38.6%	18.4%
Lautem	11.7%	6.6%	81.7%
Liquica	26.9%	29.7%	43.4%
Manatuto	15.2%	23.8%	60.9%
Manufahi	25.0%	29.9%	45.1%
Oecussi	19.7%	16.9%	63.4%
Viqueque	13.6%	14.5%	71.9%
Total	18.9%	18.6%	62.5%

Source: National Coffee Sector Development Plan 2019-2030

In Aileu and Ermera over 40% of farmers grow coffee for cash, while over 38% grow it as a non-commercial crop. Coffee is Timor-Leste's largest non-oil export and is grown by 38% of all households; in 2014, almost 50% of the households that produced coffee had incomes below the national poverty line. However, it is estimated that around half of all coffee farms require replanting and intensive rehabilitation.⁵⁰

Coffee and agroforestry. Coffee is grown by small holding farmers and these plots of land can be used for multi-cropping, an agroforestry technique that allows for vegetables and other crops to be interspersed with coffee, thus providing for additional sources of income and/or nutrition. In September 2021, the Government of Timor-Leste started implementation of the Coffee and Agroforestry Livelihood Improvement Project (CALIP) supported by ADB and the Japan Fund for Prosperous and Resilient Asia and the Pacific (JFPR) financed by Government of Japan; CALIP is currently planned to continue until October 2024. One of the outputs of CALIP is establishing productive coffee and agroforestry production systems: this aims at development and implementation of improved protocols for seed selection and nursery management; establishment of at least one multi-variety trial and ten farmer-managed demonstration plots; and training on productivity improvement and climate-smart agriculture to 2,000 coffee producing households.⁵¹ In 2021, the export value of coffee was \$16.3 million.⁵²

In Oecusse, UNDP has been implementing Coffee Value Chain Improvements 2017-2022,⁵³ which currently covers 190 coffee farmers and a total area of 83 ha under coffee in Costa, Abani, and Nemeco. While the old plantations covered 33 ha, the project supplied 94,500 new plants and increased the area by 50 ha. The density of old trees is 500-600 trees/ha but the project has increased the density to 1600 trees/ha. With assistance from the project the Coffee Cooperative has developed a facility for pulping, fermenting, and drying in one location and

50 Ibid.

51 Coffee and Agroforestry Livelihood Improvement Project (CALIP). 2023. Quarterly Report 5 (unpublished)

52 Observatory of Economic Activity (OEC). Timor-Leste. 2021 Product Exports at: [https://oec.world/en/profile/country/tls#:~:text=Exports%20The%20top%20exports%20of,United%20States%20\(%244.3M\)](https://oec.world/en/profile/country/tls#:~:text=Exports%20The%20top%20exports%20of,United%20States%20(%244.3M))

53 UNDP. Coffee Value Chain Improvements in Oecusse 2017-2022

buys the raw berries from the farmers and processes them into green beans, roasted beans, and coffee powder. Farmers are being encouraged to adopt other crops, such as turmeric, pepper, ginger, and vanilla⁵⁴ for intercropping with coffee. This could increase income of farmers.

54 ZEESM Timor-Leste. Developing Spice Value Chains in RAEQA. Vanilla Cultivation. Brochure. No date



Vanilla, candlenut oil, other vegetable products and spices

In 2021, Timor-Leste's value of exports for other cash crops was as follows¹: vanilla \$397,000, other vegetable products \$256,000, other oily seeds \$709,000, cassava \$216,000, other vegetable oils \$229,000. Products such as candlenut oil is being exported by ACELDA in Baucau to the USA (45,600 Kg per annum) and PRC (18,000 Kg per annum); other spices such as turmeric, cloves etc. are of high export potential and are being grown by farming households. However, these crops are still of low export values compared to coffee. In Oecusse, a UNDP² project has introduced spice crops to 104 farmers, with each farmer cultivating between 500 – 1000 m². Only farmers who have access to water are selected and each farmer is provided with 100 – 150 plants of two-to-three spice crops. They are provided training on cultivation of these crops as well as soil conservation and water conservation techniques. As these crops were planted in February 2023, they are still in the initial stages of growth.

1 OEC *ibid.*

2 UNDP. Information provided by Augustine Santhiapillai, Agribusiness Development and Watershed and Forestry Management Specialist. ZEESM

Livestock

According to the Agriculture Census of 2019,⁵⁵ 95% of agricultural holdings (134,158 HH) keep or rear livestock and /or poultry predominantly under low input, free grazing free ranging systems. In 2019:

Table 7: Livestock production by households in 2019

Type	HH	Heads
Cattle	88,758	286,558
Buffalo		127,475
Pigs	123,425	453,444
Goats		179,911
Chickens	118,059	1,146,037
Ducks		6,848

Source: Agriculture Census 2019; MAF. 2021. Strategic Plan 2021-2025 unpublished

However, by 2022⁵⁶ livestock heads had dwindled significantly.

Table 8: Production in livestock heads 2018-2022

Type	2018	2019	2020	2021	2022
Buffalo	61,889	58,973	58,612	57,003	52,617
Balinese cattle	112,961	112,478	124,707	104,092	73,219
Domestic goat	64,911	62,037	45,541	46,291	31,850
Sheep	11,514	9,224	7,634	7,758	6,474
Pig	201,318	163,113	96,311	97,504	76,930
Chicken	454,196	410,518	338,270	-	-

Source: MAF unpublished data for 2022;⁵⁷

Livestock productivity⁵⁸ in Timor-Leste suffers from: poor reproduction rates, low milk production, high calf mortality, slow growth rate because of high prevalence of diseases such as brucellosis, haemorrhagic septicaemia and ASF, and poor quality of forage. The high prevalence of transboundary animal diseases resulted in the 2010 Government of Indonesia ban on import of Timorese livestock. Before the ban, there was significant trade of live animals across the land border with Indonesia's Nusa Tenggara Timur Province. Production is constrained by: slow maturing indigenous breeds; free grazing practices; inadequate nutrition; water scarcity, lack of capital, and land etc.

⁵⁵ Agriculture Census 2019; MAF. 2021. Strategic Plan 2021-2025 unpublished

⁵⁶ MAF unpublished data for 2022

⁵⁷ Data not available for all Municipalities, thus totals may underestimate actual numbers.

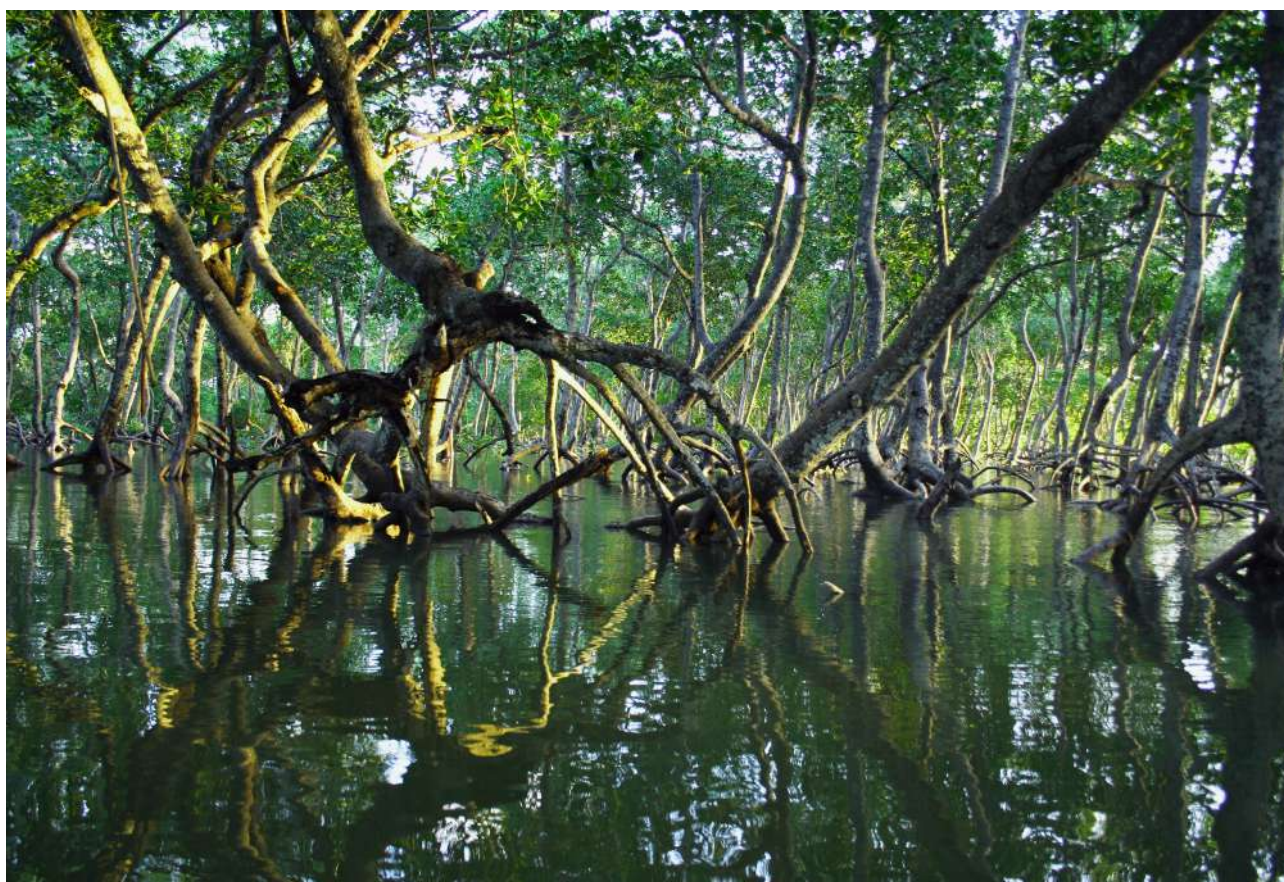
⁵⁸ MAF. 2021. Strategic Plan 2021-2025 unpublished; ACIAR. 2015. Sub-sector analysis of the Timor-Leste Beef Industry

Some **indicative interventions** for improvement of livestock could be:

- Improved breeds,
- Improved grazing practices,
- Access to veterinary services,
- Control of animal diseases through vaccination,
- Improved fodder,
- Improved access to water all year round, and
- Funding support / co-financing

Water sources and irrigation

Ninety percent of total water abstraction of freshwater withdrawals is from free or unregulated river intakes.⁵⁹ During Indonesian occupation, irrigation area was estimated at 72,159 hectares; in 2002 at independence, only 34,649 ha (48%) remained. Since 2008, development support has rehabilitated more than 38,000 ha of irrigated area for rice cultivation. To date MAF has completed nine irrigation schemes covering 7,250 ha, of which 4,086 ha are from five irrigation schemes in Larisula: 456 ha; Bulutu: 780 ha; Raibere: 225 ha; Oebaba: 2,260 ha; and Dardau: 365 ha.



