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Organization of the
United Nations**



World Food Programme

SPECIAL REPORT

FAO/WFP CROP AND FOOD SECURITY ASSESSMENT MISSION TO SRI LANKA

22 June 2017



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Acronyms and abbreviations

CFSAM	Crop and Food Security Assessment Mission
CIA	Central Intelligence Agency
CLEAR	Consolidated Livelihood Exercise for Analysing Resilience
COD	Cost of Diet
CPI	Consumer Price Index
DMC	Disaster Management Centre
DZ	Dry Zone
EC/JRC	European Commission's Joint Research Centre
FAO	Food and Agriculture Organization
FMD	Food-and-Mouth Disease
GDP	Gross Domestic Product
GIEWS	Global Information and Early Warning System on Food and Agriculture
HARTI	Hector Kobbekaduwa Agrarian Research and Training Institute
kg	kilogramme
LKR	Sri Lankan Rupee
mm	Millimetres
MED	Ministry of Economic Development
MoA	Ministry of Agriculture
MoH	Ministry of Health
MNPEA	Ministry of National Policies and Economic Affairs
NDVI	Normalized Difference Vegetation Index
OFC	Other Food Crops
PMB	Paddy Marketing Board
SAPRI	South Asia Policy and Research Institute
UN-DESA	United Nations Department of Economic and Social Affairs
UNICEF	United Nations International Children's Emergency Fund
USD	United States Dollar
VAT	Value Added Tax
WFP	World Food Programme
WZ	Wet Zone

Mission Highlights

- A severe drought in 2016 and early 2017 severely impacted the 2016/17 *maha* harvest with 45 percent reduction in the production of paddy crop.
- In addition, production prospects for the 2017 secondary *yala* paddy crop, to be harvested during the months of July and August 2017, are unfavourable due to limited irrigation water availability and shortage of seeds.
- As a consequence, the 2017 aggregate paddy output, the country's main staple food, is forecast at 2.7 million tonnes, almost 40 percent less than last year's output and 35 percent lower than the average of the previous five years.
- The heavy rains in May 2017 which caused severe flooding and landslides in southwestern parts of the country, did not ease the water supply constraints in the drought-impacted northcentral and eastern parts of the country.
- Prices of rice reached record highs in January 2017 and declined from February onward as the *maha* harvest increased supply, but in April they were still at high levels.
- The cereal import requirement for 2017 is forecast at about 1.78 million tonnes, consisting of 998 000 tonnes of wheat, 100 000 tonnes of maize and 686 000 tonnes of rice. It is expected that the required imports will be fully covered by commercial purchases.
- The prolonged period of drought caused loss of income and purchasing power among the most affected households, due to reduced production of paddy for sale, poor agricultural labour opportunities and increased retail prices. Daily agricultural labourers and rain-fed paddy farming households were among the livelihood groups most affected. Most severely drought-impacted districts include Kurunegala, Moneragala, Vavuniya, Mannar and Jaffna districts.
- The drought has impacted food consumption scores of households in affected areas, with approximately 229 560 households (about 900 000 people) estimated as borderline food insecure.
- The Mission recommends timely provision of seeds and planting equipment for the 2017/18 *maha* planting season from September to December; as well as targeted cash assistance to the poorest and most vulnerable to prevent negative coping strategies, such as building up unsustainable high debt levels, as well as ensuring adequate food consumption among the most vulnerable.

1. OVERVIEW

An FAO/WFP Crop and Food Security Assessment Mission (CFSAM) visited Sri Lanka from 12 to 29 March 2017 at the request of the Ministry of Agriculture to estimate the 2016/17 main *maha* paddy production, to forecast the ongoing 2017 secondary *yala* paddy production and to analyse household food security conditions. The request was prompted by a prolonged period of poor rainfall over most of the country throughout 2016 that raised serious concerns on production of paddy and other crops in 2017 as well as on livestock. The Mission assessed the impact of the dry weather on the 2017 main-crop harvest and estimated the expected food deficit for 2017. The Mission assessed the overall food-security situation and identified the main country's agricultural support needs until the next main harvest.

During the 2016/17 main *maha* season harvest, the Mission visited 23 of Sri Lanka's 25 districts, omitting Colombo and Mullaitivu. The CFSAM team was composed by three international staff from FAO/WFP and three national officers from the Ministry of Agriculture, the Ministry of Disaster Management and the Department of Census and Statistics. An observer from the European Commission's Joint Research Centre (EC/JRC) accompanied the Mission for one week.

Prior to departing to the field, the Mission was briefed on current crop production and food security situation as well as general macroeconomic context by several national and international institutions and obtained national and district-wise data on precipitation, prices, inputs, trade and stocks. National institutions visited were the Ministry of Agriculture (MoA), Ministry of National Policies and Economic Affairs (MNPEA), Disaster Management Centre (DMC), Ministry of Lands, Ministry of Irrigation and Water Resources Management, Department of Meteorology, Department of Census and Statistics, Ministry of Rural Economic Affairs and Paddy Marketing Board (PMB).

The Mission obtained pre-harvest planted area and yield estimates from Ministry of Agriculture and Agrarian Officers from provincial, inter-provincial and district levels. This data was cross-checked against information provided by farmers, seed farmers, rice millers and traders that were interviewed during the field trips and against Normalized Difference Vegetation Index (NDVI) images, estimated rainfall and other remotely sensed meteorological data provided by FAO/GIEWS and EC/JRC. Within the visited districts, about 200 key informant

interviews were conducted, most of them with farmers and agrarian officers associated with crop inspections, including crop cutting to “spot-check” yield estimates provided by other sources. Visits to food markets, including retail and wholesale markets, supermarkets and government-controlled Sathosa outlets, as well as structured interviews with rice millers, rice traders, merchants were also conducted.

The food security information is based on qualitative findings from the field visit, building upon the conclusions as well as from quantitative findings from the Joint Assessment of Drought Impact on Food Security and Livelihoods¹ carried out in February 2017 under the Ministry of Disaster Management and with technical support from WFP, FAO, UNICEF and Save the Children. Recognizing that agricultural livelihoods would be the most exposed to climate hazards, the Mission focused on livelihood groups engaged in agricultural activities.

The Mission’s field observations were triangulated with official data provided by Government agencies in order to obtain an objective and impartial assessment of the country’s crop and livestock situation, the extent of the damage caused by the prolonged drought and the degree to which the rural population has been affected.

An extended period of dry weather (the worst drought in 40 years to hit Sri Lanka) affected large swathes of cropping land across the country throughout 2016. It has compromised water availabilities for irrigation for the 2016/17 main *maha* season crops, resulting in considerable decrease in plantings, widespread crop losses and sharply reduced yields. Paddy cultivations in rainfed areas and minor irrigation schemes, largely dependent on precipitations, were the most affected. The 2016/17 *maha* rice production has decreased sharply throughout the whole country and the highest losses were registered in the main rice producing districts namely Kurunegala (North-Western Province), Anuradhapura (North-Central Province) and Monaragala (UVA) as well as Polonnaruwa (North-Central Province), Ampara and Trincomalee (East Province) where sharp reductions were mainly due to area contractions. In these districts production decreases ranged between 40 and 75 percent compared to the average levels. Heavy rains in the second part of May caused localised floods and landslides predominantly concentrated in the southwestern parts of the country, resulting in deaths and injuries, large displacement of people and damage to agriculture and infrastructure. Official estimates indicate that the floods affected over 630 000 people (163 889 households), mostly in districts of Kalutara (Western Province), Matara and Galle (Southern Province) and Ratnapura (Sabaragamuwa Province). The floods occurred when the 2017 *yala* season crops were planted or at early growing stage, causing localized crop losses in the most affected areas. The above-average rains however, did not occur in main rice producing areas previously affected by drought, failing to replenish water reservoirs for irrigation. Consequently, enduring tight water supplies and shortage of seeds adversely affected planting operations and early crop development of the mainly irrigated 2017 secondary *yala* crop, to be harvested from August 2017. Official estimates, as of 30 May, indicate that water storage in the main reservoirs remained 34 percent of total capacity. As a result, current prospects for the 2017 secondary *yala* season are unfavourable.

