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SPECIAL REPORT

2019 FAO/WFP CROP AND FOOD SECURITY ASSESSMENT MISSION (CFSAM) TO THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

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ACRONYMS AND ABBREVIATIONS

ASF	African Swine Fever
ADS	Agricultural Development Strategy
ASIS	Agricultural Stress Index System
CFSAM	Crop and Food Security Assessment Mission
CHIRPS	Climate Hazards Group InfraRed Precipitation with Station data
CLEAR	Consolidated Livelihood Exercise for Analysing Resilience
CPI	Consumer Price Index
DAFO	District Agriculture and Forestry Office
DMH	Department of Meteorology and Hydrology
DoA	Department of Agriculture
DoI	Department of Irrigation
DoPF	Department of Planning and Finance
DoS	Department of Statistics
ECMWF	European Centre for Medium-Range Weather Forecasts
EIU	Economic Intelligence Unit
FAO	Food and Agriculture Organization of the United Nations
FAW	Fall Armyworm
FCS	Food Consumption Score
FFA	Food Assistance for Assets
FMD	Foot and Mouth Disease
GDP	Gross Domestic Product
GIEWS	Global Information and Early Warning System on Food and Agriculture
GIS	Geographic Information System
ha	hectare(s)
HS	Haemorrhagic Septicaemia
kg	kilogramme(s)
LaCSA	Lao PDR Climate Service for Agriculture
LAK	Lao PDR Kip
LYU	Lao People's Revolutionary Youth Union
MAF	Ministry of Agriculture and Forestry
METOP-AVHRR	Meteorological Polar Orbiting satellites-Advanced Very High Resolution Radiometer
MoIC	Ministry of Industry and Commerce
MoLSW	Ministry of Labour and Social Welfare
MoNRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment

NAFRI	National Agriculture and Forestry Research Institute
NDVI	Normalized Difference Vegetation Index
NDMO	National Disaster Management Office
NTFP	Non-Timber Forestry Products
PAFO	Provincial Agriculture and Forestry Office
PDNA	Post-Disaster Needs Assessment
PRISM	Platform for Real-Time Impact and Situation Monitoring
rCSI	reduced Coping Strategies Index
RFE	Rainfall Estimates
SAMIS	Strengthening Agro-climatic Monitoring and Information Systems
SES	Socio-Economic Status
UN-DESA	United Nations Department of Economic and Social Affairs
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	United States of America Dollar
VHI	Vegetation Health Index
WFP	World Food Programme

HIGHLIGHTS

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HIGHLIGHTS

IMPORTANT: *This report is based on information gathered in the Lao People's Democratic Republic from 16 November to 5 December 2019, prior to the COVID-19 pandemic outbreak and thus the assessment does not take into consideration the impacts of the virus on the food security and agriculture sector of the country.*

- Prolonged drought conditions from May to December in the north and severe floods in August and September in the south and parts of the centre severely affected the 2019 main (wet) season paddy crop, the country's primary food staple.
- Production prospects for the 2019 secondary season irrigated paddy crop for harvest in April-May, are generally unfavourable reflecting a decline in both area harvested and yields as less irrigation water is available following the damages to the irrigation infrastructure caused by floods.
- The 2019 aggregate paddy output is forecast at 3.4 million tonnes, about 10 percent below the five-year average and slightly above last year's reduced level.
- Prices of rice reached record highs in October 2019, but stabilized in November/December as newly harvested crops from the 2019 main season boosted availabilities in most markets.
- Although widespread outbreaks of African Swine Fever (ASF) were reported during the second half of 2019, no new cases have been reported since November 2019 and local authorities declared that the disease has been contained.
- Rice import requirement in the 2020 marketing year (January/December) are forecast at a well above-average level of 260 000 tonnes and are expected to be fully covered by commercial imports.
- The impacts of drought and flooding in 2019, combined with the already low baseline levels of household resilience among vulnerable communities, indicate that an estimated 67 800 people would be food insecure beginning from March 2020.
- According to the household level food security assessments conducted as part of the Mission, food insecurity (as measured by the food consumption score) was most acute among the poor households and those dependent on upland rice cultivation.
- In consideration of the extensive crop losses and damage to agricultural livelihoods, the households dependant on upland rice cultivation and those without access to dry season planting are likely to require food assistance to bridge the food gap until the next main season harvest in 2020, which begins in October.

OVERVIEW

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IMPORTANT: *This report is based on information gathered in the Lao People's Democratic Republic from 16 November to 5 December 2019, prior to the COVID-19 pandemic outbreak and thus the assessment does not take into consideration the impacts of the virus on the food security and agriculture sector of the country.*

A joint FAO/WFP Crop and Food Security Assessment Mission (CFSAM) visited the Lao People's Democratic Republic from 16 November to 5 December 2019 at the request of the Ministry of Agriculture and Forestry. The request was prompted by concerns over the impact of unfavourable weather conditions during the second half of 2019 on the main season crops. The Mission estimated the 2019 cereal production and the import requirements during the 2020 marketing year (January/December) and assessed the overall food security situation in the country.

Upon arrival in the country, the international members of the Mission spent two days in Vientiane prior to going to the field and held meetings with officials from the Department of Agriculture (DoA), the Department of Irrigation (DoI), the Department of Planning and Finance (DoPF) of the Ministry of Agriculture and Forestry (MAF), the Department of Statistics (DoS) under the Ministry of Planning and Investment (MPI), the Ministry of Industry and Commerce (MoIC) and the Lao Ministry of Labour and Social Welfare (MoLSW). A short briefing meeting was held with the resident donor community, including the Embassy of France and the United States of America Agency for International Development (USAID), in order to explain the goal and methodology of the Mission.

The Mission was divided into three teams and visited ten out of the country's 17 provinces. Each team included representatives from FAO, WFP and MAF. An external observer from the Joint Research Centre of the European Commission joined the field visits. The teams spent 12 days in the field. Before starting the field work, a half-day meeting was held with all the team members to review the assessment methodology and the questionnaires to be used, to discuss the type of data to be collected in each province and to finalize the logistical arrangements. During the field work, teams met with the local Government officials from the MAF at provincial and district level to gather agricultural data and to be briefed on the agricultural and food security situation. Each team visited three to four districts per province and conducted structured interviews with farming households. Local markets, traders and millers in each province were visited to assess the recent changes in prices of the main staple foods.

Upon return from the field, all teams gathered together to discuss and validate the collected data and worked with a Geographic Information System (GIS) expert to map the results and conduct further analysis using vegetation indices. A technical meeting with officials from MAF, MoIC and the National Agriculture and Forestry Research Institute (NAFRI) with the aim to gain more in-depth knowledge on specific issues and to request additional data needed. Prior to departing from the country, the team briefed the Deputy Minister of Agriculture and Forestry on the Mission's main findings.

The Mission obtained planted and harvested area and yield estimates from the MAF at provincial and district level. The data was then cross-checked against the information provided by farmers, rice millers and traders that were interviewed during the field trips and against the Normalized Difference Vegetation Index (NDVI) images, the estimated rainfall and other remotely-sensed meteorological data provided by FAO's Global Information and Early Warning System on Food and Agriculture (GIEWS) as well as rain gauge data from ground stations of the Department of Meteorology and Hydrology (DMH). Within the visited districts, about 250 key informant interviews were conducted, most of them with farmers and agricultural officers. Visits to retail and wholesale food markets as well as structured interviews with rice millers, rice traders and merchants were also conducted.

In addition to the structured, qualitative interviews noted above, the Mission also assessed the food

security conditions among a non-representative set of approximately 300 households from across the ten provinces. The data collected, including basic household demographics, socio-economic conditions, 2019 agriculture activity, food consumption, coping strategies and livelihoods, were used to further triangulate the information gathered from other sources.

A prolonged drought throughout the 2019 main season, from May to December, severely affected northern cropping areas. In all southern and two central provinces of Khammouane and Savannakhet, the passage of tropical storm Podul, in late August, and tropical depression Kajiki, in early September, brought heavy rains which triggered severe floods. The two extreme weather events caused widespread crop losses, particularly for paddy, leading to a reduction in the area harvested compared with average levels. By contrast, weather conditions were favourable in most central areas and supported optimal growing conditions for crops, leading to a bumper paddy production.

The 2019 main (wet) season paddy output, including rice produced in uplands and lowlands, is officially estimated at 3.1 million tonnes, 10 percent below the previous five-year average. Strong production decreases were registered in important producing areas in the south (which account for almost 30 percent of the total national output) due to floods/waterlogging and minor producing areas in the north due to drought. In the centre, which accounts for the more than 50 percent of the national paddy production, the 2019 main (wet) season output increased by over 20 percent from last year's below-average level affected by floods. The strong production increases in the centre, more than compensated for the reduction in the north and south. Current prospects for the 2020, mostly irrigated, secondary (dry) season crop, for harvest in April, are unfavourable. Early official forecasts put the 2020 secondary paddy production at 360 000 tonnes, well below the previous five-year average, reflecting a decrease in both area harvested and yields as less irrigation water is available following the damages to the irrigation infrastructure caused by floods in both 2018 and 2019. At the aggregate level, the 2019 paddy production is forecast at 3.4 million tonnes, 12 percent below the previous five-year average and 2 percent above the 2018 reduced output. The 2019 production of maize, predominantly grown in northern parts of the country, is estimated to decrease considerably due to drought and, to a lesser extent, by Fall Army Worm (FAW) infestations.

No livestock deaths were reported as a result of dry conditions and floods. In 2019, ASF[1] outbreaks were reported throughout the country. The MAF confirmed the first ASF outbreak in Salavan Province on 20 June 2019 and the disease rapidly spread throughout the country, killing at least 40 000 pigs. However, by November 2019, the ASF outbreaks was controlled and no new cases were reported.

Rice import requirements in the 2020 marketing year (January/December) are forecast at a well above-average level of 260 000 tonnes and are expected to be fully covered by commercial imports.

Prices of the most consumed glutinous rice (type 2) started to soar in June 2019 and reached record levels in September/October, supported by concerns over the impact of unfavourable weather conditions on the 2019 main season output. Subsequently, prices stabilized or started to decline in the main producing areas in November/December with the harvest of the 2019 main crop, which was slightly delayed as a result of late plantings in many areas. Overall, in December 2019, prices of rice (glutinous rice type 2) were at high levels in most markets of the country, averaging 30 percent higher than a year earlier.

As a result of these impacts, approximately 67 800 people are estimated to be in need of food

[1] ASF is a contagious viral disease that affects pigs and wild boars causing high fever, internal bleeding and can kill up to 100 percent of the infected animals within a few weeks, as there is no treatment or vaccine available. The disease is harmless for humans. It spreads easily between domestic and wild pigs through direct contact, the feeding of contaminated food and fomites, including shoes, clothes, vehicles and equipment. Currently, there is no effective vaccine available to control or prevent the spreading of ASF.

assistance during the lean season in 2020. The effects on food security of the drought and flooding were found to be especially acute for the poor households and those dependent on upland rice cultivation. These households tend to have lower baseline levels of resilience and the household assessment findings served to corroborate the information from the key informants (traders, rice millers, etc.) that many will have already exhausted their reserves from the beginning of March 2020. To cover the immediate agricultural needs, the Mission recommends for the 2020 next main (wet) season the provision of seeds, herbicides, especially for pest and disease controls as well as irrigation equipment, including water pumps, for the most affected farmers in the rice producing areas of Bokeo, Huaphanh, Saravane, Champasack and Attapeu provinces. To address the most pressing food security concerns, the Mission recommends the immediate provision of food assistance to the vulnerable households, targeting especially those dependent upon upland rice cultivation and those without access to dry season planting opportunities. The form the assistance takes is best decided between MAF, MoLSW and development partners but could include, for example, both direct food aid to households and activities aimed to rehabilitate damaged irrigation systems (i.e. food-for-work schemes).

SOCIO-ECONOMIC CONTEXT

SOCIO-ECONOMIC CONTEXT

Macro-economy

The national economic growth, measured by real Gross Domestic Product (GDP), has declined from 7.3 percent in 2015 to 6.3 percent in 2019 (Table 1). This decline was mainly driven by the falling mining output, the weaker performance of the tourism sector, the continued fiscal tightening and the slowing down in domestic demand. The reduced agricultural output in 2018 and 2019, due to adverse weather conditions, also negatively weighed on the economic output. In 2018, the heavy rainfall from the tropical storms resulted in flooding across the country, followed by the collapse of the Xe-Pian Xe-Namnoy Dam, while in 2019 drought severely affected northern parts of the country and floods for the second consecutive year caused extensive damage in the south and parts of the central areas. Despite the slowdown in growth, the resilient mining and hydro-power sectors, continued growth in the energy and service sectors as well as robust public and international investments in large infrastructure, including a number of new hydro-power and transport projects, limited further reductions.

The economic outlook for 2020 remains positive, boosted by increased power generation after the completion of a number of hydro-power projects, growing opportunities in the non-resource sectors as a result of closer regional integration and Government reforms aimed at improving the business environment. The agriculture, industry and service sectors account for 20, 32 and 48 percent, respectively, of the national GDP. The country is rich in natural resources, such as timber, hydro-power, gypsum, tin and gold.

Exchange rate and inflation

The Kip (LAK) has depreciated against the United States Dollar (USD) at a modest pace throughout 2019 from an average of LAK 8 590: USD 1 in January 2019 to LAK 8 870: USD 1 in December 2019, more than a 3 percent devaluation against the USD during this period (Figure 1), stemming largely from rises in the United States of America's interest rates, which have supported the USD against the emerging market currencies.

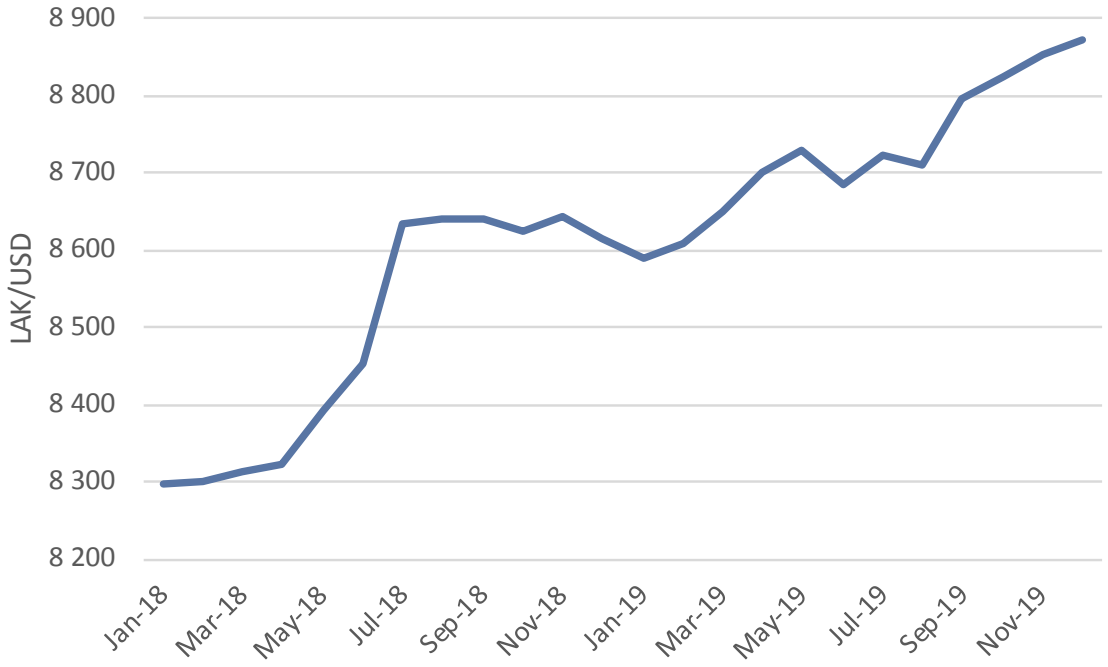
Consumer Price Index (CPI) picked up in 2019, supported by the depreciation of the local currency, as well as increasing food and beverage prices associated with the outbreak of the ASF and unfavourable weather conditions which affected the 2019 main (wet) season crops. In December 2019, the CPI was at 10.7 percent, nearly 6 percent above the same period of the previous year.

Table 1: Lao PDR – Key economic indicators (2015-2019)

Domestic economy	2015	2016	2017	2018	2019
Real GDP growth (percent)	7.3	7.0	6.9	6.5	6.3
Average consumer price inflation (percent)	1.3	1.6	0.8	2.0	2.9
Exports of goods (USD million)	3.653	4.245	4.900	5.300	5.800
Imports of goods (USD million)	-2.268	-1.385	-1.300	-1.400	-1.400
Trade surplus/deficit (USD million)	1.385	2.860	3.600	3.900	4.400
Average exchange rates LAK/USD	8.128	8.124	8.352	8.489	8.699

Source: Economic Intelligence Unit (EIU) Country Report, January 2020.

Figure 1: Lao PDR – Exchange rates (January 2018-November 2019)



Source: International Monetary Fund (IMF), 2019.

Population

The country's population in 2019 is estimated at 7 169 million, with an annual growth rate of approximately 1.5 percent during the previous five years (UN-DESA, January 2020). According to the 2015 Lao People's Democratic Republic's Population and Housing Census, about 70 percent of the population lives in rural areas, with an average population density of 27 people per square km, which is amongst the lowest in the Far East Asia region. Based on official information, during the last ten years, there has been an extensive migration of people from rural to urban areas or to neighbouring countries as China (Mainland), Cambodia, Myanmar, Thailand and Viet Nam, mostly in search of better employment opportunities.

Agriculture

Agriculture plays an important role in the domestic economy, contributing about 20 percent to the national GDP. Although slowly decreasing, the agricultural workforce still represents almost 70 percent of the active population[2], most of them engaged in rice-based agriculture, the collection of forest products and livestock raising. In recent years, the forestry subsector grew most rapidly followed by livestock, fisheries and cash crops, while staple food production of rice and maize grew more slowly, as farmers responded to the opening of market opportunities shifting production resources from staple foods to cash crops. Overall, only about 10 percent of the total land is used for agriculture due to the mountainous and hilly topography which

[2] Lao People's Revolutionary Youth Union (LYU) and United Nations Population Fund (UNFPA), 2015.

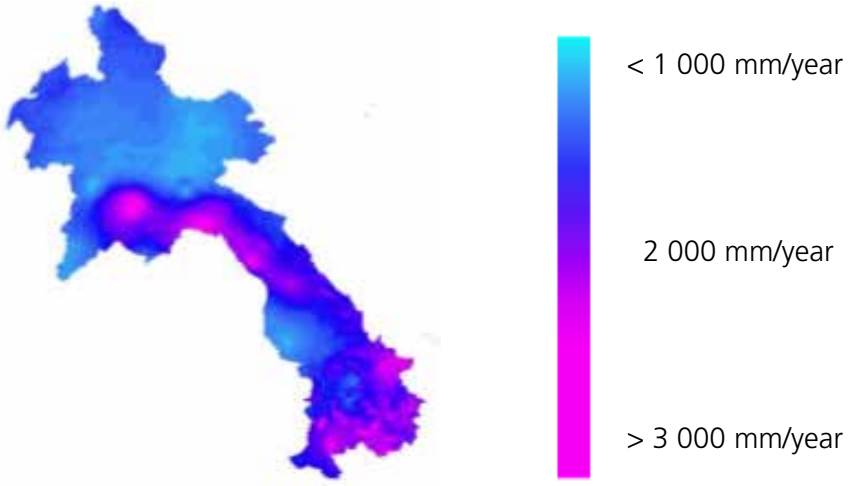
limits further expansions. Half of the arable land is dedicated to the cultivation of annual crops, the rest being used for perennial crops such as coffee, bananas and rubber. Overall, there are two main farming systems in the country: the lowland rainfed and/or irrigated farming systems of the Mekong River flood plains and its tributaries, and the upland agriculture system.

The country is characterized by a tropical monsoon climate, with a pronounced rainy season from May through October, a cool dry season from November through February and a hot dry season in March and April. Rainfall varies regionally as it can be seen in Figure 2. Temperatures range from average highs around 40 °C along the Mekong River in March and April to below 5 °C in the uplands of Xiangkhoang and Phongsali provinces in January.

In 2015, the MAF formulated the new "Agricultural Development Strategy to 2025 and Vision to the year 2030" (ADS2025) with the following aims: (1) ensure food security; (2) produce comparative and competitive agricultural commodities; (3) develop clean, safe and sustainable agriculture; and (4) modernize the agriculture sector. One of the main goals in order to ensure food security, is to increase rice production to 5 million tonnes by 2025, of which 1 million tonnes will be exported. To support this objective, the Government is promoting the expansion of the dry (irrigated) cropping season by expanding and rehabilitating irrigation facilities and encouraging the use of improved seed varieties. Between 2014 and 2018, the country is estimated to have exported an average of 300 000 tonnes of rice annually, mostly to Viet Nam, while small quantities were also exported to China (Mainland) and Thailand. In 2019, the exported quantity decreased considerably due to the reduced domestic production following adverse weather conditions. By 2025, the MAF also envisages an increased production of other crops and vegetables, including maize, coffee, sugarcane, cassava, beans, roots, tubers and fruits. To meet the ADS2025's goals, detailed regional action plans and incentive policies have been developed.