The ***Master Plan for Agriculture and Irrigation Development*** prepared with Japanese funding and completed in 2014 with the aim of increasing production of local commercial rice in a designated “rice bowl” areas have not materialized.⁶⁰ To enhance production potential in the south coast irrigation systems under rehabilitation, there are few farming populations. As rehabilitated irrigation schemes require farmers to operate and maintain the schemes, few farmers have incentives to settle in rehabilitated irrigation areas.

59 MAF. 2021. Strategic Plan 2021-2025 unpublished

60 MAF. 2021. Strategic Plan 2021-2025 unpublished

Indicative interventions for improvement of irrigation and productivity could be:

- Incentives for farmers to settle in areas of rehabilitated irrigation;
- Strengthening of Water user Associations (WUA); infusion of cash and technical skills;
- Reduction of high O&M costs;
- Adoption of climate-smart and water-efficient system of rice intensification (SRI); and
- Funding support from GCF and other funding agencies.

Land degradation, soil erosion, water scarcity

MAF⁶¹ has identified the following as important factors that exacerbate land degradation, soil erosion and water scarcity:

- Steep slopes, unstable soils and torrential rainfall;
- Floods and crop losses;
- Soil erosion and landslides;
- Deforestation and Illegal logging;
- Cultivation of steep slopes;
- Slash and burn/shifting cultivation;
- Uncontrolled grazing and recurring forest fires;
- Non-adoption of soil and water conservation measures due to a lack of security of tenure;
- Increasing population pressure on land; and
- Ineffective law enforcement.

The rate of deforestation estimated at 1.7% annum has been increasing from 1.1% since 2000, which is five times higher than the global average of 0.3%. JICA and MAF's General Directorate of Forest, Coffee and Industrial Crops reported⁶² that, in 2012, the total forest area covered 59 percent of the country (i.e. 870,000 hectares – of which only 36 percent is categorized as “dense forest”). Forests include high-value trees such as mahogany, rosewood, sandalwood and teak. However, the high levels of deforestation brought about by illegal logging, firewood collection, free grazing of livestock and wildfires has contributed to the lack of availability of quality timber in the country which now relies on importation to meet local demand. Forest policy also recognizes the importance of forests to the livelihoods of many rural communities in Timor-Leste as they provide space for forage, firewood and non-timber forest products such as rattan, bamboo, honey and bush meats.

Recognizing the need for interventions to remedy the water scarcity situation in Oecusse, the UNDP project⁶³ has worked with 6 communities to improve water availability by constructing infiltration ponds, infiltration pits and stone dams across the streams so that the springs, which are used by the communities, last some more months during the dry periods. These works were carried out by the communities in partnership with NGOs like Permatil⁶⁴ and AFFOS. The project also carried out reforestation by planting different trees like coconut, areca nut, cinnamon, and other indigenous trees. Each community worked around 5-10 ha with these structures and reforestation. Each community recovered one spring with increased output of water. The structures are constructed with communities in agreement with food for work. In two sites a water distribution system costing around US\$10, 000 was constructed for each community.

61 MAF. 2021. Strategic Plan 2021-2025 unpublished

62 MAF. 2021. Strategic Plan 2021-2025 unpublished

63 UNDP. World Water Day 2022. Groundwater – Making the Invisible Visible, March 22, 2022 at: <https://www.undp.org/timor-leste/blog/world-water-day-2022-groundwater-making-invisible-visible>

64 Permatil-The Permaculture Organization in Timor-Leste, at: <https://permatil.org>

Indicative interventions for reducing land degradation and soil erosion and improving water availability could be:

- Providing incentives to conserve top soil and steep slopes (conservation agriculture promotion),
- Reforestation / rehabilitation of forests and pastures in watershed areas,
- Incentives to maintain and protect fragile landscapes (stop slash and burn practices),
- Implement water storage and water harvesting measures in local communities (valleys and feasible check dam areas),
- Promote security of tenure,
- Install community ownership and enforcement,
- External funding and climate change funds.

Animal and crop diseases

Only six percent of livestock keepers reported using veterinary services, namely: vaccination, artificial insemination, castration and treatment of sickness. In Manufahi municipality, farmers abandoned poultry production in 2020. Population of pigs have been decimated since the arrival of African Swine Fever (ASF) in September 2019. The poultry population has also decreased due to a new wave of NDV infections.⁶⁵

In February 2020, the presence of Fall Armyworm (FAW) was confirmed for the first time in Timor-Leste⁶⁶ affecting 33% of maize plants, reaching 70% in Ainaro; on rice prevalence of FAW is at 2.8%. FAO estimates in 2021 indicated that 2,880 ha of maize crop were severely affected by FAW, approximately 9% of cultivated area. In the future, FAW could affect up to 20% of aggregated maize output. However, farmers who practiced Conservation Agriculture (CA) were less affected by FAW than farmers using traditional slash and burn practices.



65 FAO.2021. Special Report. 2021 FAO Crop and Food Supply Assessment Mission (CFSAM) to the Democratic Republic of Timor-Leste.

66 FAO ibid.

Indicative interventions. It is imperative to protect crops and livestock from diseases by:

- Providing vaccinations against animal diseases,
- Improving facilities and training veterinary staff,
- Conducting regular checks and controls,
- Covering operation and logistic costs for vaccination drives;
- Enhancing Conservation Agriculture and biological disease and pest control methods; and
- Securing funding for vaccines and mobile veterinary laboratories.



Marine fisheries

In 2019,⁶⁷ only 3.1% or 4,405 agricultural households were engaged in fishing. Of this number 52% did fishing regularly or for some months while the remaining did so for a few days or weeks over a 12-month period. Only two percent of households (3,632) depended solely on fishing for their livelihood. Fishing mainly for sale was reported by 23% of households. Only 35% of households engaged in fishing own a motorized vessel while nearly 25% do not use a vessel or non-motorized vessel owned by 18% of households.

Whilst the fisheries sub-sector represents a relatively low percentage of Timor-Leste's total GDP (i.e., 1.25 percent), it contributes significantly to communities located along coastlines and riverbanks and in the vicinity of natural and man-made water bodies. Illegal, unreported and unregulated (IUU) fishing, including significant trans-boundary fishing, is a serious threat to fishery resources. MAF⁶⁸ estimates losses from IUU fishing at a cost of USD 640 million per year. The socio-economic impacts of overexploitation of fisheries and IUU fishing include reduced economic returns and tax revenues, loss of employment of fisher families, conflicts between user groups, and loss of food sources for humans and animals. There is poor development of capture fisheries sector. This needs attention.

Indicative interventions in the marine fisheries sub-sector could be:

- Organization of groups to purchase mechanized boats using soft loans,
- Capacity building,
- Promotion of fish processing industry,
- Fish processing promotion of SMEs,
- Improvement of cold storages in rural markets to enable fish marketing, and
- Inclusion of fish protein from marine fisheries in school feeding programs and local diets.

⁶⁷ Agriculture Census 2019

⁶⁸ MAF. 2021. Strategic Plan 2021-2025 unpublished

Aquaculture

In 2019,⁶⁹ around 4,543 households or 3.2% were engaged in aquaculture activities, which includes: fish, crustaceans, seaweed, and other aquatic resources in seas, lakes, rivers, swamps, ponds, pens, and seaweed cultures. Only 44% of households engaged did so for some months during the year and only one percent relied on aquaculture for their livelihood. The aquaculture sub-sector, particularly the sea- and coast-based activities bear promise but little attention has been given to promotion thereof.

However, water security issues and perennial water sources for aquaculture (freshwater) as well as kitchen gardens need to be addressed and water availability strengthened. Fresh water aquaculture is inherently hampered by lack of water supply and prolonged dry season. Improvement of environmental conditions in uplands, watershed areas, and among farming households are needed.

Indicative interventions in aquaculture are:

- Promotion of micro enterprises for development of aquaculture,
- Women based group enterprises in aquaculture and processing / semi-processed food products,
- Supply of fish-protein from aquaculture to schools and nutritional programs,
- Building of check dams where feasible, and
- Water harvesting during the wet season by creating water holding reserves in ponds and eventually keep streams flowing.