The 2016/17 main *maha* season paddy crop is estimated by the Mission at 1.6 million tonnes, 45 percent below the corresponding season in 2016. Prospects for the 2017 secondary *yala* season paddy, due to be harvested in August and September, are unfavourable, mostly due tight water supply situation in the key producing areas and reported shortage of seed paddy, following the low production in the 2016/17 *maha* season. The output of the 2017 secondary *yala* paddy is projected to decrease by 24 percent year-on-year to 1.2 million tonnes. At aggregate level, the 2017 paddy production is estimated by the Mission at 2.7 million tonnes, almost 40 percent less than the 2016 output and 35 percent lower than the five-year average. This implies the lowest harvest in the country since 2004. Other cereals, including maize, various pulses, chillies and onion, mainly grown under rainfed conditions, were also heavily damaged by the dry weather.

The cereal import requirement in 2017 is forecast at about 1.78 million tonnes, comprising of 998 000 tonnes of wheat, 100 000 tonnes of maize and 686 000 tonnes of rice, and it is expected to be fully covered by commercial purchases.

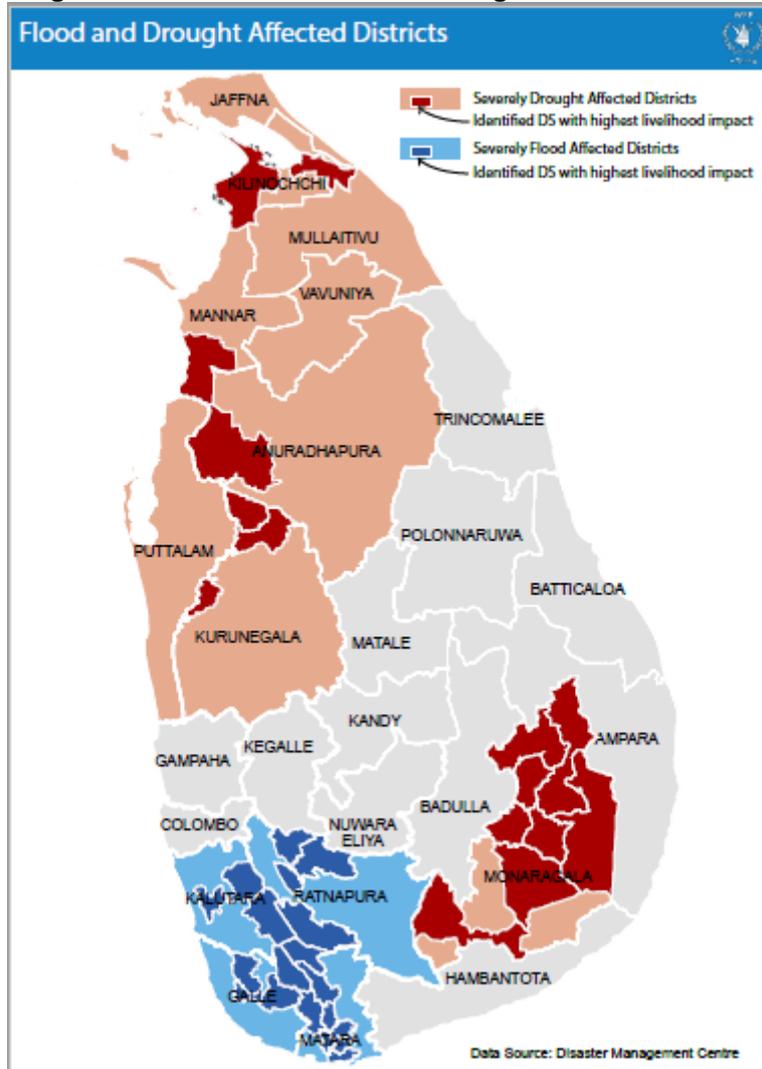
Livestock suffered a temporary setback at the end of 2016 and the beginning of 2017, with reduced milk production due to poor pasture conditions, but have since recovered with improved rains starting February.

Nominal prices of rice (white variety), the country’s main staple food, have been characterized by a steady upward trend since September 2016, reaching record levels across the country in December 2016 and January 2017, reflecting the sharp decreases of the 2016 secondary *yala* and 2016/17 main *maha* season outputs. Overall, domestic rice prices declined between January and March 2017 with the harvest of the 2016/17 *maha*

¹ The joint assessment was conducted in Kurunegala, Puttalam, Mannar, Vavuniya, Moneragala, Hambantota, Batticaloa, and Polonnaruwa. It covered 48 DS Divisions and 80 GN Divisions, and comprised 1 524 household interviews (average household size of four members) and over 50 focus group discussions.

crop and Government measures to contain prices, including increased stock releases, reductions in charges levied on imports and imposition of new maximum retail prices for rice. However, rice prices in April 2017 were at high levels, averaging 15 percent higher than a year earlier and 5 percent above the five-year average for the same month. Tight market availabilities in 2017 are expected to further underpin already high rice prices, raising concerns about food access by most vulnerable sections of the population. The price of other commodities such as vegetables fell below average levels for the same period, due to oversupply.

Figure 1: Sri Lanka – Flood and drought-affected districts



Note: The identification of severely affected districts combines the *maha* and *yala* drought data and as such covers the period from November 2016 to June 2017. It is based on a combination of crop losses and people affected – maximum impact figures were used at any stage of the two seasons. The DS with the highest livelihood impact were determined by overlaying drought and flood severity with three vulnerability criteria: poverty incidence, type of livelihood and source of drinking water.

Severe reductions of two consecutive harvest seasons due to poor rainfall impacted households' food security and resilience. Affected livelihood groups, particularly paddy producing farmers and agricultural casual labourers, experienced a reduction of income due to damage to agricultural land, crop failure, loss of harvest and reduced employment opportunities for those working in the agricultural sector. The low paddy production and loss of income consequently challenged households' access to food, considering their higher reliance on markets and the high prices of rice. Affected groups are relying on negative coping strategies as a way to cope with the impact of the drought. Food security conditions in worst affected areas deteriorated and about 900 000 people² are estimated to have borderline food consumption levels.

² The Joint Assessment carried out in February identified approximately 227 000 households (885 300 people) in hard-hit areas as borderline food insecure, an average of 16 percent per affected district. While Jaffna was not covered by the Joint

Household nutrition status remains challenging and, according to the Global Nutrition Report (2016), the country has one of the highest wasting prevalence index in the world, ranking 128 worst out of 130 countries. About a quarter of the children 6-59 months are underweight and national nutritional indicators show poor nutrition status also among women, particularly, those within reproductive age. Low Birth Weight (birth weight < 2500 gr) rates have remained stagnant over the last decade, with almost (18 percent) of new-born children having low birth weight. These factors all suggest a vicious cycle of malnutrition and the need for improved maternal nutrition.

To cover immediate agricultural needs, the Mission recommends the provision of seeds, as well as planting and irrigation equipment for the 2017/18 next *maha* planting season in the main rice-producing areas with high crop losses, including Kurunegala, Anuradhapura, Monoragala as well as Polonnaruwa, Ampara and Trincomalee. Special attention is required to make sure enough pulse seeds are available for the next main season. For the ongoing *yala* season, it is recommended that herbicides, especially for pest and disease controls as well as irrigation equipment, including water pumps and boreholes for irrigation, is made available to the most affected farmers. The Mission also recommends targeted cash assistance to the poorest and most vulnerable to prevent negative coping strategies, such as building up unsustainable high debt levels, as well as ensuring adequate food consumption among the most vulnerable. Considering the country's overall well-functioning domestic markets, the Mission recommends that any eventual food assistance should be provided in the form of cash and/or vouchers.

2. OVERALL ECONOMIC SETTING AND AGRICULTURE

2.1 General

The country has a total land area of 65 610 km². The population is predominantly rural, with around 80 percent depending on agriculture, mainly rice, tea, rubber and coconut. There are two basic categories of land tenure:

- Land under state control, which accounts for approximately 85 percent (estimated at 1.38 million hectares) of total agricultural land (estimated 3.54 million hectares) which is cultivated by private farmers under varying tenure arrangements with the state.
- Land under private ownership, accounting for approximately 0.88 million hectares.

