



Food and Agriculture Organization
of the United Nations



SPECIAL REPORT

**2021 FAO CROP AND FOOD SUPPLY
ASSESSMENT MISSION (CFSAM) TO
THE DEMOCRATIC REPUBLIC OF TIMOR-LESTE**

16 June 2021

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ACRONYMS AND ABBREVIATIONS

ASF	African swine fever
CA	Conservation agriculture
CARE	Cooperative for Assistance and Relief Everywhere
CFSAM	Crop and Food Supply Assessment Mission
COVID-19	Coronavirus disease
CPI	Consumer Price Index
CSF	Classical swine fever
DFAT	Department of Foreign Affairs and Trade
EIU	Economist Intelligence Unit
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
FAW	Fall armyworm
GDS	General Directorate of Statistics
GDP	Gross domestic product
GIEWS	Global Information and Early Warning System on Food and Agriculture
IOD	Indian Ocean Dipole
LDC	Least Developed Country
LTA	Long Term Average
MAF	Ministry of Agriculture and Fisheries
NDV	Newcastle disease virus
NGOs	Non-governmental organizations
NSD	National Statistics Directorate
OER	FAO Office of Emergencies and Resilience
PRC	Polymerase chain reaction
RAEOA	Special Administrative Region of Oé-Cusse Ambeno
RFEs	Rainfall estimates
SDP	Strategic Development Plan
UN	United Nations
UN-DESA	United Nations Department of Economic and Social Affairs
USD	United States dollar
USDA	United States Department of Agriculture
WFP	World Food Programme



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HIGHLIGHTS

- The 2021 production of maize, rice and root crops (in cereal equivalent) is forecast at about 136 400 tonnes, nearly 8 percent above the past five-year average. An early start of the rainy season, followed by abundant and well-distributed rains throughout the season, resulted in higher-than-average planted area and yields, compensating for the losses due to floods and Fall armyworm (FAW).
- The 2021 output of maize is estimated at 80 100 tonnes, about 9 percent more than the previous five-year average, while rice production is estimated at 39 950 tonnes, 13 percent higher than the past five-year average.
- Approximately 2 660 hectares of rice were affected by floods, 12 percent of the planted areas. FAW severely affected about 2 880 hectares of maize, 9 percent of the cultivated area, with a significant reduction of yields especially for late-planted crops.
- Concerns exist for the forthcoming 2021/22 main cropping season, to be planted from next December, due to damaged irrigation infrastructure caused by floods and the expansion of FAW damages. Without rehabilitation interventions, the Mission estimates that about 2 800 hectares of rice may not be fully or partially irrigated, while FAW could affect up to 20 percent of the aggregated maize output in a year with average or below-average rainfall.
- Since its outbreak in 2019, the African swine fever (ASF)¹ led to the death of more than 129 000 animals, about 28 percent of the total pig population. Over the past two years, the poultry sector has been affected by a new wave of Newcastle disease virus (NDV), particularly where vaccination campaigns were delayed.
- Abundant rainfall and good pasture conditions benefited large and small head livestock. The population of buffaloes, Bali cows, horses, sheep and goats are generally healthy and have increased in number in 2021.
- Prices of imported rice, the most consumed staple in the country, were at high levels in May 2021, averaging 15 percent higher than a year earlier, mostly reflecting strong local demand and supply disruptions related to the COVID-19 pandemic. Prices of local rice, which accounts for a small proportion of the market supply, are twice higher than the prices of imported rice, but they decreased and, in May 2021, were 23 percent below their levels a year earlier. This is due to the diminished purchasing power, following income losses and increased unemployment due to the implementation of COVID-19 restrictions.
- With an estimated utilization of 270 100 tonnes of maize, rice and root crops (in cereal equivalent), there is an expected import requirement for the 2021/22 marketing year (April/March) of about 113 700 tonnes,



¹ African swine fever (ASF), a contagious deadly viral disease affecting pigs and wild boars.

which will be fully covered by commercial and governmental purchases.

- An emergency response to support farmers affected by floods is needed to restore income and production capacity. Irrigation systems damaged by the floods need to be repaired. Interventions need to include cash for work and mobilization of heavy equipment to remove sediments from irrigation canals, intake repairs and protection of irrigated land from future riverine erosion. The provision of vegetable seeds and farming equipment packages to the farmers

can also help mitigate the impact on the affected communities.

- The Mission recommends reinforcing the national bio-security capacity and support rapid interventions at farm level on FAW and ASF, through pig restocking in bio-secure fences and extended vaccination campaigns. The Mission identified an opportunity for long-term institutionalization of local procurements, initiated through the Government's *Cesta Basica* programme, to supply the national school feeding programme (*merenda escolar*).

OVERVIEW

An FAO Crop and Food Supply Assessment Mission (CFSAM) visited all main food producing areas in Timor-Leste from 27 April to 9 May 2021 to estimate the 2021 crop production and the import requirements during the 2021/22 marketing year (April/March). The Mission's aim was to provide an accurate picture of severity and extent of the shocks that affected the agriculture sector in 2021 and identify the country's main agricultural support needs until the next harvest. In particular, as officially requested by the Ministry of Agriculture and Fisheries (MAF), the CFSAM assessed the impact of the tropical storm and floods as well as FAW and ASF outbreaks on the agriculture sector.

Given the COVID-19 pandemic and international travel restrictions, the Mission was led by an FAO international expert based in Dili, with the support of the Global Information and Early Warning System on Food and Agriculture (GIEWS) Team in Rome. National consultants were recruited to carry out the field work, with the technical support of members of the MAF Disaster Risk Management and Climate Change Adaptation Task Force. The Mission also benefitted from the contributions of Mercy Corps and Tomak/DFAT who joined the field assessment as observers. The assessment tools were developed in-country, based on FAO/CFSAM Guidelines (Annex 2), and five teams were trained on the CFSAM methodology, on 22–23 April 2021, before travelling to the municipalities. The teams visited all municipalities, except the Special Administrative Region of Oé-Cusse Ambeno (RAEOA) where travel was prohibited due to the COVID-19 pandemic. The situation in RAEOA was assessed through telephone interviews with experts from the Agriculture and Fisheries Directorate, development partners and farmers. The MAF facilitated to obtain the required travel authorizations to the municipalities from the COVID-19 Integrated Crisis Management Centre.



Favourable weather conditions and adequate rainfall amounts throughout the cropping season resulted in an expansion of the area cultivated with the 2021 main season maize as well as with upland and irrigated rice compared to the previous year. Another factor that favourably influenced the area planted with 2021 staple crops is the return of the working age population from Dili to the municipalities following the surge of COVID-19 cases in Dili in December 2020. The launch by the government of the large-scale local food procurement through the short-term *Cesta Basica* programme on 27 October 2020, has also encouraged some farmers to increase the area cultivated. The total area planted is estimated at 33 700 hectares for maize and 22 300 hectares for rice. Compared to the last five-year average, the area planted is 2 percent higher for maize and 25 percent for rice.

Several structural factors affect staple crop yields in the country, including the very low use of farming inputs, lack of mechanization, poor irrigation management and limited access to the markets. As a result, agriculture productivity remains low compared to other countries in the region. However, in 2021, staple crops benefited from good rainfall conditions,

reaching near-average yields, despite the localized impact of floods and FAW.

The Mission found that approximately 2 660 hectares of rice were affected by floods, out of 22 300 hectares planted (12 percent). However, while some rice crops were entirely destroyed by the floods and, in some instances, agricultural land was lost due to riverine erosion, not all the flooded rice resulted in yield losses. In addition, 1 570 hectares of maize were affected by floods and strong winds, out of 33 700 hectares planted (5 percent). Good rainfall patterns during the cropping season mitigated the impact of floods, allowing rice to complete its cycle, even without the irrigation systems that were partially damaged by the floods. Without interventions to rehabilitate irrigation infrastructures, the Mission estimates that about 2 800 hectares of rice, located across 70 villages (Map 1), may not be irrigated or receive sufficient irrigation water during the 2021/22 main cropping season that will start next December.

The Mission estimates that 2 880 hectares of maize had been severely affected by FAW, about 9 percent of the cultivated area, resulting in a significant yield reduction of crops in the affected areas. Late-planted maize crops were particularly affected by FAW in 2021. Being a new pest in the country, there is a high risk that FAW damages on maize crops increases in the coming cropping seasons, affecting the overall food supply, especially when rainfall conditions are less favourable. In such conditions, FAW could affect up to 20 percent of the aggregated maize output.

The 2021 output of maize is estimated at 80 100 tonnes, about 9 percent above the previous five-year average, while rice production is estimated at 39 950 tonnes, 13 percent above the previous five years. The 2021 overall staple food crop production (including rice, maize and root crops) is estimated at 136 400 tonnes (in cereal equivalent). As total utilization is estimated at 270 100 tonnes, the total cereal import requirement in the 2021/22 marketing year (April/March) is set at 113 700 tonnes reflecting the structural dependence of the country on rice imports. In anticipation of the government purchases from the international markets, estimated at about 10 000 tonnes, private cereal commercial imports are estimated at 99 700 tonnes of rice and 4 000 tonnes of maize.

Since its outbreak in 2019, the ASF had a devastating impact on the pig value chain. Based on data available, the total death to ASF, including the Classical swine fever (CSF) is estimated at 129 000 animals, about 28 percent of the total pig population. The actual figures might be higher as data had not been updated in some municipalities. Over the past two years, the poultry sector has been affected by a new wave of NDV infections in several parts of the country, particularly where vaccination campaigns were delayed.

The Mission recommends to urgently support the ongoing Ministry of Agriculture and Fisheries (MAF) efforts to rehabilitate the irrigation infrastructures destroyed/affected by the floods, to reinforce the national bio-security capacity and to support rapid interventions at farm level on FAW and ASFs, through pig restocking in bio-secure fences for farmers most affected by ASF as well as extended vaccination campaigns. In addition, addressing the low use of farming inputs (fertilizers and improved quality seeds) and the sheer lack of mechanization, through the promotion of Climate-Smart Agriculture and gender-responsive value chains, is essential to improve farmers' resilience to climate risks and increase crop productivity.

The Government's *Cesta Básica* programme (universal basic food and non-food basket) helped mitigate the impact of the COVID-19 restrictions on farmers' access to the local markets. The Mission received enthusiastic feedbacks from farmers, that often expressed the need for its continuity. There is an opportunity for long-term institutionalization of local procurements to supply the national school feeding programme (*merenda escolar*). Home-grown school feeding has multiple advantages, including the increase of school attendance and the improvement of nutrition of school age children, while, at the same time, providing market opportunities for local farmers. Linking farmers to institutional markets, such as school feeding, has the potential to contribute to the 2011–2030 Strategic Development Plan (SDP) transition objective from subsistence agriculture to commercial agriculture.

The heavy rains that caused severe flash floods in the densely population area of Dili at the end of

March and beginning of April 2021 underlined the need to urgently address the problem of land degradations on the hills bordering the southern part of the city. Long-term interventions and engaging the local communities in participatory processes, may help restore the degraded watersheds above Dili, particularly Kampung Alor, Maloa, Lahane and Becora watersheds.

Finally, the Mission identified that the national estimates of staple crop production are generated with a considerable degree of uncertainty as the country has not established a permanent agriculture statistics system and, therefore, improvements in this area are needed.

Due to the surge in COVID-19 cases and the government putting in place response measures that included travel restrictions and “health fences” to curb the spread of the virus, WFP could not have access to communities to collect information on the food security situation and decided to not participate to the CFSAM. Nonetheless, WFP started in June to collect information at municipality level through telephone interviews with key informants, including food security focal points, nutrition field officers, NGOs field officers and traders. This will ensure the provision of information about the national food security situation amid the COVID-19 pandemic and guide actions by decision makers.



SOCIO-ECONOMIC CONTEXT

Macro-economic situation

Timor-Leste is an island country in Southeast Asia, situated on the eastern half of the Island of Timor and it includes the nearby islands of Atauro and Jaco as well as the enclave of Oecusse in the western half of the island surrounded by Indonesian West Timor. The country gained its independence from Indonesia in 1999, following a referendum supervised by the United Nations (UN). The country became a new sovereign State in May 2002 and, since then, has made significant progress in key development areas, including the construction of roads, ports, airports, water and sanitation systems as well as the establishment of government facilities and institutional frameworks. Despite this progress, the country is classified by the UN as a Least Developed Country (LDC) and is one of the most oil-dependent country in the world with around 85 percent of government expenditure financed by a budget from the Timor-Leste's Petroleum Fund. The Petroleum Fund was established by the government in August 2005 under the provision of the Petroleum Fund Law, which has been amended on 23 August 2011. The purpose of the Petroleum Fund Law is to guarantee the management of the country's petroleum resources in order to benefit both current and future generations. The Petroleum Fund Law was valued at a record level of USD 18 billion in June 2020, reflecting large investment returns and limited withdrawals. Petroleum revenues consist of taxes and royalties from the off-shore production of the Bayu-Undan field. The main challenge of the national economy is to effectively manage its petroleum wealth and reduce its public sector dependence, by diversification of its petroleum-dependent economy to other sectors.

The national economic growth, measured by real Gross domestic product (GDP), has fluctuated during the previous five years. After a period of negative growth in 2017 and 2018, the



GDP increased to 3.4 percent in 2019 driven by a combination of strong public expenditures and private investments, with large public spending and household consumption. In 2020, the GDP was estimated to have contracted by 7.9 percent, the strongest fall since the country's independence, due to the negative effects of the COVID-19 pandemic on the domestic economy and delays in the approval of the 2020 State budget. The implementation of restrictions to contain the COVID-19 pandemic have caused severe income losses, increased unemployment, resulted in closure of firms, decreasing both demand and the supply of goods and services, as consumers reduced spending and companies postponed investments. The global impact of the COVID-19 pandemic, in the form of transport disruptions in tourism and business, the low demand for key export commodities, including coffee, also contributed to the decline in the economy. The political uncertainty has resulted in lower consumer and business confidence causing a decline in public spending and private demand. Growth prospects for 2021 and 2022 still depends on how the COVID-19 pandemic will evolve, but some positive signals stem from the Government's Economic Recovery Plan, approved in October 2020.

The Plan covers two distinct phases:

- The first short-term phase aims to mitigate the impacts of COVID-19's responses and focuses on avoiding job losses, supporting households and preventing firm closures in order to foster domestic consumption and improve living standards.
- The second medium-term phase aims to support the economic recovery for the next two-three years with the focus on agriculture, tourism, education, health, social protection and institutional reforms.

Regarding trade, the value of total exports (consisting in hydrocarbons and small amounts of coffee) remains overshadowed by the import bill, which surpasses twice the value of exports, resulting in an expected large merchandise trade deficit in 2021/22. The main exports of the country are crude petroleum and petroleum gas, which together account for about 90 percent of the total exports, as well as small quantities of coffee, locust beans, seaweed, sugar beet, cane and scrap iron. Singapore is the most important trading partner, accounting for almost 60 percent of exports in 2020, followed by China (mainland), Japan, Indonesia and the United States of America. Imports consist of refined petroleum, cars, cement and delivery trucks and are mostly from Indonesia, China (mainland), Singapore, Malaysia and Australia.