Rice is the major crop grown in the country and accounts for over 80 percent of the total cultivated areas. As reported in Table 2, there are two paddy seasons in the country. The major cultivation season is the wet (rainfed) paddy, which stretches from May to December, and normally accounts for almost 90 percent of the country's annual paddy production. The output this season depends on rainfall from the monsoon. The secondary dry season lasts from December until April and is irrigated. Limited irrigation coverage results that only about

Figure 2: Lao PDR – Average rainfall distribution (1982-2014)



Source: Ministry of Natural Resources and Environment (MoNRE) and WFP Consolidated, 2016. Livelihood Exercise for Analyzing Resilience (Lao PDR), 2016.
Adapted from United Nations World map, 2020.

Table 2: Lao PDR - Rice crop calendar

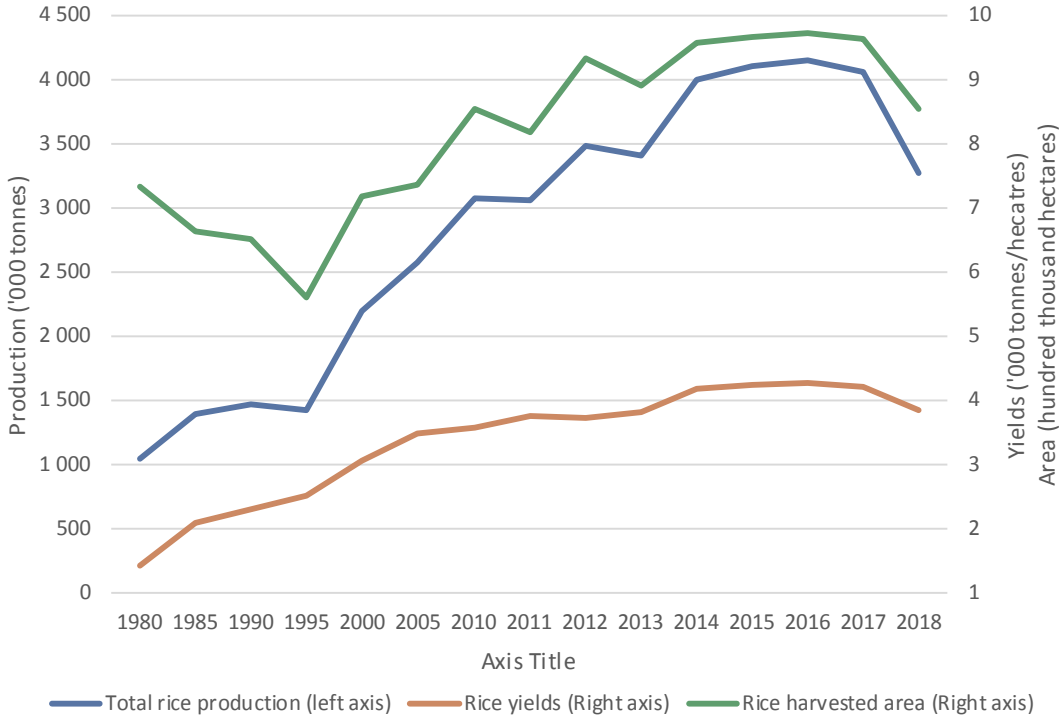
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Wet season upland		Slash and Burn			Planting		Mid-Season			Harvest		
Wet season lowland						Planting		Mid-Season			Harvest	
Dry season	Planting		Mid-Season			Harvest						Planting

Source: DoA, 2019.

10 percent of the wet season area is cultivated during the dry season. Most rice production takes place in lowland areas and about 10 percent of the production takes place in the upland, mostly in the north. The upland rice cultivation is typically based on a low output system. Yields are generally low, averaging 2 tonnes/hectare. Lowland rice is more fertile, with yields averaging 4 tonnes per hectare, twice the upland average yields. This variation in productivity is attributable to the differences in the use of technology, seed varieties and higher agricultural input use. Lowland rice is grown under two main agro-ecosystems, rainfed lowlands (main wet season) and irrigated lowlands (dry secondary season). The main rice producing areas are located along the Mekong River and include the provinces of Vientiane, Khammouan, Bolikhamxai, Savannakhet, Champasak, Khammouane and Saravan. Most rice is produced for self-consumption with less than 10 percent of the total annual output marketed.

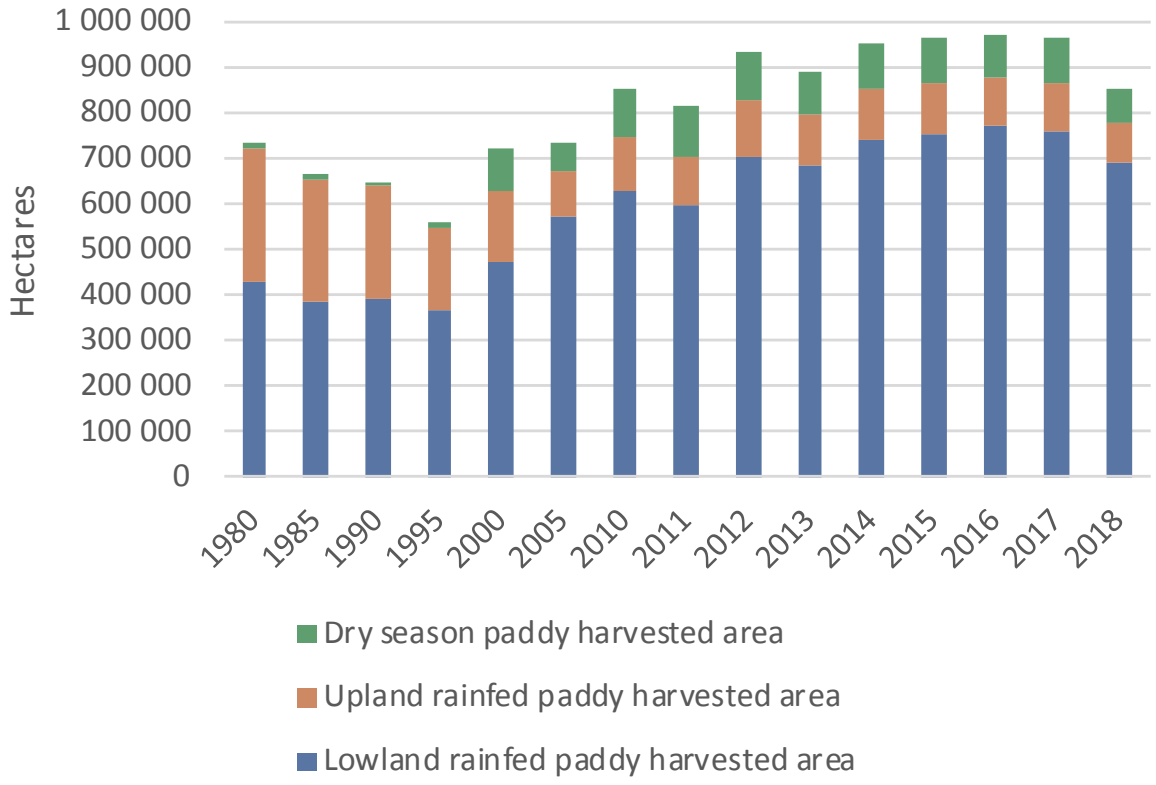
Figure 3 illustrates the evolution of rice production, harvested area and yields in the last 30 years. Production tripled during this period as a result of increasing yields due to the introduction of certified seed varieties and the increased use of agricultural inputs, including mechanization and fertilizers, coupled with an expansion in the irrigation infrastructure, which contributed to an increase of planted area.

Figure 3: Lao PDR - Total rice production, area and yields (1980-2018)



Source: DoA/MAF, 2018.

Figure 4: Lao PDR - Lowland paddy harvested area, upland harvested area and dry season harvested area (1980-2018)



Source: DoA/MAF, 2018.

The evolution of areas for the different cropping systems in the last 30 years is shown in Figure 4. In the last 30 years, the rice harvested area during the wet and the dry season has been increasing, the latter increased by 34 percent, mostly supported by an expansion in the irrigated area. The Government has been encouraging farmers to increases the dry season paddy production, however, farmers face financial difficulties in repairing and upgrading the existing infrastructure. By contrast, the upland rice cultivated area has been decreasing because of its low profitability.

Rice farmers use a wide range of seeds: local or improved seeds; early, medium and late maturing varieties; photosensitive and not photosensitive; glutinous or ordinary rice. The use of improved rice varieties (mainly TDK-11, TDK-8 and TSN-9) has increased in the last ten years, especially for lowland paddy in the central and southern provinces. The Government runs official seed centres that supply improved seeds to farmers. Every province has official seed centres and farmers can buy directly without middleman charges. However, farmers in remote areas have limited access to good quality seed, mostly due to high transportation costs. Low quality seed result in lower yields and lower milling rates, therefore, drawbacks for the farmers are considerable. In addition, a normal practice is to retain seeds for a period of three to five years, which halves potential yields.

Maize is the second largest commercial crop, mostly grown in the north and is mostly exported to China (Mainland). In other provinces, it is used for feed and household consumption.

Livestock production accounts for 18 percent of agriculture GDP and contributes significantly to the income of rural households, as most families own some livestock and use it as a form of household savings or for local trade. Livestock (buffalos, beef cattle, poultry and swine) has grown in importance gradually in the last years. Most producers are smallholders. The majority of the households

produce indigenous breeds and usually keep livestock under free range situations.

Fishing is one of the major source of income and diet diversification. Fishing takes places mainly in rivers, reservoirs and ponds. Besides wild capture fisheries, the aquaculture fishing is also gaining importance in the country. There are four main types of aquaculture in the country: cage culture with cages made of steel frames, bamboo, net or wood; rice-fish culture in irrigated areas; pond culture in small ponds created in rural lowland areas, basically to meet family requirements; and rainfed culture in irrigated paddy lands in agricultural fields under suitable agro-climatic conditions.

The main constraints for the development of the agricultural sector are topography, the low quantity of irrigated areas, cultivation technology and the lack of a good transport infrastructure, which limits internal trade and exports with its neighbouring countries. However, there is a significant cross-border movement with Thailand markets in terms of goods, services and labour. The presence of neighbouring countries in the Laotian agri-food system has increased recently due to land concessions and attractive agreements with foreign companies which provide agricultural inputs and collect the output in exchange for land and labour, especially near the borders with China (Mainland) and Viet Nam.

In the future, the main agricultural challenge will be dealing with climatic events. Projections and climate models show that the country will experience changes in temperature and rainfall pattern in the Far East Asia subregion. Rainfall amounts and the intensity and frequency of tropical cyclones are expected to increase over central and southern parts of the country, elevating flood risks. The northern parts of the country, both reduced rainfall and increased temperatures could significantly increment drought risks with devastating effects on crops and livestock.[3]

[3] MoNRE and WFP Consolidated, 2016. Livelihood Exercise for Analyzing Resilience (Lao PDR).

CEREAL PRODUCTION IN 2019/20

CEREAL PRODUCTION IN 2019/20

Factors affecting cereal crop production

Rainfall and weather conditions

Rainfall analysis is based on remote sensing data provided by FAO and WFP, namely Rainfall Estimates (RFEs)[4] and Vegetation Health Index (VHI)[5], as well as rain gauge data from ground stations of the DMH.

Two extreme weather events characterized the 2019 monsoon (rainy) season, which spans from May to September. In all southern provinces and in central provinces of Khammouane and Savannakhet, the passage of tropical storm Podul in late August and tropical depression Kajiki in early September brought heavy rains which triggered floods. The northern cropping areas were affected by a prolonged and severe drought throughout the season. These two extreme weather events caused widespread crop losses, particularly for paddy, leading to a reduction in the area harvested compared with the average levels. By contrast, weather conditions were favourable in most central areas and supported optimal growing conditions for crops, leading to a bumper paddy production.

In the northern producing areas, which account for 20 percent of the paddy output, consistently well below-average rains at planting time between May and July (Figure 5), hindered and aborted sowing operations, and required in many areas multiple replanting of crops. The negative impact of poor precipitation was compounded by the reduced water supplies from the Mekong River tributaries, following poor precipitations in the Upper Mekong River Basin, which hampered farmers to divert water to fields close to rivers. The drought effect on crop and vegetation growth is shown by the vegetation index derived from satellite imagery (Figure 6). The negative anomalies of the vegetation index were particularly visible in the northern provinces of Bokeo, Oudomxai, Luannamtha and Xayabouri. The situation eased in August with improved rains, bringing some relief, but dry weather conditions returned from mid-September, when the main rice crop was at a critical development stage. This led to a widespread wilting of crops, particularly the upland rice.

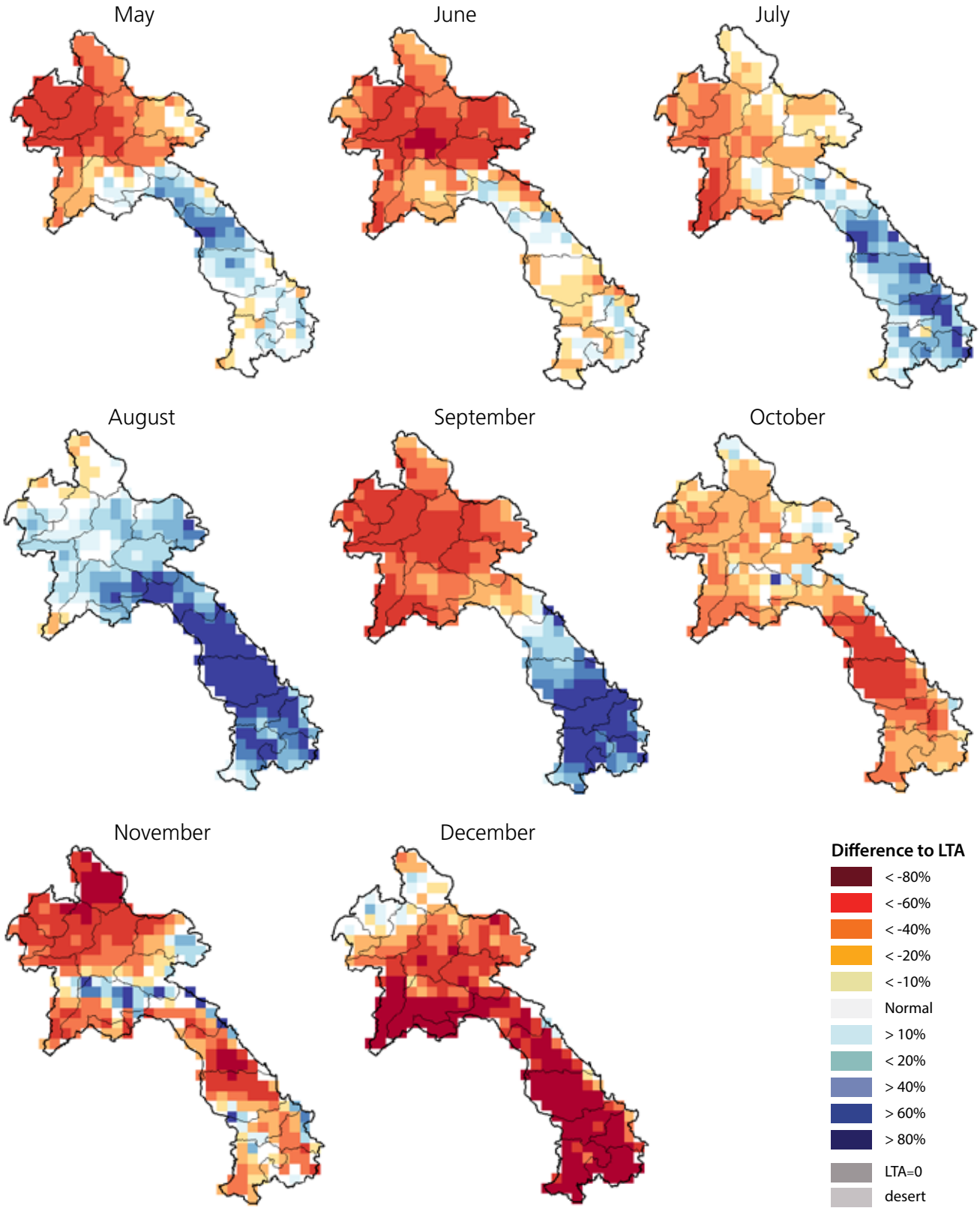
In southern provinces, which account for 30 percent of the total paddy output, precipitation was generally near normal from May to late August and benefitted plantings and early stages of crop development. Subsequently, the passage of tropical storm Podul in late August and tropical depression Kajiki at the beginning of September brought heavy rains and triggered floods and landslides in all four southern provinces. In the most affected areas, farmers reported that water remained in the fields for up to three weeks, destroying thousands of hectares of paddy land at the peak of the rice season. From October to end-December, rains were generally near average to slightly below average, helping to reduce the excess of soil moisture and allowing harvesting activities.

In the key producing central provinces, which combined account for about 50 percent of the total rice output, the rainy season had a timely onset in early May. Rains were generally near average in May, benefitting planting and transplanting activities as well as crop establishment. The months of June and July were slightly drier than normal in some provinces, including Vientiane, Bolikhamxai, Savannakhet and Xekong, leading to moderate soil moisture stress (Figure 7). Rains improved from late July onwards, and were generally near average until the harvest period in November and December. Farmers reported that the increased exposure of crops to direct sunlight due to limited cloud cover in June and July boosted the photosynthesis process, benefitting crop development at critical reproductive growth stages of panicle initiation to flowering. These factors reportedly led to optimal growing conditions for the paddy crops. By contrast, in the

[4] RFEs are derived from ECMWF data (FAO) and CHIRPS data (WFP).

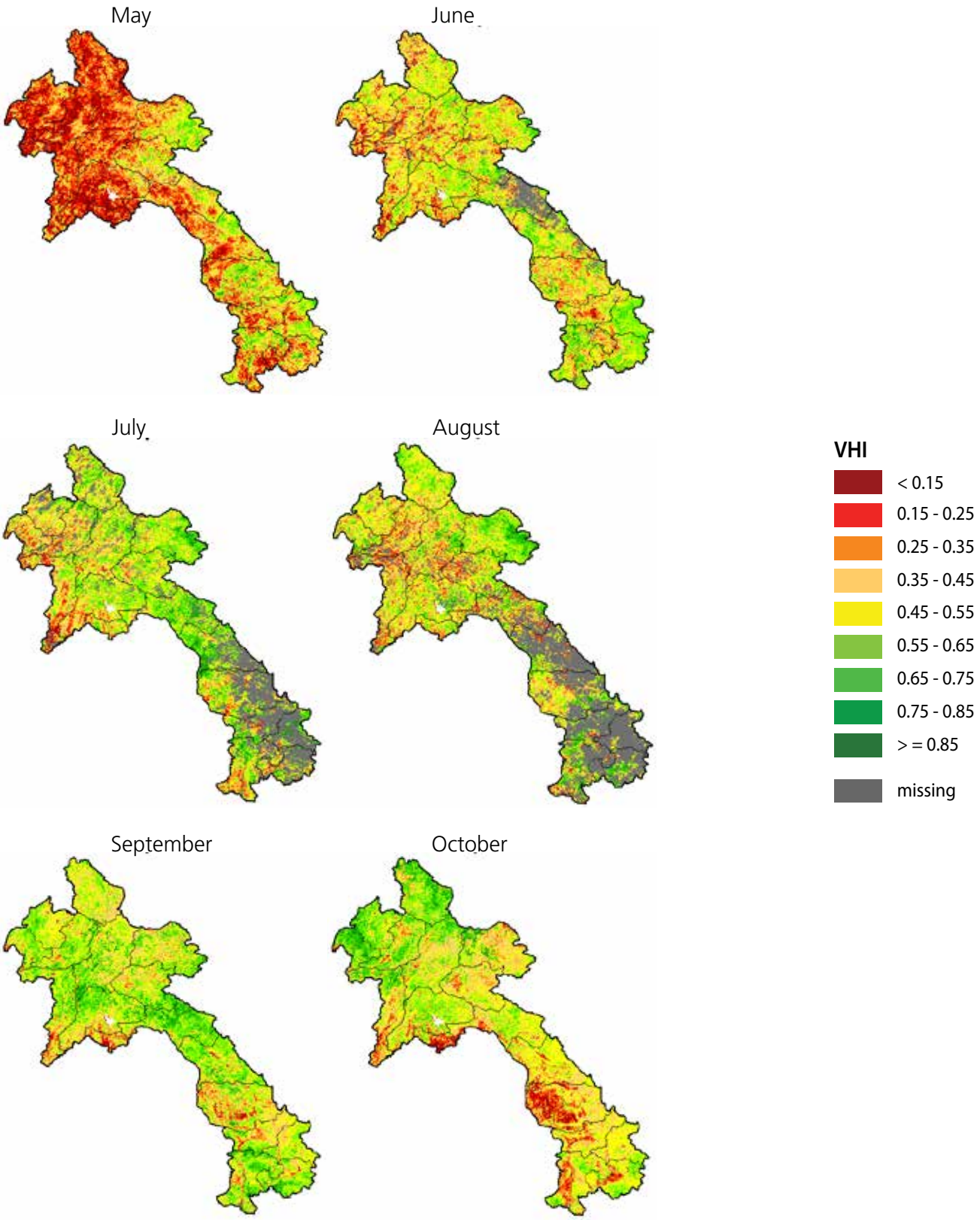
[5] VHI is derived from METOP-AVHRR sensors.