In 2015, the agricultural output accounted for 9 percent of Gross Domestic Product (GDP), the service sector for 62 percent, the industrial and manufacturing sectors for 29 percent (World Bank, 2015). Sri Lanka is classified as a lower middle-income country, with an annual GDP per capita income of about USD 4 000 at purchasing-power parity (World Bank, 2015), ahead of other countries in the region. However, the country shows a Gini coefficient of 0.53 (Central Bank of Sri Lanka 2016), implying a wide disparity among household incomes. Rates of extreme poverty (living on less than USD 1.90 per person per day) have been decreasing considerably in recent years, aided by strong economic growth. Current estimates indicate that extreme poverty decreased from 13 percent in 2002 to 1.9 percent in 2012/13, and is lower compared with neighbouring countries. However, moderate poverty remains a challenge. In 2012/13, nearly 15 percent of the population lived on less than USD 3.10 per day. Most of the poor live in rural areas and are predominantly concentrated in the districts of Kilinochchi, Mullaitivu and Mannar (Northern Province), Batticaloa (Eastern Province) and Moneragala (Uva Province).

Sri Lanka is prone to weather related hazards such as floods, droughts and storms. Floods occur due to heavy monsoon rains or effects of low pressure systems and droughts due to failure of the monsoon rains. Sri Lanka is also affected by landslides, coastal erosion, epidemics and effects of environmental pollution³ and is highly susceptible to climate change, and therefore the frequency of the weather hazards will likely increase as the earth warms.

Assessment, when visiting the district the CFSAM noticed that the food security of farmers had been affected on similar levels as in Mannar and Vavuniya. This was confirmed also by the local authority, who explained that 30 percent of the farming families (approximately 16 000 households) were affected by the drought. On the basis that in hard-hit districts an average of 16 percent of affected households showed borderline food consumption scores, and considering evidence emerged through discussions at the household level and with local authorities, the Mission assumes that out of the 16 000 farming families who had been impacted by the drought in Jaffna, around 16 percent (about 2 560 families) were borderline food insecure because of the dry spells. As such, the Mission estimates that a total number of 229 560 households (895 284 people) showed borderline food consumption scores at the time of the visit.

³ Ministry of Disaster Management of Sri Lanka.

2.2 Macro-economy

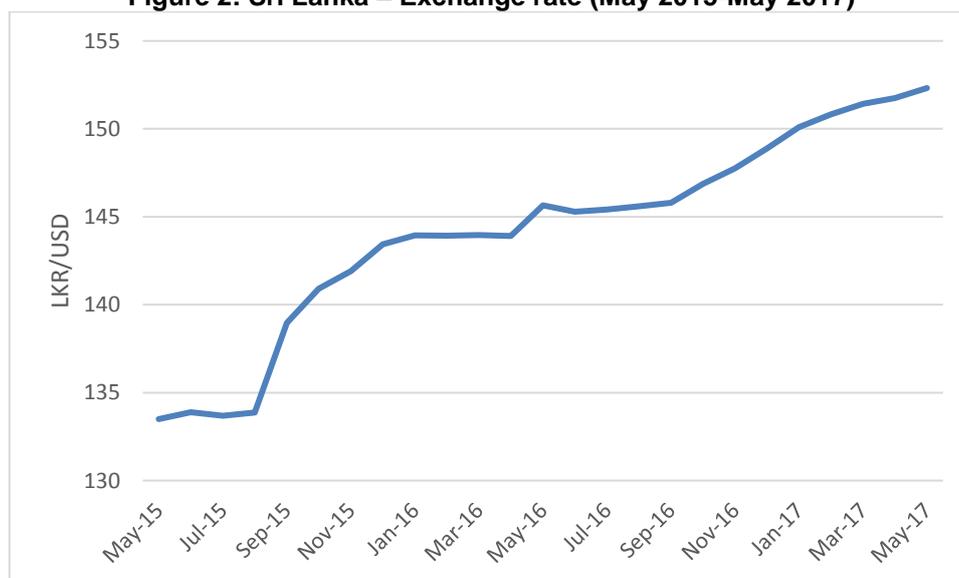
Following the end of the 26-year-long civil war in 2009, national economic growth, measured by real GDP, rose at a strong pace from 8 percent in 2010 to 9.1 percent in 2012. Increased private consumption, higher agricultural production in the Northern and Eastern Provinces (areas most affected by the civil war), strong growth of the tourist sector and increased Government spending on reconstruction, as well as stronger performance in mining and financial sectors as economy opened up, were the main drivers of the economic growth. However, compared with the post-war years the GDP slowed between 2013 and 2016, averaging 3.8 percent (Table 1). The slowdown was mainly on account of weak external demand, a tightening of fiscal policy and structural constraints. A prolonged drought in 2013 and 2014, which sharply reduced the 2014 agricultural output and negatively impacted on the performance of the hydropower generation, also negatively weighed on the economic output during this period. The economic outlook for 2017 and 2018 is muted, as structural constraints, such as shortage of skilled labour, poor infrastructure and a low female labour force participation rate, will weigh on economic activity. Poor performance of the agriculture sector in 2017, due to the 2016/17 prolonged drought, will also dampen economic growth.

Table 1: Sri Lanka – Key economic indicators, 2012-2016

Domestic economy	2012	2013	2014	2015	2016
Real GDP growth (percent)	9.1	3.4	4.9	4.8	4.6
Average consumer price inflation (percent)	9.3	4.6	1.4	4.6	4.5
Exports of goods (USD million)	9 774	10 394	11 130	10 505	10 311
Imports of goods (USD million)	19 190	18 003	19 417	18 935	19 400
Trade surplus/deficit (USD million)	-9 476	-7 609	-8 287	-8 430	-9 089
Average exchange rates LKR/USD	127.16	130.75	131.05	144.06	149.80

Source: Real GDP growth rate estimates from 2012 to 2015 from Central Bank of Sri Lanka, Socio-Economic Data 2016. The rest of the information is from Economic Intelligence Unit (EIU) Country Report (March 2017).

Figure 2: Sri Lanka – Exchange rate (May 2015-May 2017)



Source: International Monetary Fund.

The Sri Lankan Rupee (LKR) depreciated against the United States Dollar (USD) in the last quarter of 2015 and remained relatively stable between January and September 2016. It has depreciated at a modest pace from an average of LKR 145.8: USD 1 in October 2016 to LKR 152.3: USD 1 in May 2017, nearly 5 percent devaluation against USD during this period (Figure 2). A reduction in foreign-exchange reserves caused by previous official attempts to stem depreciatory pressure by intervening in foreign-exchange markets is one of the reasons behind the country's fragile external position. Widening trade deficits, as a result of higher import volumes and slightly lower revenues from exports, also provided support for the weakening of the local currency. In May 2017, the Consumer Price Index (CPI) was up nearly 6 percent relative to the same period last year. The food component of the CPI increased by 9.3 percent from the 7.4 percent last year. Reports indicated that the inflationary pressure in 2017 is expected to strengthen further, as a result of the increase in Value Added Tax (VAT) in November 2016, from 11 percent to 15 percent, and a rebound in global commodity prices. Furthermore, a steady depreciation of the LKR in 2017 will continue to put upward pressure on prices

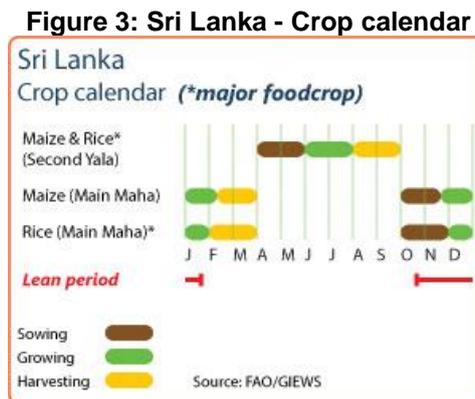
of imported goods⁴. This is of particular concern since tighter domestic food supplies (particularly rice) in 2017, are expected to further underpin already high rice prices, raising concerns about food access by most vulnerable sections of the population.

2.3 Population

The country's population in 2017 is estimated at 20 905 million persons, with an annual growth rate of approximately 0.5 percent during the preceding five years (UN-DESA, April 2017). Around 80 percent of the population live in rural areas, with a relatively high population density of 334 people km² (Sri Lanka Department of Census and Statistics, 2015).