According to the General Directorate of Statistics, the Consumer Price Index (CPI) in April 2021 increased by 0.6 percent from the previous month and was 3.4 percent up from the same month in 2020. The year-on-year increase is mainly due to the high prices of non-alcoholic beverages, which increased by 5.2 percent. Within the Price Food Index, the main driver of the increase were the prices of rice, up by 13 percent and, to a lesser extent, vegetable and dairy products and eggs, prices of which were 5 and 4 percent higher, respectively, than one year before.

Population

Using an annual average growth rate of approximately 2 percent, the mid-2021 population is estimated at 1 344 000 (UN-DESA, May 2021). About 60 percent of the population is under the age of 25.

Agriculture sector

General

The country has a total land area of approximately 14 500 km². The total cultivated land is approximately 216 000 hectares and the average size of the farming household is 1.53 hectares. About 96 percent of the holdings are owned by farmers. Two percent of the parcels of land are communal land and nearly 1 percent are leased-in in their holdings (Timor-Leste, 2020). About 44 percent of the land has a slope of 40 percent or greater and the majority of it has only a thin cover of productive soil (Thompson, 2011). Unsustainable slash and burn farming practices on steep slopes are a common feature of the sector. The agriculture sector is highly exposed to weather hazards and recurrent disasters have been caused by a combination of factors, including heavy monsoon rains, steep topography, widespread deforestation and land degradation, cyclones and strong winds. In 2019, the World Risk Index identified Timor-Leste as the 20th country most at risk in the world to natural disasters as a result of its location, geography and very limited capacity to prepare for and recover from climate-related shocks.

An estimated 70 percent of the population lives in rural areas (GDS, 2015) and agriculture is practiced by two-thirds of the Timorese households (Timor-Leste, 2020). The vast majority are small scale subsistence farming units, with only 3 percent of them producing mainly for sale (GDS, 2015). Almost all of the maize and about three-quarters of the rice produced is for households' own consumption (Lundahl and Sjöholm, 2013). The agriculture sector contributes to 17 percent of the non-oil GDP and accounts for about 60 percent of non-oil exports (GDS, 2020). The agriculture census identified 75 crops cultivated in the country (Timor-Leste, 2020). Important crops include maize, rice, coffee, cassava, sweet potatoes, peas and beans, cabbage, pumpkin, cucumber, chili, tomatoes, coconuts, mangoes, bananas, papaya, areca nuts, candlenuts, elephant yams and vanilla. A vast majority of the crops, plants and trees, are either cultivated as mixed crops or follow a scattered type of planting, while a minimum number of the crops is cultivated in mono-culture. Untapped agricultural land abounds in many parts of the country.

The utilization of farming inputs is very low as only 2.2 percent of the farmers are using inorganic fertilizers (only 0.1 percent on maize), 1 percent of farmers uses government seed/planting material and 6 percent use some type of plant protection methods (Timor-Leste, 2020). The agriculture census data also illustrates a dire situation concerning mechanization with only 4.7 percent of the farming households using hand tractors (6 683 farmers out of 141 141) and 0.7 percent having access to four-wheel tractors (1 107 farmers). Most farming operations are done manually. Regarding food processing, only 0.8 percent (1 157 farmers) use maize threshing machines and 2 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.

In this context, rainfall amounts and their distribution, coupled with the prevalence of pests and diseases, are the main drivers determining agriculture production. As irrigation is marginal and most water catchment areas have small dimensions, crop production heavily depends on local rainfall conditions. Agricultural activities generally start in November, with the onset of the main northeast monsoon rainy season (in Ermera, the season usually starts one month earlier than in other municipalities).

Agricultural productivity is one of the least developed in the world and is well below that of other small island developing countries. In recent years, productivity has fallen below the average level of other low-income food-deficit countries, making the sector to underperform in terms of its contribution to food security and overall economic growth (World Bank Group, 2019). The ubiquitous slash and burn practices limit the agriculture sector leading to low crop, forest and fisheries' productivity and low resilience to climate risks.

Despite the sector providing direct employment to about 70 percent of the employed population (NSD, 2012), the sector suffers from lack of investments. MAF's ratio of the State budget has diminished over time, from 2.0 percent in 2011 to 0.5 percent in 2021 (Timor-Leste, 2011 and Jornal da República 2020).

Climatic conditions

The country is dominated by a central mountain range, rising to 3 000 m, dissected by steep-sided river valleys. The mountains extend from the centre of the country to the north coast, but they taper off to areas of coastal plain on the south. This topography results in a diversity of weather conditions, generally grouped into three different climatic zones (Kirono, 2010):

- **North Coast Region:** Characterized by average mean temperatures of more than 24°C. Annual rainfall amounts to less than 1 500 mm, with a dry season lasting for about five months.
- **Mountainous Region:** Characterized by average mean temperatures of less than 24°C. Annual rainfall amounts to more than 1 500 mm, with a dry season lasting for four months.
- **South Coast Region:** Characterized by average mean temperatures of more than 24°C. Annual rainfall amounts to about 2 500 mm, with a dry season lasting for only three months.

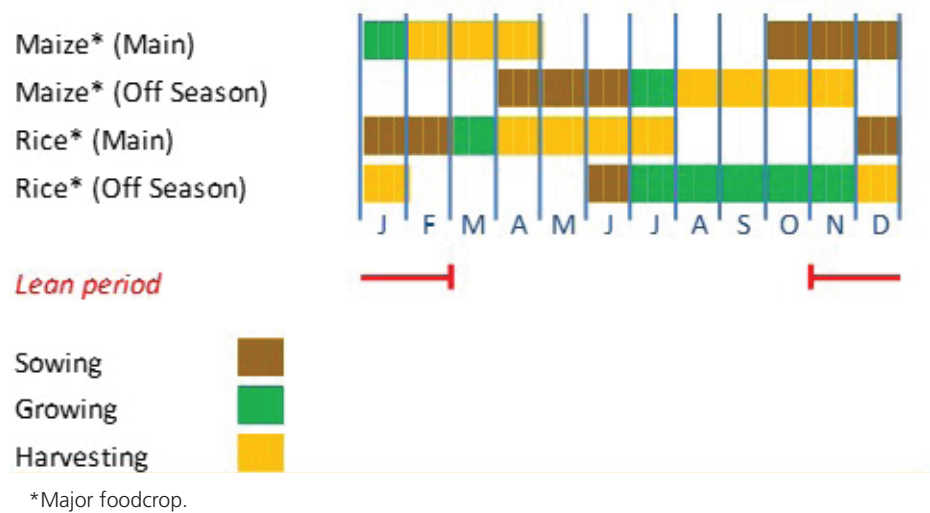
The amount of rainfall significantly increases with the increasing elevation and annual rainfall amounts up to 3 000 mm in the upland areas. The country has a monsoon climate, with a pronounced wet season from December to May and dry season from June to November. From August to October, average rainfall amounts are less than 50 mm per month. Temperatures range from 18 to 21°C in the wet season and from 26 to 32°C in the dry season.

Located between the Indian and Pacific oceans, year-to-year variations in local precipitation are due to the West Pacific Monsoon, the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD). The seasonal arrival of the West Pacific Monsoon in December usually represents a switch from very dry to very wet conditions. El Niño events are normally associated with drier-than-normal conditions and often lead to a late onset and early finish to the wet season, while La Niña events are associated with wetter-than-normal conditions. La Niña generally causes an extended wet season and increased rainfall amounts during the dry season. Similar to the ENSO, a positive IOD is normally associated with drier-than-normal conditions, while a negative IOD normally brings wetter-than-normal conditions (Australian Bureau of Meteorology).

The main cultivation seasons for maize starts in October and continues until April, rice plantings start in December with the onset of the rainy season until March and are harvested between April and June. The output this season depends on rainfall from the West Pacific Monsoon. The

secondary season starts in April and continues until November for maize, while the secondary season rice, mostly irrigated, is planted in June and harvested in December/January. The cropping calendar for these two cereals is shown in Figure 1.

Figure 1: Timor-Leste - Crop Calendar



Source: FAO/GIEWS, FAO/WFP CFSAM, 2009.

FOOD PRODUCTION IN 2021

Rainfall conditions

The rainfall analysis is based on data provided by FAO on remote sensing Rainfall estimates (RFEs) as well as farmers' observations compiled by the Mission teams.

During the main 2020/21 cropping season, weather conditions have been characterized by a La Niña event from mid-September 2020 until mid-March 2021 and a neutral IOD since July 2020 and throughout the entire cropping season. This resulted in an early onset of the rainy season in November and above-average and well-distributed precipitation amounts until mid-March 2021 which supported planting activities and benefitted germination of crops in most parts of the country (Figure 1). Subsequently, a tropical storm brought heavy rains between 29 March and 4 April and caused flash flooding and damage to standing crops that were at various stages of development (final stage for maize). According to remote sensing data, rainfall amounts in the third dekad of March and the first dekad of April were two to four times above the Long Term Average (LTA). In the important cereal producing districts of Baucau, Viqueque and Manuatu, rainfall amounts during this period were estimated at 375 mm, 310 mm and 445 mm, compared to the LTA of 125 mm, 120 mm and 110 mm, respectively. Figures 2 and 3 show cumulative rainfall in 2021 and the LTA, illustrating the unusual high amounts of rainfall, caused by the tropical storm event. From mid-April until the end of May, rains were average to below average, improving harvesting conditions for the 2021 main season crops. Both ENSO and IOD are forecasted to remain neutral during the second part of 2021.

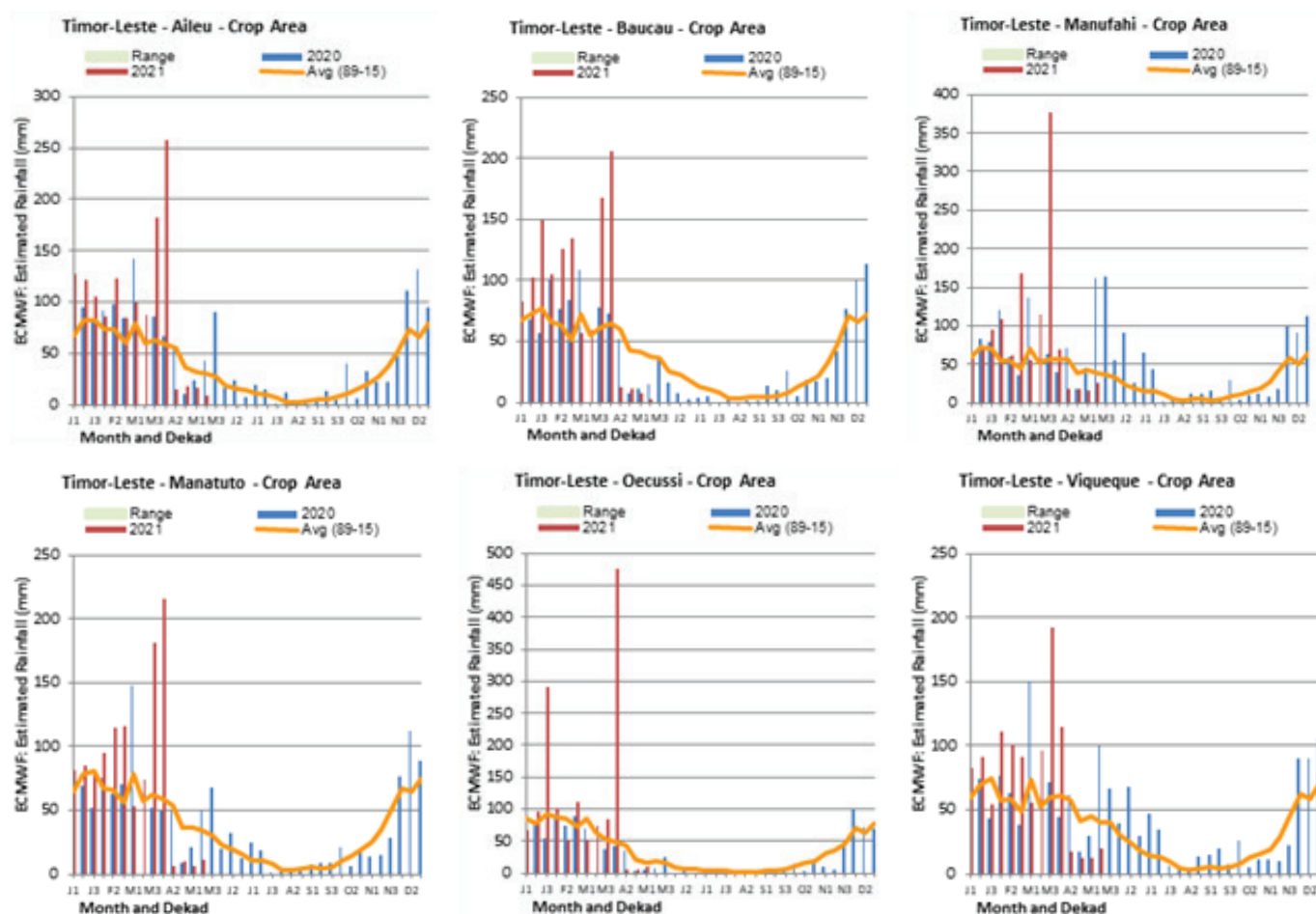


Factors affecting agriculture in 2021

Floods and damage to irrigation infrastructures

A tropical storm brought heavy rains from 29 March to 4 April 2021 that caused flash floods and landslide across all of the 13 municipalities of the country, with the capital, Dili, and surrounding low-lying areas being the worst affected. On 3–4 April, more than 400 mm of rain was recorded in Dili. Intense rains of up to 70 mm per hour welled mountainous catchments and sent tidal waves of flood water and debris into urban areas. The short, steep and degraded watersheds of Kampung Alor, Maloa, Lahane and Becora *sucos* (villages) were the main source of flood waters into the city. The country's narrow landmass and high topography mean that rivers are steep and prone to floods and landslides. On 8 April 2021, the government declared a State of Calamity in Dili and called for international assistance. Shortly after creating havoc

Figure 2: : Timor-Leste – Rainfall amounts January 2020-May 2021 compared with LTA for selected districts



Source: FAO/GIEWS, Earth Observation Tool, 2021.