Climate change impacts on production

Geographically, Timor-Leste is located in a region particularly sensitive to the impact of climate change and to the effects of El Niño. Changes in rainfall pattern and increasing rainfall may impact agricultural productivity and water availability, increase the risk of landslide, make the soil more susceptible to erosion, and increase the frequency and intensity of local flooding. Sea-level rise will increase coastal erosion and may cause the degradation and destruction of infrastructure as well as the salinization of water sources (MCIE, 2016). The country also faces a higher frequency of extreme climate events such as strong tropical windstorms, landslides, and flash floods. These climate-induced hazards happen on top of other natural hazard events, such as earthquakes and tsunamis, which also affect Timor-Leste, making it a highly vulnerable country.⁷⁰

In most municipalities⁷¹:

- Inland floods and extreme wind speeds could cause the highest (direct) economic loss due to damage to buildings and infrastructure;
- Due to the condensed concentration of infrastructure, inland floods can cause highest potential economic loss in Dili (over \$100M), followed by Viqueque, Covalima and Manufahi;
- Dili, Liquica and Lautem can witness the highest economic loss when a storm with a return period of 1 in 100 years hits the coastline; and
- Both crops and livestock information is aggregated at municipality level without location information, which makes it difficult to estimate exposure to certain types of hazards.

69 Agriculture Census 2019

70 UNDP.2021. Comprehensive climate hazard mapping and risk assessment and development of risk model for Timor-Leste. Draft Vulnerability and Risk Assessment Report, Unpublished

71 UNDP.2021. ibid

Approximately 2,660 hectares of rice were affected by the floods of 2021, out of the 22,300 hectares planted. While some rice crops were entirely destroyed by the floods and, in some instances, agricultural land was lost due to riverine erosion, yield losses were not reported in all the rice flooded fields. In addition, 1,570 hectares of maize were affected by the floods and strong winds, out of the 33,700 hectares planted. Manatuto Municipality has been the most affected by the floods, with Lacle and Manatuto post-administratives severely hit. Irrigated lands located close to the rivers were washed away, while irrigation infrastructures were extensively damaged.⁷²



Increased risk of floods, droughts, extreme weather events, coastal flooding, sea level rise, and saltwater intrusion, as well as impacts on coral reefs and fisheries, are highly likely. Despite a rise in emissions resulting from development underway in Timor-Leste, the nation's cumulative annual emissions equate to less than 0.003% of global emissions.⁷³ Increased incidence of prolonged heat exposure / drought will impact increased heat-related mortality. There is an increased risk of proliferation of disease, loss of biodiversity and changes to fishery dynamics. Increased evaporation and rainfall variation can lead to reduced water storage affecting reduced crop productivity/food security, thus leading to negative impacts on nutrition. Extreme rainfall events cause flooding that increases the risk of water-borne diseases and damage to infrastructure.

Indicative interventions to mitigate impacts and adapt to climate change could be:

- Implementation of the National Climate Change Policy 2021;
- Revision of emissions reference level for 2010 reference year;
- Low carbon development strategy;
- National adaptation plan for agriculture and infrastructure;
- Promotion of renewable energy services, energy efficiency, sustainable forest management, and waste management related to low carbon development;
- Improved and enhanced data collection, data storage, data access on public portals relating to climate change impacts, particularly on food production and food security issues;
- Establishment of a National GHG Inventory; and
- Funding for mitigation and adaptation projects.

⁷² FAO.2021. Special Report. 2021 FAO Crop and Food Supply Assessment Mission (CFSAM) to the Democratic Republic of Timor-Leste

⁷³ GoTL. Updated Nationally Determined Contribution. Timor-Leste 2022-2030

7. Transport and Warehousing

Transport / Vehicle Traffic

Transport demand and vehicle ownership in Timor-Leste have been growing substantially since 2002. In 2013, the main mode of transport for the majority of the rural population was still walking (MPWTC 2013 Baseline Survey). Typical traffic volumes are very low, with the dominant mode of motorized transport being motorbikes, followed by trucks and buses, cars (mostly 4WD) and bicycles. Survey data indicate that only a small portion of the roads carry over 50 vehicles per day (vpd).⁷⁴ The heaviest traffic flows, in excess of 1,000 vehicles per day (excluding motorcycles), are on the northern coastal road. Weather and coffee production are two major factors affecting traffic. Landslides and flooding, which are common during the rainy season, cause frequent road closures. Another factor affecting traffic patterns over the year is the location of the coffee production and harvesting activities. The coffee harvest season peaks between August and September. During that season the light and medium truck traffic in the coffee growing areas and between them and Dili increases significantly. There are a small number of heavy trucks, about 90 in total, used mainly for transporting containers and large equipment, but the narrow road width and difficult terrain do not allow for large truck operations in Timor-Leste.



Table 9: Vehicle Types 2005-2022

Vehicle Type	Estimated Total 2005	Estimated Total 2009	2022
Pickups, vans, and minibuses	3,303	3,123	na
Light and medium trucks	2,167	2,127	na
Heavy and specialized trucks	61	89	na

Source: WFP. 2009. Digital Logistics Capacity Assessment. Assessor Ian Figgins. Update needed; na=not available
At: <https://dlca.logcluster.org/32-timor-leste-transporters>

Rural roads

The Rural Access Index (RAI)⁷⁵ was introduced by the World Bank as a development indicator to measure the percentage of rural people living within 2 km (equivalent to a walk of 30 minutes) of an all-year round accessible motorable road. The 2 km limit was set as it cannot be expected that every single rural household will have all-season road access to their house. According to World Bank figures the RAI for Timor-Leste was 89% in 2001. A World Bank report with 2007 World Development Indicators showed a RAI of 21% for Timor-Leste. This sharp decline is an indication of the deterioration of the country's road network from 2001 to 2007. There are an estimated 1,097 km of rural roads that connect Sucos and Aldeias to productive agricultural land. These need to be networked into a local growth center or market, perhaps at administrative post level or where traditional markets exist.

Indicative interventions for improvement of transport and haulage tonnage could be:

- Continuation of road rehabilitation program for core rural roads, serving relatively high numbers of people and having a relatively high social and economic value;
- Improved access roads between collection points (Food Systems National Pathway-FSNP 2021);
- Incentives to improve transportation / haulage of harvest / agricultural products; and
- Policies for transport associations & transporters to standardize pricing especially in vulnerable areas.

Warehousing

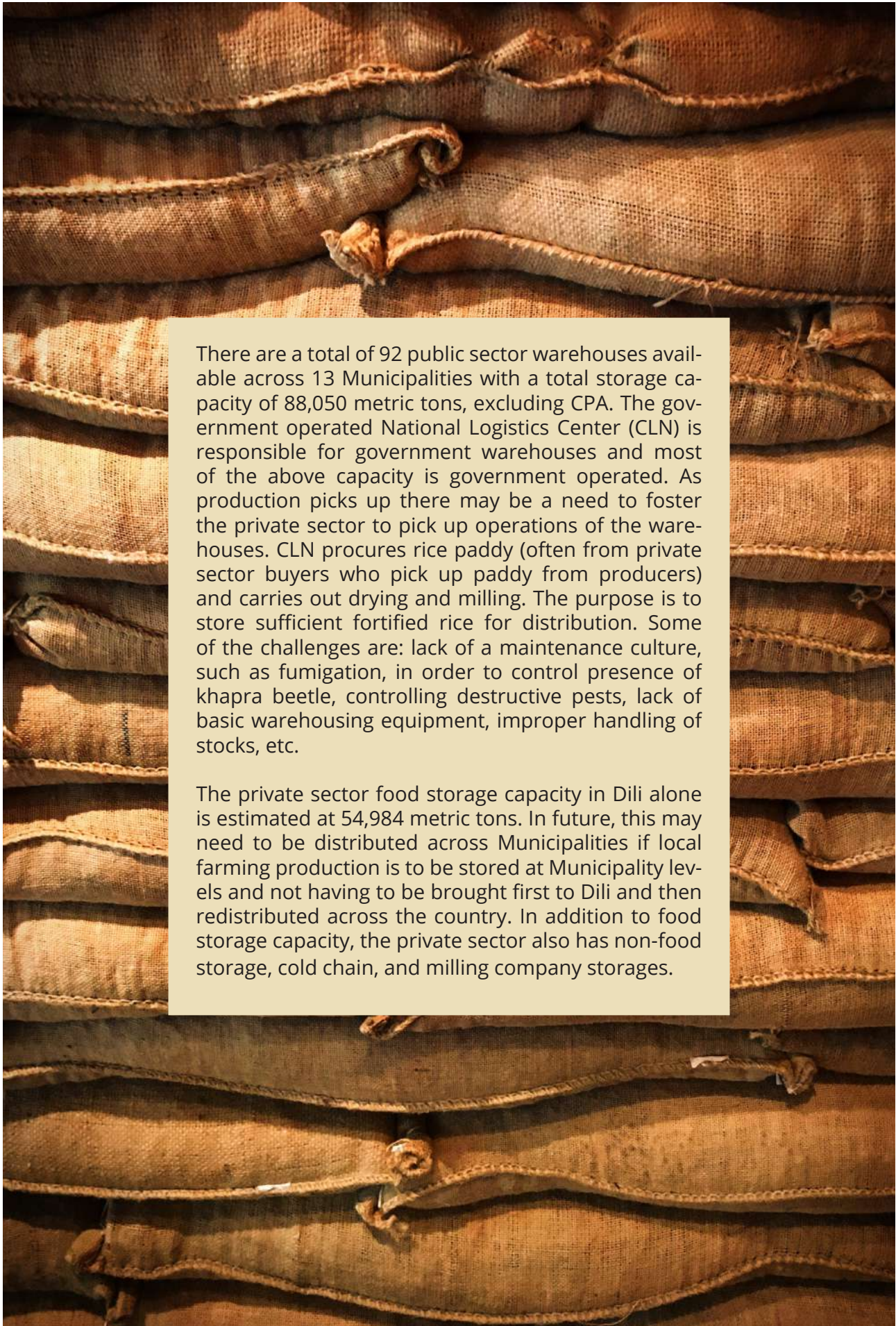
In 2023, public sector storage available across Municipalities in Timor-Leste is as follows:

Table 10: Public Sector Storage Capacity across Municipalities, 2023

No	Municipality	Number of W/H per Municipality							Total W/H
		NLC	SAMES	MSSI	Municipality	MOH	MOE	CPA	
1	Aileu	-	-	-	1	2	1		4
2	Ainaro	1	1	-	1	2	1		6
3	Baucau	2	1	1	1	5	1	1	12
4	Bobonaro	1	1	-	1	3	1		7
5	Covalima	-	-	1	1	2	1		5
6	Dili	4	5	3	0	3	1		16
7	Ermera	-	-	1	2	3	1		7
8	Lautem	-	-	1	1	3	1		6
9	Liquica	3	-	-	1	-	1		5
10	Manatuto	1	-	1	1	3	1		7
11	Manufahi	-	-	1	1	1	1	1	5
12	Viqueque	-	-	1	1	2	1	0	5
13	Oecusse	-	-	1	1	3	1	1	7
Total		12	8	11	13	32	13	3	92
	Capacity MT	41,500	12,150	9,850	5,600	5,950	13,000		88,050

Note: NLC = National Logistics Center (CLN), SAMES= Autonomous medical services and health equipment, MSSI= Ministry of Social Solidarity and Inclusion, MOH= Ministry of Health, MOE= Ministry of Education, CPA= Casa de Produção Audiovisual

Source: WFP. 2023. Public Sector Warehouse Storage Capacity



There are a total of 92 public sector warehouses available across 13 Municipalities with a total storage capacity of 88,050 metric tons, excluding CPA. The government operated National Logistics Center (CLN) is responsible for government warehouses and most of the above capacity is government operated. As production picks up there may be a need to foster the private sector to pick up operations of the warehouses. CLN procures rice paddy (often from private sector buyers who pick up paddy from producers) and carries out drying and milling. The purpose is to store sufficient fortified rice for distribution. Some of the challenges are: lack of a maintenance culture, such as fumigation, in order to control presence of khapra beetle, controlling destructive pests, lack of basic warehousing equipment, improper handling of stocks, etc.

The private sector food storage capacity in Dili alone is estimated at 54,984 metric tons. In future, this may need to be distributed across Municipalities if local farming production is to be stored at Municipality levels and not having to be brought first to Dili and then redistributed across the country. In addition to food storage capacity, the private sector also has non-food storage, cold chain, and milling company storages.

Table 11: Private Sector Food Storage Capacity in Dili, 2023

No.	Company	Warehouse No	Condition	Rent (\$)	Capacity (MT)
1	PERISSOS	Fatuhada 01	working condition	NO	1,000.00
		Fatuhada 02	working condition	NO	5,000.00
		Tibar	working condition	\$	8,000.00
					14,000.00
2	LISUN	Hudi Laran Fatu-Hada	working condition	\$	8,000.00
					8,000.00
3	LOJA CREATIVE FURAK	Fatudada 01	working condition	No	1,000.00
		Fatuhada 02	working condition	No	1,000.00
		Bairo Pite Hudilaran	working condition	\$	2,000.00
					4,000.00
4	W - FOUR	Bairo Pite Hudilaran	working condition	\$	2,000.00
					2,000.00
5	ALFA	Audian	working condition	\$	5,000.00
					5,000.00
6	BRANDITALL	Bairo Pite Hudilaran	working condition	\$	5,000.00
					5,000.00
7	MEIMART	Manleu 01	working condition	\$	2,000.00
					2,000.00
8	STAR KING	Bairo Pite	working condition	\$	5,000.00
					5,000.00
9	ANL - CMA CGM GROUP	Aldeia Moris Foun	working condition	\$	1,000.00
					1,000.00
10	BOLLORE	Bairo Dos Grilos	outsourcing	\$	
					-
11	LSC UNIP.LDA	Manleu	working condition	\$	2,000.00
					2,000.00
12	ACELDA	Lecidere	working condition	\$	1,000.00
					1,000.00
13	CLADOTIA FU	Hera	working condition	\$	1,000.00
					1,000.00
14	JACINTO UNIP.	Kuluhun	working condition	\$	300.00
					300.00
15	NEW ABC UNIP.	Akadiruhun	working condition	\$	2,000.00
					2,000.00
16	FORTUNA LORO-SAE	Manleu	working condition	\$	300.00
					300.00
17	Graca Argo Trading - Maliana	Memo	working condition	\$	1,884.00
					1,884.00

No.	Company	Warehouse No	Condition	Rent (\$)	Capacity (MT)
18	Yang Fa	Holsa	working condition	\$	300.00
					300.00
19	Hugo Amor	Holsa	working condition	\$	200.00
					200.00
	Total Capacity MT				54,984.00

Source: WFP. 2023. Private Sector Warehouse Capacity Timor-Leste

Strategic grain reserve

Maintaining a basic level of food supply through establishment of a grain reserve could be a vital function of government and in the public interest.⁷⁶ Food security has been defined to mean having physical and economic access to sufficient, safe and nutritious food that meets dietary needs and food preferences for an active and healthy life.⁷⁷ A rice reserve could be based on 10% of domestic production procured by the Center (CLN) under the Coordinating Ministry for Economic Affairs (MCAE), which is seen to be an optimistic assumption.⁷⁸ However, 10% of the paddy harvest could result in rice equivalent of 5,477 tons, which could serve the needs of 5,000 to 6,000 tons of rice per year for 300,000 school-age children under the school feeding program.⁷⁹ A second option

would be a rice reserve based on imported rice. There are a sufficient number of private companies with warehousing capacity in central Dili and stocks could be procured through the private sector. A third option is to maintain minimum private sector stocks mandated by Government based on a prequalification of leading rice importers. The fourth option is a so-called three-part hybrid rice reserve consisting of government-held stocks of fortified rice, government-held stocks of locally purchased imported rice, and privately held government-monitored stocks of imported rice.⁸⁰ It is advisable to involve the private sector in any scheme of rice reserve the government may opt for as government-operated models are not always viable in the long run.

Indicative interventions for improvement of transport / haulage tonnage and warehousing could be:

- Construction of new and rehabilitation of existing warehouses /storages at strategic locations / in major markets,
- Skills development and regulated warehouse inspections to address food safety issues
- Strategic rice reserve,
- Seed storages,
- Cold storages,
- Access to market information,
- Secure packaging,
- Linking storages and warehouses to value chains / contract growers,
- Food safety and quality control services in markets and collection centers, and
- Environmentally safe waste management practices.

⁷⁶ WFP. 2022. Strategic Rice Reserve in Timor-Leste: An Analysis of the Need and Options (unpublished report by David McKee, Food Systems Adviser)

⁷⁷ World Food Summit, 1996

⁷⁸ WFP. 2022. McKee *ibid.*

⁷⁹ *Ibid.*

⁸⁰ *Ibid.*



8. Processing, markets and value chains

Food Processing

Regarding food processing,⁸¹ only 0.8 percent (1,157 farmers) use maize threshing machines and two percent (2,853 farmers) use maize milling machines, while for rice, 0.5 percent (723 farmers) use rice threshing machines and only 37 farmers use rice harvesting machines (Timor-Leste, 2020). Nearly all staple food processing operations are done manually (FAO, 2021). Lack of mechanization constitutes a major bottleneck for the agriculture sector. Post-harvest losses (from harvesting to processing and during storage) are estimated at 20,710 tons, with rates ranging from 18 percent for maize, 15 percent for rice and eight percent for root crops. The used rates are above the average levels as the heavy rainfall in April caused difficulties for drying grains.⁸² Thus, post-harvest losses remain significantly high accounting for about 20% to 35% across all agricultural products. Furthermore, locally produced products are too expensive with low yields and high labor costs.⁸³ However, there are gaps in standards and lab testing facilities; UNIDO has recently launched a project in Timor-Leste to assist with strengthening of the Quality Infrastructure (QI) system that can enhance export compliance of the food & beverage sector.⁸⁴

In 2009, there were few agribusiness operators⁸⁵ in Timor-Leste, specialized in milling services, with correspondingly limited investment by the private sector to develop robust supply chains for local products. In this regard, imported food stuffs dominate the market, thereby creating an uncompetitive environment for local businesses to process and market their food products. The following milling companies are in different municipalities as

follows: (i) Global Timor LDA in Ermera, (ii)

Graca Agro in Maliana, and (iii) Acelda located in Baucau. These millers are involved in both fortified and non-fortified food production. Some small-scale rice millers are also available in Timor-Leste but with a very limited production capacity serving family requirements at a village level. In 2022, there were 106 markets⁸⁶ spread across 14 municipalities, mainly locat-

81 FAO.2021. CFSAM TL

82 Ibid.

83 GoTL. 2021. Food Systems Pathway Commitment and Position Statement. Food Systems Summit 2021

84 UNIDO. Strengthening the QI System to enhance Export compliance of F&B Sector. Sushil Kumar Saxena, Chief Technical Advisor

85 WFP. 2009.Digital Logistics Capacity Assessment. Assessor Ian Figgins.

86 WFP. 2022. List of Markets (see Annex 2 of this report)

ed in Sucos (villages). A list of these markets is provided in the Annex. The market facilities

are in poor condition and access roads to markets are not all-weather roads.