2.4 Agriculture

Total land area is estimated at around 6.5 million hectares, including 3.54 million hectares of agricultural land (54 percent), 1.95 million hectares of forest (31 percent), the rest occupied by water bodies and urban areas. The agricultural sector accounts for about 8.5 percent of GDP and employs some 30 percent of the country's workforce. The country's main agricultural product is rice, which is grown under a wide range of environmental conditions, such as different elevations, soils and hydrological regimes. The major cultivation season *maha* paddy, stretches from September to March, and normally accounts for 65 percent of the country's annual paddy production. The output of this season depends on rainfall from inter-monsoon rains and northeast monsoon. The mostly irrigated secondary *yala* season lasts from April to September and relies on the southwest monsoon. Maize is also grown during these two seasons but on a much smaller scale than paddy. The cropping calendar for these two cereals is shown in Figure 3.

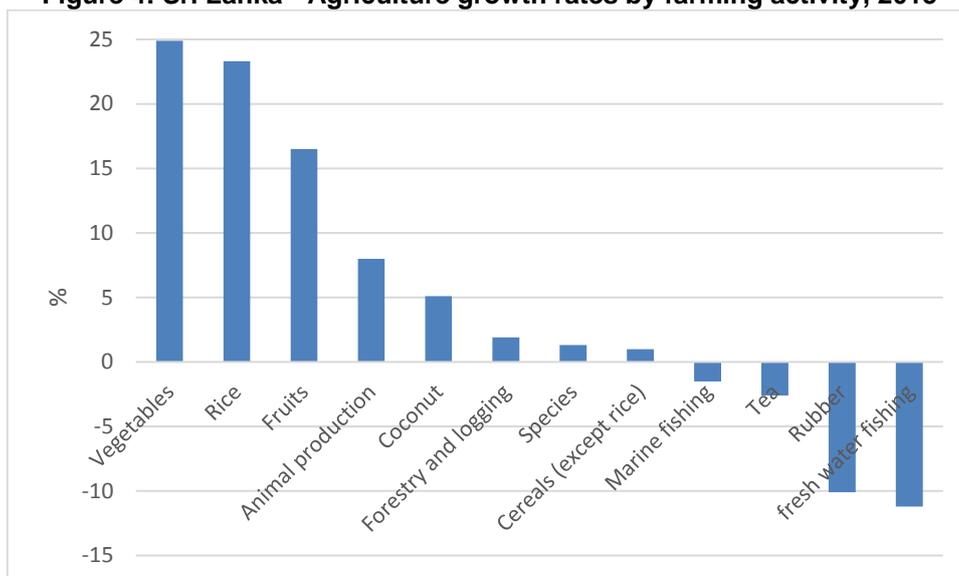


Source: GIEWS, FAO.

Other agricultural products which are cultivated in large amounts in Sri Lanka, include pulses, oilseeds, spices, vegetables, fruits, sugarcane, milk, eggs, hides, beef and fish. Tea, which occupies more than 222 000 hectares, is a major source of foreign exchange and employs, either directly or indirectly, more than 1 million people. Other plantation crops include rubber (about 125 000 hectares) and coconuts (395 000 hectares). Growth rates of various local agricultural commodities in 2015 are shown in Figure 4. In 2015, the rice sector recovered from a prolonged drought in 2014.

⁴ Economist Intelligence Unit, Sri Lanka - Country Report (generated on 10 March 2017).

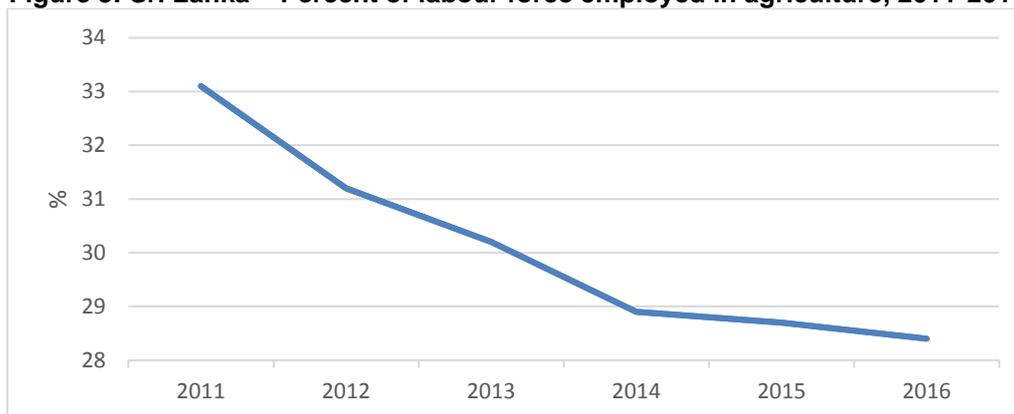
Figure 4: Sri Lanka - Agriculture growth rates by farming activity, 2015



Source: Department of Census and Statistics. The Annual Estimates of the GDP, 2015.

In recent years the proportion of the labour force involved in agriculture has declined steadily from more than 30 percent in 2011 to 28.4 percent in 2016 (Figure 5), the consequence of more off-farm employment opportunities following the cessation of civil conflict in 2009, and of young farm-family members seeking urban white-collar jobs.

Figure 5: Sri Lanka – Percent of labour force employed in agriculture, 2011-2016



Sources: 2011-2015: Sri Lanka Labour Force Survey. Annual Report, 2015; 2016: CIA World Factbook.

Rainfall in Sri Lanka occurs in four main distinct seasons:

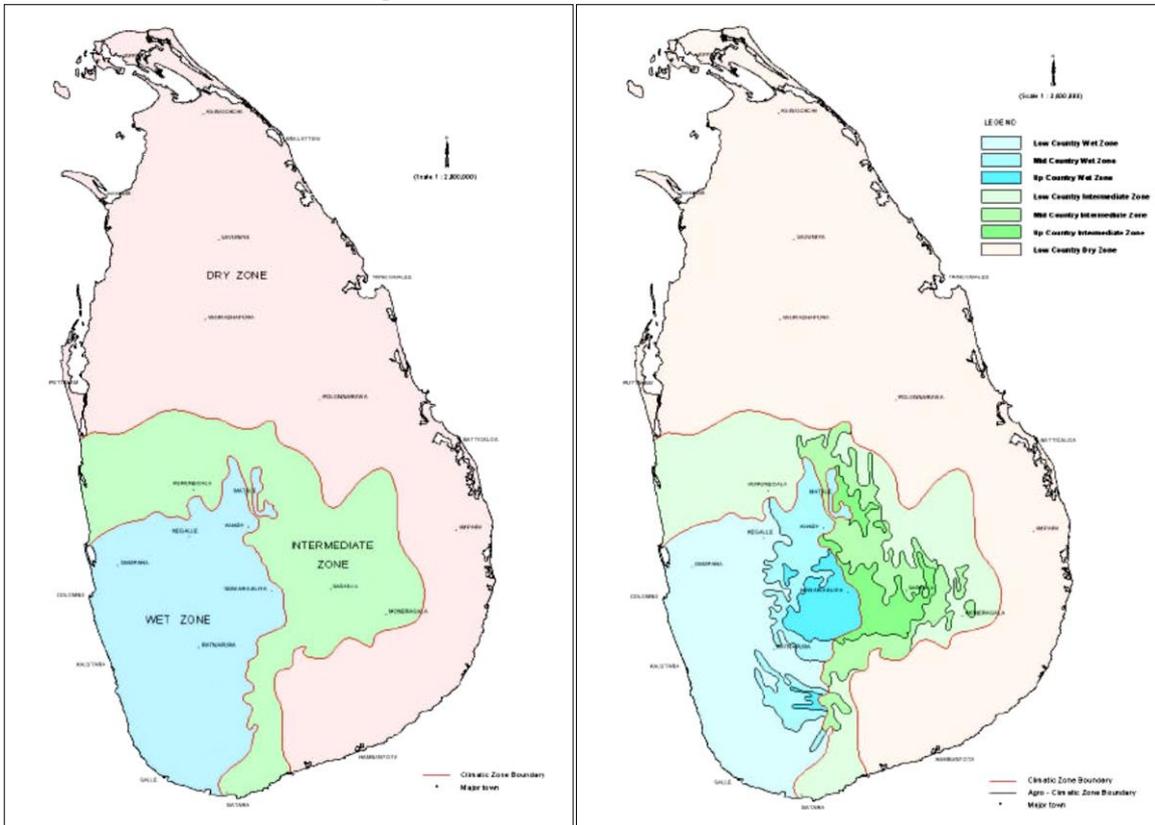
- First inter-monsoon season that usually stretches between March and April supports planting of the secondary *yala* season crops, such as paddy, maize, various pulses, chillies and onions, that will be harvested in August-September
- Southwest monsoon season that usually begin in May and end in September, supports growing of the secondary *yala* season crops
- Second inter-monsoon season that usually stretches between October and November supports plantings of the main *maha* season crops, mainly paddy, maize, pulses etc.
- Northeast monsoon season that usually begin in December and continues until February, supports growing of the main *maha* season crops.