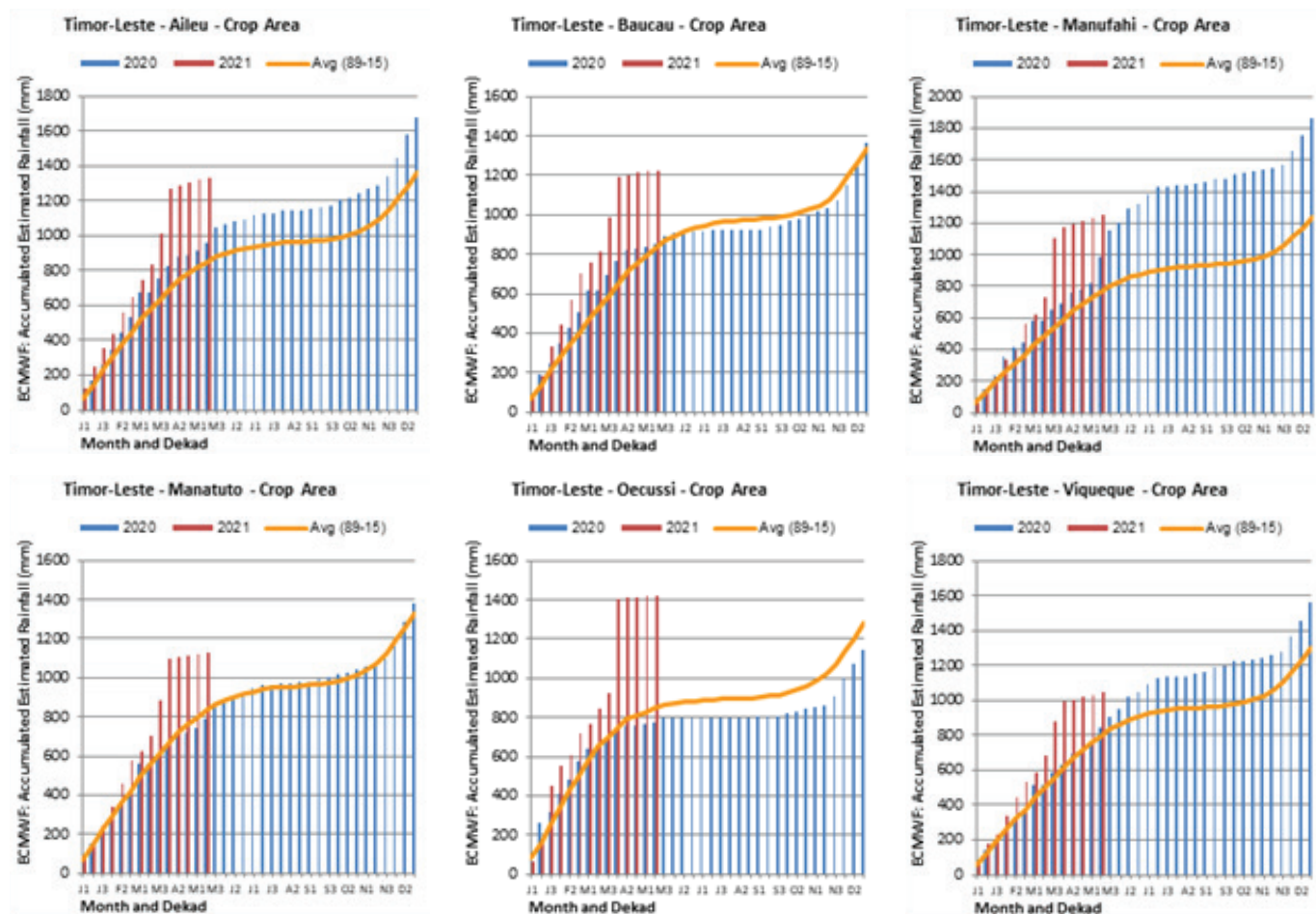
in the country, the tropical storm gained in intensity and was upgraded into Category 1 Seroja Cyclone on 5 April 2021.

The Mission found that approximately 2 660 hectares of rice were affected by the floods, out of the 22 300 hectares planted. However, 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. However, a favourable overall rainfall pattern during the 2021 main season mitigated the impact of floods, allowing rice to complete its cycle, even often without irrigation systems that were partially damaged by

the floods. Without interventions to rehabilitate irrigation infrastructures, the Mission estimated that about 2 800 hectares of rice may not be irrigated or receive sufficient irrigation water during the 2021/22 main cropping season.

From an agriculture perspective, 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. Rapid interventions to repair intakes and canal infrastructures as well as removing sediments with heavy machineries and through cash-for-work programmes are necessary. In some locations, protecting agriculture land from future erosion with gabions is also required. Irrigation

Figure 3: Timor-Leste – Cumulative rainfall January 2020-May 2021 compared with LTA for selected districts



Source: FAO/GIEWS, Earth Observation Tool, 2021.

infrastructure in Baucau Municipality has also been severely affected, while moderate damages have been reported in Viqueque, Bobonaro, Aileu and RAEOA municipalities. Only Lautem Municipality did not suffer any damage due to the floods. Overall, the Mission identified 90 *sucos* with significant damage to irrigation infrastructure. Only in 20 *sucos*, the local communities were able to repair the damages, while in the remaining 70 *sucos*, external assistance is required before the start of the next 2021/22 main cropping season. In some municipalities, the Agriculture and Fisheries Directorates responded swiftly by renting heavy equipment from private companies to remove sediments.

The Mission identified the urgent need to repair and upgrade the irrigation infrastructure, damaged

or destroyed by recurring flash flood events. The long-term landscape degradation, caused primarily by unsustainable shifting slash and burn agriculture practices, uncontrolled fires and overgrazing, resulted in a severe erosion of soils across the country. The short-term, but intense, annual rainy season, coupled with steep slopes and degraded land cover, increases the risk of incidents of intense surface splash, sheet, rill and gully erosion, landslides and river/streambank erosion. Shallowing and widening of riverbeds due to erosion have resulted in damage to agriculture lands, particularly paddy fields, which are normally situated along the riversides, due to intense rain following a wet period. The April 2021 floods intensified these processes. In 22 *sucos*, paddy fields are now directly exposed to riverine erosion due to the disaster and need infrastructure work to prevent future losses of agricultural land.

Fall armyworm (FAW)

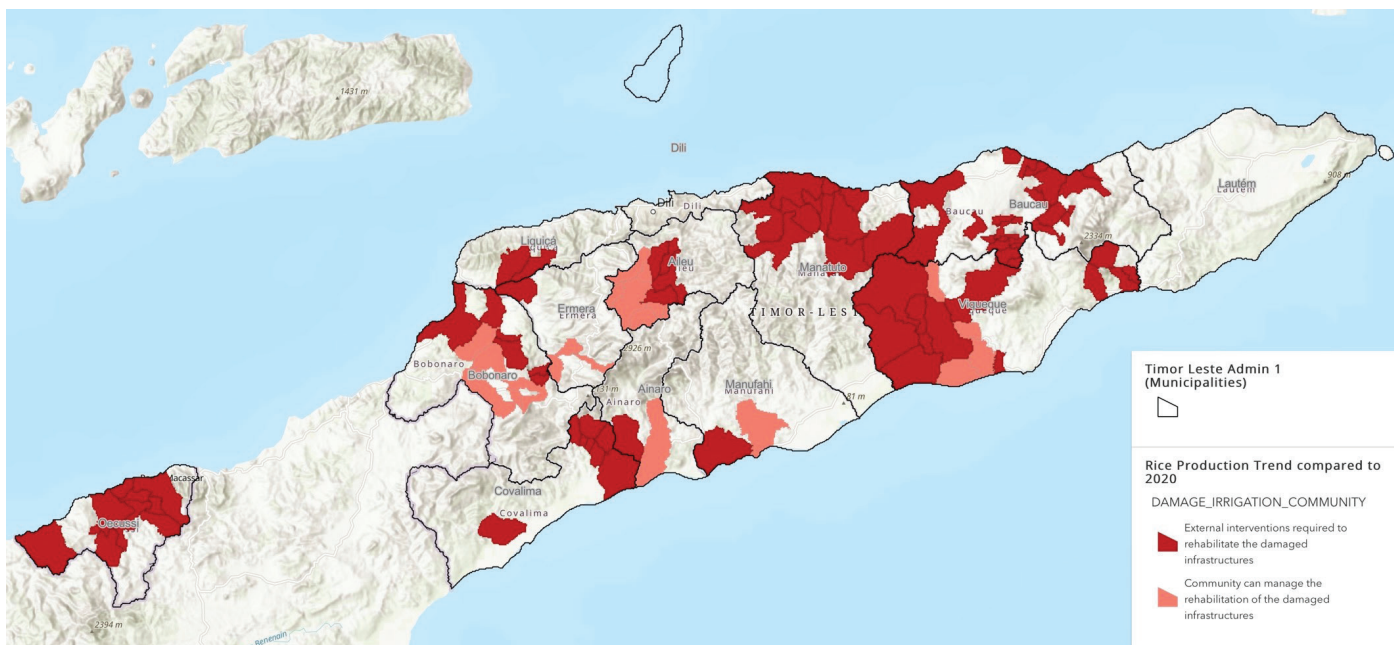
In February 2020, the presence of FAW² was for the first time confirmed in the country and, soon after, it was reported in all municipalities. The FAW proved to be reproducing fast in the local agro-climatic conditions, completing one life cycle within a month. At each cycle, an adult FAW female moth lays between 200 and 300 eggs. The adult moths have great mobility and can travel up to 150 km overnight. In 2020, the FAW prevalence on maize plants averaged 33 percent, while it reached 70 percent in Ainaro Municipality. On rice, the prevalence remained low, at 2.8 percent.

Experience from the Meso Americas and, recently, from Africa has shown that once FAW arrive in a country, it is almost impossible to eradicate them. The pest is known to feed on more than 350 cultivated crops and wild plants. Being a resident pest, farmers need to learn how to manage them in their fields. The challenges for responding to FAW in the country are many. Firstly, based on the assessment done by FAO in other Asia-Pacific countries, the invading pest population has developed resistance to insecticides,

including several insecticides available in the country. Local farmers have reported the lack of effects of insecticides on FAW. Secondly, the access of extension services information, indispensable to disseminate good practices, are reaching only 12 percent of the farmers (Timor-Leste, 2020). Thirdly, local solutions that could be undertaken by farmers to reduce the presence of FAW at farm level have not yet been introduced and tested.

Based on data collected from *suco* extensionists and Municipality Agriculture Directorates as well as on field observations, the Mission estimates that 2 880 hectares of maize had been severely affected by FAW, approximately 9 percent of the cultivated area, resulting in significant reduction of yields in the affected plots. The municipalities of Liquiça, Ainaro, Lautem, Covalima, Oecussi and Viqueque are among the most affected, with more than 10 percent of the fields severely damaged. Being a new pest in the country, there is a high risk that FAW could cause more damages in the coming cropping seasons, affecting the overall food supply, especially when rainfall conditions are less favourable. In such conditions, FAW could affect up

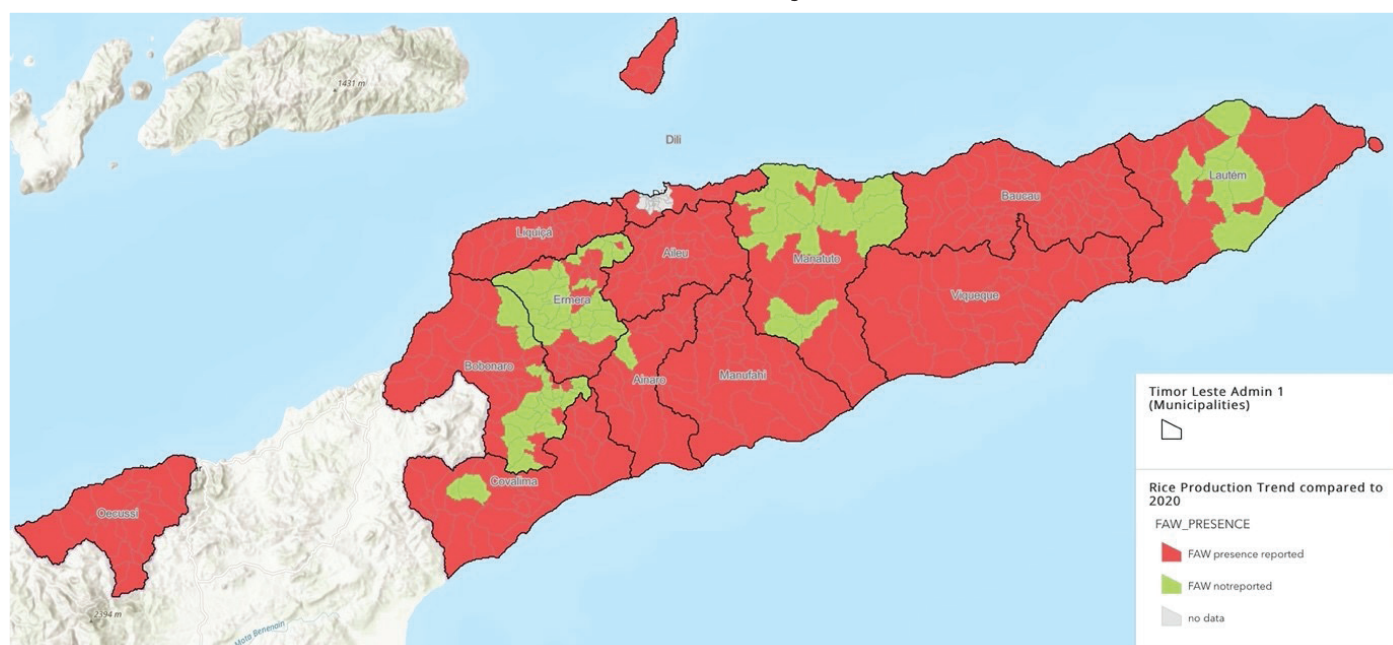
Map 1: Timor-Leste - Damaged irrigation infrastructures by *sucos*



Source: CFSAM, FAO/OER, complies with UN map, 2021.

² Fall armyworm (*Spodoptera frugiperda*) (FAW), native to tropical and sub-tropical regions of America, is a major transboundary insect pest which has become a significant threat to food security and agricultural sustainability worldwide. It was first detected in Africa in 2016 and then spread to the Near East and Asia within the last four and a half years.

Map 2: Timor-Leste - *Sucos* where FAW was reported by agriculture extensionists, May 2021



Source: CFSAM, FAO/OER, complies with UN map, 2021.

to 20 percent of the aggregated maize output. From field visits and interviews with extensionists, the Mission was informed that farmers who planted maize late were particularly affected by the pest. On the other hand, farmers who practiced Conservation agriculture (CA) were less affected by FAW than the farmers who applied traditional slash and burn practices. This is likely to be related to the increased biotic activities and the presence of natural FAW enemies on CA fields.

Map 2 illustrates the *sucos* where FAW's presence was reported by extensionists in May 2021. One year and three months after the pests were first detected and confirmed in the country, out of the 435 assessed *sucos*, FAW were reported in 375 *sucos*. The absence of FAW was reported in 60 *sucos*, mostly in Ermera, Bobonaro, Manatutu and Lautem municipalities.