Value Chains

Agriculture in Timor-Leste is changing and there are numerous opportunities to support farming families to advance towards commercial and more profitable production.⁸⁷ Rural households are generally confident that they can buy imported rice and are turning to producing higher value crops that generate cash income. An analysis of value chains reveals the following to have potential for growth in 2022:

Table 12: Selected value chains 2022

<i>Legumes</i>	<ul style="list-style-type: none"> - Cowpea - Mung bean - Common bean - Winged bean
<i>Livestock</i>	<ul style="list-style-type: none"> - Local chickens/poultry - Pigs
<i>Staple and root crops</i>	<ul style="list-style-type: none"> - Red rice - Orange fleshed sweet potato
<i>Horticulture</i>	<ul style="list-style-type: none"> - Shallot/onion - Green leafy vegetables (bok choy, mustard greens, kanku) - Strawberry

Source: TOMAK. 2022. Inclusive Value Chain Analysis (unpublished research)

Spice production⁸⁸ in Timor-Leste will always be a small fraction of global production and costs of production are higher than in other producing countries. Timor-Leste will never be able to compete on price but could compete on quality, if farmers are encouraged to improve quality through price premiums. There may also be potential to achieve price premiums through certification. Geographical Indication certification may be particularly appropriate for Timor-Leste, as has been achieved with Kampot Pepper in Cambodia. Planting spices in coffee plantations⁸⁹ reduces livelihood risks by diversifying income sources. Labour requirements for spices are complementary to coffee with vanilla harvest taking place before the coffee season and pepper and clove harvest taking place after the coffee season. Spice production fits well into agroforestry systems which are very appropriate considering Timor-Leste's topography. The main buyers are also coffee exporters and spices follow the same market channels as

coffee, therefore institutional linkages are already established. Spice prices in Timor-Leste



87 TOMAK. 2022. Inclusive Value Chain Analysis (unpublished research)

88 TOMAK.2018. Analysis of the Spice Value Chain in Timor-Leste

89 TOMAK.2018. Ibid

are determined by international market prices discounted backwards to the farm-gate.



Indicative interventions for improvement of processing, markets and value chains could be:

- Review of the crop pricing methodology which makes CLN less attractive to small holder farmers
- Ensure timely payments to supply of rice by farmers to CLN
- Provision of hand tractors, threshers and staple food processing equipment to affected farmers organized in groups in order to stimulate agricultural production and generate income as of the next main cropping season with a focus on the main affected areas.
- Increased mechanization;
- Technical assistance in processing technologies and methods;
- Improvement in shelf-life of agri-products at farm level/household level;
- Promoting value chains /contract farming models for potentially beneficial and market demand linked agri-products;
- Linking farm/household level improved storages with processing of foods and medium-term storage; and
- Establishing farmer producer groups/associations linked to value chains and contract farming to increase bargaining strength, use common storage facilities, and share market price information.

9. Distribution

The Government's *Cesta Basica*⁹⁰ programme intended to mitigate the impact of COVID-19-related restrictions on farmers' access to the local markets.⁹¹

Agricultural inputs and extension

By May 2018,⁹² MAF's Department of Agriculture, Horticulture and Extension had streamlined import approval procedures. The entry of Vinod Patel into the wholesale inputs market, and the shift in Kmanek's business model from supplying inputs to support farmers in their grocery supply chain to one of a wholesale focused input supply business improved the situation. Some municipalities are served by sizeable input supply shops, and farmers in this area can easily access a range of vegetable seed and farm chemicals. Irrigation supplies, fertilizer, and mechanical equipment are also available, though slightly less so than smaller inputs. Daily market stalls also stock some supplies in both places, with reports that inputs are widely sold on weekly market days.⁹³ The National Seed System is functioning well, despite an under-resourced and over-centralized national association (Anaprofiku).⁹⁴

Loja do Povo, an initiative of the Ministry of Tourism, Commerce, and Industry,⁹⁵ connects farmers and consumers. **Loja Agi Agrikultura**⁹⁶ supplies free training and technical advice to its customers and remains one of the most popular shops in Dili. Aileu farmers reported that the shop's prices are lower than other shops and that they often travel to Dili to buy seeds and other inputs there. In 2018, Loja Agi Agrikultura supplied ten shops in five municipalities, installed and trained on drip irrigation systems, and provided online technical support to customers via WhatsApp. Rural customers sent in a photo of a pest or disease, and Loja replied with a diagnosis and a product recommendation. This type of online ex-

tension information is extremely beneficial to farmers. There is a need for printed resources on input use and safety to supply to district retailers and farmers, as shortcomings of several of the resources that have been produced in the past.⁹⁷



According to the Government's Food Systems Pathway Commitment⁹⁸ the Government has established two farmers' shops in Dili to enable local producers to reach consumers in urban centres. In addition, various private sector actors, including supermarkets and street vendors are involved in promoting these linkages. Government plans to establish

90 GoTL. 2020. Cesta Basica Program

91 FAO.2021. CFSAM TL

92 Reported by Nilton Aniceto, the owner of input supply store Loja Agi Agrikultura (also co-author of the publication: *USAID.2013.The Fresh Vegetable Value Chain in Timor-Leste*)

93 TOMAK. 2018. Agricultural Input Supply Strengthening

94 TOMAK. 2018. Ibid

95 [Ezisténsia 'Loja do Povo' atu kria merkadu ba produktu lokál - TATOLI Agência Noticiosa de Timor-Leste](#)

96 MAF with JICA funding

97 TOMAK. 2018. Ibid

98 GoTL. 2021. Food Systems Pathway Commitment and Position Statement. Food Systems Summit 2021

an additional four farmers' shops in Dili and 12 in municipalities to facilitate food distribution and incentivise farmers to continue food production activities. In addition, agriculture shops are to be established at the post-administrative levels and Government will review the price support scheme for imported

rice (and other foodstuffs) to encourage local producers and traders to respond to market signals. The establishment of farmer groups within the school catchment areas will create linkages and support home grown school meal programs.

Indicative interventions for distribution could be:

- Increase use of post-harvest technologies to protect stocks
- Increase use of private sector suppliers across Timor-Leste;
- Improve, strengthen national seed distribution system;
- Sustain cash transfers to households for purchase of agricultural inputs;
- Limit establishment of government run stores;
- User friendly safety instructions on use of agricultural inputs (pesticides, fertilizers);
- Improve extension services farmer-to-farmer exchanges, extension by suppliers and contract buyers.

10. Consumption

The staple foods of the population in Timor-Leste are rice and maize.⁹⁹ **Rice:** 80% of households consume rice on a daily basis; they also consume it two-three times per day. Households consume rice an average 6.3 days per week, compared to 2.4 days for maize and 2.1 days for cassava. The annual per capita rice consumption between 1990 and 2002 was estimated at 90 kg¹⁰⁰ per person, which equals about 247 grams/day. This represented 34% of total energy intake in that time. Currently, the rice consumption is estimated to be about 315 grams/capita/day, which indicates a growing rice consumption indicating an increased preference of rice over maize. **Maize** consumption¹⁰¹ was about 105 kg¹⁰² (or 287 grams/capita/day) per person per year, which was 29% of the total energy intake. Because maize consumption is likely to reduce with economic development and that the maize milling industry is not consolidated, maize fortification in Timor-Leste is currently not feasible.



Wheat consumption¹⁰³ accounts for five percent of the total energy intake and is therefore too low to be considered for fortification to have an impact. Consumption of **cassava, sweet potato, beans** and **vegetables** is small,¹⁰⁴ accounting for 21% of total calorie intake. A very limited intake of **animal food products** of only 320 calories per day reflects low income and a poor standard of living and leads to a low overall dietary diversity, which is the most important cause of low micronutrient intake.

The Government¹⁰⁵ plans to strengthen nutrition social behavior change communication (SBCC) including meal preparation using locally available products and broader nutrition and lifestyle messages. Consistent SBCC messages supporting improved utilization of healthy, safe local foods will be included in the child focused conditional cash transfer program, the nutrition sensitive agriculture program, with mother support groups and in other programs targeting women and children and the first 1000 days. The Government will trial a national rice fortification program, establish regulatory frameworks for the marketing of breastmilk substitutes and establish consumer associations. Tax on sugar, sweets and beverages has been promulgated.

Indicative interventions for consumption could be:

- Rice fortification is made mandatory by law (both imported and locally produced rice)
- Continuation of conditional cash transfer models enabling rural farming households to buy food locally,
- National Campaign in schools and public advertisement on healthy diets, and
- Health program for obese school children in urban areas and obese population groups.

99 WFP. Landscape Analysis of Rice Fortification in Timor-Leste, 2018

100 MAF estimates this figure to be 106 kg/capita/year.

101 WFP. 2016. Mission Report. Food Fortification.

102 MAF estimates this figure to be 68 kg/capita/year.

103 WFP. 2016. Ibid.

104 WFP. 2006. Timor-Leste: Market Profile for Emergency and Food Security Assessments.

105 GoTL. 2021. Food Systems Pathway Commitment and Position Statement. Food Systems Summit 2021



Rice Fortification

In the short term,¹⁰⁶ which can be implemented relatively easily, the Ministry of Commerce and Industry plans to import fortified rice instead of normal rice for its public rice programs, such as school feeding and provision of foods to institutions. In the medium term the Government of Timor-Leste could encourage all imported rice, public and private sector, to be fortified with vitamins and minerals. If the domestic rice-milling sector would consolidate in the long term, then it could influence making most of the rice on the Timorese market to be fortified. The plan¹⁰⁷ is to have fortified rice available with CLN in partnership with the private sector. Rice fortification machines have been installed in municipalities and links developed with government and private sector to have fortified rice available with schools for Merenda Escolar. The improved implementation of school feeding programs as well as the food basket programs buys mostly local product from the community that could empower farmers to increase production and improve their livelihoods. The local community is required by law to purchase 75% of food produced locally.

106 WFP. Landscape Analysis of Rice Fortification in Timor Leste, 2018

107 GoTL. 2023. 1st UN Food systems Stocktaking Moment 2023. Progress Review on Country Level Food Systems Transformation

11. Matching Government Priorities with indicative investments

Priority Matching

The Government has already identified several priorities in the SDP 2030 as well as in the ERP 2021.