Based on the total annual rainfall, the country is broadly divided into three climatic zones (Figure 6):

- Wet Zone (WZ) Rainfall > 2 500 mm
- Intermediate Zone (IZ) Rainfall 1 500 – 2 500 mm
- Dry Zone (DZ) Rainfall < 1 500 mm

The mean annual rainfall varies from under 900 mm in the driest parts (southeastern and northwestern) to over 5 000 mm in the wettest parts (western slopes of the central highlands).

Figure 6: Sri Lanka - Climatic zones

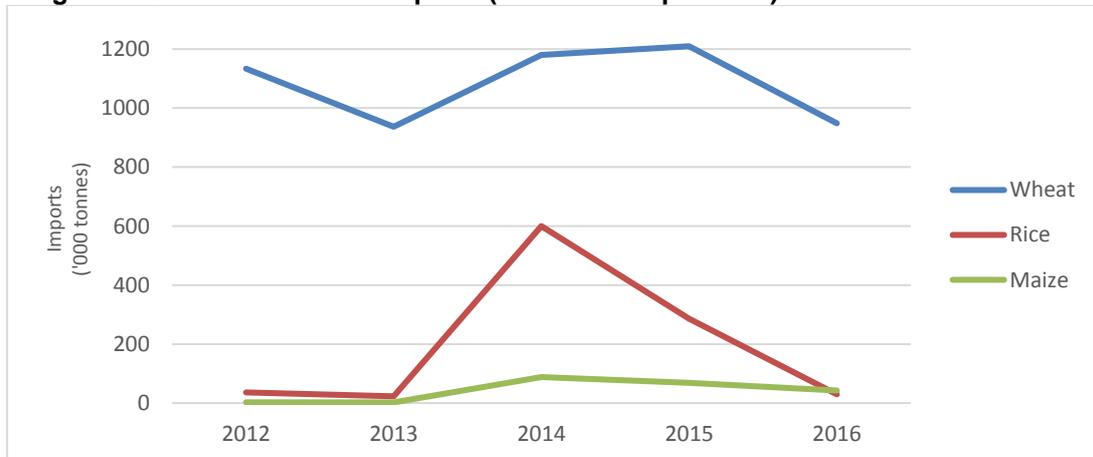


Source: Climate Change Secretariat, Sri Lanka http://www.climatechange.lk/Climate_Profile.html, retrieved April 2017.

2.5 Food imports

Although the country aims for self-sufficiency in rice, during the last five years (2012-2016), annual imports of milled rice have fluctuated between 20 000 and 600 000 tonnes (Figure 7). It is estimated that about 40 percent of the paddy produced is for home consumption, while the remaining 60 percent enter the market. Wheat is not produced in the country and the entire domestic requirements are covered by commercial imports. Annual wheat imports ranged from 900 000 tonnes to 1.2 million tonnes from 2012 to 2016. Small quantities of maize are imported annually.

Figure 7: Sri Lanka - Cereal imports (rice milled equivalent) between 2012 and 2016



Source: Retrieved from Global Trade Atlas which indicates as source Sri Lanka Customs.

The Government maintains a strategic stock of about 50 000 tonnes of rice. Stocks carried over by millers and merchants are thought to be usually about 200 000 tonnes.

The Paddy Marketing Board (PMB), established in 2008, is the Government's agency in charge of purchasing and handling of paddy and other agricultural products. Its principal function is to benefit farmers, by purchasing paddy at minimum support price. The minimum support price for paddy is set by the Cabinet, and there are 250 purchasing points throughout the country that purchase paddy at the guaranteed market price from producers. The level of the floor price is considered to be an incentive for farmers, as millers and other buyers normally match that price. However, PMB quality controls are more stringent than those imposed by the millers and other buyers. For example, deliveries to the PMB must satisfy several criteria, such as moisture content less than 14 percent, waste material less than 1 percent, empty grains less than 9 percent, varietal contamination less than 6 percent and free insect and pest damages. By contrast, millers accept deliveries of paddy also with relatively high moisture contents (even up to 22 percent), varietal contamination etc., and adjust the price paid accordingly. The PMB's criteria are often difficult to be fulfilled by the majority of farmers, as a result farmers are more inclined to sell to traders and millers, even if they are offering a lower price. The PMB, which has a storage capacity of 350 000 tonnes, aims to purchase certain amount of the country's annual production, which averaged 6 percent of the total annual output in the last five years.

In order to protect genetic purity and sustainable disease resistance of local varieties, all paddy seeds are produced in the country by contracted out-growers and none is imported. If the out-growers' production is severely compromised by adverse weather conditions, as it has been in 2016/17 by poor rainfall, the supply of seed for the subsequent season's planting is unlikely to meet the country's requirement.