African swine fever (ASF)

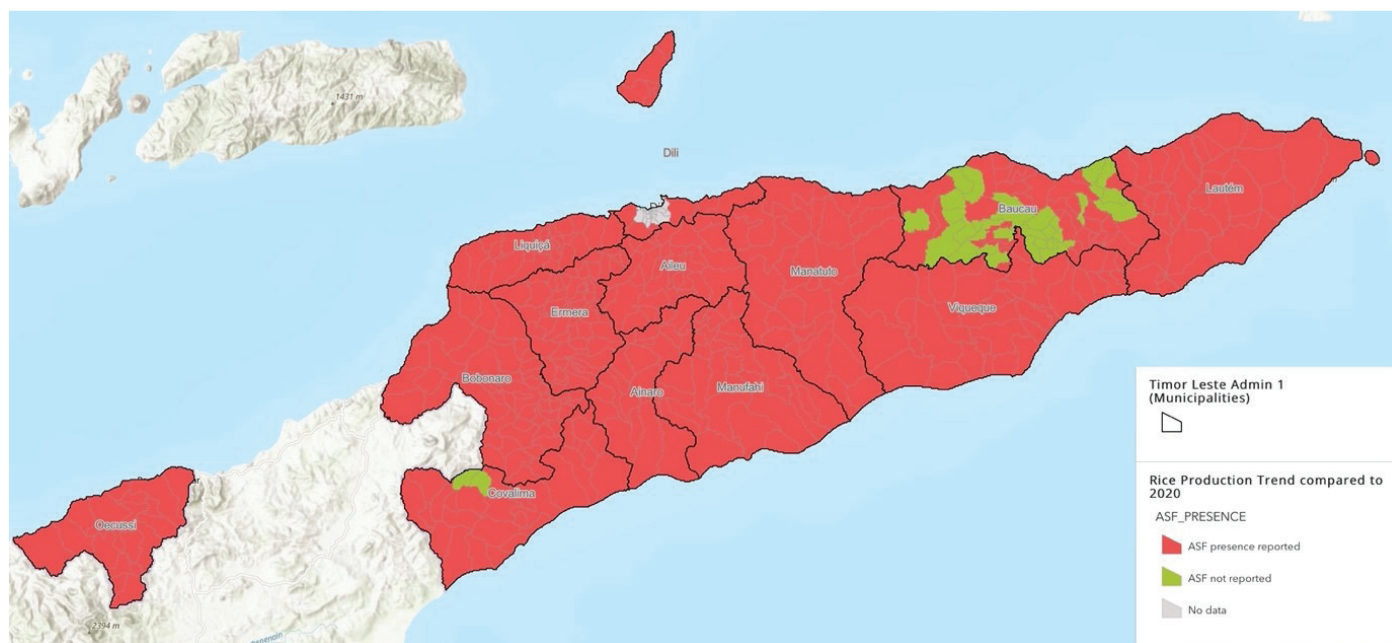
In September 2019, Timor-Leste became the 11th Asian country to report ASF. According to the 2020 agriculture census, there were approximately 453 500 pigs in the country prior to the outbreak. The ASF transmission is driven by characteristics of the national pig herd, including the dominance of free-range systems and the widespread

reliance on household scrap-feeding. The national challenges to respond to ASF are several. In particular, symptoms of the ASF are very similar to those of the endemic Classical swine fever (CSF). However, the country has now the capacity to conduct definitive tests for ASF. The entire national veterinary service is severely under-resourced in terms of financial resources as well as number of staff and technical capacity.

Based on data collected by *suco* extensionists and staff of Municipality Agriculture Directorates, the total deaths due to ASF and CSF, since the ASF outbreak, is estimated at 129 000, representing about 28 percent of the total pig population. However, in several municipalities, data had not been updated for the past 12 months or more and it is likely that the real total death toll is higher. In the municipalities where the death estimates have not been updated recently, there is evidence that pig deaths range from 25 to over 90 percent of the initial pig population. The Ministry of Agriculture and Fisheries started in May 2021 a new survey on pig deaths in order to generate more precise estimates.

Map 3 illustrates the *sucos* where ASF is reported in Timor-Leste. One year and half after the first detection of ASF in the country, the disease has

Map 3: Timor-Leste - *Sucos* where ASF was reported by agriculture extensionists, May 2021



Source: CFSAM, FAO/OER, complies with UN map, 2021.

affected almost all *sucos*, with the exception of parts of Baucau Municipality and two remote *sucos* in Covalima Municipality.

COVID-19 pandemic

In 2020, the country was largely free of COVID-19, but a second wave of COVID-19 cases started in December 2020. The government imposed a health fence on RAEOA since 29 December 2020 to prevent community transmission of SARS-Cov-2 variant. All travels to RAEOA have remained prohibited since then. In February 2021, the government imposed also a health fence in the two municipalities of Covalima and Bobonaro, bordering West Timor. With the increasing number of cases in the capital city, the government implemented a health fence and home confinement in Dili Municipality since 9 March 2021. The health fence and home confinement were extended to Baucau and Viqueque municipalities on 16 March 2021. The restrictions were then temporarily suspended due to the flooding on 4 April 2021. Four weeks later, on 29 April the government reinstated the health fences for the nine municipalities of Ainaro, Baucau, Covalima, Dili, Ermera, Lautem, Liquiça, Manufahi and Viqueque. Polymerase chain reaction (PCR) tests and travel authorizations were required for anyone travelling in or out of these municipalities.

The Mission found that the restrictions implemented to contain the COVID-19 pandemic generally have not affected the local food production. On the contrary, the Mission obtained several reports indicating that movement of population from Dili to the other municipalities, following the emergence of new cases in December 2020, has boosted farm labour supply and resulted in increased area planted. Yet, in Baucau Municipality, restricted access to the markets resulted in a reduction of area planted with vegetables and other cash crops.

The COVID-19 restrictions have affected farmers' capacity to sell their products, particularly in Dili market, but also in the Suai market in Covalima. Farmers from the four municipalities of Aileu, Ermera, Liquiça and Manatuto that are neighbouring Dili, were able to continue to supply the city with agricultural products, albeit with lower volumes. In Ermera Municipality, an exchange point was established at Tibar check point, in close collaboration with local authorities, enabling local farmers to keep selling to traders based in Dili. For farmers located in other municipalities, such as Baucau, Ainaro or Manufahi, the access to Dili's main markets was largely restricted since the implementation of the health fence on

9 March 2021. However, the impact of restrictions was mitigated by the Government's *Cesta Basica* programme, which provided opportunities for most farmers to sell agricultural products locally.

As a response to the COVID-19 restrictions on farmers' access to the market, the RAEOA President took a very interesting initiative to link farmers with the schools, where farmers' groups are provided the opportunity to supply the national school feeding programme (*merenda escolar*). This initiative has multiple advantages, which include increasing school attendance and participation in classes and improving nutrition of school age children while, at the same time, providing long-term market opportunities for local farmers.

Area planted and harvested

In the absence of a permanent agriculture statistic system, all available data on area planted, harvested, yield and production present a significant degree of uncertainty. Considering the prevalence of shifting slash and burn farming systems for the production of maize, upland rice, legumes and other crops, the planted areas can vary significantly from one year to the other. The annual estimates of the area planted and harvested are carried out by Municipality Agriculture and Fisheries Directorate experts, based on field observations and considering factors that might have influenced them.

Favourable weather conditions, with an early start of the wet season and adequate rainfall amounts throughout the cropping season, generally resulted in larger area cultivated with maize, upland and irrigated rice compared to the previous year. Yet, the Mission found that rainfall started late in RAOEA, while in Iliomar post-administrative in Lautem, rainfall amounts were lower than average. In these areas, planted areas of maize and rice in 2020/21 have been lower compared to the previous year. Another factor that contributed to increase the area planted with staple crops in 2020/21 is the movement of working age population from Dili to the municipalities following the surge of COVID-19 cases in Dili's urban area at the beginning of the season in December 2020. Anecdotal evidence gathered by the

Mission suggests that these movements increased farm labour availability at planting time. Also, the launch by the government of a large scale local food procurement through the *Cesta Basica* programme on 27 October 2021 has encouraged some farmers to increase the area cultivated. The total area planted is estimated at 33 700 hectares for maize and 22 300 hectares for rice. Compared to the past five-year average, the area planted is 2 percent higher for maize and 25 percent for rice.

Due to the impact of floods, FAW and other localized shocks such as landslides or strong winds, the total harvested area is estimated at 31 000 hectares for maize and 20 100 hectares for rice. Compared to the past five-year average, the total harvested area is similar for maize and 18 percent higher for rice.

Factors affecting yields

Many factors are affecting agriculture productivity per unit of land. These include:

- **Very low use of farming inputs:** The use of fertilizers and improved seeds is marginal, and farmers rely on shifting agriculture, burning the biomass before planting in order 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, 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.

- **FAW:** While this new pest continued expanding in 2021, its impact was mitigated by the abundant rainfall amounts, which helped maize plants to recover from foliage damages. In addition, farmers reported that the physical effect of intense rainfall reduced the population of young FAW larvae (growth stage 1 to 3).
- **Floods and heavy rainfall:** Floods and heavy rainfall reduced the harvested areas of rice, but were beneficial for some irrigated rice fields, which are usually affected by water shortages, for rainfed maize and for root crops.
- **Strong winds:** Maize crops in some localized areas have been affected (lodging) by strong winds during the tropical storm in April 2021.

In 2021, yields of the 2021 main season crops benefited from generally good rainfall, reaching near-average levels. However, compared with other countries of the subregion, yields of locally grown staple crops remain low due to limited development of the agriculture sector.

Annual estimates of maize and rice yields are carried out by agriculture extensionists that conduct crop-cuttings on a sample of fields (Timor-Leste, 2014). The main limitation of national yield estimates is that crop-cuttings are not an integral part of an agriculture survey. The tasks are conducted by agriculture extensionists who integrate the activities in their work plan. In each municipality, two extensionists are trained to conduct crop-cutting exercises and they are provided with a lump sum of USD 10 per assessed field, regardless of the distribution of the crop-cutting fields within the municipality. As sampling of the fields is done by agriculture extensionists, the crop-cutting sample allocations tend to remain close to municipality centres.

At municipality level, the average productivity for maize in 2021 is estimated at 2.6 tonnes per hectare, ranging from 1.6 tonnes in RAEOA to 3.3 tonnes in Manufahi municipalities. Average rice productivity is

estimated at 1.8 tonnes per hectare, ranging from 1.2 tonnes in Lautem to 2.1 tonnes in Covalima and Manufahi (or 2.0 to 3.5 tonnes per hectare of paddy).

Production estimates for main crops (maize, rice and root crops)

The total production of maize, rice and root crops in 2021, in cereal equivalent, is forecast at 136 400 tonnes (Table 1). Maize production is estimated at 80 100 tonnes, 9 percent above the last five-year average. Paddy production is estimated at 39 950 tonnes, 13 percent above the last five-year average. The production of root crops is estimated at 51 100 tonnes. The secondary crops of maize and rice, to be harvested during August–November 2021 for maize and December 2021–January 2022 for rice, are expected to be average, given the neutral ENSO and IOD outlooks during the coming months.

Maps 4, 5 and 6 illustrate the variation of the 2021 production of maize, rice and root crops at *suco* level compared to the 2020 level, based on qualitative estimates by agriculture extensionists and on the Mission's field direct observations.

Maize production has increased or remained stable in parts of the country that have been less affected by floods and FAW, but it decreased in Covalima, Dili, Manatuto, Lautem, RAEOA and part of Baucau, due to flash floods, severe FAW pressure and strong winds. In Illumar post-administrative in Lautem, a reduced maize production is due to low rainfall amounts.

The aggregate rice production has generally increased in the main producing areas, but the output declined compared to last year in several areas affected by the floods, such as Manatuto, Oecussi, Aileu and parts of Baucau and Viqueque municipalities.

Production of root crops has generally increased in most part of the country compared to last year, except in areas most affected by the floods in Metinaro and parts of Manatuto, Aileu and Viqueque municipalities.

Table 1: Timor-Leste - Crop production estimates, 2021

Municipality	Maize					Rice						Root crops production	Total output ^{1/2/} (cereal equivalent)
	Main cropping season			Second crop production	Total production	Main cropping season				Second crop production	Total production		
	Area	Yields	Production			Area	Paddy yields	Milled ^{1/} yields	Production				
Aileu	1 300	3.2	4 200	0	4 200	340	2.8	1.7	570	0	570	1 500	5 250
Ainaro	1 400	3.2	4 500	50	4 550	470	3.4	2.0	960	0	960	3 500	6 630
Baucau	6 000	2.4	14 400	300	14 700	5 100	3.0	1.8	9 200	400	9 600	2 500	25 100
Bobonaro	4 500	2.9	13 050	550	13 600	3 200	3.3	2.0	6 300	600	6 900	5 500	22 260
Covalima	4 200	2.2	9 200	800	10 000	2 200	3.5	2.1	4 620	350	4 970	7 500	17 370
Dili	280	2.6	750	0	750	10	3.0	2.0	20	0	20	100	800
Ermera	2 000	2.5	5 000	0	5 000	660	3.0	1.8	1 200	0	1 200	3 000	7 160
Lautem	2 400	2.0	4 800	650	5 450	500	2.0	1.2	600	100	700	5 500	7 910
Liquiça	1 500	2.7	4 050	300	4 350	160	2.5	1.6	250	20	270	1 000	4 940
Manatuto	540	2.5	1 350	0	1 350	680	3.2	1.9	1 320	150	1 470	5 600	4 610
Manufahi	1 550	3.3	5 150	300	5 450	500	3.5	2.1	1 050	300	1 350	5 400	8 530
RAEOA	3 000	1.6	4 800	0	4 800	1 550	3.2	1.9	3 000	350	3 350	2 500	8 950
Viqueque	2 300	2.5	5 750	150	5 900	4 700	2.9	1.7	8 160	430	8 590	7 500	16 890
TOTAL	30 970	2.6	77 000	3 100	80 100	20 070	3.0	1.8	37 250	2 700	39 950	51 100	136 400

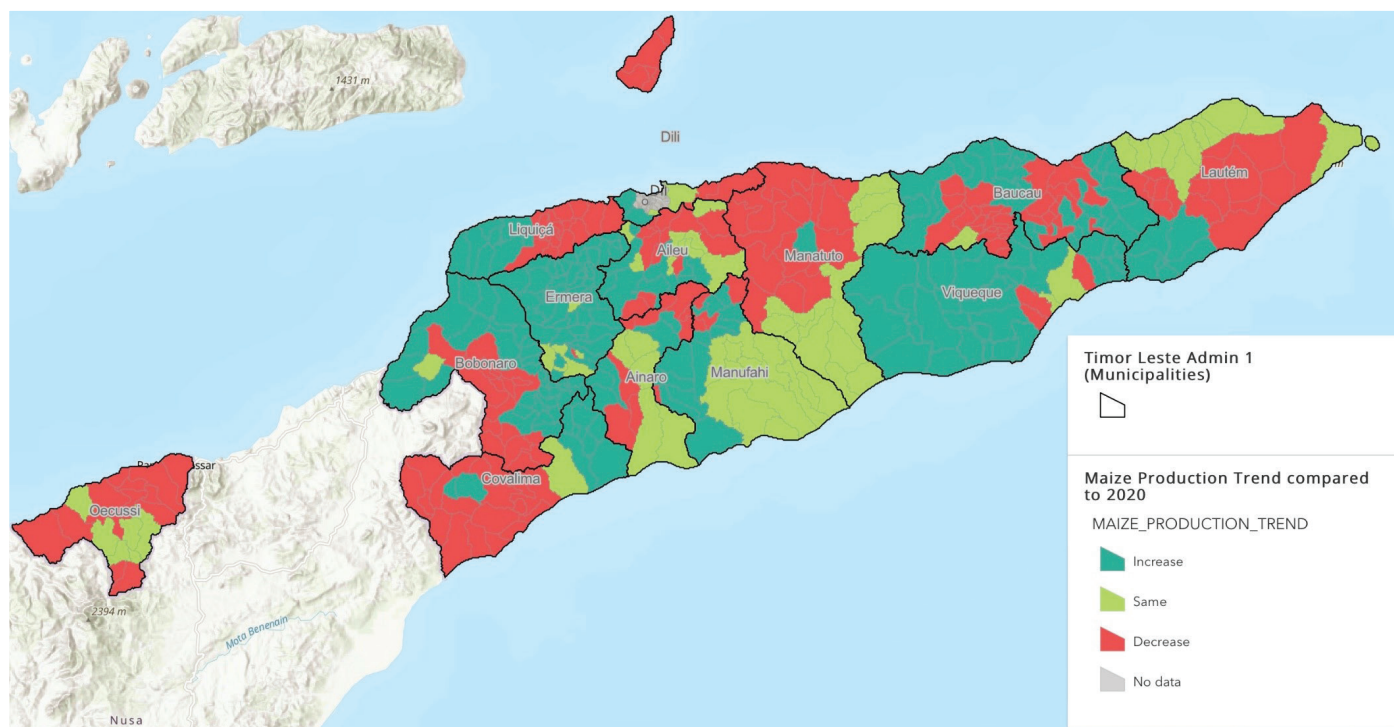
Source: CFSAM, 2021.