Table 13: Government Priorities

No.	Priorities
1.	<ul style="list-style-type: none"> · Tonnage for rice (grain adjusted for losses) will have increased from 37,500 tons to 61,262 tons · The area of irrigated rice will have increased by 40% from 50,000 ha to 70,000 ha <p>SDP 2011-2030</p> <p>Justification: Timor-Leste is a rice deficit country. Government of Timor-Leste's priority is to put in place import substitution in the long-term. Rice production must move up the scale in areas where irrigation systems are rehabilitated.</p>
2.	<ul style="list-style-type: none"> · On-farm rice storage losses will have reduced from 20% to about 5% <p>SDP 2011-2030</p> <p>Justification: One of the low hanging fruits is to reduce post-harvest losses. Farmers will have sufficient food to overcome the lean season.</p>
3.	<ul style="list-style-type: none"> · The Timor-Leste Research and Development Institute will guide and plan additional investment into research, development and extension for all major agricultural sub-sectors. · Average maize yields will have increased to 2.5t/ha <p>SDP 2011-2030</p> <p>Justification: Internationally R&D in rice, maize, wheat have already produced high yielding varieties and certified seeds of good quality. This knowledge of techniques needs to be transferred to Timor-Leste</p> <ul style="list-style-type: none"> · Create "productive seed banks" and make them available to farmers · Encourage national production, through seeds supply and market/support to the production flow guarantee (a program of State purchase and production distribution) <p>ERP 2020</p>
4.	<ul style="list-style-type: none"> · Encourage planting of trees for firewood to avoid indiscriminate logging; improving the quality of rural extension; introduction of livestock education; · Develop forestry exploration, namely sandalwood and teak, supported by the law approved in 2017 <p>ERP 2020</p>
5.	<ul style="list-style-type: none"> · Coffee production will have doubled following the rehabilitation of 40,000 hectares of coffee plantations <p>SDP 2011-2030</p> <ul style="list-style-type: none"> · Set a renewal policy of Timor-Leste's coffee plantation, with subsidies for growers who replace old plants with newer and more productive ones; and <p>ERP 2020</p>

No.	Priorities
6.	<ul style="list-style-type: none"> Support the private sector in increasing meat production, with animal confinement and health control. ERP 2020
7.	<ul style="list-style-type: none"> Intensify the use of power tillers (but not tractors) in rice cultivation ERP 2020 Justification: Apart from low levels of mechanization, farmers lack skills in processing and value addition. Most of the larger processors of food and food items, who are also buyers of large quantities of agricultural produce do not have purchasing agents or outlets in rural markets of the country. It seems that private sector firms do not see enough incentives to establish their operations in the countryside, even in a situation where demand is there and conventional economic wisdom seems to have stalled

Source: Timor-Leste Food Systems Assessment Report 2023

Since the Commitment Statement issued by the Government of Timor-Leste at the World Food Summit in September 2021, the Unit for Combating Stunting (UNMICS) under the Prime Ministers' Office has been following up on the Food Systems Stocktaking by responding to a questionnaire issued by the UN Food Systems Hub as well as by conducting one national and several subnational workshops to document feedback from stakeholders on achievements as well as gaps and challenges. UNMICS in the PMO's Office and the Ministry

of Agriculture and Fisheries have formulated a list of activities (interventions) that are subsumed under five pathways, which are given below in one column on the left-hand side, while a small number of priority and potentially pragmatic interventions have been identified in the right-hand side column, which have emerged from the food systems assessment reflected in this report. It is important to match Government priorities with potential investment recommendations.

Table 14: Food Systems Pathway: National Action Plan**Goal**

Achieve food self-sufficiency, sustainable and resilient food value chain to secure nutritious diversified local food consumption to all people.

Proposed MAF Priority Activities	Recommended in FSA Report
Pathway #1 Achieve Self-Sufficiency nutritious diversified local Food Production	
<ol style="list-style-type: none"> 1. Increase production in agriculture including staple food, horticultural, fruity culture, livestock, fishery, coffee, and Industrial crops. 2. Ensure the functioning of existing irrigation schemes. 3. Strengthen capacity of local farmers in sustainable agriculture 4. Build Check Dams to ensure water availability for agriculture activities. 5. Improved crop management and technology practices including Conservation. Agriculture Sloping land Agriculture, Agroforestry, improved seed, seed. multiplication, inter-cropping of leguminous crop, 6. Improved seed storage and seed banks, system of rise intensification, water harvesting and integrating nutrition valuable crop in farming system (i.e., pulses and millets). 7. Improved homestead food production including small livestock to ensure healthy. diverse diets. 8. Construction of fishing ports and develop Aquaculture developments. 9. International and regional cooperation to tackle the illegal unregulated unreported. Fishing. 10. Implement land lease mechanism to allow access to potential farming land. 11. Integrate national land use plan. 12. Sustainable management of the use of tractor and agriculture machinery. 	<ol style="list-style-type: none"> 1. Increase production of vegetables, legumes, leafy greens (rich in vitamins and micronutrients) 2. Improve water security (through check dams, HH water harvesting, small scale gravity irrigation pipes, water re-use, recycling etc.) 3. Improve farm and processing implements and machinery

Proposed MAF Priority Activities	Recommended in FSA Report
Pathway #2 Improved Food Transportation and Warehousing	
<ol style="list-style-type: none"> 1. Reduce post-harvest loss. 2. Strengthen Agri-food processors, wholesalers and re-tailors, 3. Strengthen Cooperatives, farmers associations and private sectors. 4. Strengthen mechanism for transportation and warehousing to reduce waste, maintain quality and food safety. 5. Capacity building for value chain actors' relation to market system information, secure packaging, storage, transportation methods, quality control, food safety, and environmentally safe waste management practices. 6. Maintenance of existing or construction of public warehousing at essential places. 7. Strengthen warehouse capacity including food storage, seed storage, food transportation methods, food safety, food quality control, food waste management and ensure easy access for all including women, elderly, and people with disability. 8. Ensure road access and transportation connection between collection points, processing centers and markets. 	<ol style="list-style-type: none"> 1. Reduce post-harvest losses 2. Improve food safety and storage facilities at household level as well as in markets (municipal levels) 3. Increase warehouse capacity at municipal level (make operational)

Proposed MAF Priority Activities	Recommended in FSA Report
Pathway #3 Improved Food Processing	
<ol style="list-style-type: none"> 1. Strengthen the capacity of processing facilities. 2. Strengthen capacity of procession groups and cooperatives 3. Strengthen capacity of Private sector in involvement of input supply, agro-processing and marketing to facilitate productivity, value addition, and income production 4. Increase opportunity for digitalize of the food system, creating new opportunity within value chain. 5. Support the establishment of procession and packaging centers. 6. Support the establishment of food collection centers. 7. Support the establishment of cold chain storage facility to control quality and reduce food waste. 8. Support food processing and production to improve infant and child feeding practices. <p>The Government will support private sector initiatives to establish facilities that enhance the processing and packaging of perishable products using integrated cold chain management</p> <ol style="list-style-type: none"> 9. Capacity building of workers to effectively manage processing requirements 10. Increase access to financial capacity through provision of credit and through public private partnership. 11. Made arrangement to substitute import by supporting initiatives for locally processed product 12. Support to provide platform for locally produce products by rural women, youth and people with disabilities. 13. Adhere to CODEX Alimentarius by ensure the implementation of the codes associates with maintaining food commodity standard to protect health of the Consumers. 	<ol style="list-style-type: none"> 1. Improve food processing, storage, and food preparation at household level 2. Provide incentives to private sector to improve input supply, extension, processing

Proposed MAF Priority Activities	Recommended in FSA Report
Pathway #4 Improved Food Distribution	
<ol style="list-style-type: none"> 1. Establishments of Loja dos Agricultures and Loja do Povo 2. Enable producers to reach consumers in urban and rural areas 3. Improved linkages with supermarkets include street vendors 4. Promote local food products to market 5. Support farmers groups around school area to produce food for school meal programs 6. Established information system to provide easy access to market information, regulations, prices and distribution. 	<ol style="list-style-type: none"> 1. Promote contract farming / grower schemes that link farmers to buyers 2. Link farmers/farmer groups to produce and supply food for school meals program
Pathway #5 Improved Food Consumption	
<ol style="list-style-type: none"> 1. Nutrition and health SBCC 2. Conditional cash transfer 3. Nutritional sensitive agriculture 4. Mother support group supporting 1000 days. 5. Healthy food environment 6. Rice fortification 7. Marketing with adoption of BMS code 8. Establish consumer association. 9. School meal program covered all student in whole year. 10. Increase breast feeding practices that include proper supplementary feeding practices. 	<ol style="list-style-type: none"> 1. Conduct effective good nutrition and nutritious food preparation campaigns across targeted geographical areas and schools 2. Promote consumption of fortified rice; provide fortified rice to schools for school meals program.

Source: Timor-Leste Food Systems Assessment Report 2023

While the long list of activities identified by Government are important and should be pursued in the long term, it is imperative to formulate a short list that could be financed in the next three to five years.