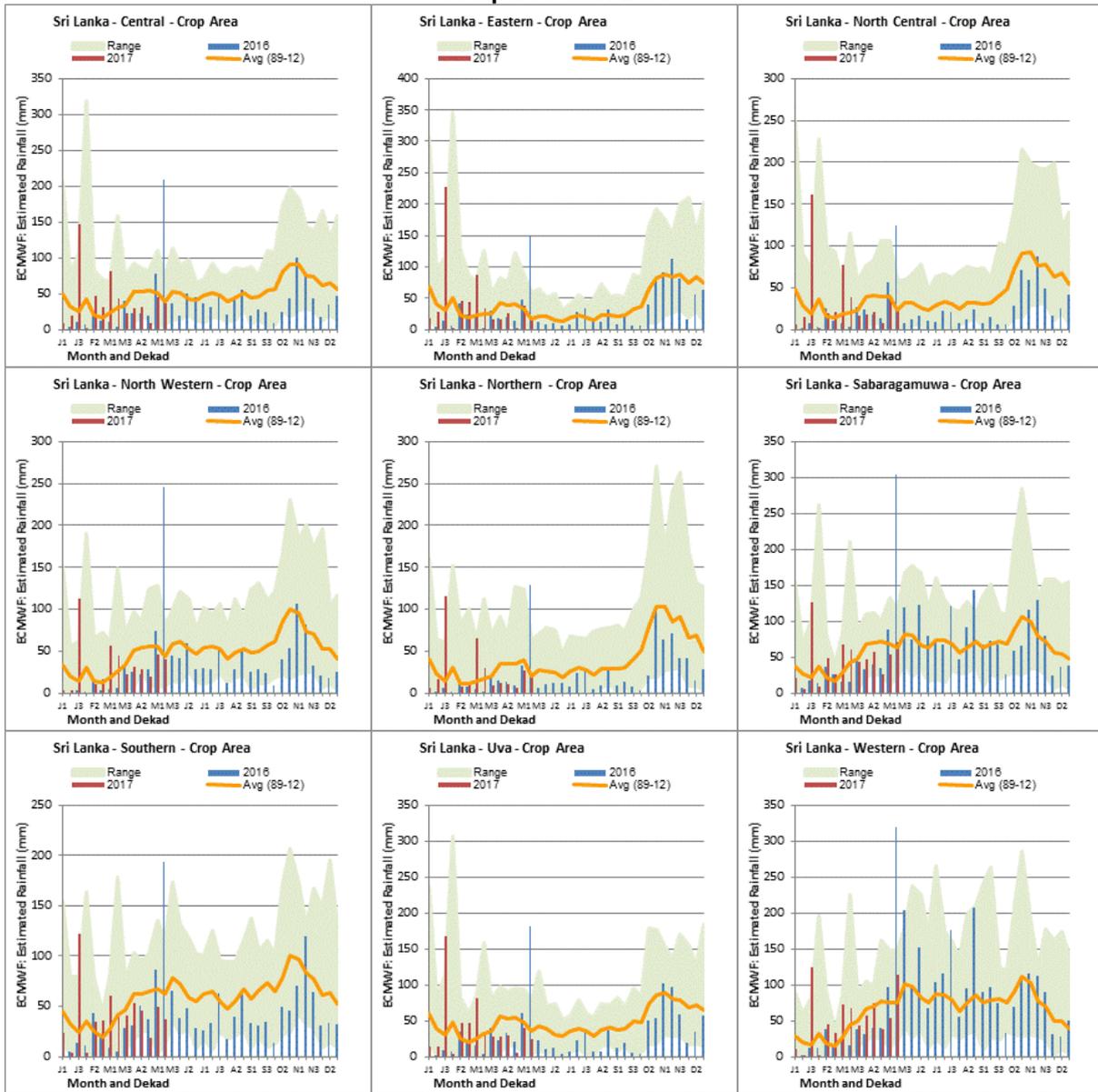
3. CEREAL PRODUCTION IN 2017

3.1 Factors affecting yield of the 2016/17 *maha* paddy

3.1.1 *Rainfall and water availability during the 2016/17 maha season*

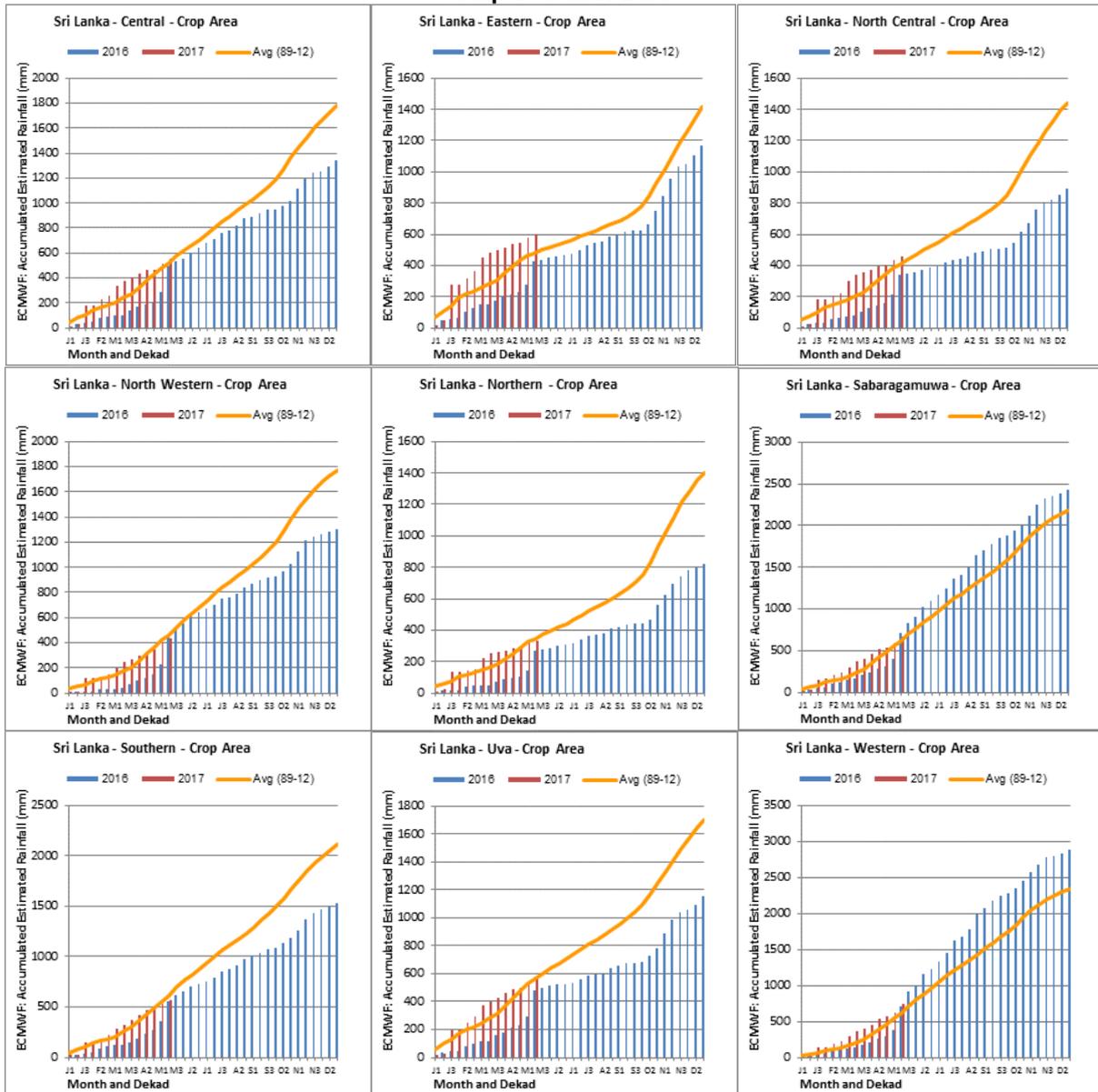
The Mission used estimated rainfall data provided by FAO/GIEWS and had access to satellite images on NDVI elaborated by EC/JRC. Rainfall was considerably below average throughout 2016 over much of the country, particularly affecting the main rice-producing areas, including Northern, North Central, North Western, Eastern and Uva provinces (Figure 8). From country's nine provinces, only Sabaragamuwa and Western provinces, which are minor rice producing areas, received favourable rainfall. During this period cumulative precipitation throughout 2016 over most of the country remained at levels well-below the long period average (Figure 9), severely compromising water availability for irrigation. The combination of precipitation shortfalls (Figures 8, 9, 11), coupled with very low irrigation water availability during October and November 2016, when most plantings of the 2017 main *maha* season cereal crops normally takes place, hindered and aborted sowing operations, considerably reducing the overall area planted. The drought effect on crop and vegetation growth is captured by the vegetation index derived from satellite imagery (Figure 9). Negative anomalies of the vegetation index were particularly visible in October and November 2016 over most of the country. The situation began to ease in December 2016, but considerable stress persisted in the north and east at least until mid-January 2017, when main season crops were at a critical flowering stage. As a result farmers abandoned large areas of paddy and other main season plantations. The dry conditions during the 2016/17 *maha* season were generally considered to be the worst since 1974.

Figure 8: Sri Lanka – Rainfall amounts for the period from January 2016 to May 2017 compared with LTA



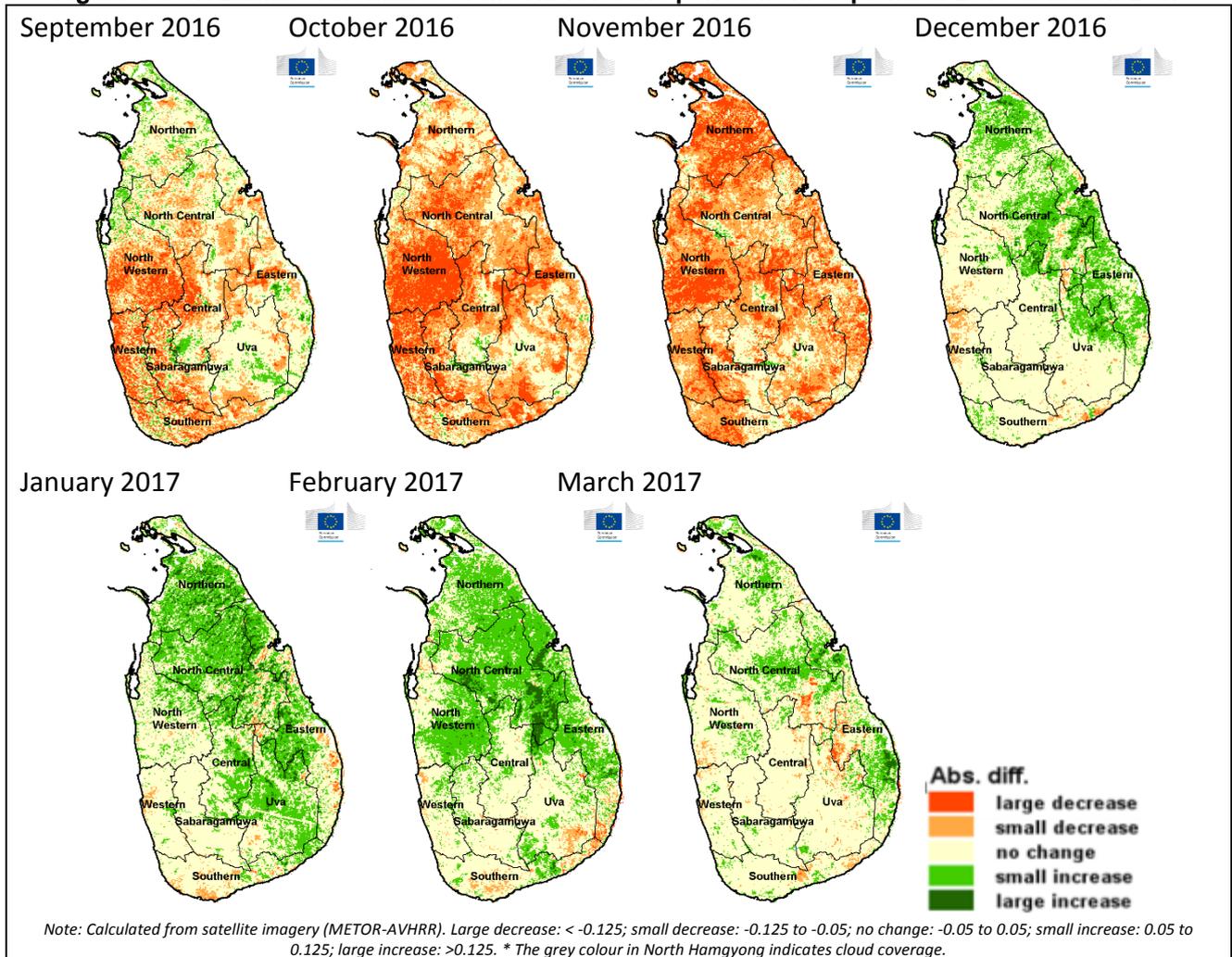
Source: FAO/GIEWS Earth Observation.