Figure 5: Lao PDR - Indicative monthly rainfall, relative to long-term average, (May-December 2019)



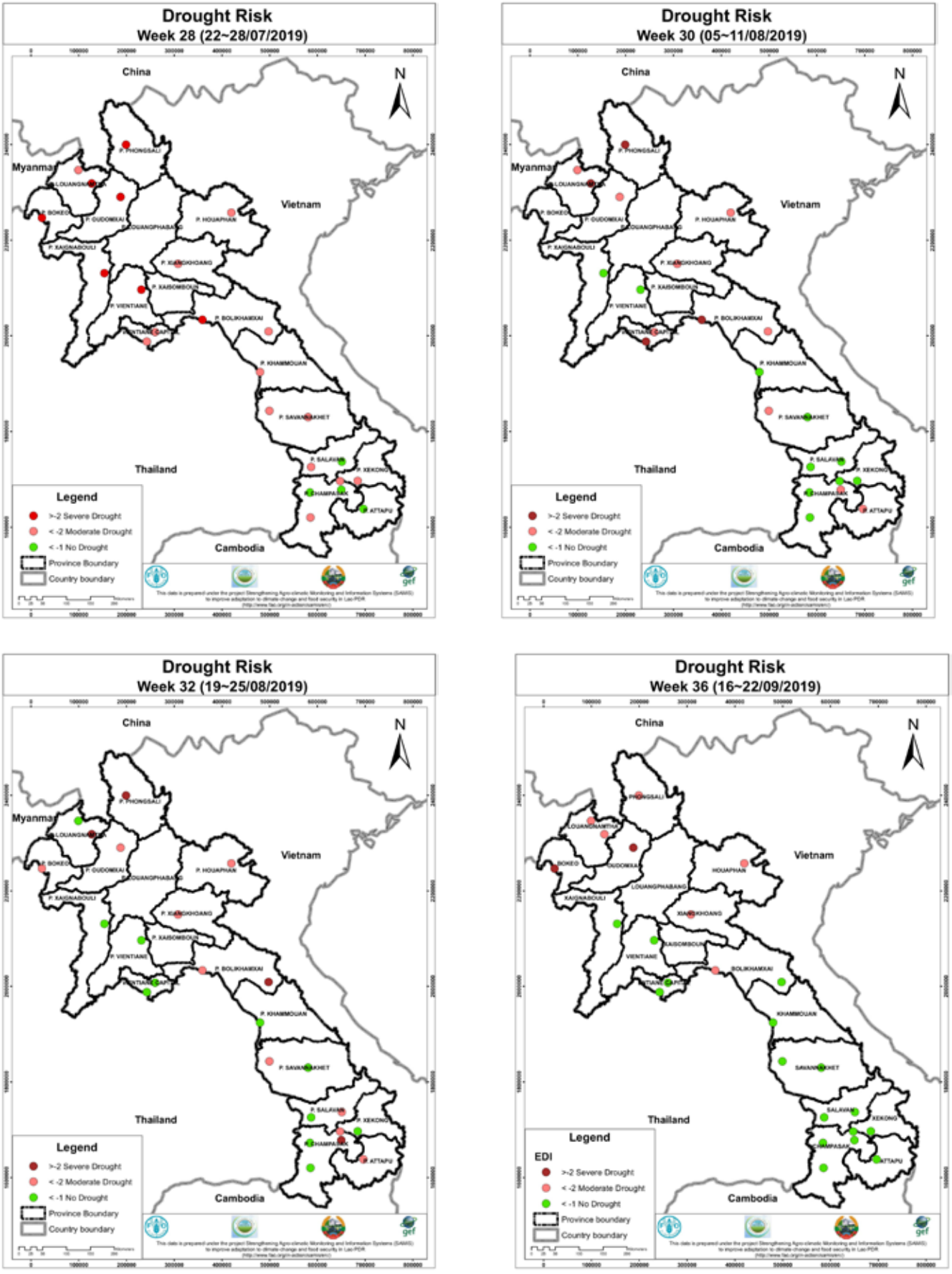
Source: FAO/GIEWS, 2019 http://www.fao.org/giews/earthobservation/index.jsp?lang=en.
Adapted from United Nations World map, 2020.

Figure 6: Lao PDR - Anomalies of the Vegetation Health Index, relative to long-term average, (May-October 2019)



Source: FAO/GIEWS, 2019 http://www.fao.org/giews/earthobservation/index.jsp?lang=en.
Adapted from United Nations World map, 2020.

Figure 7: Lao DPR - Drought risk maps (July-September 2019)



Source: Department of Meteorology and Hydrology, Ministry of Natural Resources and Environment, 2019.
Adapted from United Nations World map, 2020.

provinces of Khammouane and Savannakhet, where the storms Podul and Kijiji brought heavy rains and triggered floods, severe area contractions were recorded, particularly in low-lying paddy fields.

Fertilizers

In general, fertilizer utilization in the country is below the recommended rates due to their relatively high cost and farmers' perception that land has an adequate level of fertility. This is particularly the case in the remote areas, where no fertilizer is applied due to high costs. The most common practice is applying organic fertilizer, such as rice husk and animal manure, with limited quantities of chemical fertilizers, before transplanting the crops. Only farmers in most productive southern and central provinces follow the general recommendations for fertilizer use of 250-300 kg/hectare of combined chemical fertilizers, while the rest of the farmers reported using only 50-100 kg/hectare of Urea (46 00 00) or 150 kg/hectare of NPK.

In 2019, a 50 kg Urea bag was sold at LAK 180 000-190 000 in well-connected areas, while in most remote areas the price averaged LAK 200 000, reflecting higher transportation costs and middlemen margins. The price of NPK fertilizer formulation depends on composition, but it is normally 10-15 percent more expensive than Urea. As most of the chemical fertilizer used in the country are imported from Thailand, prices vary according to the exchange rates with the Baht. Since the Kip has been on a sustained and gradual depreciation since May 2018, fertilizer became more expensive in 2019 compared to 2018.

Seeds

During the 2019 main season, paddy seed availability was generally adequate and most farmers reported to have used their own seeds saved from the previous harvests (in some cases, seeds were retained for up to three years). In the northern parts of the country, where several re-plantings were required due to drought, farmers reported that they had to rely also on supplementary seeds provided by friends and relatives or by the Government's seed production plants. In many unfortunate cases, farmers reported that farmers were unable to re-plant due to the lack of seeds.

Chemicals

Overall, the use of chemical biocides is low, mostly due to a widespread concern about the impact of chemical products on the health and the environment, but also due to the high cost of the products and the limited knowledge about appropriate application in terms of quantity and time. The hand removal of insects is the most common pest control method, together with the use of organic hand-made biocides. By end-2016, the Government started promoting the production of organic crops and intensified pesticide regulations by issuing a law to control the use of chemicals and two decrees limiting the use of pesticides and herbicides.

The most common insecticides used in 2019 were Cypermethrin and Dicrotophos, produced in Thailand. A limited number of farmers reported using Parathion methyl and Diazine to control brown hopper, rice bug and stem borer infestations. The most common purchasing method for farmers is buying from middlemen or local shops, except from farmers living next to the border, which prefer to buy abroad.

Labour

Land preparation is normally carried out with mono-axle tractors, while transplanting and harvesting is mostly done manually. Only in the most productive areas, the whole process is mechanized. The Mission was informed of a general shortage of farm labour and strong increases of farm wages over the last two years. The average daily wage for a farm worker increased from around LAK 35 000 in 2018 to LAK 50 000-LAK 60 000 in 2019 as a result of an extensive flow of rural labour forces to different types of international companies, mostly from China (Mainland), operating in the country as well as toward urban areas or neighbouring countries in search of better employment opportunities. In some northern provinces, Chinese companies were hiring farmers at LAK 80 000/working day during the 2019 main (wet) season, which caused farm labour to increase to the same price.

Mechanization

Land preparation: Mostly mechanized throughout the country. The most used machine for tillage is a mono-axle tractor. In 2019, mono-axle tractors were

available at LAK 1.5 million/hectare for ploughing and harrowing (including labour), slightly above the previous year's level when prices ranged between LAK 1.2 1.3 million/hectare.

Seeding: Transplanting is preferred to broadcasting by farmers as the quantity of seed used is lower and the yield potential is higher. Broadcasting is used only by 10-15 percent of the farmers and it is less expensive and faster than transplanting.

Harvesting: Manual harvesting and the use of small cutting machines is the most common method, while combine harvesters are limited to the most productive areas.

Pests and diseases

During the 2019 (wet) season, the main pests reported affecting rice crops were rice bugs, brown plant hoppers, stem borers and leaf folders. Overall, the number of outbreaks was limited and less severe than the previous year. Most farmers managed to successfully control pest and disease outbreaks. Rodents caused minor losses, especially concentrated in upland paddy and maize crops in northern provinces. Localized damages to the maize crop due to FAW infestations were reported in 2019.

Paddy area planted and harvested during the 2019/20 (wet) season

According to official estimates, the area planted during the 2019 main (wet) season is set at 877 600 hectares, close to 2018's near-average level. However, as a result of the damages caused by the floods to paddy fields in the south and in the central provinces of Khammouane and Savannakhet, and drought/low irrigation water availability in the north, 123 000 hectares (or 16 percent of the 2019 main (wet) season planted area) were completely lost. The largest share of losses is attributed to floods (Table 3). Disaggregated by farming systems, the impact of drought was higher on upland rice crops, while floods severely compromised paddy in the lowland, reducing the extent of the plantings. As a result, the actual harvested area of the 2019 main (wet) season is officially estimated at 754 500 hectares, 3 percent below the previous year's low level and over 10 percent below the last five-year average. The provinces of Chanpasack, Saravan and Savannaket, which account on average for more than half of the overall paddy extension, were the most affected (Table 3).

Paddy yields

The average national yields of lowland main (wet) season paddy in 2019 is estimated at 4.3 tonnes/hectare, an increase of 9 percent from the previous year's reduced level and close to the five-year average (Table 4). Disaggregated by farming systems, lowland paddy yields decreased in most provinces in the north due to drought, while they increased in the south and the centre due to near-optimal growing conditions as rainfall at the critical growing stages was reported to be adequate. In addition, the increased exposure of crops to direct sunlight due to limited cloud cover in June and July boosted the photosynthesis of crops, leading to above-average yields in the lowlands.

The average yields of upland main (wet) season paddy in 2019 is estimated at 2 tonnes/hectare, slightly below average in the north and centre, but increased compared with the previous year in the south due to better rains (Table 5).

Overall, the combined lowland and upland average paddy yields in 2019 main (wet) season are estimated at 4.1 tonnes/hectare, 9 percent above last year's low level and close to the five-year average (Table 6).

Paddy production estimate of the 2019/20 main (wet) season

The 2019 main (wet) season paddy output, combined upland and lowland paddy rice, is officially estimated at 3.1 million tonnes, 6 percent above last year's low level, but 10 percent below the previous five-year average. Strong production decreases, year

on year, and compared with average levels were registered in the north and the south where drought and floods/waterlogging led to severe crop wilting, sharply reducing the area harvested. The provinces of Phongsaly, Bokeo, Huaphanh, Saravane and Sekong, where among the provinces registering the highest declines in production, ranging between 10 to 30 percent decrease year on year (Table 6). In the centre, the 2019 main (wet) season output increased by over 20 percent from last year's flood reduced level. The strong production increases in the centre, more than compensated for the reduction in the north and south.

Dry season paddy production forecast, 2019/20

Current prospects for the 2020, mostly irrigated, secondary (dry) season crop, for harvest in April, are unfavourable. Early official forecasts put the 2020 secondary paddy production at 360 000 tonnes, well below the previous five-year average, reflecting a decrease in both area harvested and yields as less irrigation water is available following damages to irrigation infrastructures caused by floods in both 2018 and 2019.

Table 3: Lao PDR - Comparison between planted, lost and harvested area, main (wet) season, lowland, upland rice and total ('000 hectares)

2019	Main (wet) season rice lowland				Main (wet) season rice upland				Total main (wet) season rice			
	Planted area	Lost area	Harvested area	Loss from planted area (%)	Planted area	Lost area	Harvested area	Loss from planted area (%)	Planted area	Lost area	Harvested area	Loss from planted area (%)
North	**104**	**2**	**103**	**-1**	**82**	**15**	**67**	**-18**	**186**	**16**	**170**	**-9**
Phongsaly	8	0	8	0	9	0	9	0	18	0	18	0
Luangnamtha	9	1	8	-11	9	1	8	-12	18	2	16	-12
Oudomxay	15	0	15	-1	16	4	11	-28	31	5	27	-14
Bokeo	13	0	13	-3	6	2	4	-33	19	2	16	-12
Luangprabang	13	0	13	-1	26	7	19	-28	40	8	32	-19
Huaphanh	13	0	13	0	5	0	5	0	17	0	17	0
Xayaboury	33	0	33	0	11	0	11	0	44	0	44	0
Centre	**456**	**56**	**400**	**-12**	**13**	**0**	**13**	**0**	**469**	**56**	**413**	**-12**
Vientiane Capital	52	0	52	0	0	0	0		52	0	52	0
Xiengkhuang	19	0	19	-1	8	0	8	0	27	0	26	-1
Vientiane	54	1	53	-2	1	0	1	0	55	1	54	-2
Borikhamxay	38	0	38	0	2	0	2	0	40	0	39	0
Khammuane	84	14	70	-17	0	0	0	0	84	14	70	-17
Savannakhet	202	41	161	-20	0	0	0		202	41	161	-20
Xaysomboon	8	0	8	0	3	0	3	0	10	0	10	0
South	**218**	**50**	**168**	**-23**	**4**	**0**	**4**	**-6**	**222**	**51**	**171**	**-23**
Saravane	80	26	53	-33	0	0	0		80	26	53	-33
Sekong	9	1	8	-12	2	0	2	-10	11	1	10	-11
Champasack	109	21	88	-19	0	0	0		109	21	88	-19
Attapeu	20	2	18	-10	2	0	2	0	22	2	20	-9
Total	**778**	**108**	**670**	**-14**	**100**	**15**	**85**	**-15**	**878**	**123**	**755**	**-14**

Source: CFSAM and MAF, 2019.

Table 4: Lao DPR - Comparison between (wet) season 2019, 2018 and five-year average area harvested, yield and production of lowland rice

Province	Area harvested ('000 hectares)					Yields (tonnes/hectare)					Production ('000 tonnes)				
	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average
North	**103**	**106**	**-3**	**106**	**-3**	**4.4**	**4.5**	**-2**	**4.7**	**-6**	**447**	**472**	**-5**	**493**	**-9**
Pongsaly	8	8	4	8	7	4.2	5.0	-15	4.9	-15	34	39	-12	38	-9
Louangnamtha	8	8	-6	10	-19	4.4	4.5	-3	4.5	-2	34	38	-9	43	-20
Oudomxay	15	16	-4	15	1	4.3	4.1	4	4.5	-5	65	65	-1	68	-4
Borkeo	13	15	-14	15	-14	4.3	4.5	-4	4.7	-7	55	66	-17	68	-20
Luangphrabang	13	14	-3	14	-4	4.4	4.0	11	4.6	-4	58	54	7	62	-8
Houphan	13	12	5	13	3	4.5	4.8	-6	4.7	-5	58	59	-2	59	-2
Xayabouly	33	34	-3	33	0	4.4	4.5	-3	4.7	-7	143	152	-6	155	-7
Centre	**400**	**370**	**8**	**420**	**-5**	**4.3**	**3.9**	**12**	**4.3**	**1**	**1 733**	**1 431**	**21**	**1 808**	**-4**
Vientiane capital	52	43	22	52	1	4.5	4.4	1	4.5	-2	232	188	23	237	-2
Xiengkhouang	19	19	-3	19	-2	4.6	4.3	8	4.4	6	87	83	5	84	4
Vientiane	53	50	5	52	2	4.4	4.2	6	4.7	-5	235	211	11	243	-4
Bolikhamxay	38	26	42	33	15	4.2	3.7	12	4.1	2	158	99	60	135	17
Khammouane	70	54	28	71	-1	4.2	3.2	32	4.1	3	295	175	68	294	0
Savannakhet	161	170	-5	187	-14	4.3	3.8	13	4.2	3	696	651	7	789	-12
Xaysomboun	8	7	18	7	10	4.0	3.8	5	3.8	5	31	25	24	26	16
South	**168**	**212**	**-21**	**216**	**-22**	**4.4**	**3.9**	**11**	**4.2**	**3**	**731**	**829**	**-12**	**915**	**-20**
Saravan	53	79	-33	75	-29	4.2	4.0	4	4.3	-4	222	319	-30	326	-32
Xekong	8	9	-9	9	-12	4.4	4.7	-6	4.5	-2	36	42	-14	41	-14
Chanpasack	88	104	-16	110	-20	4.5	4.0	12	4.3	4	396	418	-5	476	-17
Attapeu	18	19	-5	22	-15	4.3	2.6	62	3.3	30	78	50	54	71	10
Total	**670**	**688**	**-3**	**742**	**-10**	**4.3**	**4.0**	**9**	**4.3**	**0**	**2 911**	**2 732**	**7**	**3 216**	**-9**

Source: CFSAM and MAF, 2019.

Table 5: Lao PDR – Comparison between (wet) season 2019, 2018 and five-year average harvested area, yield and production of upland rice

Province	Area harvested ('000 hectares)					Yields (tonnes/hectare)					Production ('000 tonnes)				
	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average
North	**67**	**75**	**-10**	**83**	**-19**	**2.0**	**2.0**	**-1**	**2.0**	**-3**	**133**	**149**	**-11**	**170**	**-22**
Pongsaly	9	10	-4	10	-7	1.9	2.0	-4	1.8	4	18	19	-7	18	-4
Louangnamtha	8	9	-12	7	10	2.0	1.9	5	1.9	5	16	17	-7	14	16
Borkeo	4	7	-47	8	-50	1.9	1.8	7	1.9	0	7	13	-44	15	-49
Luangphrabang	19	23	-18	23	-16	1.9	1.5	24	1.6	16	36	36	1	37	-3
Houphan	5	15	-70	15	-70	2.1	2.7	-23	2.7	-25	9	40	-77	42	-78
Xayabouly	11	10	7	12	-4	2.1	2.3	-10	2.3	-9	24	24	-3	27	-13
Centre	**13**	**13**	**-1**	**18**	**-24**	**2.0**	**2.1**	**-4**	**2.0**	**0**	**27**	**28**	**-4**	**35**	**-24**
Xiengkhouang	8	8	-7	8	-2	2.1	2.1	-1	2.1	-2	16	17	-8	16	-3
Bolikhamxay	2	2	3	2	-24	1.9	1.7	10	1.9	-3	3	3	13	5	-27
Xaysomboun	3	3	-28	4	-30	2.0	2.3	-13	1.9	7	5	8	-37	7	-25
Southern	4	4	-10	5	-28	1.8	1.7	10	2.0	-6	7	7	-1	11	-33
Xekong	2	2	-11	2	2	1.8	2.0	-8	1.9	-6	4	5	-18	4	-4
Attapeu	2	2	-9	1	26	1.9	1.3	39	1.5	21	4	3	26	2	54
Total	85	92	-8	106	-20	2.0	2.0	-1	2.0	-3	167	185	-10	216	-23

Source: CFSAM and MAF, 2019.