Note: Area in hectares, yields in tonnes/hectare, production and total output in tonnes.

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

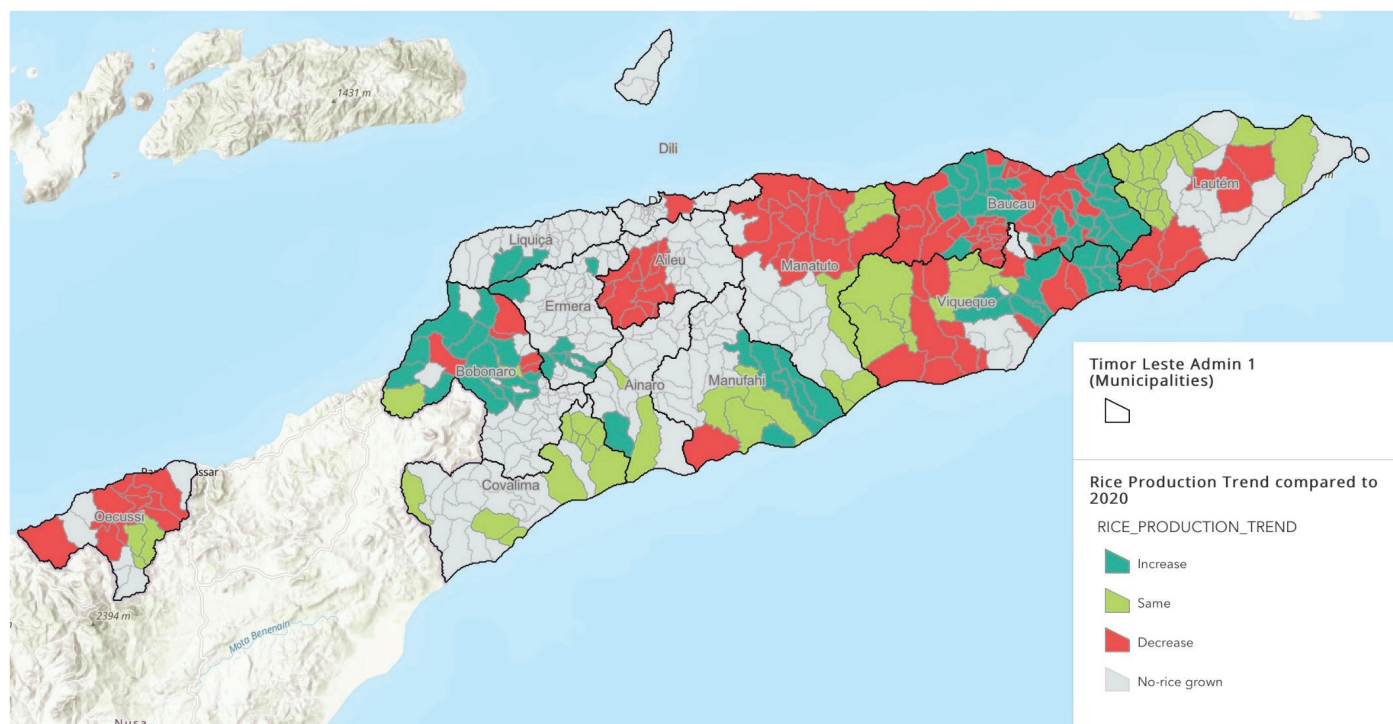
^{2/} Cereal equivalent of root crops is 32 percent.

Map 4: Timor-Leste - Maize production trends by *suco* in 2021 compared to 2020 main cropping season



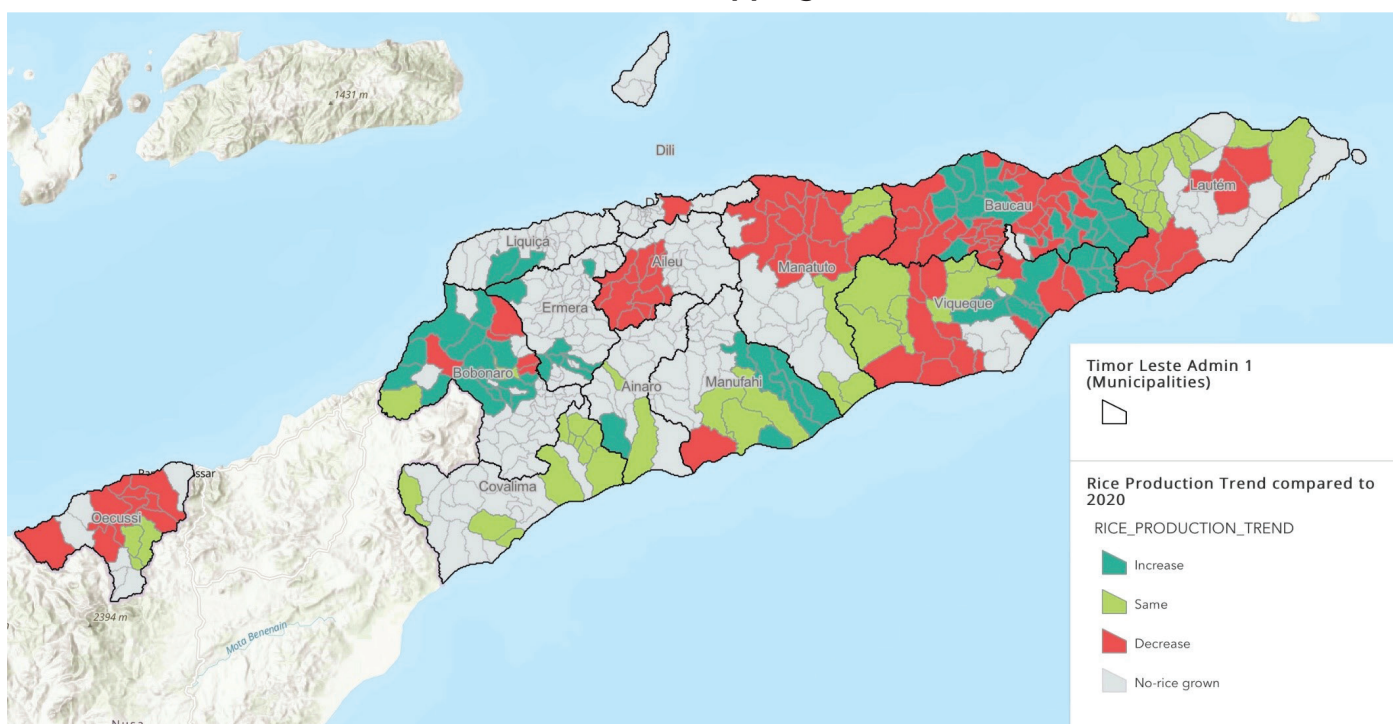
Source: CFSAM, FAO/OER, complies with UN map, 2021.

Map 5: Timor-Leste - Rice production trends by *suco* in 2021 compared to 2020 main cropping season



Source: CFSAM, FAO/OER, complies with UN map, 2021.

Map 6: Timor-Leste - Root crops production trends by *suco* in 2021 compared to 2020 main cropping season



Source: CFSAM, FAO/OER, complies with UN map, 2021.

Livestock and pasture

Overall pasture conditions are good in all municipalities due to favourable rainfall and livestock are generally healthy, with increases in the population of buffaloes, Bali cows, sheep, goats and horses. In Liquiça, the Municipality Directorate reported the presence of an unidentified disease that affects sheep and goats.

The ASF had a severe impact on pig population (section “Factors affecting agriculture in 2021”). The poultry population has also decreased over the past two years due to a new wave of NDV infections in many parts of the country. Although large scale poultry farms were not affected, the disease is a highly contagious virus transmitted through direct contact between healthy and infected birds’ droppings and secretions from the nose, mouth and eyes. Virus-bearing material can also be picked up on shoes and clothing and

carried from an infected flock to a healthy one. Possible routes of transmission, therefore, include contacts between poultry and contaminated vehicles, equipment, manure, feed and water. The virus can survive for several weeks in a warm and humid environment on birds’ feathers, manure and other material.

The most affected municipalities are Aileu, Ainaro, Ermera, Lautem and Manufahi. The Mission visited farmers in Manufahi who abandoned poultry production due to sweeping poultry death in 2020. Effective vaccines are available and poultry shall be routinely vaccinated. With the support of Tomak Project, MAF successfully led a vaccination campaign in Bobonaro, Baucau and Viqueque municipalities. According to MAF, other municipalities received the necessary vaccines, while efforts are still needed to mobilize the necessary resources to cover for operation and logistics costs.



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FOOD SUPPLY/DEMAND SITUATION

Cereal markets

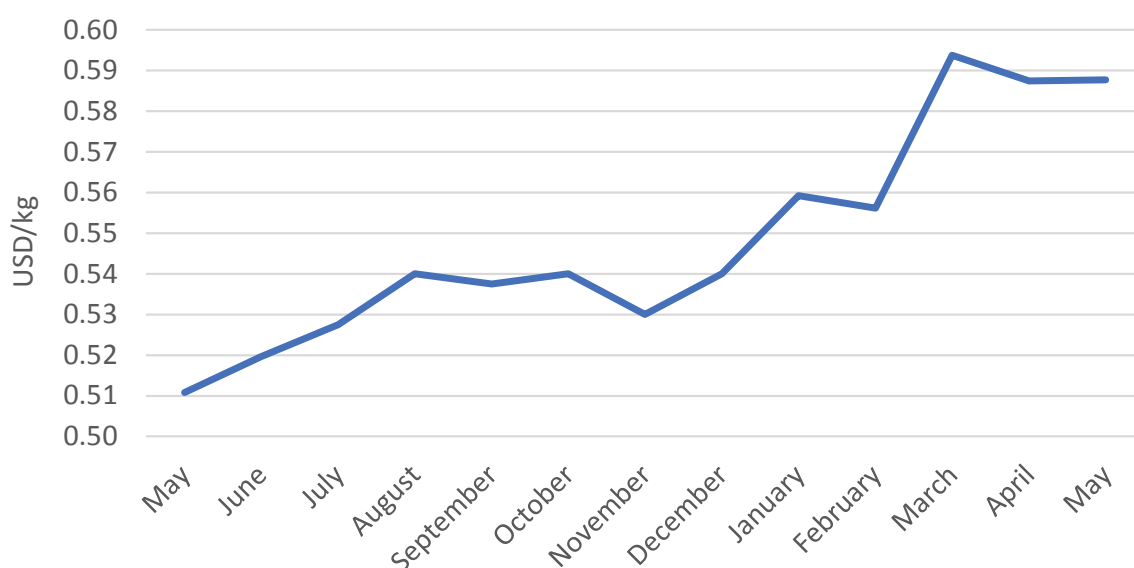
The domestic rice market is generally well integrated into the international market and domestic supply shocks do not affected the wholesale or retail domestic rice prices that generally follow the quotations in exporting countries.

As illustrated in Figure 4, the national average prices of imported rice have been characterized by a steady upward trend between May and August 2020, mirroring the trends in the international markets and due to supply disruptions related to the COVID-19 pandemic, which led to lower imports. The sustained upward trend was temporarily interrupted between August and November 2020, when prices remained stable or showed signs of softening, weighed by increased market availabilities reflecting high flows of imports and the commercialization of the 2020 newly harvested crops. From November 2020



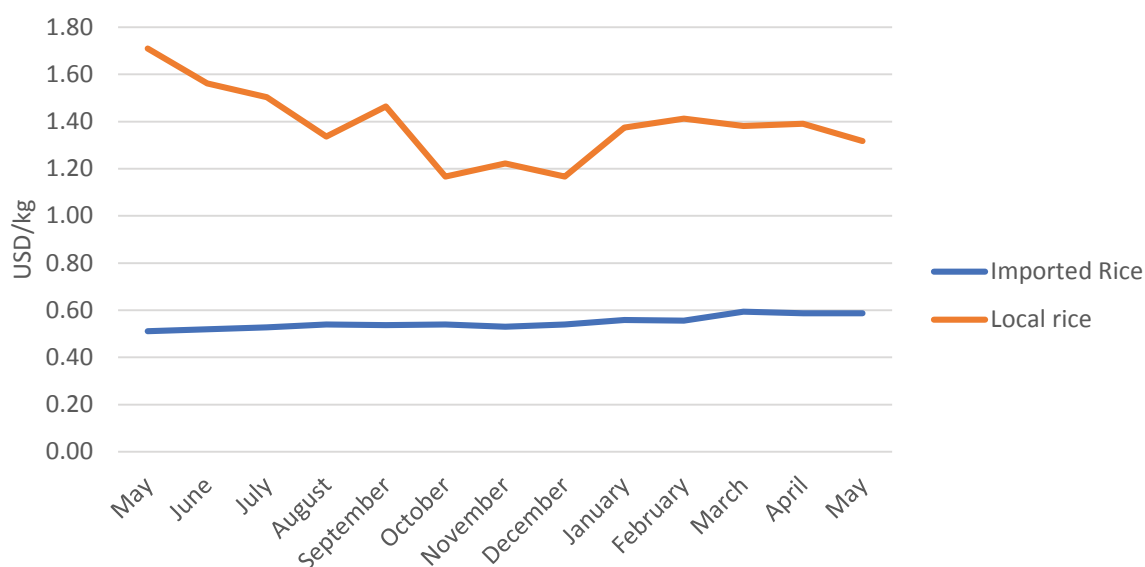
until March 2021, the prices of imported rice increased, supported by seasonal tightening market availabilities and high prices in international markets. Prices have remained generally stable in April and May 2021 and were at high levels, averaging 15 percent higher than a year earlier.

Figure 4: Timor-Leste - National average prices of imported rice, May 2020–May 2021



Source: MAF, GDS, WFP, 2021.