Long List of Investment Priorities

The long list of investment priorities could cover a period of 10 years and implementation could be considered in an integrated and coordinated manner that links the five pathways as follows:

Table 15: Food Systems Priorities: Long List

No.	Intervention	Years 1-3	Years 4-6	Years 7-10	Lead	Collaboration
1. Production						
1.1	Increase production of vegetables, legumes, leafy greens				MAF	
1.2	Increase production of staples (rice and maize); road access to potential agricultural/arable land				MAF	
1.3	Increase marine fish catches for domestic market				MAF	
1.4	Increase livestock production				MAF	
1.5	Increase coffee production				MAF	
1.6	Ensure functioning of existing irrigation schemes				PWD	MAF
1.7	Improve water security and micro irrigation schemes for farming households				PWD	BTL
1.8	Improve sloping land agriculture and Conservation Agriculture				MAF	
1.9	Improve seed storage and seed banks				MAF	
1.10.	Establish international and regional cooperation to tackle illegal, unregulated, and unreported fishing				MAF	
2. Transportation and Warehousing						
2.1	Improve storage and warehousing capacity at household, producer group, market and municipal levels				CLN	
2.2	Reduce post harvest losses				MAF	
2.3	Improve food safety at household, market, and municipal levels				MOH	MTCI
2.4	Strengthen agrifood processors, wholesalers and retailers (private sector)				MAF	
2.5	Strengthen cooperatives and farmer associations				MAF	
2.6	Strengthen transportation and warehousing				CLN	
2.7	Reduce food waste and install environmentally safe waste management				?	
2.8	Build capacity of value chain participants, market information, quality control				PMO	
2.9	Ensure road access and transportation connection between collection points, processing centers, and markets				PWD	

3. Food Processing						
3.1	Improve food processing and food preparation at household levels, producer group, market and municipal levels				MTCI	
3.2	Strengthen capacity of processing facilities				MTCI	
3.3	Strengthen private sector capacity to supply inputs, agro-processing, value addition				MAF	
3.4	Construct fishing ports and fish processing centers				PWD	MAF
3.5	Establish processing and packaging centers				MTCI	
3.6	Support establishment of cold chain storage systems				CLN	
3.7	Support food processing to improve infant and child feeding				MTCI	MOH
3.8	Build capacity of processing staff/workers				MTCI	
3.9	Provide financial resources / credit facilities / public-private partnerships				MTCI	
3.10	Support adherence to CODEX Alimentarius and its implementation				MOH	
4. Distribution						
4.1	Make operational capacity to locally produce food for School Meals (Home-Grown School Feeding) programs				MOEYS	
4.2	Strengthen contract farming and grower schemes				MAF	
4.3	Establish market information system relating to prices, regulations etc.				MAF	
5. Consumption						
5.1	Conduct campaigns on nutrition and health SBCC				MOH	
5.2	Implement conditional cash transfers				MSSI	
5.3	Enhance fortified rice consumption in school feeding programs and by vulnerable groups				MOEYS	
5.4	Increase breast feeding practices that include appropriate supplements				MOH	

Source: Timor-Leste Food Systems Assessment Report 2023

The long list of potential investments presents a whole suite of interventions that are needed across the five pathways to achieve SDG 2 targets. However, it may be imperative to accept the fact that, realistically seen, this would be difficult to achieve by 2030, no matter how much effort may go into implementing the long list of investments; financial resources are not infinite and time is short.

Hence, the Food Systems Assessment report has come up with a short list of potential investments based on conclusions of the study as well as feedback from the national and subnational dialogue on Food Systems Stocktaking.

Short List of Investment Priorities

The short list below indicates possible lead responsibilities and collaboration by UN agencies, which could be considered during implementation, of course with the proviso that in any project the Government has the overall supervision and leadership; for practical implementation in the field UN and other development agencies may take the lead most appropriate and suitable to their mandate, experience and field presence.

Table 16: Food Systems Priorities: Short List

No.	Intervention	Years 1-2	Years 3-5	Years 6-10	Lead	Collaboration
1. Production						
1.1	Production of vegetables, legumes, leafy greens increased by farming households				MoALFF	WFP/FAO
1.2	Water security improved for households (upstream and downstream, micro and small-scale irrigation)				MSA PWD	UNDP UNICEF-WFP
2. Transportation and Warehousing						
2.1	Storage and warehousing capacity improved at household, producer group, market, and municipal levels				MSA CLN	WFP
2.2	Food safety improved at household, market, and municipal levels				MOH MoALFF	WHO-UN-UNIDO
3. Food Processing						
3.1	Food processing and food preparation improved at household levels, producer group, market, and municipal levels				MTCI MoALFF	WFP /FAO
4. Distribution						
4.1	Locally produced food in School Meals (Home-Grown School Feeding) made operational				MOEYS MoALFF	WFP/ FAO
4.2	Contract farming and Grower schemes strengthened; homestead agricultural				MoALFF	FAO
5. Consumption						
5.1	Campaigns on good nutrition and nutritious food preparation (SBCC) implemented				MOH MSA	UNICEF-WHO-WFP
5.2	Fortified Rice consumption enhanced in school feeding programs and by vulnerable groups				MSSI MOEYS	WFP
5.3	Special nutritious food combating stunting for first 1000 days				MOH MSA MoALFF	WFP WHO UNICEF

Source: Timor-Leste Food Systems Assessment Report 2023

National and Subnational Stakeholder Dialogue

During the 2021 Food Systems Summit, Timor-Leste presented its vision and commitments on transforming food systems to become more sustainable and contribute to the achievement of the 2030 Agenda and the SDGs. To document progress and milestones, the UN Food Systems Coordination Hub provided a *Template for Voluntary Progress Review on: Country Level Food Systems Transformation* to give countries an opportunity to celebrate progress during the 2023 Stocktaking Moment. At the same time, the *Template (Questionnaire)* aimed at identifying persisting bottlenecks and challenges that constituted an important exercise towards laying the foundations for a robust follow-through after the Stocktaking Moment, looking ahead to the SDG Summit and the 2025 Stocktaking Moment. The Government of Timor-Leste, repre-

sented by the Executive Director of UNMICS and FSS National Convenor submitted the voluntary response by 25 April 2023 to the UN Food Systems Coordination Hub.

The national and subnational dialogue workshops were a follow up from the Preparatory Meeting of the 2023 Food Systems Stocktaking Moment: Transforming Food Systems in Asia and the Pacific. A Regional Stocktaking, which was conducted on 30th March 2023 at UNCC in Bangkok, Thailand. The objective of the national and subnational dialogue workshops was to provide opportunities for all stakeholders to report on progress made since the UN Food Systems Summit in 2021 and document their contributions to the achievement of the 2030 Agenda.

One national and four subnational stakeholder dialogue workshops were conducted as follows:

National Dialogue in Dili	14 June 2023
Subnational Dialogue in Baucau	21 June 2023
Subnational Dialogue in Manufahi	23 June 2023
Subnational Dialogue in Bobonaro	26 June 2023
Subnational Dialogue in Oecusse	28 June 2023

After the official opening at each workshop in Timor-Leste, the Dialogue was structured around a number of presentations followed by discussion groups focusing on areas identified in the Food Systems Pathway, namely production, transport and warehousing, processing, distribution and consumption. The key messages from all five workshops reiterate and confirm the results of the Food Systems Assessment report. These are:

- High priority must be given to improving the nutrition status of rural population, in particular the vulnerable and children;
- Water scarcity is a major and pressing issue during the dry season across all Municipalities; and this must be tackled as a priority;
- Investments in household level kitchen gardens (with provision of water) will meet household needs of producing vegetables and fruits;
- Farmer households are keen to produce but lack quality seeds, skills to implement good farming practices, lack appropriate farming tools, lack good storage facilities; and techniques to process food and increase shelf life;
- Those farmers who are able to produce lack access to markets and buyers; they also have few means of transporting food to markets and other distribution centers.

12. In Conclusion – the Best Things First

Bjorn Lomborg, a Danish economist argues “We’re not reaching the SDGs. What now?”¹⁰⁸ His team challenges the myth that SDGs are achievable. Their argument is as follows:

“The hunger goal of SDG 2 sets a long list of ambitious targets related to hunger, food security, nutrition, and agriculture. One is directly related to decreasing hunger, but it’s surrounded by many other targets. They promise secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment. The SDGs also aim to double the agricultural productivity and income of small-scale food producers by 2030, particularly those that are women, indigenous people, family farmers, pastoralists, or fishers”. The Copenhagen economists point out that the Sustainable Development Report of 2021 indicates that the SDG 2 target may be missed.¹⁰⁹



Lomborg’s team has come up with **12 best policies** identified over a range of areas that could be achievable by 2030. These are: Tuberculosis, education, maternal and newborn health, agricultural research and development, malaria, e-procurement, nutrition, land tenure security, chronic diseases, trade, child immunization and skilled migration. The argument is: we cannot do everything; budgets are limited and we need to focus. Fortunately, the list of 12 includes: (i) nutrition; (ii) agricultural research and development; (iii) land tenure security. And these are some of the topics most important in the context of the food systems assessment. If we were to follow Lomborg’s argument, then these three priorities would bring the world and Timor-Leste by far the biggest target achievements under the framework of the SDGs.

In the context of food systems, an alternative to matching government priorities with indicative investment proposals would be to concentrate on nutrition, agricultural research (including improving and distributing quality seeds), and establishing security of land tenure (Viet Nam experienced a boom in agricultural production after introducing Red Certificates of land ownership to private households).

¹⁰⁸ Lomborg, Bjorn. 2023. The 12 most efficient solutions for the world’s poorest and our global SDG promises. Copenhagen Consensus Center

¹⁰⁹ Lomborg, Bjorn. Best Things First (pp. 111-113). Copenhagen Consensus Center.