Table 6: Lao PDR – Comparison between (wet) season 2019, 2018, five-year average harvested area, yield and production of upland and lowland rice, combined

Province	Area harvested ('000 hectares)					Yields (tonnes/hectare)					Production ('000 tonnes)				
	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average	2019	2018	% change: 2019 over 2018	Average 2014-2018	% change: 2019 over five-year average
North	**169.9**	**180.9**	**-6**	**189.4**	**-10**	**3.4**	**3.4**	**-1**	**3.5**	**-2**	**579.9**	**621.7**	**-7**	**662.9**	**-13**
Phongsaly	17.6	17.7	0	17.7	-1	3.0	3.3	-10	3.2	-6	52.1	58.3	-11	56.1	-7
Luangnamtha	15.9	17.4	-9	16.9	-6	3.2	3.1	1	3.4	-5	50.4	54.9	-8	56.7	-11
Oudomxay	26.7	15.9	68	24.2	11	3.3	4.1	-20	3.5	-6	87.9	65.3	35	84.8	4
Bokeo	16.4	21.9	-25	22.2	-26	3.8	3.6	5	3.7	1	62.1	79.0	-21	83.0	-25
Luangprabang	32.0	36.7	-13	36.2	-11	2.9	2.4	20	2.8	6	93.7	89.4	5	99.7	-6
Huaphanh	17.4	27.3	-36	27.8	-37	3.8	3.6	6	3.6	6	66.9	98.6	-32	100.7	-34
Xayaboury	43.9	44.0	0	44.4	-1	3.8	4.0	-5	4.1	-7	166.9	176.4	-5	181.9	-8
Centre	**413.1**	**383.4**	**8**	**437.7**	**-6**	**4.3**	**3.8**	**12**	**4.2**	**1**	**1 759.3**	**1 459.0**	**21**	**1 842.9**	**-5**
Vientiane	52.1	42.7	22	51.7	1	4.5	4.4	1	4.6	-3	231.8	187.8	23	237.0	-2
Xiengkhuang	26.4	27.5	-4	26.9	-2	3.9	3.6	7	3.7	5	102.7	99.8	3	99.8	3
Vientiane	53.9	50.2	7	55.2	-2	4.4	4.2	4	4.5	-3	236.5	210.8	12	249.8	-5
Borikhamxay	39.5	28.2	40	35.1	12	4.1	3.6	13	4.0	3	161.2	101.7	58	139.1	16
Khammuane	69.9	54.4	29	70.8	-1	4.2	3.2	31	4.2	2	295.6	175.3	69	294.1	1
Savannakhet	161.1	170.3	-5	187.3	-14	4.3	3.8	13	4.2	2	695.9	650.7	7	790.0	-12
Xaysomboon	10.3	10.1	2	10.6	-3	3.5	3.2	7	3.1	12	35.7	32.8	9	33.1	8
South	**171.5**	**216.1**	**-21**	**221.4**	**-23**	**4.3**	**3.9**	**11**	**4.2**	**3**	**738.5**	**836.5**	**-12**	**925.5**	**-20**
Saravane	53.3	79.4	-33	77.4	-31	4.2	4.0	4	4.3	-2	222.3	319.3	-30	3 30.9	-33
Sekong	10.2	11.2	-9	11.3	-10	3.9	4.1	-6	4.0	-4	39.3	46.1	-15	45.2	-13
Champasack	87.9	104.3	-16	109.7	-20	4.5	4.0	12	4.3	4	395.7	417.8	-5	4 76.3	-17
Attapeu	20.1	21.3	-5	23.1	-13	4.0	2.5	61	3.2	27	81.3	53.2	53	73.1	11
Total	**754.5**	**780.4**	**-3**	**848.5**	**-11**	**4.1**	**3.7**	**9**	**4.0**	**1**	**3 077.7**	**2 917.1**	**6**	**3 431.4**	**-10**

Source: CFSAM and MAF, 2019.

Aggregate paddy production, 2019/20

At the aggregate level, 2019/20 paddy production, including the 2019 main (wet) and the 2020 secondary (dry) season, still to be harvested, is forecast at 3.4 million tonnes, 2 percent above last year's reduced level and 12 percent below the previous five-year average (Table 7).

The below-average paddy output in 2019 follows a sharply reduced paddy production in 2018, severely affected by floods. According to official information, the 2018 paddy output, estimated at 3.3 million tonnes, decreased by almost 20 percent compared with 2017's level.

Other crops

Maize

Maize is the second most produced crop in the country, predominantly in northern provinces. The grain is principally used for livestock feed and it is partially exported.

Maize output has increased gradually from 2000 to 2016, when it reached a record level of 1.6 million tonnes from 260 000 hectares as a result of a series of factors such as strong exports demand by China (Mainland), attractive domestic prices that induced farmers to increase plantings and the introduction of new techniques, including the use of hybrid seeds. Since 2016, the demand from China (Mainland) has declined as the Chinese Government decided to release local maize in order to cut domestic large inventories and maize production in the country declined to an average 800 000 tonnes of maize per year on an area of almost 150 000 hectares. In 2019, maize output is officially forecast at about 717 000 tonnes, 7 percent below the 2018 reduced level and 44 percent below the five-year average. With the planted area close to the previous year's level, most of the year-on-year decrease is due to lower yields following the severe drought in the north and damages caused by FAW infestations.

Cassava

Cassava, known as "Man Ton", has become in recent years an important cash crop for export as it can be used for food, feed and industrial processing into starch, sweeteners and ethanol. The increasing regional and global demand for animal feed, starch products and biofuel together, as well as demand for dry chips and cassava starch, led to a drastic increase

Table 7: Lao PDR – Rice production by season (2014/15-2019/20)

Years	Wet season lowland			Wet season upland			Dry season irrigated			Total, wet and dry seasons		
	Area ('000 ha)	Yields (tonnes/ha)	Production ('000 tonnes)	Area ('000 ha)	Yields (tonnes/ha)	Production ('000 tonnes)	Area ('000 ha)	Yields (tonnes/ha)	Production ('000 tonnes)	Area ('000 ha)	Yields (tonnes/ha)	Production ('000 tonnes)
Avg. 2014-2018	756	4.4	3 336	110	2.0	224	92	5.1	469	958	3.8	4 029
2018/19	688	4.0	2 732	92	2.0	185	89	5.1	455	869	3.7	3 372
2019/20	670	4.3	2 911	83	2.0	167	90	4.0	360	843	3.4	3 438

Source: CFSAM and MAF, 2019.

in the cultivation area from 10 000 hectares in 2010 to over 100 000 hectares in 2019. Cassava expansion occurred in areas with good market access. Currently, there are 14 starch/dry chip processing factories throughout the country and the main investors are from Viet Nam, Thailand and China (Mainland).

Overall, cassava production in 2019 was not affected by adverse weather conditions. Cassava is more tolerant to drought than other crops and it is mainly grown in uplands that were not affected by floods.

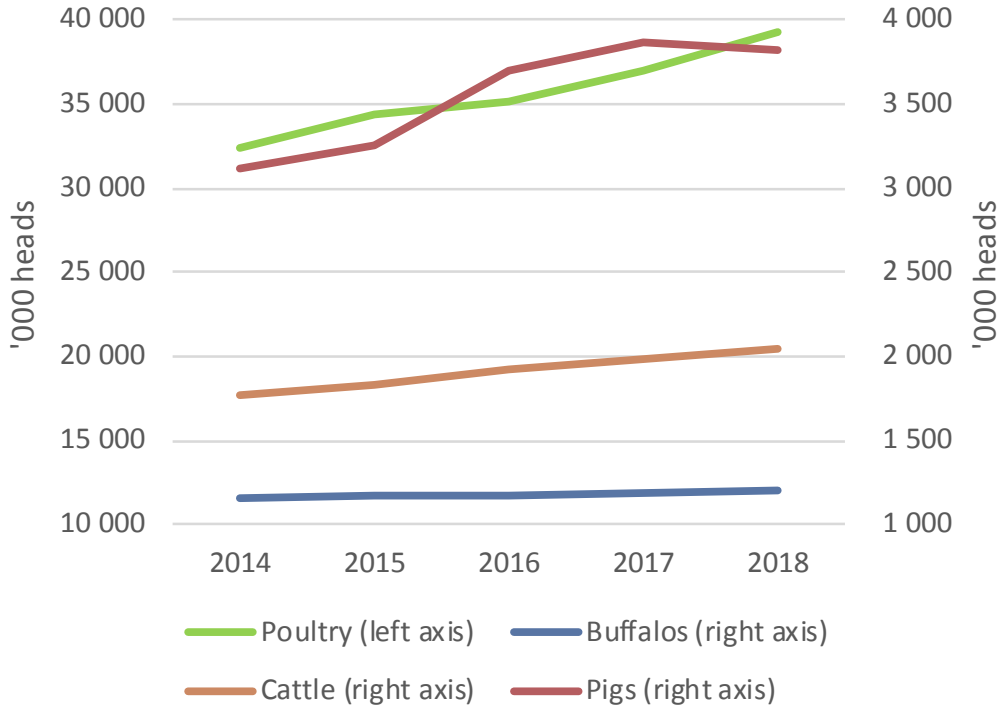
Vegetables

The area dedicated to vegetables production has raised rapidly over the last years, from less than 50 000 hectares in 2007 to more than 160 000 hectares in 2019 due to an increase in contract farming by foreign companies that provide farmers with seeds, fertilizers, plastic sheeting and, often, irrigation. At the household level, vegetables is one of the main food sources for diet diversification.

Livestock

Numbers of the principal livestock species, cattle, buffalos and goats, have increased between 2014 and 2018 (Figure 8). Substantial expansions were registered in the number of poultry and pigs, both increasing by more than 20 percent and reaching record levels at 39.2 million and 3.8 million in 2018, respectively. Similarly, the numbers of cattle increased over the last five years, supported by strong demand from neighbouring countries, principally China (Mainland) and Thailand. By contrast, the buffalo population has remained stable, which may be attributed to the increasing use of mechanization for land preparation. Disaggregated by regions, the centre and the south have the higher number of buffalos and cattle, while the pig and poultry population is evenly distributed throughout the country (Table 8). The goat and sheep population is marginal.

Figure 8: Lao PDR – Livestock numbers (2014-2018)



Source: MAF Agricultural Statistics Yearbook, 2018 and Department of Planning and Cooperation (MAF), 2018.

Table 8: Lao PDR - Livestock numbers ('000 heads) by province (2016-2018)

Province	Buffalos			Cattle			Pigs			Poultry		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
North	**281**	**282**	**285**	**489**	**507**	**521**	**1.286**	**1.345**	**1.329**	**10.166**	**10.689**	**11.34**
Phongsaly	44	45	45	53	55	56	263	275	272	945	994	1.054
Luangnamtha	16	16	17	24	25	26	126	132	130	661	694	737
Oudomxay	37	37	37	44	45	46	196	204	202	1.583	1.665	1.766
Bokeo	26	26	27	61	62	64	85	89	88	669	704	747
Luangprabang	56	56	57	92	95	97	263	275	272	2.519	2.648	2.809
Huaphanh	51	51	52	81	84	86	184	192	190	964	1.013	1.075
Xayaboury	51	51	51	134	141	145	169	177	175	2.825	2.971	3.152
Centre	**556**	**581**	**586**	**1.061**	**1.093**	**1.124**	**1.022**	**1.069**	**1.056**	**10.561**	**11.104**	**11.787**
Vientiane	14	15	15	79	84	86	165	173	171	2.115	2.224	2.36
Xiengkhuang	44	57	57	141	150	155	122	127	126	1.417	1.49	1.588
Vientiane	60	61	61	172	177	182	134	140	139	1.143	1.202	1.276
Borikhamxay	47	48	48	67	69	71	90	94	93	1.145	1.203	1.277
Khammuane	69	75	76	115	118	122	117	122	121	1.006	1.058	1.123
Savannakhet	302	305	308	451	456	469	364	380	376	3.527	3.709	3.935
Xaysomboon	20	20	21	37	39	40	30	31	31	206	217	230
South	**340**	**326**	**329**	**373**	**385**	**396**	**1.392**	**1.456**	**1.439**	**14.423**	**15.166**	**16.089**
Saravane	117	101	102	141	145	150	903	945	934	3.391	3.565	3.783
Sekong	31	31	31	28	29	30	165	172	170	1.363	1.433	1.52
Champasack	150	150	152	175	181	186	273	285	282	6.575	6.914	7.335
Attapeu	43	44	44	29	30	30	51	54	53	3.094	3.253	3.451
Total	**1.177**	**1.189**	**1.200**	**1.923**	**1.984**	**2.041**	**3.700**	**3.869**	**3.825**	**35.150**	**36.960**	**39.217**

Source: MAF Agricultural Statistics Yearbook, 2018.

Buffalos and cattle are typically raised in free range systems, with continuous access to pasture. The traditional pig and poultry production system is implemented in three different types, free-scavenging, semi-scavenging and penning. In the case of free-scavenging, exposure and contact to wild life and other animals is possible and might contribute to disease transmissions and increased difficulties about diseases control. Free-scavenging and semi-scavenging systems are usually characterized by a small number of animals per household. The households involved in penning pig and poultry production manage the animals in pens all year around.

No livestock deaths were reported as a result of dry conditions in the north and floods in the south. The unusual low rainfall amounts in the north resulted in poor pasture condition. An increased number of cattle owners, whose paddy production was lost in 2019, resorted to sell animals for cash.

Animal health

Several livestock diseases are prevalent in the country, but most are kept at a tolerable level with the support of adequate veterinary services. The most common diseases among cattle and buffalos are Foot and Mouth Disease (FMD) and Haemorrhagic Septicaemia (HS). In 2019, no significant outbreaks of diseases for buffalos and cattle have been reported. Villages are provided with veterinary services: either a veterinary doctor resides in the village, or they receive weekly (or monthly in remote areas) visits by a veterinary doctor from another village. Vaccination rates, reported during the Mission, were at 80 percent. Pigs and poultry are rarely vaccinated. In some villages, the District Agriculture and Forestry Office (DAFO) provides free vaccination services. Fowl cholera, Newcastle disease and the Highly Pathogenic Avian Influenza are common among the poultry population, although infected animal numbers are not always registered officially.

Among pigs, Swine Fever and Porcine Reproductive and Respiratory Syndrome (commonly known as the blue ear disease) are the most common diseases. In 2019, multiple outbreaks of ASF were reported throughout the country. The MAF confirmed the first ASF outbreak in Salavan Province on 20 June 2019 and the disease rapidly spread, killing at least 40 000 pigs in all 18 provinces of the country (Table 9). The death toll accounts only for about 1 percent of the national herd. The provinces with the highest death toll were Huaphanh, Phongsaly, Oudomxay and Borkeo in north Saravan and Attapeau in the south and Borikhamxay in the centre. Since the beginning of the outbreak, the MAF designated Red Areas around an outbreak to control the movement of pork meat and products and prohibited trade. Additional Yellow Areas (with a 3 km radius from the Red Areas) were designated as official surveillance zones. Pork meat and products have been banned in markets until the end of the outbreak. By the time of the Mission, the ASF outbreaks were controlled and no new cases were reported.

Table 9: Lao PDR – Extent of the outbreak of African Swine Fever

Province	Number of districts	Number of villages	Number of pigs
Saravan	1	14	4 598
Savannakhet	2	6	1 851
Vientiane	4	7	374
Houphan	9	17	3 354
Pongsaly	5	13	3 584
Xaysomboun	3	4	1 523
Bolikhamxay	4	18	4 817
Xekong	2	7	2 439
Oudomxay	6	32	6 386
Xiengkhouang	4	5	2 194
Louangnamtha	2	11	1 191
Vientiane	2	2	580
Luangphrabang	1	1	6
Khammouane	1	1	165
Attapeu	5	11	3 585
Borkeo	4	19	3 090
Chanpasack	1	1	194
Xayabouly	1	1	199
Total	**57**	**170**	**40 130**

Source: MAF, 2019.

CEREAL SUPPLY AND DEMAND SITUATION

CEREAL SUPPLY AND DEMAND SITUATION

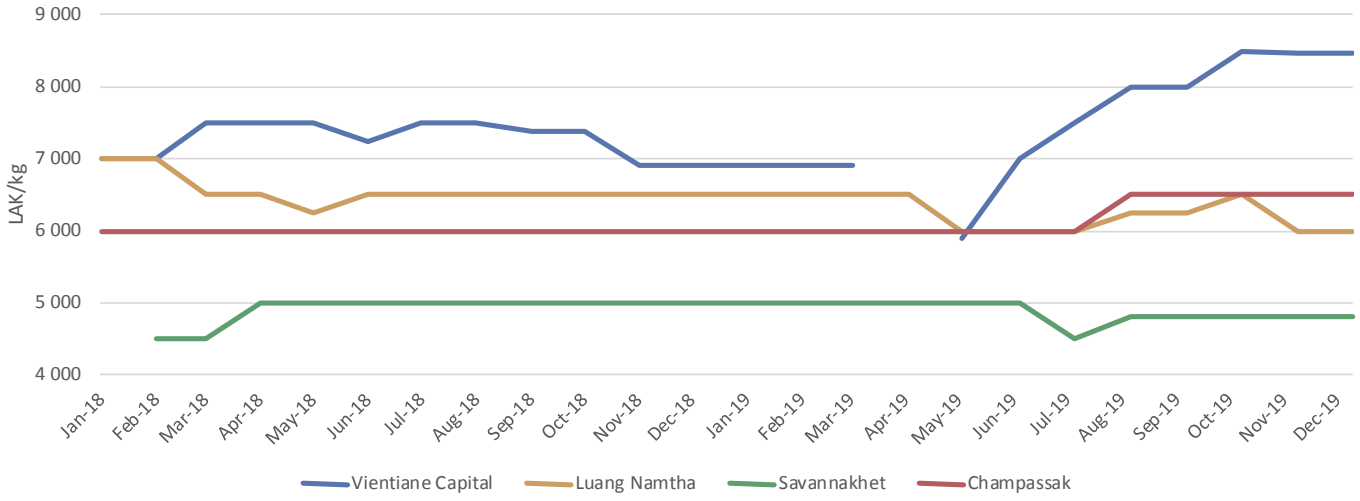
Prices of rice

Prices of the most consumed glutinous type 2 rice variety started to soar in June 2019 in most markets of the country (Figure 9), supported by concerns over the impact of dry weather conditions on the 2019 main season output. Prices continued their increasing trend in the following months reaching record levels in September/October 2019 following severe floods which affected crops in the southern and central main rice producing areas. Price increases were also supported by a sharp increase of the benchmark Thailand export price for the same variety as the country relies on imports mostly from Thailand to cover its local needs (Figure 10). Domestic prices of rice were generally stable or started declining in the main producing areas in November/December 2019 with the harvest of the 2019 main crop. Overall, in December 2019, rice prices were at high levels in most markets, averaging 30 percent higher than a year earlier. The strongest price increases were recorded in the areas affected by the drought and floods, particularly in the deficit provinces located in the north. For example, in Oudomxay market located in the north (among the most affected by the drought) and Khammoun (located in the centre and affected by floods) prices in December 2019 were 60 and 50 percent, respectively, higher than their year-earlier levels (Figure 11, 12 and Figure 13). In Vientiane, prices in December 2019 were 22 percent up year on year.

Discussions with rice traders, millers, farmers and district DAFO officials confirmed the following key factors supporting the increase in rice prices in 2019 compared to 2018:

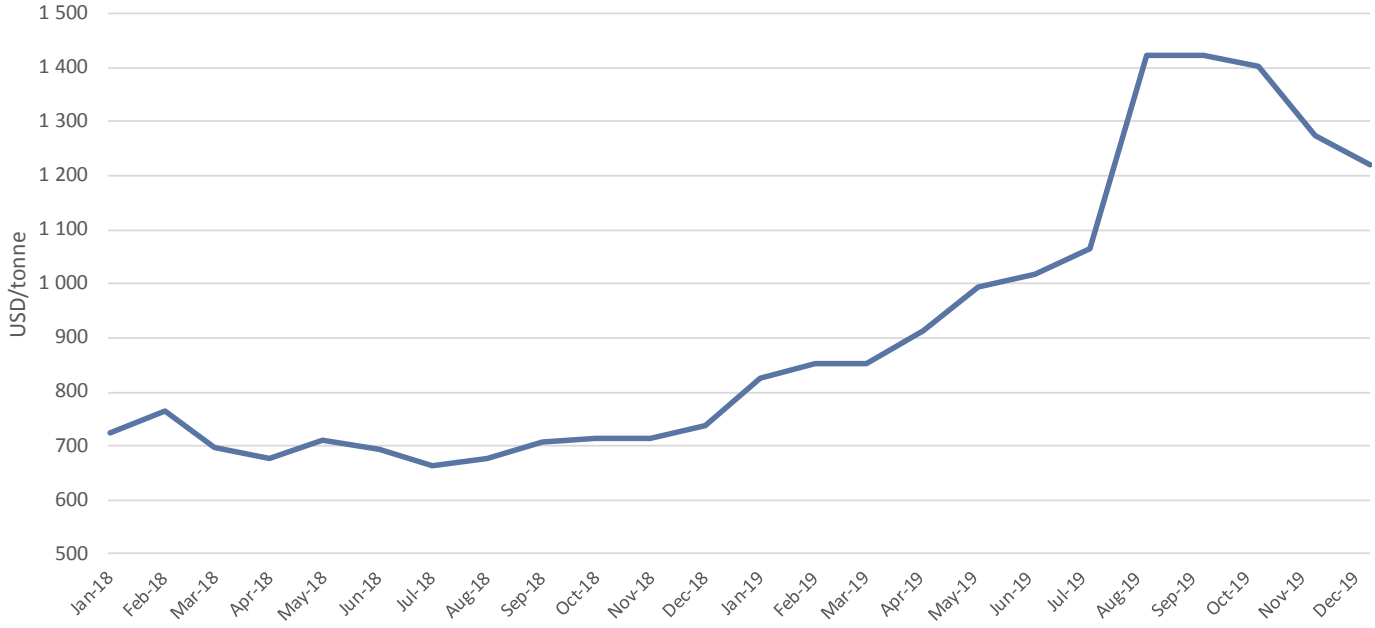
- Concerns over weather-related crop losses: The strong increases in rice prices between June and September/October were the result of expectations of a reduced 2019 main season rice output, for the second consecutive year. The 2018 paddy output was severely affected by drought.
- High prices in Thailand: The Lao People's Democratic Republic sources the bulk of its rice import supplies from Thailand. The benchmark Thailand export price for glutinous type 2 rice variety increased considerably during 2019, due to concerns over the impact of unfavourable weather conditions on 2019's paddy production.
- Increased production costs and agricultural labour shortage: Day labourers, upon which small-holder farmers depend for land preparation, transplanting and harvesting, are increasingly looking to work for Chinese companies or Chinese farmers (who rent local land to grow mostly vegetables for export) as they are often better payed.