Figure 9: Sri Lanka – Cumulative rainfall for the period from January 2016 to May 2017 compared with LTA



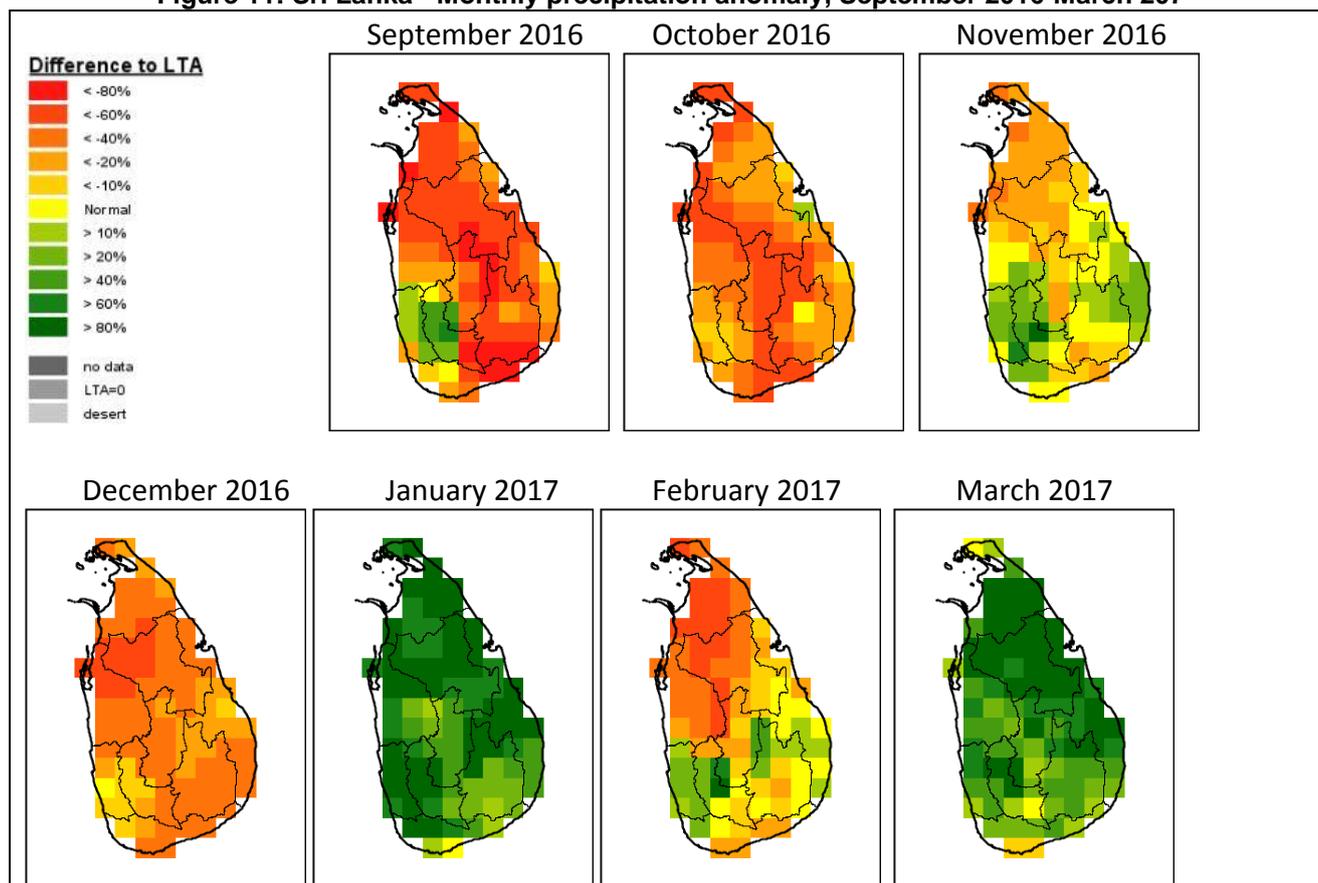
Source: FAO/GIEWS Earth Observation.

Figure 10: Sri Lanka – Anomalies of the NDVI for the period from September 2016 to March 2017



The arrival of unusually heavy rainfall at harvest time from late January to March 2017 caused additional damage to the standing 2016/17 *maha* paddy and other crops. Rainfall at that time delayed harvesting by preventing access to fields for combine harvesters, and interfered with the drying of harvested grain. Figure 11 shows the monthly differences between the 2017 *maha* season's rainfall and the long-term average (LTA is calculated from 2008 to 2015), clearly demonstrating the unusually low rainfall during the last three months of 2016 and the unusually high rainfall in January and March 2017.

Figure 11: Sri Lanka - Monthly precipitation anomaly, September 2016-March 2017



Source: FAO/GIEWS Earth Observation.

3.1.2 Area planted and harvested for 2016/17 maha season

As a result of the drought and low availability of irrigation water, only 540 000 hectares of paddies were planted during 2016/17 *maha* season, down from the 756 000 hectares sown in 2016 and a ten-year low. Some 30 percent of the 2016/17 *maha* planted area was damaged by the dry weather and around 70 000 hectares failed completely due to moisture stress. The continuation of the dry spell into December 2016 and, in parts, until January 2017, when paddy crops were at critical flowering stage, resulted in abandonment of paddy plantations by farmers. Overall, the area harvested in the 2016/17 *maha* is estimated at 463 000 hectares, almost 40 percent lower than the level of the *maha* season in 2016 and 33 percent below the average of the previous five years (Table 2). Kurunegala (North Western province), Anuradhapura and Polonnaruwa (North Central province) and Ampara (East province) which together, normally account for close to a half of overall paddy extension, have registered the highest area reduction (Table 3).

3.1.3 Seeds

Farmers either use the seed retained from their previous harvest, or purchase certified seed produced by Government-registered growers. For the 2016/17 *maha* season seed supply was adequate, but with poor *maha* production and the failure of many seed farms, the availability of seed for the 2017 *yala* season has been seriously compromised. In February 2017, the Cabinet approved purchasing paddy grain from unregistered farmers for use as seed in the *yala* season, since the seed available from registered producers was insufficient. Such seed may be of inferior quality to that produced by registered growers and may result in lower yields.

3.1.4 Fertilizers

Direct fertilizer subsidies were removed in 2013. During 2016/17 season a farmer pays the full market price (LKR 2 500/50 kg) but receives a cash hand-out of LKR 5 000 per 1 acre (maximum amount is LKR 25 000 for 5 acres) on purchase. Fertilizer recommendations used to be uniform for the whole country but have recently been made location-specific. Availability and use of fertilizer during 2017 *maha* season was at normal levels. Prices stayed stable compared with last year's level.