Annex 1: List of indicative interventions across food systems areas

Areas	Indicative Interventions
1. Production	<p>Crops</p> <ul style="list-style-type: none"> • Promote pooling of cultivable land to improve land preparation, inputs, irrigation, and harvesting • Increase use of certified seeds/seed multiplication, hybrid crops, • Increase use of fertilizers • Increase mechanization • Rehabilitate and maintain irrigation infrastructure (also small irrigation schemes that have fallen into disuse) • Increase availability of processing equipment, promote processing technology, and capacity building • Improve local markets, facilities and storage (dry and cold) • Promote farmer groups/associations that deliver to local markets to bulk storage • Attract value chain buyers to local markets, promote market information and agriculture product price information (seasonal and out-of-season) and bulk purchases • Establish system of permanent agriculture statistics • Conduct market data collection and statistical integration • Mobilize development agency funding / co-financing <p>Livestock</p> <ul style="list-style-type: none"> • Improved breeds • Access to veterinary services • Control of animal diseases through vaccination • Improved fodder • Improved access to water all year round • Funding support / co-financing <p>Water resources</p> <ul style="list-style-type: none"> • Incentives for farmers to settle in areas of rehabilitated irrigation • Strengthening of Water user Associations (WAU); infusion of cash and technical skills • Reduction of high O&M costs • Adoption of climate-smart and water-efficient system of rice intensification (SRI) • Funding support from GCF and other funding agencies <p>Land degradation, soil erosion, water scarcity</p> <ul style="list-style-type: none"> • Incentives to conserve top soil and steep slopes (conservation agriculture promotion) • Reforestation / rehabilitation of forests and pastures in watershed areas • Incentives to maintain and protect fragile landscapes (stop slash and burn practices) • Implement water storage and water harvesting measures in local communities (valleys, feasible check dam areas) • Promote security of tenure • Install community ownership and enforcement • External funding, climate change funds

Areas	Indicative Interventions
1. Production	<p>Animal and crop diseases</p> <ul style="list-style-type: none"> • Vaccinations against animal diseases • Improved facilities and trained veterinary staff • Regular checks and controls • Cover operation and logistic costs for vaccination drives • Enhance Conservation agriculture and biological disease and pest control methods • Funding for vaccines and mobile veterinary laboratories <p>Fisheries (capture fisheries as well as aquaculture)</p> <ul style="list-style-type: none"> • Promotion of fish processing industry • Fish processing promotion of SMEs • Capacity building • Organization of groups to purchase mechanized boats using soft loans • Improvement of cold storages in rural markets to enable fish marketing • Inclusion of fish protein in school feeding programs and local diets • Micro enterprises • Women based group enterprises in aquaculture and processing / semi-processed food products • Supply of fish-protein to schools and nutritional programs • Building of check dams where feasible • Water harvesting during wet season by creating water holding reserves in ponds and eventually keep streams flowing
2. Transport & Warehousing	<ul style="list-style-type: none"> • Continuation of road rehabilitation program for core rural roads, serving relatively high numbers of people and having a relatively high social and economic value • Improved access roads between collection points (Food Systems National Pathway-FSNP 2021) • Increased and improved transportation • Construction of new and rehabilitation of existing warehouses /storages at strategic locations / in major markets • Seed storages • Cold storages • Access to market information • Secure packaging • Linking storages and warehouses to value chains / contract growers • Food safety and quality control services in markets and collection centers • Environmentally safe waste management practices
3. Processing	<ul style="list-style-type: none"> • Provision of hand tractors, threshers and staple food processing equipment to affected farmers organized in groups in order to stimulate agricultural production and generate income as of the next main cropping season with a focus on the main affected areas (FAO) • Increased mechanization • Technical assistance in processing technologies and methods • Improvement in shelf-life of agri-products at farm level/household level • Promoting value chains /contract farming models for potentially beneficial and market demand linked agri-products • Linking farm/household level improved storages with processing of foods and medium-term storage • Establishing farmer producer groups/associations linked to value chains and contract farming to increase bargaining strength, use common storage facilities, and share market price information

Areas	Indicative Interventions
4. Distribution	<ul style="list-style-type: none"> • Increase use of private sector suppliers across Timor-Leste • Improve, strengthen national seed distribution system • Sustain cash transfers to households for purchase of agricultural inputs • Limit establishment of government run stores • User friendly safety instructions on use of agricultural inputs (pesticides, fertilizers) • Improve extension services farmer-to-farmer exchanges, extension by suppliers and contract buyers
5. Consumption	<ul style="list-style-type: none"> • Rice fortification is made mandatory by law (both imported and locally produced rice) • Food basket / conditional cash transfer needs to continue in the form of conditional cash transfers enabling rural farming households to buy food locally • National Campaign in schools and public advertisement on healthy diets • Health program for obese school children in urban areas and obese population groups

Annex 2: List of markets

	Municipality	Post Administrativ	Suco/Village	Market Names
1	Aileu	Aileu Vila	Seloi	Malere
2		Aileu Vila	Lahae	Daisoli
3		Remexio	Asu-Mau	Lok-Mai-Ulu
4		Remexio	Tu-la takeu	Ai-kurus
5		Lequidoe	Namolesu	Namolesu
6	Ainaro	Ainaro	Ainaro Vila	Base Camp
7		Ainaro	Casa	Nu laran
8		Hatubelico	Nuno Moge Leten	Kinus Lao
9		Hatubelico	Nuno Moge Kraik	Nu laran
10		Hatubelico	Mulo	Dare
11		Hatubelico	Mulo	Hautio
12		Hato-Udo	Leolima	Kampung Baru
13		Maubessi	Maubessi Vila	Maubessi
14	Atauro	Atauro	Beloi	Beloi
15		Atauro	Macadade	Makadade
16		Atauro	Maquili	Maquili
17	Baucau	Baguia	Alawa Kraik	Baguia-Vila
18		Baguia	Samalari	Samalari
19		Baguia	Lavateri	Buawa
20		Baucau - Vila	Bahu	Merkadu Vila-Antiga
21		Baucau - Vila	Tirilolo	Merkadu Vila-Nova
22		Baucau - Vila	Gariuai	Gariuai
23		Baucau - Vila	Triloka	Triloka
24		Baucau - Vila	Seical	Merkadu Seical
25		Quelicaí	Baguia	Quelicaí Posto
26		Quelicaí	Laisorulai de Baixo	Laisorulai
27		Quelicaí	Afaca	Afaca
28		Laga	Soba	Talakai
29		Laga	Nunira	Darafae
30		Laga	Saelari	Teriloedae
31		Laga	Atelari	Eladae
32		Venilale	Uato Haco	VenilaleVila
33		Venilale	Umana Ulu	Berkoli
34		Vemassee	Loilubu	Loilubu
35		Vemassee	Vemassee Tasi	Vemassee
36	Bobonaro	Atabae	Aidaba Leten	Atabae Vila
37		Balibo	Balibo Vila	Balibo Vila
38		Balibo	Batugade	Batugade
39		Bobonaro	Bobonaro	Bobonaro Vila
40		Bobonaro	Maliubu	Maliubu
41		Cailaco	Meligo	Marco
42		Cailaco	Suku kahur hmtuk 4	Bilimau
43		Maliana	Lahomea	Maliana Vila

	Municipality	Post Administrativ	Suco/Village	Market Names
44	Covalima	Suai	Camenasa	Suai Vila
45		Suai	Beco	Beco
46		Tilomar	Maudemo	Tilomar
47		Zumalai	Fatuleto	Zumalai Vila
48		Zumalai	Lepo	Lepo
49	Dili	Fohorem	Fohorem	Fohorem
50		Metinaro	Sabuli	Akadiru-laran
51		Cristo Rei	Hera	Hera
52		Cristo Rei	Becora	Camea
53		Nain Feto	Taibessi	Taibessi
54	Ermera	Dom Aleixo	Manleuana	Manleuana
55		Dom Aleixo	Bairo Pite	Bairo Pite
56		Hatolia	Fatubolu	Fatubolu/Dauhati
57		Hatolia	Hatolia Vila	Hatolia Vila
58		Atsabe	Laklo	Laklo
59	Lautem	Letefoho	Lauana	Lauana
60		Letefoho	Dukurai	Letefoho Vila
61		Ermera	Riheu	Gleno-Dauhati
62		Ermera	Poetete	Ermera Vila
63		Railaku	Samalete	Daserlaku
64	Liquisa	Railaku	Lihu	Railaku Vila
65		Iliomar	Iliomar I	Iliomar
66		Luro	Luro	Luro
67		Lautém	Parlamento	Lautém
68		Lospalos	Fuiloro	Fuiloro
69	Manatuto	Bazartete		Liquiçá Vila-Maumeta
70		Bazartete	Fatumasi	Fatumasi
71		Maubara	Vaviguinia	Maubara Vila
72		Manatuto Vila	Maabat	Maabat
73		Manatuto Vila	Cribas	Ranac
74	Manufahi	Laleia	Haturalan	Haturalan
75		Laleia	Cairui	Cairui
76		Laclo	Lakumesak	Mantane
77		Bariqui	Umaboco	Natarbora
78		Soibada	Manlala	Manlala
79		Laclubar	Orlalan	Orlalan
80		Same	Letefoho	Same Vila
81		Same	Daisua	Simpan Tiga
82		Same	Betano	Loro Betano
83		Fatuberlio	Fatuboe	Weikar Fatuboe
84		Turiscas	Manumera	Manumera Vila

	Municipality	Post Administrativ	Suco/Village	Market Names
85	Oecusse	Pante Makasar	Costa	Oecusse Vila
86		Pante Makasar	Naimeco	Maumeta
87		Oesilo	Bobometo	Tumin
88		Oesilo	Usitacae	Pune
89		Passabe	Abani	Passabe
90		Nitibe	Usitaco	Nitibe
91		Nitibe	Beneufe	Baocnana
92	Viqueque	Viqueque	Carabalo	Mercida
93		Viqueque	Carabalo	Beloi
94		Viqueque		Buicarín
95		Viqueque	Uma wain Leten	Area Sede Suku
96		Uato-Lari	Matahoi	Darabai
97		Uato-Lari	Macadiqui	Area Sede Suku
98		Uato-Lari	Afaloicai	Bebui
99		Uato-Lari	Vessoru	Kampo Vessoru
100		Uatucarbau	Irabin de Baixo	Postu Vila
101	Viqueque	Uatucarbau	Irabin de Baixo	Caidawadalaga
102	Viqueque	Ossu	Afalocai	Area Sede Suku
103	Viqueque	Ossu	Ossu de Cima	Ossu Vila
104	Viqueque	Ossu	Builale	Larigutu
105	Viqueque	Lacluta	Dilor	Lacluta Vila
106	Viqueque	Lacluta	Uma Tolu	Aitara

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