Figure 9: Lao PDR - Retail prices of glutinous rice, 2nd quality (selected markets)



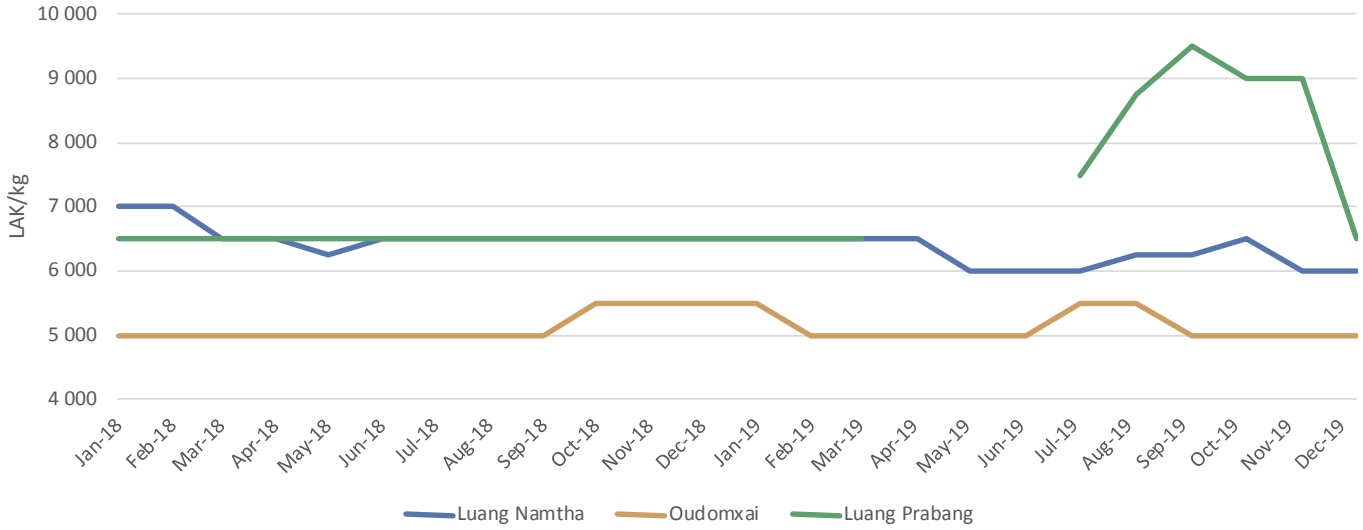
Source: MoIC, 2019.
Note: Data between March and May-June 2019 not available for most markets.

Figure 10: Thailand - Export prices of glutinous rice, 10 percent (f.o.b Bangkok)



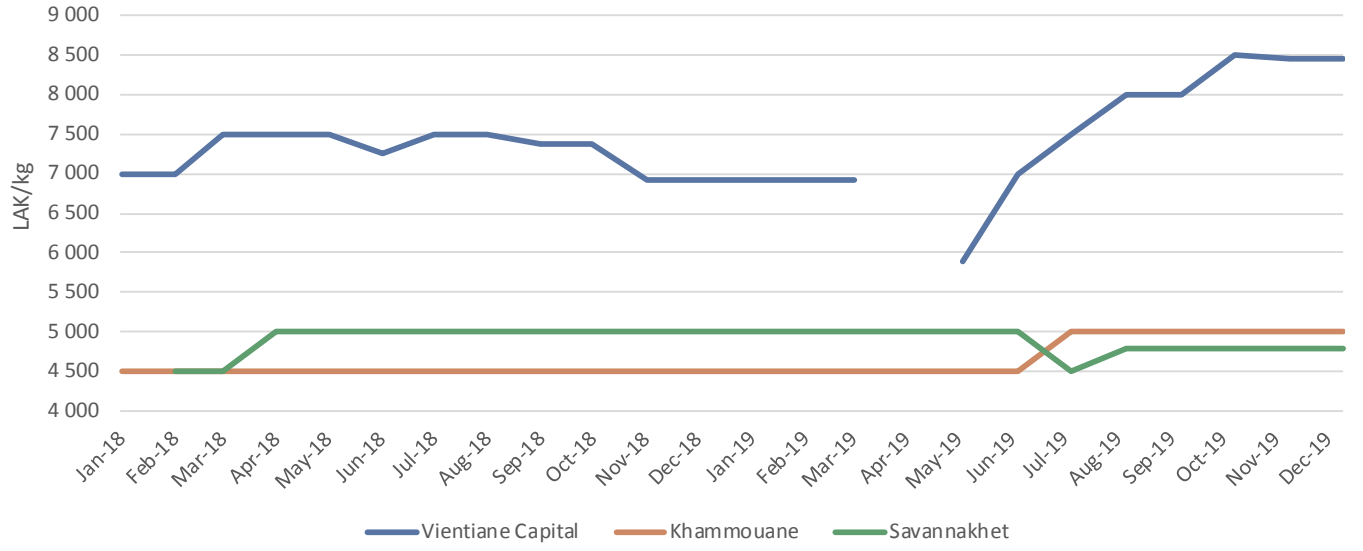
Source: Thai Rice Exporters Association, 2019 http://www.thairiceexporters.or.th/price.htm.

Figure 11: Lao PDR - Retail prices of glutinous rice, 2nd quality (selected markets in the north)



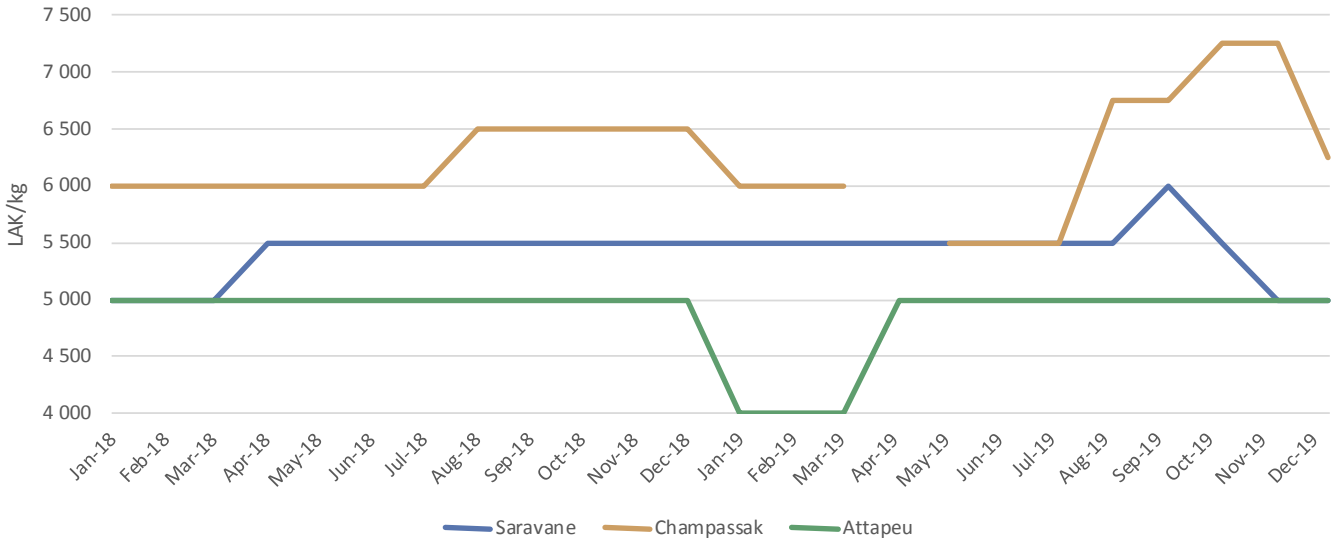
Source: MoIC, 2019.
Note: Data between March and May-June 2019 not available for most markets.

Figure 12: Lao PDR - Retail prices of glutinous rice, 2nd quality (selected markets in the centre)



Source: MoIC, 2019.
Note: Data between March and May-June 2019 not available for most markets.

Figure 13: Lao PDR - Retail prices of glutinous rice, 2nd quality (selected markets in the south)



Source: MoIC, 2019.
Note: Data between March and May-June 2019 not available for most markets.

Cereal supply/demand balance for marketing year 2020 (January/December)

The national cereal supply/demand balance for marketing year 2020 (January/December) is summarized in Table 10, considering separately rice (in milled terms) and maize. The balance is based on the Mission's production estimates and the latest information on consumption, trade flows and stocks availability. In drawing up the national food crop balance, the following assumptions were made:

Paddy production in 2019 is estimated at 3.4 million tonnes (in paddy terms), while maize production is estimated at 717 000 tonnes.

The majority of the rice mills are small-sized and appeared in many cases dilapidated resulting in comparatively low milling rate, in some cases as low as 55 percent. An average **milling rate** of 60 percent used by the Government has been adopted to derive the milled equivalent production figure used in the balance sheet.

Cereal stocks are expected to not change during the 2020 marketing year (January/December).

Food use is estimated at about 1.5 million tonnes, using the projected 2020 mid-year population of 7 169 million (UN-DESA, January 2020) and a per capita average consumption of 206 kg of milled rice. The use of maize for food is negligible.

Feed use is estimated at about 608 000 tonnes, mostly maize plus a minimal quantity of rice, estimated by the Mission at 3 percent of the total production.

Seed requirements for year 2020 are estimated at 95 000 tonnes on the basis of the recommended seed rates used in the country and the last three-year average planted area of about 980 000 hectares of rice and 890 000 of maize. The following seed rates have been used: 80 kg/hectare for lowland paddy, 60 kg per hectare for upland paddy and 20 kg/hectare for maize.

Post-harvest losses and other uses are estimated at 472 000 tonnes, using loss rates of 15 percent

Table 10: Lao PDR – Cereal supply/demand balance sheet, 2020 ('000 tonnes)

	Rice (milled)[1]	Maize	Total
Domestic availabilty	**1 947**	**717**	**2 664**
Wet season farm production	1 847	672	2 519
Dry season production	100	45	145
Total Utilization	**2 207**	**717**	**2 924**
Food use	1 499	0	1 499
Feed use	58	550	608
Seed requirements	78	18	95
Post harvest losses and other uses	472	36	508
Exports	100	114	214
Stock build-up	0	0	0
Import requirements	**260**	**0**	**260**
Anticipated commercial imports	260	0	260

Source: FAO/GIEWS, 2020.
Note: Totals may not add up due to rounding.
[1] Paddy to rice milling rate of 60 percent.

for rice and 5 percent for maize. The total includes 250 000 tonnes of rice variety CR302 that is not used for human consumption and is anticipated to be used by the domestic brewing industry.

During the last five years, the country exported an average of 300 000 tonnes of rice annually, mostly to Viet Nam with, small quantities to China (Mainland) and Thailand. **Rice exports** in 2020 are expected to decline significantly and are projected at only 100 000 tonnes. Despite the need to cover the domestic consumption requirements, this small quantity is expected to be still exported as some traders prefer to sell to neighbouring countries and not to the areas experiencing shortfalls, due to high transportation costs associated with the poor local road infrastructure.

Maize exports in 2020 are forecast at 114 000 tonnes, half the level exported last year and considerably below the five-year average.

Estimated import requirements: The import requirements for rice in the 2020 marketing year (January/December) are forecast at a well above-average level of 260 000 tonnes. Based on the country's import capacity, the Mission expects that the entire deficit will be covered by commercial imports.

HOUSEHOLD FOOD SECURITY SITUATION

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HOUSEHOLD FOOD SECURITY SITUATION

This section presents an overview of the qualitative and quantitative household food security findings from the Mission. The overall household food security situation at the time of the Mission was stable but with pockets of vulnerability, particularly for the poor households and those which were dependent upon upland rice cultivation as their main livelihood. The drought and subsequent heavy rains created challenges for households without access to large plots of land (>1 hectare) and the financial resources to support wet season replanting (inputs) and renting land during the dry season. As a result, the Mission expects that some households will have already begun to exhaust their rice reserves and require food assistance throughout the 2020 lean season.

Number of people affected

Based on the household food security findings presented below, the Mission estimates that there will be approximately 67 800 people in need of food assistance during the lean season in 2020 (Table 11). Because the Mission did not visit all provinces, this estimate is based on a model which considers various factors associated with food insecurity as identified in the household assessment, namely: (1) dependency on upland rice cultivation; (2) low socio-economic status; and (3) poor rainfall/ vegetation conditions during the main planting season.[6]

Table 11: Lao PDR – Number of people in need of food assistance (by province)

Province	People in need of food assistance
Phongsaly	1 793
Louangnamtha	1 759
Oudomxai	8 473
Bokeo	21 476
Louangphabang	10 899
Houaphan	1 450
Xaignabouly	1 759
Khammouan	491
Savannakhet	5 998
Salavan	2 233
Xekong	4 188
Attapeu	7 252
TOTAL	**67 771**

Source: WFP, 2019.

[6] More information on the methodology used to derive this estimate can be provided by WFP as requested.

Impacts of 2018 shocks contributing to reduced household resilience in 2019

A thorough understanding of the food security situation in late 2019 must begin with an appreciation of the events that occurred in 2018 and their impacts on the underlying resilience of the vulnerable households. Between July and September 2018, the country was affected by a series of disasters including two tropical storms and a breach in the Xe pien-Xe Nam Noy Dam. These events resulted in severe losses for farmers across the country. The 2018 Post-Disaster Needs Assessment (PDNA) estimated damages and losses in the agricultural sector alone at LAK 1 227 billion (USD 144 million)[7] and rice production in 2018 declined by almost 20 percent compared to 2017.

In addition to these hazards, 2018 rice and maize harvests in northern provinces were affected by rodent and pest infestations. The net effect of these events was to lower baseline resilience among rural households, particularly vulnerable groups (e.g., households entirely dependent on upland/shifting rice cultivation[8] and those without access to irrigated land during the dry season). For example, according to official agricultural statistics, in 2018 upland rice production decreased by 57 and 65 percent compared to 2017 for Oudomxai and Phongsaly, respectively.[9] This situation was troublesome since most households in northern provinces depended upon their upland harvest to supplement the production from their lowland plots (if they had them).[10]

Likewise, rice production in the central and southern provinces was reduced in 2018 due to the heavy flooding experienced in these areas. Official statistics show a reduction of 21 percent in total rice production during 2018 in Savannakhet, the main rice-growing province, compared to 2017; in Attapeu, a rice-deficit province, 2018 production was down nearly 27 percent from 2017.

Stemming from a reduced 2018 harvest, many households entered the 2019 (wet) season with stocks of rice for their own consumption and with very limited reserves of seeds for planting. A rapid assessment conducted by WFP in Oudomxai and Phongsaly in August 2019 found that most households in both provinces were facing rice shortages.[11] At that time, households were already resorting to selling cows and buffalos, eating less preferred rice imported from Viet Nam and increasing their collection of food items from the surrounding forests (bamboo, mushrooms, etc.). Borrowing seeds from relatives and neighbours was also frequently reported.

Results of household food security assessment

General food security situation overview

It was within this context that WFP conducted a food security assessment of households in the provinces visited by the Mission.[12] While the findings presented here are only indicative (and cannot be extrapolated broadly), they provide some useful insight into the household food security situation of farming and non-farming households in late 2019.

The Food Consumption Score (FCS) indicator is based on dietary diversity and food frequency. A

7 Post-Disaster Needs Assessment: 2018 Floods, Lao PDR. The Government of the Lao People's Democratic Republic, April 2019.

8 The terms "upland" and "shifting" are used interchangeably throughout this report to reference rice cultivation which rotates between plots in non-flat areas and often employs slash/burn for land clearing and preparation.

9 MAF 2018 Statistics.

10 Lowland plot sizes in the north are substantially smaller, on average, than those found in the centre and south. Furthermore, many households in northern and some southern provinces do not have access to lowland plots at all.

11 WFP Rapid Assessment 2019.

12 The assessment collected data from seven to ten non-randomly selected households in each village visited by the Mission; in total, 307 households were assessed.

household food consumption score is measured by calculating the types of foods consumed during the previous seven days, the frequencies with which they are consumed and the relative nutritional weight of the different food groups. According to the results from the Mission's food security assessment, most households (98 percent) were consuming an acceptable diet at the time of the Mission.[13] Such a strong finding can be explained, in part, due to the timing of the Mission: teams visited the provinces during the harvest season, when even households with reduced harvests were still able to consume from their current or previous (2018) production and/or sell 2019 production for income (e.g., those households growing maize or other cash crops).

In addition to this important caveat, the finding also masks the substantial variability in food consumption scores observed across the different provinces and socio-economic groups. A closer look reveals the vulnerability patterns that one might expect given the impacts of the 2018 and 2019 droughts and floods.

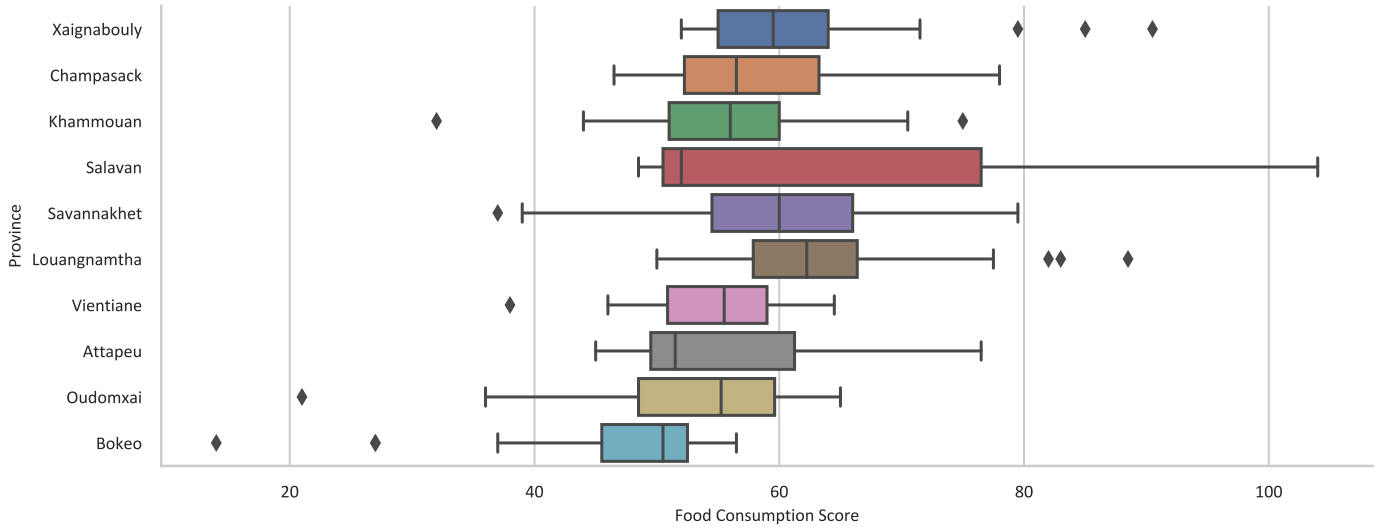
Figure 14 presents the distribution of FCS results across the ten provinces visited by the Mission.

Notably, households in Bokeo, Salavan and Attapeu were consuming a diet (per the FCS) that was substantially poorer than households from other provinces. The median FCS in Bokeo, Salavan and Attapeu was 50.5, 52.0 and 51.5, respectively. By contrast, in Louangnamtha and Savannakhet, the median FCS was 62.3 and 60.0, respectively.

Similar results are observed when using the reduced Coping Strategies Index (rCSI). There are several common behavioural responses, or coping strategies, to food insecurity which households use to manage food shortages. The rCSI measures the following five consumption-based coping behaviours:

- Eating less preferred or expensive foods.
- Borrowing food or relying on help from friends and relatives.
- Limiting portion sizes at meal times.
- Limiting adult in-take so that children can eat; and
- Reducing the number of meals per day.

Figure 14: Lao PDR - Food consumption score (by province)



Source: WFP, 2019.

[13] In the Lao People's Democratic Republic, WFP categorizes as 'acceptable' those food consumption scores greater than 36.5.

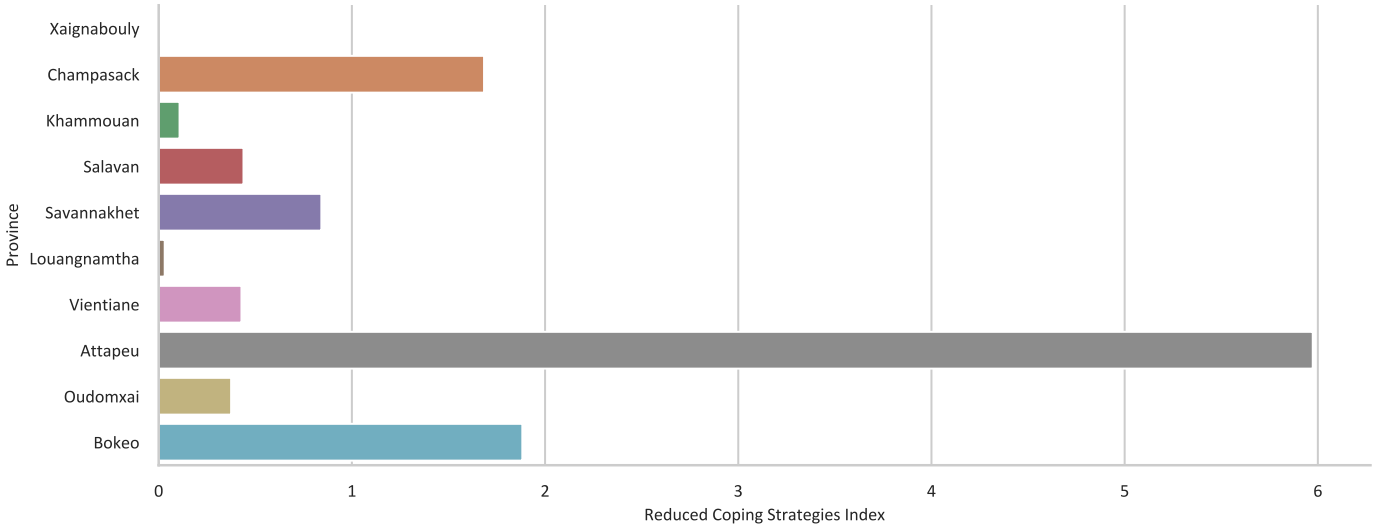
While the rCSI alone does not explain the absolute level of food insecurity experienced by the household, it allows for comparison of the relative food security of different households.[14] According to the results from the Mission's food security assessment, households in Bokeo and Attapeu, along with those in Champasack, were much more likely to have employed these coping strategies than the households in other provinces (Figure 15).[15]

Together, these results suggest that, while from a national perspective the food security situation of households in the country in late 2019 was acceptable, there existed pockets of insecurity and vulnerability even at the time of the harvest that warranted the attention of the Government and development partners. These findings are also consistent with the anecdotal information provided to the Mission during the focus group discussions with farmers and provincial/district Government officials.