**Figure 5: Timor-Leste - National average prices of imported and local rice
May 2020–May 2021**



Source: MAF, GDS, WFP, 2021.

Prices of local rice, which accounts for a small proportion of the market supply, are twice higher than imported rice, considering its limited availability and consumer preference to use it for ceremonies and special occasions. Local rice producers normally consume most of their production and only limited quantities are sold on the markets in return of cash. Differently from imported rice, local rice quotations generally follow seasonal patterns, generally declining between May to August/September following the start of the main harvest and normally peaking between December and March. As illustrated in Figure 5, the national average price for local rice decreased by 32 percent between May and October 2020, mostly due to the diminished purchasing power, following income losses and increased unemployment due to the implementation of COVID-19 restrictions, as consumers preferred the cheaper imported rice. Amid tightening market availabilities, domestic rice prices increased seasonally between December 2020 and February 2021. Starting from March, prices were generally stable or showed signs of softening. Overall, prices of local rice in May 2021 were 23 percent below their levels year earlier.

Food supply/demand balance sheet

The national food crop supply/demand balance for marketing year 2021/22 (April/March) is summarized in Table 2. It considers maize, rice (in milled terms) plus cassava and root crops (in cereal equivalent). In drawing up the national food crop balance, the following assumptions were made:

- **Total food production** (in milled terms and cereal equivalent) is estimated at 136 400 tonnes, including forecast of the secondary crops to be harvested in August and September 2021.
- **Food use** is estimated at 217 020 tonnes, using the UN-projected 2021 mid-year population of 1 344 000 and a per capita average consumption of about 189 kg of cereal and root crops, which includes 106 kg of rice (milled), 45 kg of maize and 38 kg of cassava and root crops (both in cereal equivalent).
- **Feed use** is estimated at 10 140 tonnes, mostly maize, according to the Mission's

Table 2: Timor-Leste - Food supply/demand balance sheet, April 2021–March 2022 (tonnes)

	Maize	Rice ^{1/}	Root crops ^{2/}	Total ^{2/}
Total Availability	81 100	58 950	16 350	156 400
Opening stocks	1 000	19 000	0	20 000
Production	80 100	39 950	16 350	136 400
Total Utilization	85 100	168 650	16 350	270 100
Food use	60 480	142 500	14 040	217 020
Seed	680	550	0	1 230
Animal feed	9 140	0	1 000	10 140
Losses	13 800	5 600	1 310	20 710
Closing stocks	1 000	20 000	0	21 000
Import Requirements	4 000	109 700	0	113 700
Anticipated commercial imports	4 000	99 700	0	103 700
- of which government purchase		10 000	0	10 000
Uncovered Deficit^{3/}	0	0	0	0

Source: CFSAM, 2021.

Note: Numbers may not add up due to rounding.

^{1/} Milling rate of paddy to rice is estimated at 60 percent.

^{2/} In cereal equivalent.

^{3/} The Mission does not forecast any uncovered food deficits for the marketing year 2021/22.

findings and information retrieved from the Conservation agriculture evaluation conducted in 2019.

- **Seed requirements** for the 2021/22 marketing year are estimated at 1 230 tonnes, assuming an area planted in 2021/22 of 56 000 hectares as in 2020/21 and using an average seed rate of 20 kg/hectare for maize and 25 kg/hectare for rice.
- The Mission gathered some information on **stocks** amounts of cereals at the beginning and the end of the marketing year (stocks of the government, millers and traders). However, given the lack of reliable data, in particular regarding private stocks, the balance shows only the estimated variation in stocks during the year. The Mission assumes a 1 000 tonnes increase of rice stocks during the 2021/22 marketing year reflecting the higher output forecast, while no changes are envisaged for maize, cassava and root crops.

- **Post-harvest losses** (from harvesting to processing and during storage) are estimated at 20 710 tonnes, with rates ranging from 18 percent for maize, 15 percent for rice and 8 percent for root crops. The used rates are above the average levels as the heavy rainfall in April caused difficulties for drying grains.

Reflecting the structural dependence of the country on imports, the total utilization exceeds the domestic availability of cereals, cassava and root crops. Total import requirements (in cereal equivalent) are estimated at about 113 700 tonnes for the 2021/22 marketing year (April/March). It comprises 109 700 tonnes of rice and 4 000 tonnes of maize. As the government plans to import about 10 000 tonnes of rice, the Mission expects that the remaining gap of 99 700 tonnes of rice and maize will be purchased by private traders. As part of the Government's COVID-19 Recovery Plan, USD 12 million are allocated for the purchase of rice on domestic and international markets to strengthen national reserves. The government imports also include USDA-funded McGovern-Dole

Hatutan School Feeding Programme implemented by the Cooperative for Assistance and Relief Everywhere (CARE). The Programme plans to import 440 tonnes of Fortified Rice, 5/20 Long Grain from the United States of America for distribution to schools in Ainaro, Ermera, Liquica and Manatuto in the first trimester of the 2022 school year (January–April 2022). These imports are expected to reach the country by October 2021. For maize, the entire required amount of 4 000 tonnes is expected to be imported by private traders. The Mission does not forecast any uncovered food deficits for marketing year 2021/22.

Maize and rice surplus and deficit municipalities

Map 7 and Table 3 summarize the cereal (maize and rice) surplus and deficit situation for each municipality of the country. For rice, all municipalities are expected to experience a deficit in 2021. The municipality with the largest rice deficit is Dili, where 36 625 tonnes of rice will be needed in 2020/21 to cover the requirements for mostly urban households.

Important producing municipalities, including Baucau, Bobonaro, Cavallima and Viqueque, are expected to experience shortfalls due to the flood-induced declines in output. Similarly, the rice deficit in small to medium producing municipalities including Liquica, Lautem, Ainaro and Manufahi, is expected to surpass slightly the previous years level. For maize, four municipalities are estimated to be maize-deficit and four municipalities are maize-surplus, while five municipalities are self-sufficient with maize. Similarly to rice, Dili is forecast to require the largest quantity of maize forecast at 6 360 tonnes to cover the needs in 2021/22. A sharp decrease in outputs due to FAW and floods, will revert the maize-surplus or self-sufficient municipalities in the past years such as Liquica, RAEOA and Manatuto into maize-deficit in 2021/22. The remaining municipalities are either self-sufficient in maize or the output will surpass the local demand in Baucau, Bobonaro, Manufahi and Covalima, reflecting above-average 2021 main season production following favourable weather conditions and strong demand, which supported an increase in area planted.

Map 7: Timor-Leste - Maize deficit/surplus by Municipality



Source: CFSAM, FAO/OER, complies with UN map, 2021.

Table 3: Timor-Leste - Estimated cereal surplus/deficit by Municipality, April 2021–March 2022 (tonnes)

	Maize	Rice ^{1/}	TOTAL	Maize	Rice ^{1/}	TOTAL
AILEU			LAUTEM			
Total Availability	4 200	570	4 770	5 450	700	6 150
Production	4 200	570	4 770	5 450	700	6 150
Total Utilization	4 200	6 110	10 310	5 450	7 540	12 990
Food Use	3 000	6 015	9 015	4 050	7 440	11 490
Seed, livestock feed and losses	1 200	95	1 295	1 400	100	1 500
Deficit/Surplus	0	-5 540	-5 540	0	-6 840	-6 840
AINARO			LIQUICA			
Total Availability	4 550	960	5 510	4 350	270	4 620
Production	4 550	960	5 510	4 350	270	4 620
Total Utilization	4 550	7 400	11 950	5 790	8 790	14 580
Food Use	3 280	7 245	10 525	4 620	8 750	13 370
Seed, livestock feed and losses	1 270	155	1 425	1 170	40	1 210
Deficit/Surplus	0	-6 440	-6 440	-1 440	-8 520	-9 960
BAUCAU			MANATUTO			
Total Availability	14 700	9 600	24 300	1 350	1 470	2 820
Production	14 700	9 600	24 300	1 350	1 470	2 820
Total Utilization	11 590	15 600	27 190	3 270	5 669	8 940
Food Use	7 430	14 070	21 500	2 870	5 430	8 300
Seed, livestock feed and losses	4 160	1 530	5 690	400	240	640
Deficit/Surplus	3 110	-6 000	-2 890	-1 920	-4 200	-6 120
BOBONARO			MANUFAHI			
Total Availability	13 600	6 900	20 500	5 450	1 350	6 800
Production	13 600	6 900	20 500	5 450	1 350	6 800
Total Utilization	10 140	12 150	22 290	3 940	6 490	10 430
Food Use	5 890	11 110	17 000	2 460	6 320	8 780
Seed, livestock feed and losses	4 250	1 040	5 290	1 480	170	1 650
Deficit/Surplus	3 460	-5 250	-1 790	1 510	-5 140	-3 630
COVALIMA			RAEOA			
Total Availability	10 000	4 970	14 970	4 800	3 350	8 150
Production	10 000	4 970	14 970	4 800	3 350	8 150
Total Utilization	6 855	8 410	15 264	5 880	8 450	14 330
Food Use	3 550	7 660	11 210	4 200	7 950	12 150
Seed, livestock feed and losses	3 305	749	4 054	1 680	500	2 180
Deficit/Surplus	3 145	-3 440	- 294	-1 080	-5 100	-6 180

	Maize	Rice ^{1/}	TOTAL	Maize	Rice ^{1/}	TOTAL
DILI			VIQUEQUE			
Total Availability	750	20	770	5 900	8 590	14 490
Production	750	20	770	5 900	8 590	14 490
Total Utilization	7 110	36 645	43 755	5 900	10 079	15 980
Food Use	6 880	36 645	43 525	4 265	8 740	13 005
Seed, livestock feed and losses	230	0	230	1 635	1 340	2 975
Deficit/Surplus	-6 360	-36 625	-42 985	0	-1 490	-1 490
ERMERA			NATIONAL			
Total Availability	5 000	1 200	6 200	80 100	39 950	120 050
Production	5 000	1 200	6 200	80 100	39 950	120 050
Total Utilization	9 425	15 315	24 740	84 100	149 650	232 750
Food Use	7 985	15 125	23 110	60 480	142 500	202 980
Seed, livestock feed and losses ^{2/}	1 440	190	1 630	23 620	7 150	29 770
Deficit/Surplus	-4 425	-14 115	-18 540	-4 000	-109 700	-112 700

Source: CFSAM, 2021.

Note: Numbers may not add up due to rounding.

^{1/} Milling rate of paddy to rice is estimated at 60 percent.

^{2/} Including opening and closing stock difference for national level estimates.

RECOMMENDATIONS

Although agriculture has been affected by multiple shocks in 2021, the production of main staple crops was above average due to favourable rainfall throughout the cropping season. However, specific households as well as infrastructures have been severely affected by the various shocks and require emergency assistance.

Emergency flood response

- Repair and rehabilitation of irrigation systems that have been affected by the floods through cash-for-work programmes and mobilization of heavy equipment to remove sediments from irrigation canals, intake repairs and protection of irrigated land from future erosion as riverbeds configuration have been modified following the flooding events. Farming communities in 70 *sucos* need external support to rehabilitate their irrigation systems.
- Distribution of vegetable seeds to about 3 000 most affected farmers.
- 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.

Pests and diseases

Over the past two years, the country has been affected by ASF and FAW outbreaks, while a new wave of NDV and CSF spread throughout several municipalities. There is a need to reinforce national bio-security capacity and conduct rapid interventions in the field, including:

- Establish a FAW early warning system.
- Test and disseminate on-farm FAW management practices.



- Conduct vaccination campaigns of livestock, including NDV on poultry and CFS on pig population.
- Restock pigs in bio-secure pens for farmers most affected by ASF.

Other long-term priorities

The Mission also identified the following long-term priorities:

COVID-19 and access to markets

The Government's *Cesta Basica* programme helped mitigate the impact of COVID-19-related restrictions on farmers' access to the local markets. The Mission received enthusiastic feedback from farmers who expressed the need to guarantee continuity to the programme. There is an opportunity for long-term institutionalization of local procurements to supply the national school feeding programme (*merenda escolar*). Home-grown school feeding has multiple advantages, including those of increasing school attendance and participation in classes and improving nutrition of school age children while, at the same time, providing long-term market opportunities for local farmers. Linking farmers to institutional markets through school feeding

programmes has the potential to contribute to the 2011–2030 Strategic Development Plan (SDP) transition objective from subsistence agriculture to commercial agriculture.

Recurrent floods in Dili

Dili is built upon young coastal sediments with insufficient drainage and it is surrounded by hills that are characterized by short, steep, increasingly urbanized, deforested and eroded catchments. As a result, the flow of runoff water can reach dangerous speeds during the wet season, representing a significant risk for the safety of the urban population downstream. Once these short rivers reach the coastal plain, they flow along heavily silted channels that get narrower as they reach the densely populated urban areas. Every year, the channels reach their

maximum capacity and, when it exceeds, they cause floods and infrastructure damage. There is a need for long-term interventions, engaging the local communities in a participatory process to restore the degraded watersheds above Dili, particularly the Kampung Alor, Maloa, Lahane and Becora watersheds.

Agriculture statistics

The Mission identified that national staple crop production estimates are generated with a considerable degree of uncertainty due to the lack of a permanent agriculture statistics system. Given the prevailing food insecurity in the country, there is an opportunity and a need to link the development of agriculture statistics with food and nutrition security through the design of an integrated annual agriculture and socio-economic survey.

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ANNEX 1

Agricultural overview by municipality

Aileu

Maize and root crops are the main staple crops grown in the municipality, followed by irrigated rice cultivated on small irrigation schemes on valley floors. The municipality has a well-developed market-oriented agriculture sector, producing fruits and vegetables for Dili's markets.

Rainfall started with a slight delay, but after the onset, precipitation amounts were above average and well distributed, mitigating the impact of flash floods on rice and root crops and of FAW on maize. Overall, the production of root crops has increased, while maize production remained at similar levels and rice production has decreased. The flash floods affected 36 hectares of rice (out of 380 hectares planted) while 83 hectares of root crops (cassava and sweet potatoes) planted along the rivers were damaged. All irrigation systems in Aileu Villa and irrigation intakes in four *sucos* (Aisirimou, Bandudato, Fahiria and Saboria) were damaged by the floods. Support is needed to repair the damaged irrigation infrastructure as local communities lack the capacity.

FAW affected all *sucos* of the municipality, with an estimated 110 hectares of maize severely impacted, out of 1 480 hectares planted.

The livestock population has generally remained close to last year, owing to good pasture conditions. Pig population was severely affected by ASF in all *sucos* of Aileu, causing a loss of 25 700 pigs or 90 percent of the total pig population since the beginning of the outbreak. The remaining pig population in the municipality is 4 020, which provide an opportunity for restocking locally. The poultry population remains at a very low level due to high mortality in 2020 due to NDV.



The COVID-19 restrictions have not affected food production. Farmers were able to access the markets in Dili Municipality, but traded volumes decreased following the implementation of the health fence in the capital.