Rice growing in the north is more dependent on shifting cultivation, which due to the 2019 rainfall pattern (drought followed by heavy rains) resulted in more harvest losses proportionally than that observed in lowland and irrigated cultivation. In addition to the impact of drought on shifting cultivation, this type of rice farming is usually performed on smaller plots and results in substantially lower yields than lowland and irrigated rice cultivation.

Even while the household economy in the north is quite diversified in some respects, the impact of two consecutive years of poor harvests cannot be overstated. During the interviews, rice traders and millers in northern provinces estimated that the local production of glutinous rice would run out by late February; in a "normal" year, local production can sustain demand through the lean season (May-October). As a result, traders and millers in the north were already importing non-glutinous rice varieties from Viet Nam to meet the demand gap.[16] While less preferred, these non-glutinous varieties are substantially cheaper (LAK 5 000/kg vs. LAK 10 000/kg) and thus will serve as a key coping mechanism for rice-deficit households in the region.

Figure 15: Lao PDR - Reduced coping strategies index (by province)



Source: WFP, 2019.

[14] These coping strategies are assigned weights based on their severity. The rCSI is calculated by multiplying the frequency (number of days per week with which the coping strategy is used) by relative severity (weight).

[15] A higher rCSI indicates more coping behaviours used in the previous seven days.

[16] Traders in northern provinces were not buying substantially from central/southern provinces of the country because of logistical constraints (especially transportation costs). Furthermore, in 2018 and 2019 the quantity of Vietnamese rice selling in the market increased due to successive years of poor local production; Vietnamese rice is cheaper than the local rice.

Main factors with an impact on household food security

A deeper exploration of the assessment findings provides a more comprehensive understanding of the factors related to food insecurity the country in late 2019.

Household agricultural cultivation patterns

The first important linkage to food insecurity is cultivation type, as noted above. The Mission's food security assessment asked farmers to report whether they practiced lowland and/or upland (i.e. shifting) rice cultivation. Among the households reporting only lowland cultivation, the mean FCS was 58.8; for households that reported any shifting cultivation, the mean FCS was 52.0 (Figure 16).

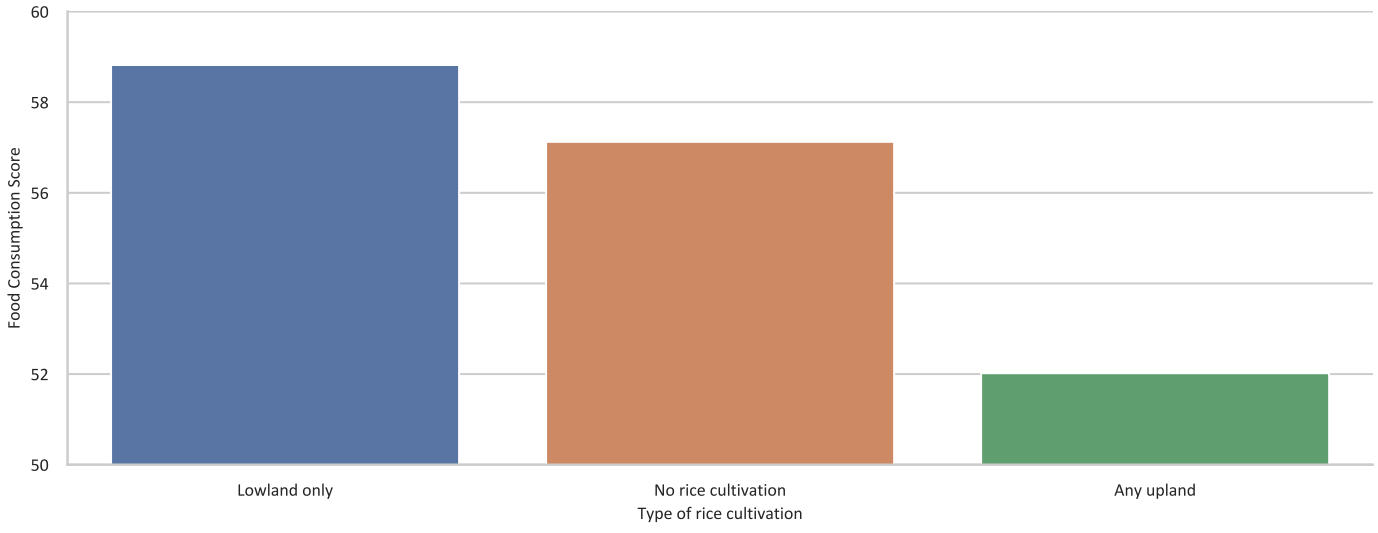
Another important factor in households' food security is the presence of additional agricultural activities: the households reporting that they grew cash crops, particularly maize and vegetables, had better food consumption scores than those that did not (~ 59.3 vs. ~ 55.5). These findings highlight both the limitations of shifting cultivation to provide food security and the value to households in having additional agricultural income sources to complement the traditional wet season rice harvest.[17]

Harvest and market dependency, 2019

Households cultivating lowland rice which managed to harvest the same or more in 2019 compared to 2018 had materially better FCS than those which harvested less (Figure 17). For lowland cultivating households which harvested less in 2019 compared to 2018, the mean FCS was 58.2 compared to 63.0 for those which harvested more.

Figure 18 makes especially clear the importance of a good harvest for food security for households in northern provinces. By contrast, a poor 2019 harvest for the households in the central region had virtually no apparent relationship with FCS or food security conditions in the household. This finding likely reflects the better socio-economic situation of the households in the central provinces compared to those in the north. This element of food insecurity is explored further below.

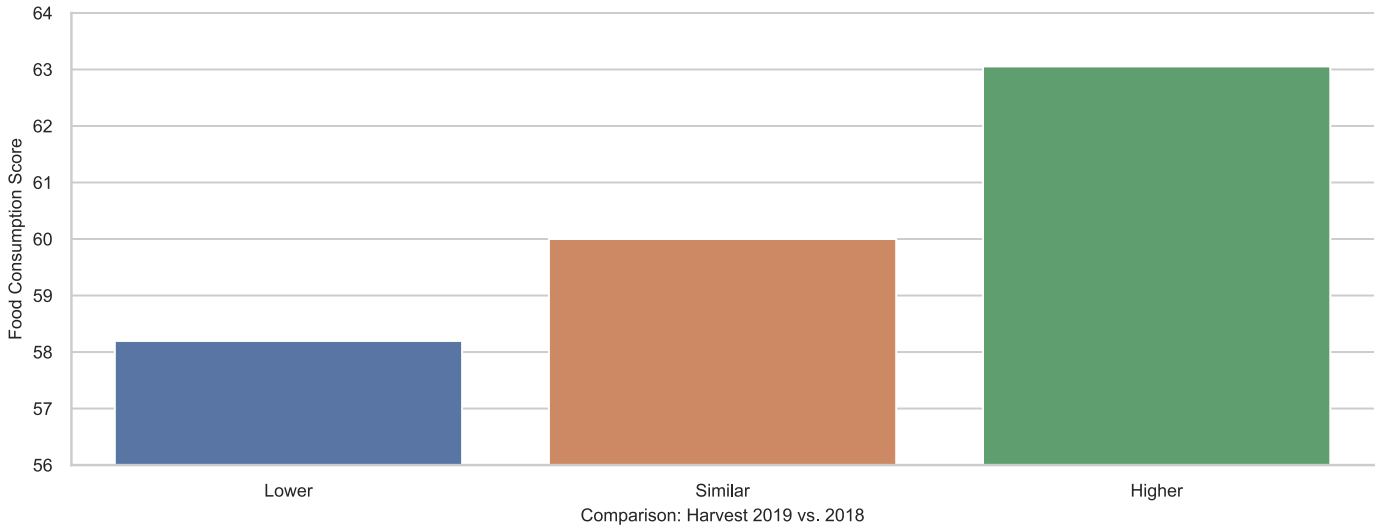
Figure 16: Lao PDR - Food consumption score (by type of rice cultivation)



Source: WFP, 2019.

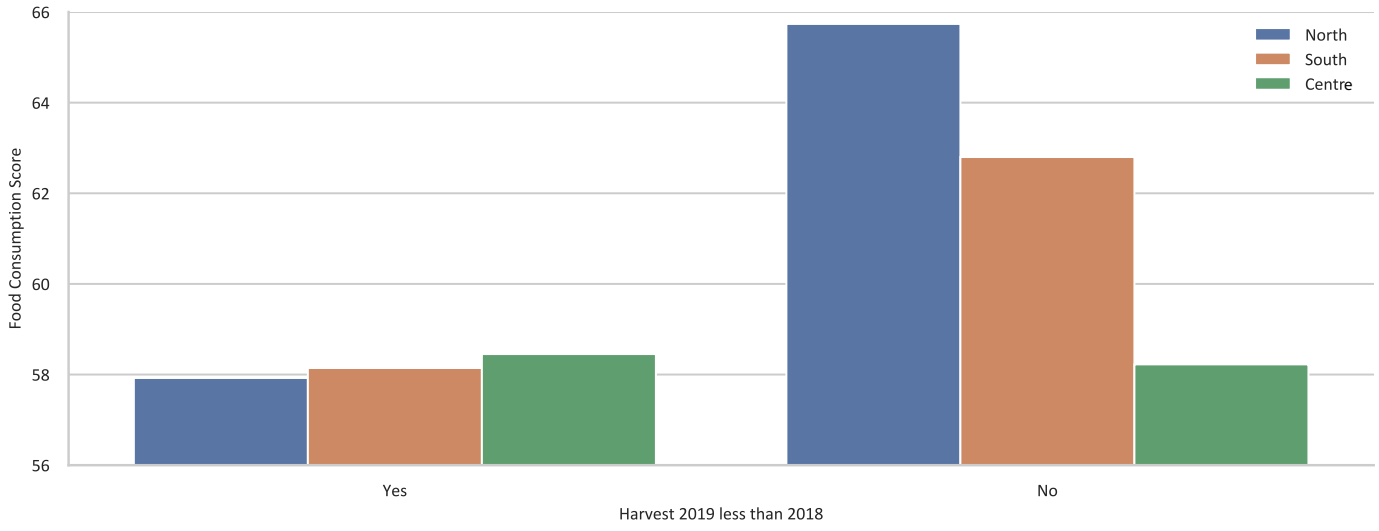
[17] The Mission's assessment sample was too small to determine whether the households practicing shifting rice cultivation and growing cash crops had materially better FCS than those that did not.

Figure 17: Lao PDR - Food consumption score according to harvest category (2019)



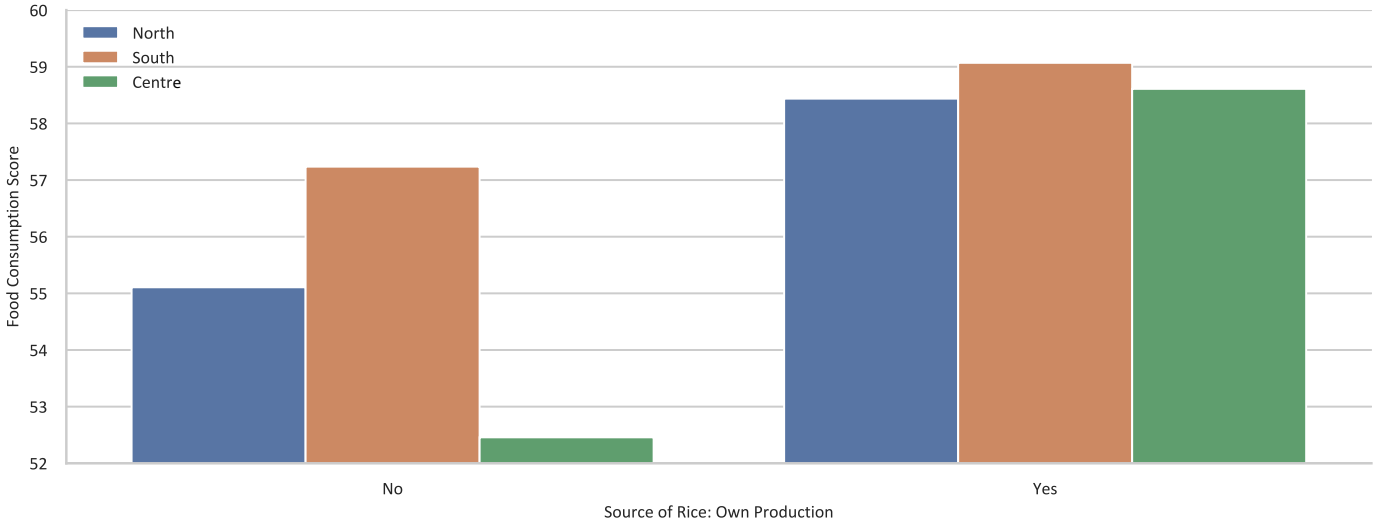
Source: WFP, 2019.

Figure 18: Lao PDR - Food consumption score according to harvest category in 2019 (by region)



Source: WFP, 2019.

Figure 19: Lao PDR - Food consumption score according to main source of rice (by region)



Source: WFP, 2019.

Likewise, the mean FCS among the households consuming rice from their own production at the time of the Mission was 58.7 compared to 55.3 for those obtaining rice by some other method (Figure 19). Even more telling, the mean FCS among households which reported exchanging labour for rice was just 44.2. These households likely represent the landless who were unable to grow any crops during the 2019 (wet) season.

Predictably, just one in ten households which reported neither upland nor lowland cultivation in 2019 were consuming their own production, whereas nearly 90 percent of the households only cultivating lowland rice were doing the same.[18]

Socio-economic factors

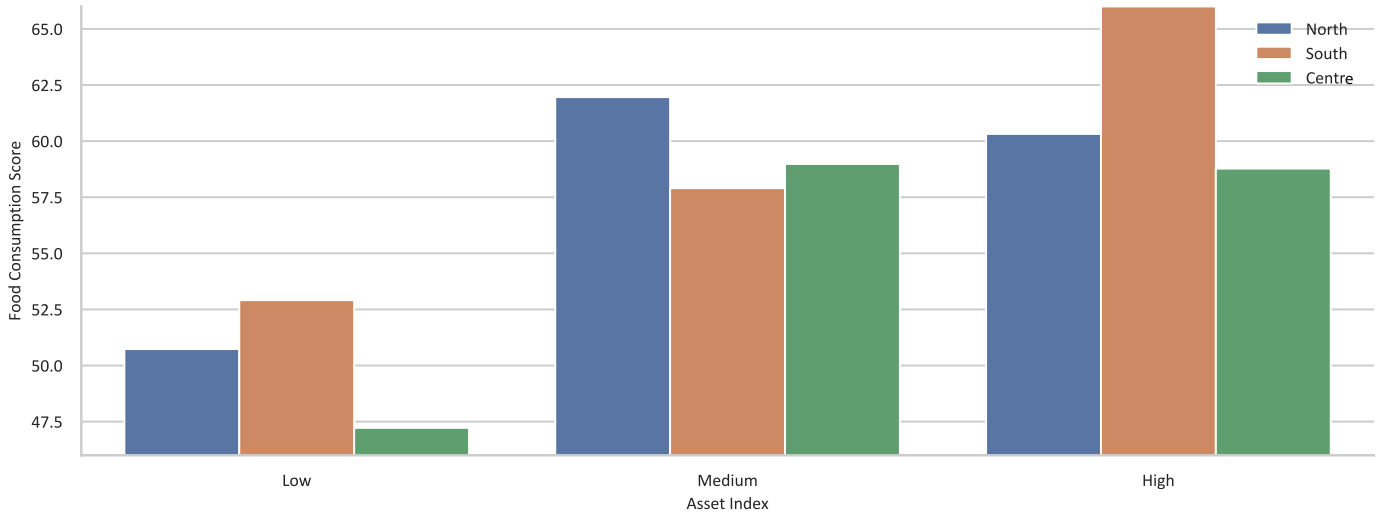
Among the strongest factors related to FCS in the Mission's food security assessment was the household's socio-economic status.. The households were queried on their ownership of a small set of assets, including refrigerator, iron, fan and rice cooker.[19] Creating an index of these assets proved remarkably strong at their predicting food consumption score. Figure 20 presents the distribution. The asset index was also a reliable predictor of the area available for cultivation, such that households with "high" asset ownership had nearly 2.5 hectares compared to just 1.5 hectares for "low" asset households.

In addition, the education level of the household head and the source of flooring material were equally strong at predicting a household's food consumption score (Figure 21).

[18] Households without rice cultivation in 2019 but consuming their own production were likely consuming from the 2018 harvest. The Mission visited a small number of communities in the north where the drought prevented cultivation but stocks from 2018 existed.

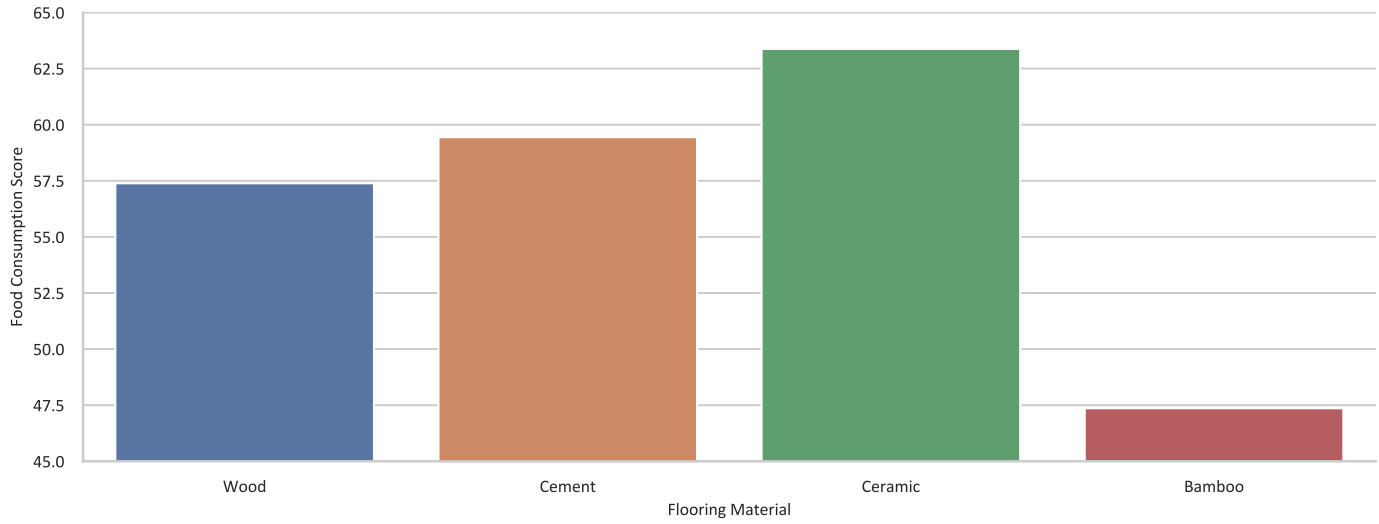
[19] This limited set of assets was chosen based on their ability to predict the socio-economic status in the 2017 Lao Social Indicator Survey. See section 4.2 in that report for more information. Lao Statistics Bureau. 2018. Lao Social Indicator Survey II 2017, Survey Findings Report. Vientiane, Lao PDR: Lao Statistics Bureau and UNICEF.

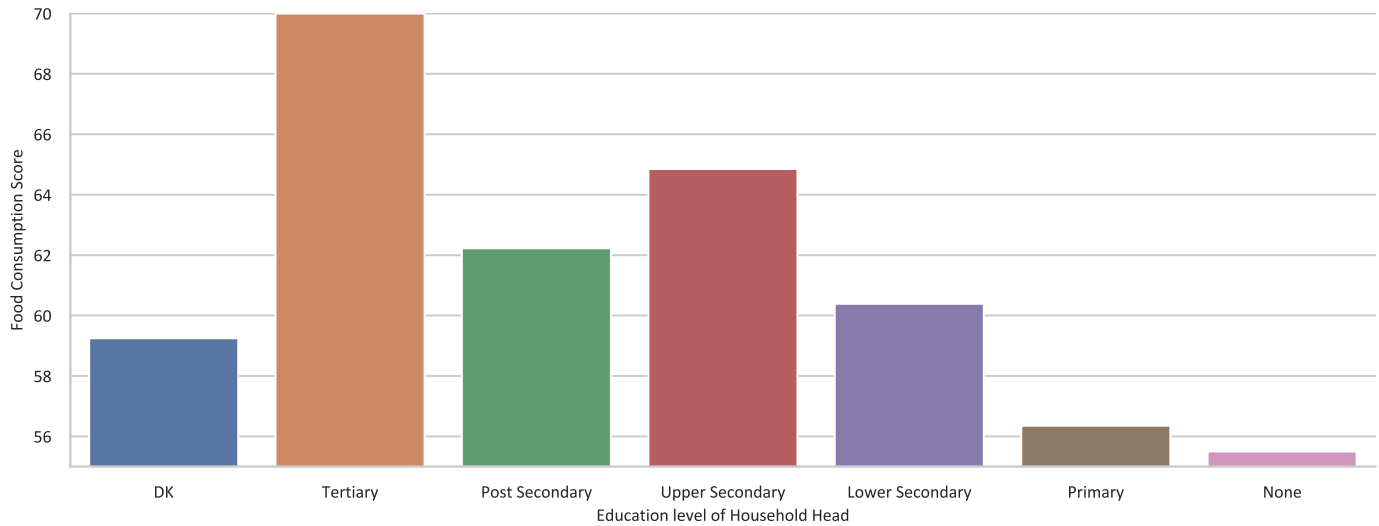
Figure 20: Lao PDR - Food consumption score according to asset index (by region)



Source: WFP, 2019.

Figure 21: Lao PDR - Food consumption score according to flooring material (top) and education of household head (bottom)





Source: WFP, 2019.

Finally, food consumption scores also appeared strongly related to the self-reported livelihoods of households (Figure 22).

Impact of 2019 drought and floods

Households were asked to compare the time of planting during the 2019 (wet) season to a normal year. Just more than 20 percent of the households in the central region reported planting later than normal compared to nearly 60 percent of the households assessed in the north (Figure 23). These findings highlight the impact of the drought on farming households in northern provinces.

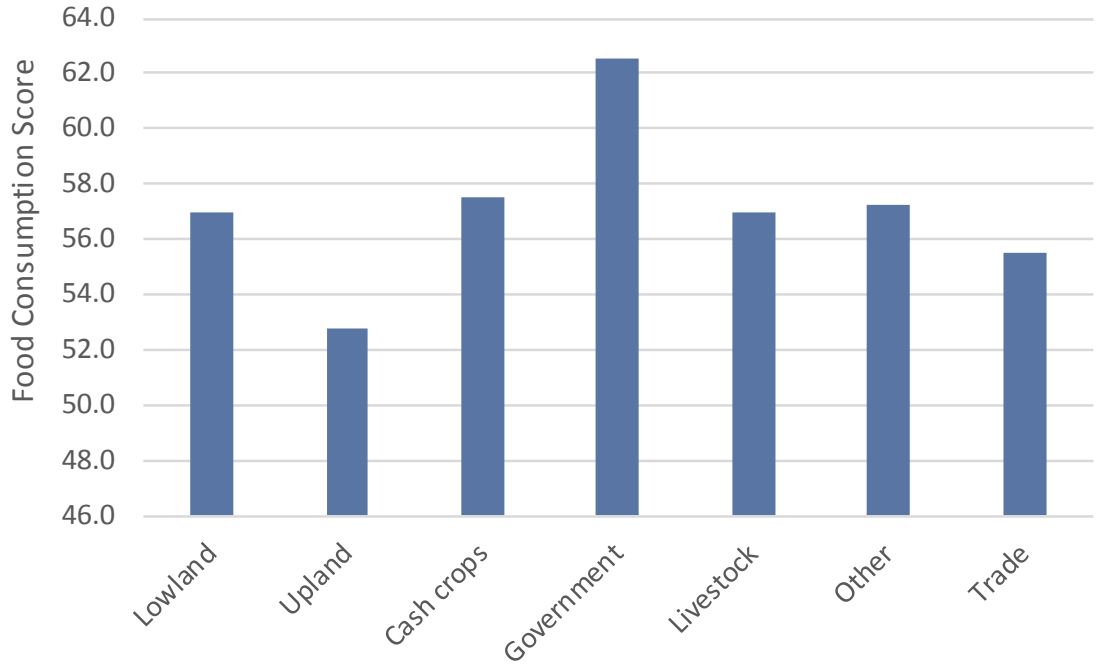
Nearly nine in ten households which reported planting later than normal in 2019 said that their harvest was lower compared to 2018 (a smaller, but still substantial, proportion of the households planting on time reported a reduced harvest as well [73 percent]).

As Figure 23 makes clear, the relationship between a good harvest and food consumption score is not direct. In the communities with a low baseline resilience and a poor Socio-Economic Status (SES), e.g., in the north and in parts of Attapeu Province, a bad harvest was strongly linked to food insecurity as measured by FCS. However, in communities with more resilience and higher SES, e.g., those in the central and rice-surplus areas of the south, a poor 2019 harvest was less likely to manifest as food insecurity at the time of the Mission. This does not mean that the marginal households in these areas may not begin to suffer as the 2020 lean season sets in. But vulnerable households in Bokeo, Salavan and Attapeu provinces were already showing signs of stress just after the (wet) season harvest.

Access to markets

The type of household in the country which is dependent on the market for rice purchases varied by

Figure 22: Lao PDR - Food consumption score according to livelihood activities

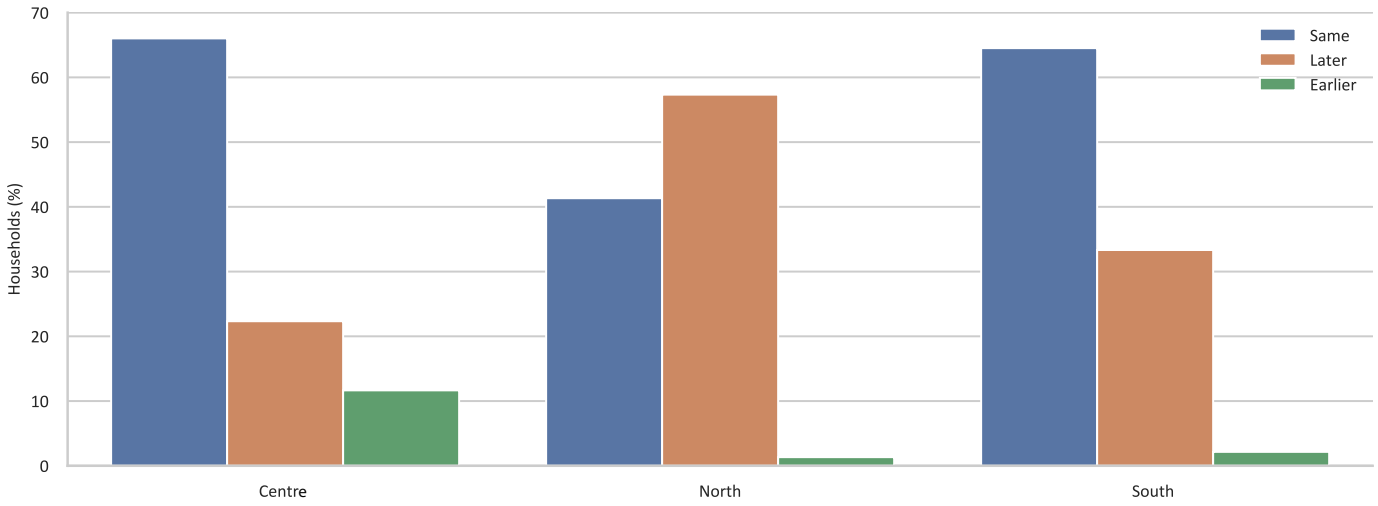


Source: WFP, 2019.

region. Figure 24 shows that, in northern provinces, among households with lowest SES, roughly 28 percent were obtaining rice by some method other than their own production; in contrast, just 5 percent of medium SES households in the north were consuming rice from sources other than their own production. However, in the southern provinces, low and medium SES households were just as likely to consume from sources other than own production; it was the highest SES households consuming from their harvest.

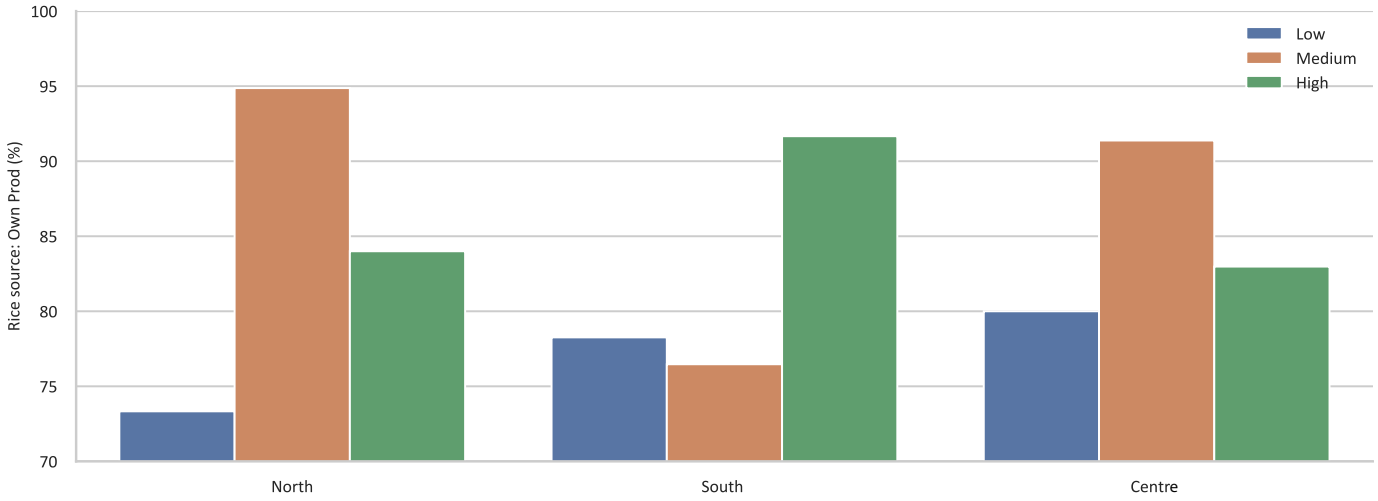
One possible way of explaining this is to recall, as outlined in the Cereal production section, that the 2019 flooding heavily impacted the irrigation systems in the southern region. Therefore, as medium SES households in the south were more likely to perform irrigated rice cultivation, they may also have been disproportionately impacted when these systems were damaged. A second explanation could be that only higher SES households were able to circumvent the effects of the flooding (e.g., by having sufficient resources to replant or rent land which was not flooded).[20]

Figure 23: Lao PDR - Proportion of households according to timing of 2019 (wet) season planting, vs. 2018 (by region)



Source: WFP, 2019.

Figure 24: Lao PDR - Proportion of households according to timing of 2019 (wet) season planting, vs. 2018 (by region)



Source: WFP, 2019.

[20] A third possibility is that the measure of SES used in this report (i.e. asset index) does not adequately capture the many nuances to wealth found in different regions of the country. For example, among low SES households in the north, 20 percent of the household heads had completed no education; in contrast, 60 percent of the household heads in low SES households in the south had completed no education.

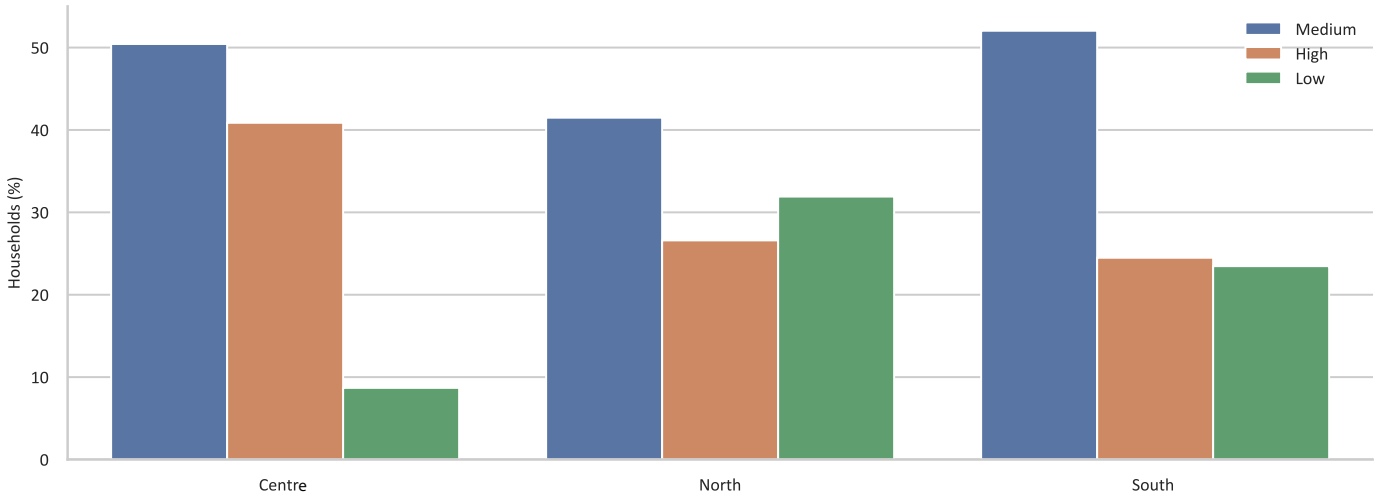
Whatever the explanation, market prices for glutinous rice in the central and southern regions were materially lower than in the north and low SES was more prevalent in the north (Figure 25). This combination serves as another piece of evidence of the increased vulnerability of the households in the north.

One challenge observed during the Mission, which has been reported on extensively elsewhere and highlighted by senior Government officials during various debriefings, is the relatively low level of regional connectivity between markets in the country. This is in part due to high transportation costs, relatively low levels of infrastructure and a low population density in many areas. This prevents markets from being as efficient as they could be. Therefore, much of the rice harvested in the central and especially southern provinces will stay locally and be exported. These supply chain issues help explain, to some extent, how a rice surplus country such as the Lao People's Democratic Republic can still have pockets of food insecurity in remote communities or those with low levels of resilience.

Livelihoods and coping strategies

Since the Mission was conducted during the harvesting season, households' rice stocks in the north were not completely exhausted and serious coping strategies were not yet being applied (even for farmers with low production). However, many households will encounter a rice shortage beginning in late February and into March, especially the households dependent upon shifting cultivation that were most affected during the 2019 (wet) season. While provincial, district and village authorities encouraged the communities to plant crops during the dry season, this is only useful for the households with access to irrigated land (either owned or rented). Furthermore, water levels in most rivers in the north remained very low at the time of the Mission and many areas will not have enough water for planting dry season rice and cash crops. In some communities there will be a lack of water supply at household level (e.g., for drinking) during the upcoming dry season due to the extensive drought.[21]

Figure 25: Lao PDR - Proportion of households according to asset index (by region)



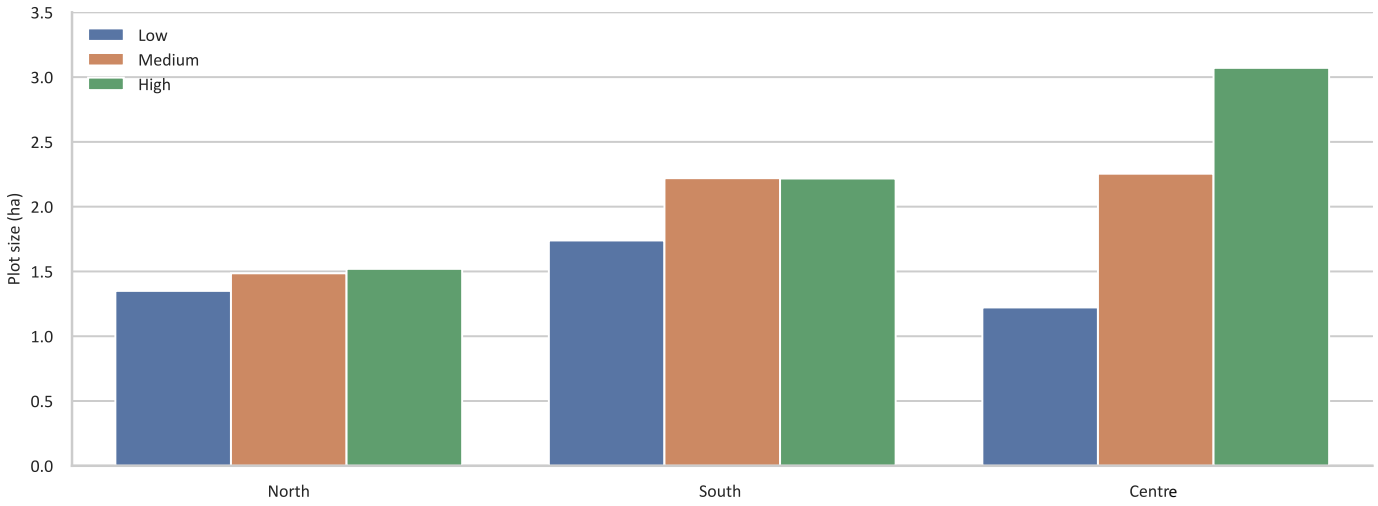
Source: WFP, 2019.

[21] Farmers in the north with access to irrigation during the 2019 (wet) season experienced improved harvests due to warmer temperatures associated with the drought.

As noted elsewhere, the communities in the north have a wide range of livelihood activities; they are not (and cannot be) solely dependent on rice cultivation for their food and livelihood security. Income opportunities are plentiful in some districts and daily wage labour (LAK 50 000 for both men and women) was reported during the focus group discussions as the primary mechanism for coping with the poor 2019 (wet) season harvests. These opportunities include selling labour on Chinese plantations (bananas and watermelons) and working on railway construction. In addition, the households in the north can sell their maize harvest[22] and their home garden vegetables for additional income. Finally, many of these households can harvest Non-Timber Forestry Products (NTFP) such as bamboo and mushrooms to serve as a third main source of supplemental income.

The situation in the central and southern (rice-surplus) provinces was notably different. While the impact of flooding on 2019 (wet) season crops cannot be disputed (Cereal production section), the generally higher levels of resilience and socio-economic conditions in these regions translate to a somewhat different food security profile among households. To begin, lowland plot sizes in the central/southern regions are significantly larger compared with the north (Figure 26). The net result of this is that these households are normally net sellers of rice; so even if they lost some of their harvest to flooding, they are likely to have produced enough to last well into the lean season for their own consumption.

Figure 26: Lao PDR - Plot size according to region (by asset index)

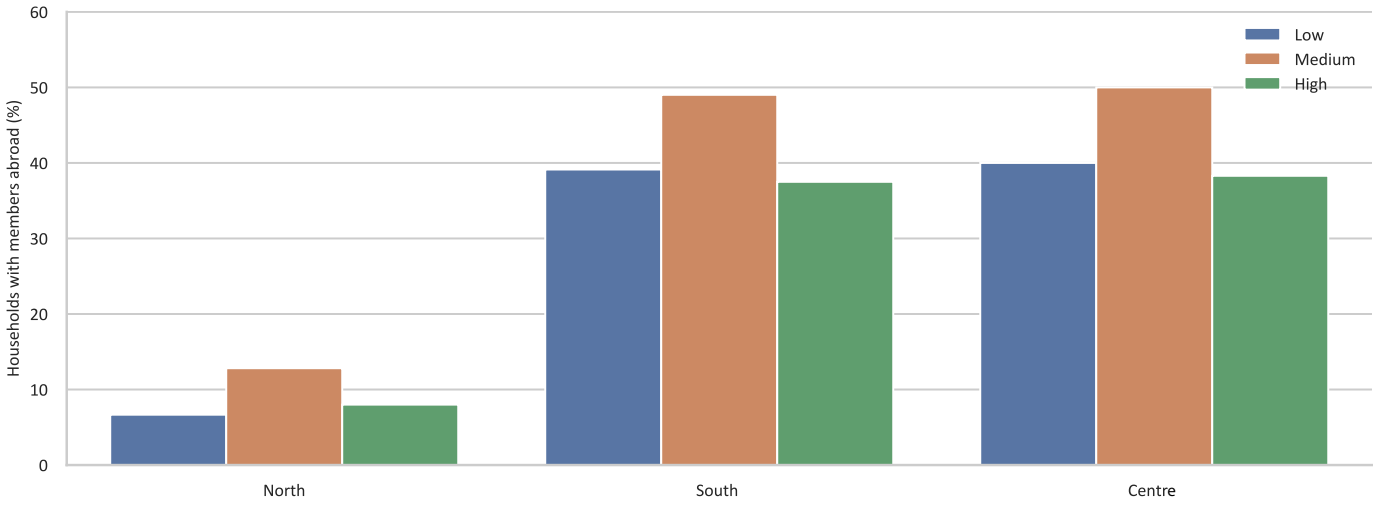


Source: WFP, 2019.