Ainaro

Maize is the main staple crop grown in the municipality, normally inter-cropped with vegetables and peas. Ainaro includes highlands in Maubisse and Hatu Builico where counter-seasonal vegetables and beans are grown mainly for Dili and Suai markets. Coffee is also cultivated in the municipality.

The rainy season started in mid-November, but precipitation amounts were below average until mid-December. Subsequently, rainfall amounts were adequate during the rest of the cropping season, mitigating the impact of FAW on maize. Maize output is expected to remain at the same level of last year, while rice production is expected to increase.

The flash floods had a limited impact on crop production in Ainaro. The situation has been addressed as the Municipality Agriculture and Fisheries Directorate rented heavy equipment to

clean level 1 and 2 canals while farmers are clearing the level 3 canals closer to their field.

FAW impacted all *sucos* of the municipality to different degrees, with an estimated 190 hectares severely affected by the pest, out of 1 450 hectares planted. Ainaro is particularly affected.

The livestock population increased compared to last year, owing to good pasture conditions. The pig population was severely affected by ASF with more than 16 800 pigs (accounting for two-thirds of the municipality's herd) have died or have been lost due to the outbreak. All *sucos* in Aileu are affected by ASF to various degrees. The poultry population remains at a very low level due to high mortality in 2020 due to NDV.

The COVID-19 restrictions have not affected food production in Ainaro, but farmers' access to the markets has been constrained due to the health fences on Covalima (since December 2020) and Dili.

Baucau

The main agricultural production includes rice, maize, vegetables (tomatoes in particular), beans, groundnuts, cassava, sweet potatoes, copra, elephant yam and candlenuts. The rainy season started on time in December and precipitation amounts have been above average and well distributed, leading to both an above-average production for maize, despite crop damages due to floods and FAW. Rice production is estimated to have decreased compared with the five-year average due to the impact of floods. The flash floods affected 940 hectares of rice (out of the 5 700 hectares planted) and 300 hectares of maize (out of the 6 200 hectares planted). The irrigation schemes in Buruma, Caibada and Seical *sucos* (Baucau post-administrative) have been affected. The Municipality Agriculture and Fisheries Directorate has rented excavators to correct the riverbed configuration to prevent erosion of crop land. A similar scenario exists in five *sucos* (Bado ho'o, Uailaha, Uaiolo, Uataco and Uma Ana Ulu) in Venilale post-administrative. Irrigation infrastructures in other *sucos* in Quelicai (Abafala, Baguia, Bualale and Macaloco) and Vemassee (Loilubo and Vemassee) were covered with sediments and would require excavators and labour to remove them.

The FAW impact was limited with only 80 hectares of maize severely affected by the pest, out of the 6 200 hectares planted.

The livestock population remained close to last year's level, owing to good pasture conditions. Pig population was affected by ASF, but the overall impact was limited. Many *sucos* (40 out of 59) remained ASF-free and Baucau did not report the presence of ASF and could constitute an important source for pig restocking interventions. Some *sucos* are, however, seriously affected such as Waitame in Quelicai and Vemassee. The poultry population has also decreased due to NDV infections.

The COVID-19 restrictions affected cash crop production in Baucau due to concerns over the access to the Dili market. The area planted with vegetables and tomatoes decreased compared with last year. Transporting products to Dili requires a formal authorization from the local authorities, this being a challenge particularly for low-income farmers and market actors. Some fresh agricultural products were spoiled due to lack of market access. For example, in Buruma *suco*, nearly 7 tonnes of unsold tomatoes were reportedly wasted.

Bobonaro

This municipality is one of the main agricultural producing areas, particularly for rice, maize and livestock. Large irrigation systems, including Maliana-I and II are located in this municipality. The Maliana-II irrigation system was damaged by floods in 2002 and since then only 1 800 hectares are irrigated, compared to 2 800 hectares previously.

Rainfall started on time and precipitation amounts were above average, leading to an increase in aggregate production for all staple crops compared to last year despite some areas affected by floods and FAW.

The flash floods affected 410 hectares of irrigated and rainfed rice (out of the 3 500 hectares planted) and 485 hectares of maize (out of the 4 600 hectares planted). Maize has also been affected by strong winds just before the harvest. The Maliana-II irrigation system had been damaged by the flood in 2021, while it was already not fully operational following the damages caused by the floods in 2002. Also,

the irrigation systems in Atabae and Aidabaleten *sucos* were damaged by floods in 2020 and require repair. In Cailaco, irrigation canals were covered with sediments following the recent floods and would need assistance to repair it as it lacks local capacity, particularly in Purugoa and Raiheu *sucos*. In Atudara *suco*, changes in the riverbed configuration puts at risk 180 hectares of rice fields that could be protected with the installation of gabions.

FAW affected an estimated 250 hectares of maize, out of the 4 600 hectares planted, with Atabae and Balibo post-administrative as well as Manapa *suco* have been particularly affected.

The buffalo, Bali cow, sheep and goat population is estimated to be close to last year's level owing to good pasture conditions. The poultry population has increased due to a NDV vaccination campaign by MAF and partners. The pig population was severely affected, with 22 500 pigs (accounting for 70 percent of the municipality's herd) estimated to have died or been culled due to the outbreak. All *sucos* in Bobonaro are affected by ASF.

The COVID-19 restrictions have not affected food production and marketing for farmers in Bobonaro.

Covalima

The municipality benefits from the country's most fertile coastal lowland soils cultivated mainly with maize, rice and mung beans, while on the hills, maize is predominantly grown inter-cropped with root crops (cassava) and cowpeas. Rainfall started on time and precipitation amounts were above average, resulting in an increased planted area compared to last year, offsetting for the small damages to crops caused by floods and FAW. Rice production is anticipated to remain at a similar level as last year, while maize production is expected to decrease mostly due to the negative impact of FAW and floods on the main season production in some *sucos*. Root crops production is expected to increase.

FAW severely affected 470 hectares of maize, out of the 4 250 hectares planted. All *sucos* in this municipality are affected by FAW.

The flash floods affected 135 hectares of rice (out of the 2 250 hectares planted) and 30 hectares

of maize in Beco and Suai Loro *sucos*. The floods brought sediments into irrigation infrastructures, particularly in Zumalai post-administrative, which has been the most affected (namely Fatuleto, Lepo, Lour, Mape, Raimea and Zulo *sucos*). In Suai post-administrative and Debos *sucos*, the irrigation system has also been covered with sediments. The Municipality Agriculture and Fishery Directorate has addressed the situation rapidly by renting heavy equipment to remove sediments from all irrigation schemes in Zumalai post-administrative.

The buffalo, Bali cow, sheep and goat population remained stable or increased compared to last year in some areas owing to good pasture conditions. The poultry population has increased this year thanks to a NDV vaccination campaign by MAF. An estimated 4 300 pigs died due to ASF since the beginning of the outbreak, mostly in Covalima.

The COVID-19 pandemic has not affected food production in Covalima, but farmers reported that restrictions imposed as early as February 2021 limited their access to the main market in Suai, Dili and Bobonaro municipalities. Farmers reportedly were able to sell their produce on the Government's Cesta Basica programme.

Dili

Agriculture production in Dili Municipality is concentrated in Cristo Rei, Atauro and Metinaro post-administrative and most of the production is oriented toward cash crops such as vegetables and fruits/bananas (Hera), seaweeds (Atauro) and fuel wood (Metinaro). A limited amount of maize is cultivated in Atauro, Metinaro Hera, Manleuana and Dare.

Rainfall started on time and has been above average, mitigating, to some extent, the impact of flash floods and FAW. At aggregate level, stable crop production decreased substantially compared to last year. Some 155 hectares of maize out of the 900 hectares cultivated was washed away by floods in Hera and Metinaro, and by strong winds in Atauro. The limited rice production in Hera (5 hectares out of the 15 hectares planted) was affected by flash floods, resulting in a decline in production. The Municipality Agriculture and Fisheries Directorate rented excavators and removed the sedimentation.

Seaweed production in Atauro was not affected by the cyclone.

The impact of FAW was limited with about 40 hectares of maize severely affected, out of the 300 hectares planted. All maize producing *sucos* in the municipality are affected by FAW.

The livestock population has generally increased compared to last year owing to good pasture conditions. Some 705 pigs died or have been culled due to ASF. However, most of the pig production in Dili occurs in the city and these were not assessed by the Mission.

The COVID-19 restrictions did not affect agricultural production and access to the market for farmers in Dili Municipality was unrestricted.

Ermera

The main staple crops are maize and cassava and small amounts of rice in Atsabe post-administrative. Vegetables are also produced in the municipality to supply Dili's market. Rainfall started with a slight delay and amounts were above average throughout the main cropping season leading to a production increase in most *sucos* for all staple crops compared to last year, particularly for root crops. Coffee is an important cash crop in Ermera and overall coffee production is expected to increase supported by favourable weather and adequate rainfall amounts.

The impact of FAW was limited and in most *sucos* of Hatolia, Letefoho and Railaco post-administrative, the pest is not present. This could be explained by the fact that in Ermera, the main agricultural season starts up to one month earlier than in other municipalities, when the FAW population was still limited at the end of the dry season. Therefore, with about 60 hectares of maize severely affected by FAW (out of the 2 100 hectares planted), the impact of ASF on maize was small.

The flash floods affected 24 hectares of rice fields (out of the 680 hectares planted). In Asulau *suco*/ Hatolia post-administrative, floods caused damage to irrigation infrastructures. These communities require support to build gabions and other infrastructures to protect the remaining rice fields from further erosion from the river.

The buffalo, Bali cow, sheep and goat population increased compared to last year thanks to good pasture conditions. The pig population was severely affected by ASF with an estimated 75 percent (or 750 pigs) of the municipality's herd population estimated to have died or been culled due to the outbreak. All *sucos* in Ermera are affected by ASF. The poultry population in the municipality has also decreased due to NDV infections.

The COVID-19 restrictions did not affect agriculture production in Ermera. Marketing of agriculture products to Dili continued, albeit at a slightly reduced level. An exchange point at Tibar was established, enabling Ermera farmers to sell to buyers based in Dili, originally from Ermera, who redistribute fresh products in the city. The exchange point was established in close collaboration with the local authorities to facilitate transactions in a pandemic scenario.

Lautem

The municipality in the far east of the country is a main maize and an important livestock producing area. Rice is cultivated in the southern flatland around Ilomar. Cassava, beans and vegetables are also cultivated. Rainfall started on time and precipitation amounts were above average, benefitting crop production. However, Ilomar post-administrative received lower rainfall than average, which has negatively affected rice production.

FAW affected about 350 hectares of maize, out of the 2 750 hectares planted, in 29 out of the 34 *sucos* of the municipality, with Lospalos and Lautem post-administrative particularly affected. FAW were reported in 29 out of 34 *sucos*. This led to a reduction in maize production this year at aggregate level. The municipality was generally not affected by the floods.

The cattle and buffalo population remained close to last year's level, as pasture remained generally in good condition. The sheep and goat population has increased this year. ASF caused a 90 percent (or 5 100 pigs) loss of the municipality's total pig herd. All *sucos* in Lautem are affected by ASF. Only 13 out of 34 *sucos* have not reported ASF cases and could be a source of pigs for restocking activities.

The poultry population in the municipality has also decreased due to NDV infections.

The COVID-19 restrictions have not affected food production in Lautem, but farmers reported to have lost their access to the main market in Lospalos due to COVID-19 movement restrictions.

Liquiça

The main staple crop production is maize and rice, while the highlands, bordering Ermera, coffee is mainly produced. Rainfall started early and precipitation amounts were above average, supporting cereal production. Coffee is an important cash crop for the high land of Liquiça. Overall, coffee production is expected to increase supported by above-average rainfall.

FAW impacted about 600 hectares of maize, out of the 1 570 hectares planted. All *sucos* in the municipality are affected, particularly the coastal lowland.

The flash floods affected 15 hectares of rice (out of the 160 hectares planted) and 135 hectares of maize crops. The irrigation schemes in Loetaela and Lissadila *sucos* need to be repaired to stop further erosion damage due to changes in the riverbed configuration. The installation of gabions was proposed by the local authorities and farmers. The intake at Lissadila irrigation system was damaged and needs to be repaired.

The livestock population is estimated to be close to the previous year's level owing to good pasture conditions. The Municipality Directorate reported the presence of an unidentified disease that affects goats and sheep. An estimated 6 800 pigs died due to ASF. All *sucos* in Liquiça are affected by ASF.

The COVID-19 restrictions have not affected food production in Liquiça, but farmers' access to the market in Dili Municipality was limited due to COVID-19 restrictions. However, farmers were able to sell their produce on the Government's *Cesta Basica* programme.

Manatuto

The municipality is located on both south and north coasts of the island and is, therefore, encompassing

all agro-climatic zones of the country. Rainfall started on time and has been favourable until March/April when heavy rains triggered flash floods causing severe losses to staple crop production.

The northern part of Manatuto was the most affected by the floods, in particular Manatuto and Lacle post-administrative. The cyclone affected approximately 915 hectares of rice (out of the 1 590 hectares planted) and in some areas the crops were completely destroyed. The cyclone also affected some 375 hectares of maize crops (out of the 1 050 hectares planted) and an average of 50–60 percent crop losses is estimated in these areas. The damages to the irrigation systems in Manatuto and Lacle post-administrative are extensive and require rapid intervention to repair intakes, canal infrastructures, removing sediments with heavy machinery as well as protecting crop land from future erosions with gabions as the river configuration had been altered by the disaster. Approximately 1 000 hectares of irrigated land in the municipality requires interventions to maintain future production capacity.

The impact of FAW was limited with only 10 hectares of maize severely affected, but worms were present in more than half the municipality's *sucos* (17 out of 32) and farmers who planted late were mostly affected.

The livestock population remained stable or increased compared to last year owing to good pasture conditions. The pig population was affected by ASF with an estimated 620 pigs or 25 percent of the municipality's total herd reportedly perished. All *sucos* in Matatuto are affected by ASF.

The COVID-19 restrictions have affected the ability of farmers in Manatuto to sell their agricultural products to Dili, which was sold locally at lower prices causing a decline in income.

Manufahi

The municipality benefits from the country's most fertile coastal lowland soils cultivated mainly for maize and rice production. Vegetables, fruits (avocadoes), beans and coffee are also cultivated in the municipality in its various agro-climatic zones. Rainfall started on time and precipitation amounts were

above average, leading to an increase in aggregate production for all staple crops compared to last year, despite the impact of FAW on maize crops.

The flash floods had a limited impact on crop production in Ainaro, with only 12 hectares of rice field impacted, out of the 500 hectares planted. In Betano suco, sediments from the floods obstructed the irrigation canals and the intake has been damaged by the floods. The level 1 and 2 canals were cleaned with the support of Manufahi Agriculture and Fisheries Directorate, while farmers cleaned the level 3 canals closer to their field. The intake has not been repaired and support is required to rehabilitate the scheme to its full capacity.

The impact of FAW was limited with only 130 hectares of maize severely affected, out of the 1 670 hectares planted. FAW were reportedly present in all *sucos* in the municipality.