[22] Farm gate prices for maize, which is largely exported/purchased by Chinese companies, were higher in 2019.

Moreover, the households in the central and southern regions are more likely to have at least one household member working outside the country and sending money back (Figure 27). Anecdotally, this was very common among older farming households in Salavan Province. This serves as another source of resilience for the households in these areas than those in the north that do not have access to.

Figure 27: Lao PDR - Proportion of households with a member living/working abroad (by region and asset index)



Source: WFP, 2019.

RECOMMENDATIONS

RECOMMENDATIONS

Immediate actions

- Provision of food security interventions for vulnerable households

  Food assistance will be needed for the most affected/vulnerable households throughout the 2020 lean season (many households were already food insecure beginning in February 2020). This should be primarily targeted to poor/low SES households dependent upon upland/shifting rice cultivation during the wet season. The mechanism for delivery and source of rice/commodities should be agreed between MAF, MoLSW and development partners.

- Support the 2020 main (wet) season planting

  Support the households which lost much, or all, of their 2019 (wet) season harvest with agricultural inputs for the 2020 main season, to be planted between May and July. In all regions, the households requested support from provincial and district agricultural offices (PAFO/DAFO) to provide support in this regard, including provision of seeds, irrigation equipment, as well as irrigation repair and access to irrigated land. As an example of the types of policies which might be explored, in one community visited in Salavan Province, leaders arranged access to 1 hectare of irrigated land at no charge to those households which lost all their 2019 (wet) season harvest.

- Rehabilitation and upgrade of irrigation schemes and canals that are old or have been damaged by the 2018 and 2019 floods

  The irrigation schemes and canals throughout the country are obsolete resulting in water losses due to leakage. In addition, the floods in 2018 and 2019 caused extensive damages to the irrigation infrastructure in the south and parts of the centre. Overall, the irrigation schemes need to be upgraded and damaged sections of the irrigation canals need to be repaired. This will minimize the losses of water and will increase water availability on time. WFP, in collaboration with MoLSW and MAF, should explore potential opportunities for Food Assistance for Assets (FFA) interventions to promote recovery in these areas.

- Improve and assure long-term utilization of remote sensing data and predictive analytics to assess the risk/impact on cereal production and vulnerable populations

  In the Lao People's Democratic Republic, there is currently a gap between the availability of Earth Observation data collected by satellites to monitor climate hazards (drought, flooding, etc.) and the forecasting of risks and potential impacts on the country's cereal production and the most vulnerable communities. According to recent studies on climate change in the Mekong Basin, the country is expected to experience more frequent and extreme weather events and temperatures are expected to rise by an average 3°C to 5°C by the end of the century. Both droughts and floods will be harmful, but drought poses the greatest challenges since the lack of water impedes planting. The Mekong River Basin is already facing increasing drought frequency and there is an expected, up to 20 percent, increase in drought months by 2050.[23] Longer dry seasons will impact the country's agriculture and farmers' livelihoods, who need to make decisions according to the expected rainfall pattern. FAO and WFP should support the implementation of a system, which uses these large data repositories to provide timely, actionable information products for farmers and decision makers.[24]

[23] WFP (2016) Lao PDR, Consolidated Livelihood Exercise for Analysing Resilience (CLEAR) available at: https://www.wfp.org/publications/lao-pdr-consolidated-livelihood-exercise-analyzing-resilience-clear.

[24] See for example WFP's work with governments in Cambodia, Sri Lanka and Indonesia on the Platform for Real-Time Impact and Situation Monitoring (PRISM): https://innovation.wfp.org/project/prism.

There is already a system in place in the country called Strengthening Agro-climatic Monitoring and Information Systems (SAMIS), with the objective to gather, process, analyse and share climatic and geospatial information which can be applied to planning and decision-making for the agricultural sector. Starting from May 2020 under the SAMIS umbrella, a new online system and mobile phone app called Laos Climate Service for Agriculture (LaCSA) will be put in place, which uses massive amounts of weather data to make rainfall and temperature seasonal forecasts to help farmers make their decision on seasonal agricultural production. It is recommended that long term Government support to keep the system running is guaranteed. In addition, it is recommended to develop a Drought Early Warning System, as the Country-Level Agricultural Stress Index System (ASIS) Tool developed by FAO to help countries monitor agricultural drought and manage its risks, using satellite data to detect cropped land (farm land) that could be affected by drought. The country-specific version of the Tool is based on the general methodological principles of the global ASIS, which is used at FAO Headquarters to support the GIEWS.[25]

Furthermore, a common complaint among farmers during the focus group discussions was the lack of information from PAFO/DAFO staff on which cash crops to plant based on estimated farm gate prices at harvest. There is scope to explore (and experience to draw upon) the use of global/regional commodity prices and derivatives to provide such "last mile" information.

- Scaling weather index-based insurance

  To support farmers in better managing risks from weather and climate-related hazards, weather index-based insurance solutions should be piloted and scaled across the country. These innovative insurance solutions pay out to farmers based on changes to an index, such as rainfall, rather than based on a consequence of weather such as crop yields.

Long-term actions

Agriculture

- Agricultural training

  During the Mission, most farmers interviewed reported using less fertilizers and renewed seed than they should for optimal yields. This results in lower yields and lower food availability, impacting especially the poor households. Farmers recognised the effort of extension agents, but they requested more training and demonstration at village level, since most workshops and seminars are organized in PAFO and DAFO offices and attending is challenging for them. The Mission found that many villagers sell labour in Chinese farms where the use of chemicals is high; however, it was learned (anecdotally) that often these labourers do not (or are unable) to adequately protect themselves properly against their side effects.

- Agricultural data collection and dissemination

  Agricultural yearbooks are published yearly by MAF. They provide disaggregated information, at province level, on areas, yields and production of main crops, livestock and forestry. However, other important agriculture information for policy makers or donors, normally published in agricultural census, is difficult to find. The last agricultural census was prepared in 2010/11. A new census will be published between 2020 and 2021, which will provide a good overview on the current situation. However, ten years is a long period, and uniform procedures should be put in place to keep the census updated every six months or so rather than waiting for another ten years before the next census. This will help both internal decision making and externally it would allow the international community to decide the target sectors and areas more effectively.

- Dry season irrigation

  The Government attempts to increase dry season irrigated paddy production which appears to be hampered by financial constraints.

[25] http://www.fao.org/giews/earthobservation/asistool.jsp?lang=en.

Assistance with wells, pumps, diversion weirs and small dams would show beneficial results.

- Promoting forest watersheds

  Forests have significant environmental, social and economic impacts on watersheds. Apart from, producing food and non-food timber products and provide human beings with other valuables services, forests have proved to reduce storm water runoffs and flooding, improve water storage potential, promote infiltration by slowing down runoff, reduce soil erosion and tampon air and water temperatures. These effects are especially relevant in northern uplands, which are also most affected by droughts. However, while the proportion of the forest area has increased, forests are degrading due to illegal logging, agricultural practices (slash and burning), industrial tree plantations, and the development of infrastructure (hydro-power dams, roads, mines, etc.). Therefore, to catalyse the synergic effect that forests have on water management, there is a need to include a more integrated forest and watershed management in agricultural policies, plans and projects. Given that the five-year plan (2016-2020) contained in the MoNRE Natural Resources and Environment Strategy 2025 is ending and a new plan will be designed, it should include measures aiming at enriching this combined approach such as identifying the critical forest areas, proposing agro-forestry interventions in already damaged areas, design an incentive plan for farmers living within watershed boundaries to adopt sustainable practices and capacity building for farmers to enhance awareness and understanding on watershed management practices.

- Minimize impact of hydro-power on fisheries

  Dams provide energy and irrigation water, but also alter the eco-systems and impact the natural water flows necessary for fisheries. These dams severely affect fisheries development and decrease the number of catches by disrupting flows, sediment load and adversely affect migratory fish, which constitute at least 35 percent of the fish caught in the Mekong River. Therefore, in the Lower Mekong Basin, hydro-power development could restrict access to subsistence fish and lead to increased risk of nutritional deficiencies for small farmers. To minimize and mitigate these effects, measures such as matching operations to natural hydrologic regimes could increase fish catches, without significant reductions in the amount of power generated. Although individual governments in the Lower Mekong Basin are concerned for their fisheries and other aquatic resources, regional coordination should be strengthened.

Food security

- Access to low cost loans for rice cultivation

  Access to financing within the country is heterogeneous, such that households in neighbouring villages may have completely different debt/loan profiles. Moreover, financing for agriculture, while highly organized, is mostly limited to those farmers practicing activities outside of rice cultivation. As a result, many worthy households which need financing to support rice farming (e.g., in the case when flood or drought impact the wet season harvest) are unable to access it. The Government should explore whether there is any scope to extend the existing agriculture bank-lending scheme to qualified households for rice cultivation under certain circumstances.

- Support communities dependent on shifting cultivation to transition to other livelihoods

  Shifting rice cultivation contributes nominally to household food security status in the areas where it is practiced and represents a significant resource and time drain for households (compared to the net benefit). In addition, shifting cultivation in upland areas destroys trees/forests which has the effect of increasing flooding for nearby lowland areas. As part of an integrated strategy for reducing/mitigating the increased rains/floods associated with climate change, the Government and partners should explore ways to transition these vulnerable communities away from the practice and towards more sustainable, future-oriented livelihoods.

ANNEX

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ANNEX

Agricultural situation by province

NORTH

Oudomxai Province

Seasonal rains started at the end of May, the normal period, and allowed farmers to start preparing land and supported plantings of rice seedlings and planting of maize, which is the main crop in this province. Subsequently, from the first dekad of June until the third dekad of July rains were well below average, hampering transplanting of rice seedling and causing widespread crop wilting, particularly rice. Rains improved in August, allowing farmers to replant some of the lost fields and plant the areas left uncropped due to earlier dry spells. Maize production has been steadily and strongly increasing in the previous year, in the last three years more than doubled the amount of planted area to rice, in response to strong demand from the feed industry from both the domestic and the export market. The production of maize in 2019 has also been severely affected by the drought and some damages were also inflicted by FAW infestations.

Luang Namtha Province

Luang Namtha is a rice surplus province that normally exports small quantities of its production to China (Mainland). However, this year due to the sharply reduced output, the local needs are expected to be covered with imports, mostly from Thailand, as the neighbouring northern producing provinces have produced less than their actual needs. The drought affected both lowland (in part irrigated), which accounts for 70 percent of the province's main season rice output, as well as upland (rainfed). Production from the irrigated lowland increased in the areas which had adequate water supplies, as more sunlight due to reduced cloud coverage and warmer irrigation water, proved extremely beneficial for growing conditions of paddy crops resulting in record yields. However, water supply was limited this season, which left many previously irrigated areas without water, resulting in area cuts also for the irrigated segments. Rice production in the upland, which is rainfed, has been severely affected by the prolonged drought conditions throughout the whole 2019 main cropping season (May-December). Most of the farmers reported that they were unable to plant, but even for the areas planted, crops wilted on large areas, leading to a sharp contraction in the harvested areas. The impact of the drought on yields has also been severe. As a result, a significant drop in production for the 2019 main season paddy is estimated. The maize crop, which is planted for export to China (Mainland), is also expected to decrease considerably to well below-average levels, due to a combination of droughts and FAW infestations. The province also produces large quantities of rubber and sugarcane mainly for exports to China (Mainland).

Bokeo Province

The seasonal rains, although slightly below average, started in late May and continued until mid-June, followed by three consecutive dekads of poor rainfall, which delayed planting and transplanting operations until the third dekad of July. From the third dekad of July rains were near average until September, but receded earlier than usual which negatively impacted on the late-planted crops. Both the upland and lowland rice was severely affected with strong decreases in both harvested area and yields.

Xayabouri Province

Xayabouri is the largest paddy producer of the northern provinces. The 2019 rainy season was poor, rains were well below average throughout the whole season, with the exception of a short period between late July and early August when rains were average to above average. Paddy production decreased in both uplands and lowlands. Maize output exceeds that of paddy and increased considerably in the last ten years, reflecting strong demand from China (Mainland). The drought together with FAW infestations has severely reduced the harvested areas and yields of the maize crops.

CENTRE

Vientiane Province

Located in the Vientiane Plain, Vientiane Province is one of the six major rice producing province in the Lao People's Democratic Republic. According to PAFO, about 7 500 hectares are irrigated. Rains started in May, supporting seedbeds preparation for the 2019 (wet) main paddy season. Overall, paddy fields in lowland with irrigation systems reached higher yields than in te 2018 (wet) season due to better weather conditions and the absence of floods, which hit the province in 2018. Losses in the northern districts were more severe, but increased output in the southern plain areas, which account for the bulk of the production, compensated for the decreases in the northern parts. Overall, the harvested area in 2019 was 53 000 hectares, 5 percent higher than in 2018.Total rice production for the 2019 main (wet) season in the province is estimated at 237 000 tonnes, 12 percent higher than the 2018 (wet) season. Since last year, there have not been pest and disease outbreaks for paddy fields. However, there were minor losses in maize caused by FAW infestations. Apart from rice cultivation, the other main crops in the province include cassava, maize, banana and vegetables. The Vientiane Province was one of the less affected by the ASF.

Khammouane Province

Khammouane is the third major rice producing province. Rice and livestock are the main source of income for farmers. Most of the smallholders also grow vegetables in home gardens and raise poultry for their own consumption and sell to the local market. Rubber plantations are common in the province, but they mainly belong to foreign investors or big farmers. Seasonal rains started in early June, but were below the average levels in June and July. Despite the drier-than-normal conditions, farmers reported that they were able to transplant most of their paddy fields. Heavy rains from mid-August until the first week of September caused floods in many paddy fields located along the Xebang Fai River, but the overall impact on the paddy crop was minimal. Overall paddy harvested area for the main 2019 (wet) season is estimated at 70 000 hectares, 30 percent above last year's same season area and close to the five-year average. Total paddy production for the 2019 main season is estimated at 296 000 tonnes, a 70 percent increase from 2018, but close to the average levels. There has not been relevant pest and disease outbreaks in the province during the 2019 (wet) season. ASF incidences were one of the lowest in the country, with only one village affected, according to MAF.

Savannakhet Province

Savannakhet is the main paddy grower in the Lao People's Democratic Republic. Planting operations for rice plantings at the beginning of June. However, rainfall was poor in July and damaged seedlings, particularly in the rainfed areas. Therefore, many farmers re-seeded using direct seeding, broadcasting and drum seeding technologies – more suitable for paddy fields with low water availability, as there is no need to wait for the first rains and preparing the seedbeds. In late August, the province was affected by floods. Flooding in 2019 was more severe than in 2018 but affected only the paddy districts located near the rivers Xebangfai, Xechamphone, Xesamsoi and Xebang Hieng such as Champhone, Sonnabouly and Songkhone. The paddy area harvested in the 2019 main (wet) season is estimated at 161 000 hectares, 5 percent below last year's already reduced level and 14 percent below the five-year average. However, while the floods affected some areas, better-than-normal rains were beneficial for the surrounding areas which were not flooded. As a result, yields of paddy increased by 13 percent compared to 2018's reduced level and were slightly above the average level. As a result, the 2019 main season paddy output is estimated at 696 000 tonnes, increased 7 percent year on year, but was still 12 percent below the five-year average. There was no significant incidence of any pest and disease outbreaks, although there were some localized fields which were affected with rice bugs and rodents. The other main crops in the province comprise banana, vegetables, cassava and rubber.

An important source of household income in the province is livestock (mainly cattle and buffalos). Most households own small livestock such as goats and poultry as well as pigs mainly for household consumption and eventual sale to the local market. The main concern in 2019 in the flood-prone areas

has been animal fodder, as the quantity and quality of pastures have decreased due to the prolonged drought. There were some cases reported of FMD and HS for buffalos and cattle. ASF outbreaks were detected in two districts.

SOUTH

Saravane Province

The Saravan Province borders the Savannakhet Province to the north, Viet Nam to the east, Xekong Province to the southeast, Champasak Province to the south and Thailand to the west. Part of the province is located on the Bolaven Plateau and paddy rice, cassava, coffee and vegetables are the main crops. The total paddy area for the 2019 main season decreased from 2018 mainly due to a drop of both upland rice and dry season planted areas as a consequence of damages in the irrigation infrastructure caused by tropical storm Podul and tropical depression Kajiki. In 2019, seasonal rains started in the first dekad of May but the accumulated precipitation remained below than usual until the third dekad of July, which caused low emergence of paddy crops and some farmers needed to replant. From mid-August until the beginning of September, rains were heavier than usual causing floods in many areas, resulting in 100 percent damage in some villages. Saravan was the second province most affected by floods, with 16 018 households reporting damages. Agricultural and forestry losses reported were USD 3.43 million. To cope with this situation, the province received national and international aid. Banana plantations are consistently diminishing in the last three years, from more than 7 700 hectares to 1 000 hectares reflecting decreasing international demand. Regarding livestock, more than 4 000 pigs, which account for a small share of the total pig numbers in the province, died or were killed from ASF in 12 districts. Both capture fishing and aquaculture importance are growing in the province.

Sekong Province

The Sekong Province is the second smallest province of the country, the less populated and also one of the poorest. The Sekong River flows through the province and the fertile plains located in the river valley combine paddy fields and fruit orchards. Coffee is grown in the upland. For the 2019 rainy season, rainfall was consistent but slightly below average in May, June and July. In August, heavy rainfall caused by tropical cyclone Podul and tropical depression Kajuki affected the lowland crops in 197 villages, damaging 9 percent of the paddy planted area. Total output of the 2019 main (wet) season is estimated to have decreased by 15 percent compared to 2018. Livestock production is low, although most families own some poultry for household consumption. Seventeen villages in two districts in Sekong Province were affected by ASF.

Champasak Province

The Champasak Province is located in the southwestern part of the country, near the Thailand and Cambodia borders. The province benefits from extensive lowland paddy production in the Mekong River Valley and substantial coffee production on the Bolaven Plateau. The main crops grown are paddy, coffee, vegetables and fruit trees. The average plot size is 2.5 hectares, with one of the highest levels of agricultural mechanization in the country. Seasonal rains started in early May but cumulative rains were below average during most of June and July. In August, substantial rains triggered widespread floods that damaged almost 20 percent of the paddy area. According to the country's National Disaster Management Office (NDMO), emergency relief items were distributed to the affected population. Grasshopper and rice bug incidences were reported after the floods, but caused very limited damage. There is virtually no upland paddy in this province. The (wet) season yields for lowland paddy are expected to be around 12 percent higher than last year. The output of the (dry) season is expected to be lower than in 2019, mostly on expectations of reduced area and yields due to the flood damages to the irrigation facilities and the low water levels in the Mekong River and its tributaries which, at December 2019, were at alarming low levels. The agricultural priorities for the province, reported by PAFO, are the improvement of irrigation infrastructure and the establishment of farmers' cooperatives. The livestock sector (especially poultry) reported damages during the floods and cattle received free vaccinations against Pasteurella multocida from the Government to mitigate the losses. ASF was reported only in Mounlapamok District (199 deaths).

Attapeu Province

Attapeu is located in the extreme southeast of the country and shares a border with Sekong in the north, Champasack in the west, Viet Nam in the east and Cambodia in the south. The main crops are paddy, sugarcane, banana, coffee and cardamom. Attapeu´s agriculture is the less modernized and households' access to markets is very limited. During the rainy season, rivers are difficult to cross. The average farm size reported is the smallest in the country, less than 1 hectare. Farmers make little use of inputs due to high prices and mainly grow local paddy varieties. Families rely heavily on middlemen for selling and buying from the local markets, since most of them (even whole villages) lack any means of transport. Most farmers reported not selling any rice, as most of their output is used for household consumption. Total output of paddy is expected to increase from the 2018 level, which was already lower than average due to the dam's collapse. Little incidence of pest and disease outbreaks has been reported in 2019; only 3 percent of the farmers reported using organic pesticides against rice bug. The (dry) season is expected to be lower than average as well because the damages caused by the floods in irrigation weirs have not been repaired yet. Maize area has been heavily decreasing since 2016 in favour of more profitable crops. In the 2019 cropping season, sugarcane area increased because a new big sugarcane factory from Viet Nam started operating in the area. As a result, additional farmers shifted from maize to sugarcane. Cassava cultivation is dedicated only for commercialization, while maize is mainly for household consumption and feed. ASF incidences in the province were high, leading to some villages losing all their pigs.

This report has been prepared by Cristina Coslet, Maria Isabel Parras Pancorbo, Olayvanh Singvilay and Southida Souliyavong (FAO) and Aaron Wise, Hakan Tongul and Dale Wilson (WFP) under the responsibility of the FAO and WFP secretariats with information from official and other sources. Since conditions may change rapidly, please contact the undersigned for further information, if required:

Mario Zappacosta
Senior Economist
Global Information and Early Warning System on Food and Agriculture (GIEWS)

Food and Agriculture Organization of the United Nations (FAO)
Viale delle Terme di Caracalla
00153 Rome, Italy

E-mail: GIEWS1@fao.org

John Aylieff
Regional Director
Asia and the Pacific

World Food Programme (WFP)
7th floor, Wave Place Building No. 55
Wireless Road, Lumpini, Pathum Wan
10330 Bangkok, Thailand

E-mail: John.Aylieff@wfp.org

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