The livestock population has increased for cows or remained stable for buffaloes compared 2020 owing to good pasture conditions. The poultry population is estimated at a very low level as a result of the high mortality in 2020 due to NDV. The pig population was severely affected by ASF with an estimated 16 000 pigs lost. Reportedly ASF was present in all *sucos* of the municipality.

The COVID-19 restrictions have not affected food production in Manufahi, but farmers reported to have lost their access to the market in Dili Municipality and sold their products on the Government's *Cesta Basica* programme.

Special Administrative Region of Oé-Cusse Ambeno

RAEOA is an enclave within the Indonesian territory of West Timor. The Region could not be visited by the Mission due to the COVID-19 travel restrictions. Information on the agricultural situation was obtained by telephone from the Agriculture and Fisheries Directorate experts and extensionists. Other key informants and some farmers reached by telephone also provided information on the cropping season. Rainfall started with a slight delay and remained above average throughout the cropping season. The late start of the rainy season hindered

planting operations of maize and rice. As a result, the production of maize and rice has decreased compared to last year, while the production of root crops remained stable.

The flash floods affected 140 hectares of irrigated and rainfed rice (out of the 1 800 hectares planted) and 500 hectares of maize (out of the 3 300 hectares planted). The floods brought sediments into irrigation infrastructures, particularly in Pante Macasar (Bobocase, Costa and Taiboco *sucos*) and Nitibe (Lela-Ufe suco) post-administratives. Cash-for-work and heavy equipment are needed to remove the sediments. The irrigation intakes and first level canals in Pante Macasar post-administrative as well as in Naimeco *suco* were damaged and need repair.

FAW affected 320 hectares of maize (out of the 3 300 hectares planted) and were reportedly present in all *sucos* in the region.

The buffalo, sheep and goat population remained close to the level of 2020 owing to improved pasture conditions. The Bali cow population is reported to have decreased due to a large purchase by the *Cesta Basica* programme. ASF caused the culling or death of an estimated 12 100 pigs and the disease was present in all *sucos* in RAEOA.

The COVID-19 restrictions have not affected food production in RAEOA, but farmers' marketing was limited due to the travel ban imposed in late December 2020, leading to losses of income. The procurement of locally grown food by the *Cesta Basica* programme mitigated the impact of the COVID-19 restrictions. The President of RAEOA also took a very interesting initiative to link farmers with schools, where local farmer groups are supplying the national school feeding programme (*merenda escolar*).

Viqueque

The municipality benefits from the country's most fertile coastal lowland soils cultivated mainly for maize, rice (paddy and upland) and mung beans. Paddy rice is predominant in Uatu Lari, Uatu Carbau and Viqueque post-administratives. In the lowland, farmers in Viqueque have established an intensive crop rotation system, allowing for three crops to

be harvested in the same year; maize, followed by upland rice, followed by mung beans. Copra, elephant yams, sago flour and candlenuts are also produced in the municipality. Rainfall started on time and precipitation amounts have been above average benefitting main season crops.

The flash floods had a limited impact on crop production in Viqueque, with only 5 hectares of rice fields affected. The floods clogged the irrigation infrastructures with sediments in all irrigated rice producing *sucos* in Viqueque (six *sucos*), Lacluta (three *sucos*), Uatucarbau (three *sucos*) and Ossu (one *suco*). Farmers need support to clean the irrigation canals from sediment with heavy equipment, which could be provided in the form of cash-for-work. In Uatu Lari, the irrigation intake in Vessoru *suco* was damaged and needs to be repaired. Without support, the water flow on these irrigation systems will be reduced, resulting in losses of production for the secondary season crop.

FAW affected an estimated 270 hectares of maize, out of the 2 380 hectares planted. FAW were present in all *sucos* in the municipality.

The livestock population increased compared to 2020 owing to good pasture conditions. The poultry population has increased this year, due to a NDV vaccination campaign led by MAF and partners. ASF severely affected the pig population leading to the loss of 16 700 pigs (or 80 percent of the total municipality's pig herd), with only 4 020 pigs remaining in the municipality.

All *sucos* in Viqueque are affected by ASF and restocking is urgently needed.

The COVID-19 restrictions have not affected food production, but farmers reported to have lost their access to the market in Dili Municipality. However, farmers were able to sell their produce on the Government's *Cesta Basica* programme.



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ANNEX 2

CFSAM data collection tools

Municipality Format

(Sample multidisciplinary interview guide and data recording format)

Season: 2020/21	main harvest season <input type="checkbox"/> / secondary harvest season <input type="checkbox"/>
------------------------	--

1. General Information

Municipality:	Key Informants (list):
Number of households interviewed:	Number of fields visited:

2. Rainfall [Information from farmers, Agriculture Directorate staff and other key informants]

Start		Dry spells	Rainfall amount	Compared to previous year
Early <input type="checkbox"/> Date	Month	Number of weeks	Below average <input type="checkbox"/>	Better <input type="checkbox"/>
Normal <input type="checkbox"/>			Average <input type="checkbox"/>	Same <input type="checkbox"/>
Late <input type="checkbox"/>			Above average <input type="checkbox"/>	Lower <input type="checkbox"/>

Rainfall data on Cyclone Seroja (April) – please collect the data from the Municipality and attach to the report:

Field observations:

3. Most seriously affected areas by heavy floods, winds and heavy rains – Cyclone Seroja [Information from farmers, Agriculture Directorate staff and other key informants - [severity damages: 5 = very severe; 1 = minimal damages]

Location	Type of damage (floods, landslides, erosions, strong winds)	Total acreage of agriculture land affected (ha)	Acreage affected by main crops (ha)	Yield reduction (%)	Damages to irrigation infra-structures (Y/N)	Severity of the damages (scale 1 to 5)	If yes, explain main damages
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Any reports available: **Y/N** (please take copies of report/damage tables, etc. if available), If so, list titles:

4. Area, yield and production [Information mainly from Agriculture Directorate staff, but also farmers and other key informants. "Other" may include cash crops]

		Rice	Maize	Beans/peas	Tubers	Other	Other
Planted area (ha)	Current year						
	Last year						
Harvested area (ha)	Current year						
	Last year						
Yield (kg/ha)	Current year						
	Last year						
Production (tonnes)	Current year						
	Last year						
% losses	Current year						
	Last year						

Factors that affected area, yield and losses (Where this is different by crop, please specify):

5. Pests & crop diseases [Information from farmers, Agriculture Directorate staff and other key informants]

Specify	Crop affected	Level of damage		
		Mild	Average	Serious
Fall armyworm				
Remarks (comparison with last year):				

6. Household livestock [Condition: 1 = very poor; 5 = very good. Information from farmers, Agriculture Directorate staff and other key informants]

	Compared to last year (census period)			Remarks [specify condition and reasons if decrease compare to last year, type of diseases, etc.]
	Increase	Same	Decrease	
Buffaloes				
Bali cows				
Pigs				
Sheep & goats				
Poultry				
Other				

7. Pasture & water for livestock [Condition: 1 = very poor; 5 = very good. Information from farmers, Agriculture Directorate staff and other key informants]

	Condition (1-5)	Compare to previous year (improved / same / worse)	Remarks
Pasture			

8. COVID-19 State of Emergency [Information from farmers, Agriculture Directorate staff and other key informants.
Severity: 1 = very severe; 5 = minimal effect]

Has COVID-19 restrictions affected farmers to produce food? (Y/N)	Severity (1 to 5)	Has COVID-19 restrictions affected farmers to sell food on the market? (Y/N)	Severity (1 to 5)
Provide any further details on how COVID-19 might have affected food production and selling locally produced food to the market:			

Suco-village Format
Flood, irrigation infrastructure and RICE production trends
(example for Covalima Municipality)

To be filled with the Extensionist Coordinators -> with information from *Suco* Extensionists and *Chefe de Suco*

COVALIMA	Rice & Irrigation infrastructures						
	Cyclone/ flood - hectares affected (ha)	Production trend compared to last year			Damages to irrigation infra- structures (Y/N, n/a)	Can damages/ repair be managed by community (Y/N, n/a)	If NO, explain the support that is required (desilting, intake repair, 1st, 2rd, 3rd level canal repair, other)
Increase/ same/ decrease		%	Reasons (flood, pest & diseases, labour, seeds, fertilizer, tractor, others)				
1. FATULULIC							
FATULULIC							
TAROMAN							
2. FATUMEAN							
BELULIK LETEN							
FATUMEA							
NANU							
3. FOROHEM							
DATO RUA							
DATO TOLU							
FOHOREN							
LACTOS							
4. MAUKATAR							
BELECASAC							
HOLPILAT							
MATAI							
OGUES							
5. SUAI							
BECO							
CAMENA«A							
DEBOS							
LABARAI							
SUAI LORO							
6. TILOMAR							
CASABAUC							
FOHOLULIC							
LALAWA							
7. ZUMALAI							
MAUDEMO							
FATULETO							
LEPO							
LOUR							
MAPE							
RAIMEA							
TASHILIN							
UCECAI							
ZULO							

Suco-village Format
Floods, FAW, MAIZE and ROOT CROPS production trends
(example for Covalima Municipality)

To be filled with the Extensionist Coordinators -> with information from *Suco* Extensionists and *Chefe de Suco*

COVALIMA	Maize					Root Crops			
	FAW - hectares affected (ha)	Cyclone - hectares affected (ha)	Production trend compared to last year			Cyclone - hectares affected (ha)	Production trend compared to last year		
Post- Administrative/ Suco			Increase/ same/ decrease	%	Reasons (flood, moisture, pest & diseases, labour, seeds, fertilizer, landslide, fire, tractor, others)		Increase/ same/ decrease	%	Reasons (flood, pest & diseases, labour, landslide, fire, others)
1. FATULULIC									
FATULULIC									
TAROMAN									
2. FATUMEAN									
BELULIK LETEN									
FATUMEA									
NANU									
3. FOROHEM									
DATO RUA									
DATO TOLU									
FOHOREN									
LACTOS									
4. MAUKATAR									
BELECASAC									
HOLPILAT									
MATAI									
OGUES									
5. SUAI									
BECO									
CAMENA«A									
DEBOS									
LABARAI									
SUAI LORO									
6. TILOMAR									
CASABAUC									
FOHOLULIC									
LALAWA									
7. ZUMALAI									
MAUDEMO									
FATULETO									
LEPO									
LOUR									
MAPE									
RAIMEA									
TASHILIN									
UCECAI									
ZULO									

Suco-village Format
ASF and PIG situation
(example for Covalima Municipality)

To be filled with the Extensionist Coordinators -> with information from *Suco* Extensionists and *Chefe de Suco*

COVALIMA	Pigs			
	Presence of ASF (Y/N)	Number of pigs died since the beginning of the outbreak	Pigs died since the beginning of the outbreak (%)	Current pig population (numbers)
1. FATULULIC				
FATULULIC				
TAROMAN				
2. FATUMEAN				
BELULIK LETEN				
FATUMEA				
NANU				
3. FOROHEM				
DATO RUA				
DATO TOLU				
FOHOREN				
LACTOS				
4. MAUKATAR				
BELECASAC				
HOLPILAT				
MATAI				
OGUES				
5. SUAI				
BECO				
CAMENA«A				
DEBOS				
LABARAI				
SUAI LORO				
6. TILOMAR				
CASABAUC				
FOHOLULIC				
LALAWA				
7. ZUMALAI				
MAUDEMOMO				
FATULETO				
LEPO				
LOUR				
MAPE				
RAIMEA				
TASHILIN				
UCECAI				
ZULO				

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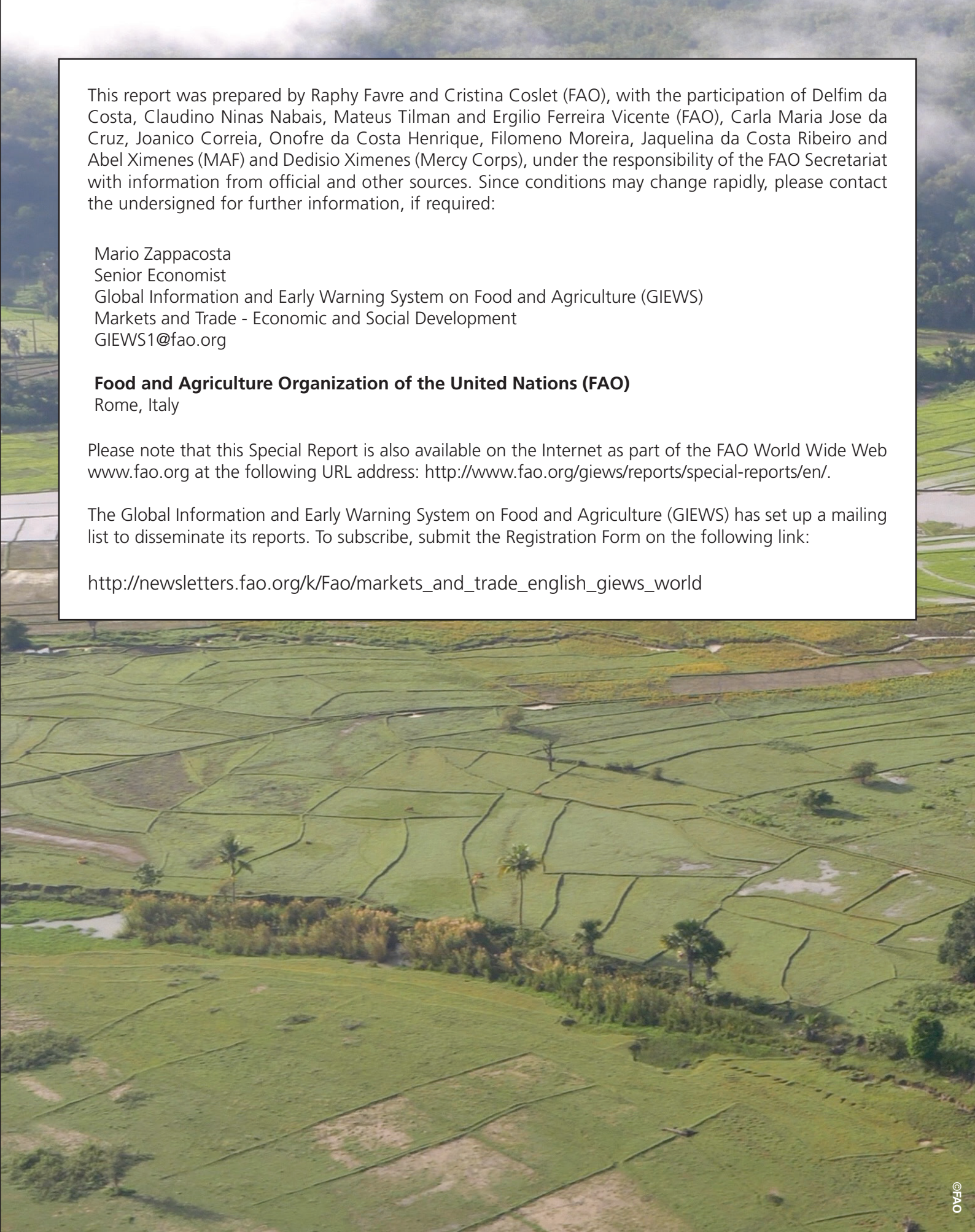
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