3.1.5 *Chemicals*

Until recently, farmers relied heavily on the use of the herbicide glyphosate ('Roundup') to control weeds in their paddy fields. In 2014 a presidential decree banned its use in most agricultural sectors in the belief that it was responsible for the high incidence of chronic kidney disease amongst paddy farmers, especially in North Central, North Western, Uva and Eastern Provinces. In the absence of glyphosate, paddy fields often have a high weed population. In a year of reduced rainfall this is especially harmful as the weeds, which are often more adapted than the crop to dry conditions, use a large proportion of the available soil moisture.

3.1.6 *Land preparation*

Land preparation is still carried out although on a small scale on fields that are too small to accommodate tractors. But the use of buffaloes is gradually giving way to mechanization. Land preparation by 2-wheel tractor usually costs about LKR 7 500 per acre, and by 4-wheel tractor LKR 10 000 per acre. The MoA encourages the use of transplanting and has provided district offices with transplanters for demonstration purposes, but the method has not been widely adopted. Many farmers use the so-called "parachute method" which involves broadcasting recently germinated seed. Paddy harvesting is almost universally carried out by combine harvesters at a cost of between LKR 5 000 and 10 000 depending on the terrain. With the current demographic drift away from the land, farm labour has become slightly less readily available. However, with the poor start to the 2016/17 *maha* season and the ensuing poor harvest, the demand for farm labour has been lower than usual. The cost of farm labour has not changed significantly over the last 12 months, remaining between LKR 1 000 and 1 500 per day depending on location and task.

3.1.7 *Pests and diseases*

Brown plant-hoppers and rice blast are common in Sri Lanka. This year, however, their incidence was very low because of the unusually dry weather. An outbreak of rice blast was reported in Mannar District but it was successfully controlled. On the other hand, damage to crops by elephants was worse than usual this year because of the dry conditions. With their usual watering places dry and a shortage of wild vegetation to browse, elephants tended to seek feed and water on cropped land.

3.2 Yields of the 2016/17 *maha* season

The national average yield for 2016/17 *maha* is estimated at 3.4 tonnes/hectare, compared to the average level of 3.9 tonnes/hectare in 2016 (Table 3). Rain-fed areas were the worst affected, with average yield estimated at a low of 1.5-1.8 tonnes/hectares, followed by the cultivated areas dependent on water from the minor irrigation schemes, while the least affected was the sector served by major irrigation tanks, where attained yields were around 5.7 tonnes/hectare. Many areas that normally depend on irrigation from minor tanks reported significant losses and yield reductions resulting from poor filling of the tanks and inefficient water conveyance.

3.3 Production estimate of the 2016/17 *maha* season

The conjunction of reduced area and low yields has resulted in a paddy production for the 2016/17 *maha* season of 1.587 million tonnes (paddy terms), 45 percent below the record level of the 2015/16 *maha* and 42 percent lower than the five-year average. Kurunegala (North-Western Province), Anuradhapura and Polonnaruwa (North-Central Province) and Monoragala (UVA) as well as Ampara and Trincomalee (East Province) which, together, normally account for more than half of overall rice production, were among the districts registering the highest declines in production, ranging from 40 to 75 percent decrease year-on-year (Table 3).

See Annex 1 for information on the drought impact on provisional level.

3.4 *Yala* season paddy production forecast, 2017

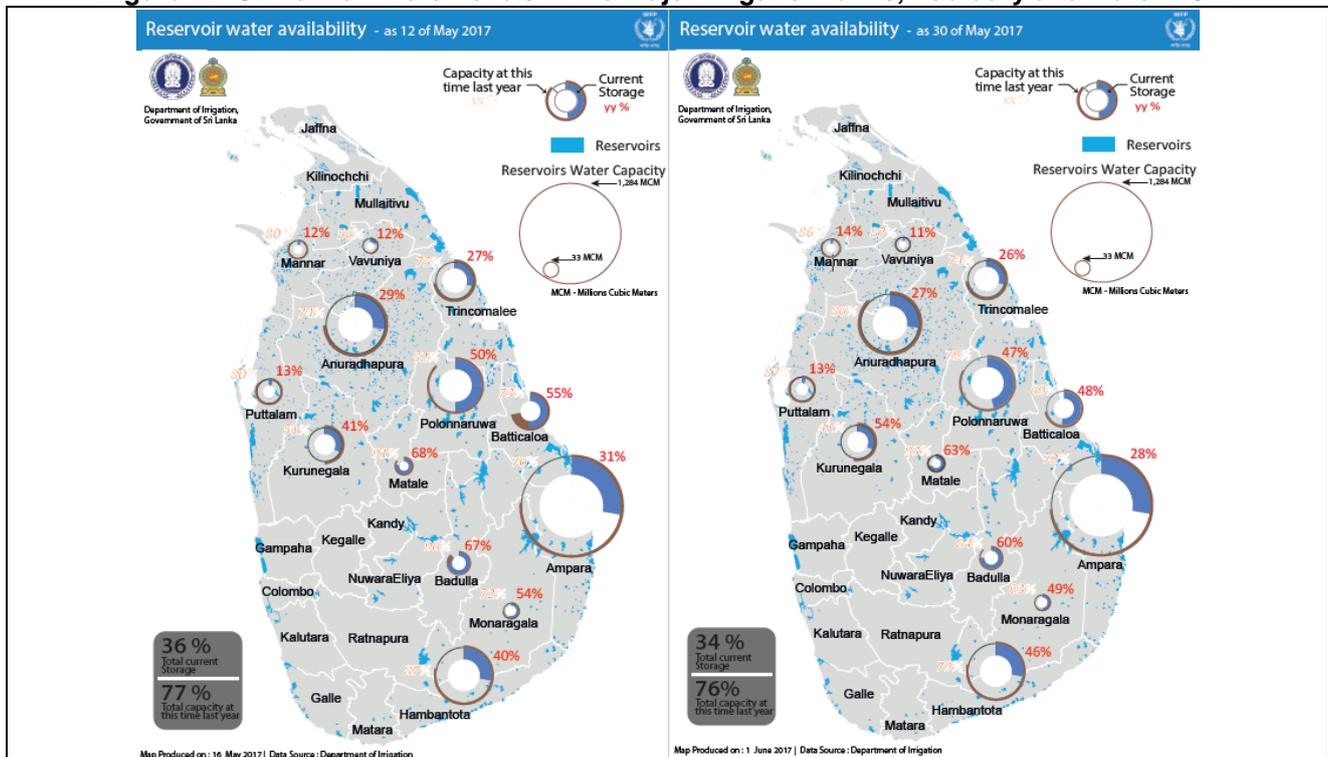
Prospects for the 2017 secondary *yala* crop are unfavourable, due to current tight water levels in the major irrigation tanks and the shortage of seeds. Heavy rains in the second part of May 2017 helped alleviate dryness in some areas but also caused localised flooding in southwestern parts of the country, particularly affecting Kalutara (Western Province), Galle and Matara (Southern Province), as well as Ratnapura and Kegalle (Sabaragamuwa), which together normally account for about 10 percent of *yala* season cropped area. The floods occurred when the 2017 *yala* season paddy was planted or at early growing stage, causing localized crop losses in the most affected areas, particularly standing paddy crops in the low lying fields. The above-average rains, however, avoided the drought-affected main rice producing districts located in the northcentral

and eastern parts of the country, failing to replenish water reservoirs for irrigation for the predominantly irrigated 2017 *yala* crop. Consequently, the main rice producing areas continue to be affected by dry conditions, which negatively impact on planting operations and early crop development for the ongoing 2017 *yala* crops. Official reports, as of 30 May, indicate that water availabilities in irrigation reservoirs remained well-below average, accounting for only 34 percent of total capacity compared to 76 percent for the same time of the year in 2016. Furthermore, Department of Meteorology forecasts that the cumulative precipitation between June and August over the country as a whole are likely to remain below-average hereby possibly also indicating problems for the forthcoming 2017/18 *maha* planting season.

During the mission, most of the interviewed farmers reported shortages of seeds, following the reduced 2016/17 *maha* output. Although, in February 2017 the Cabinet approved purchasing paddy grain from unregistered farmers for use as seed in the *yala* season, most of the farmers were concerned about seed availability, considering the sharp drop in 2016/17 *maha* output.

Taking into account the low water levels in the irrigation schemes and reported seed shortages, the 2017 *yala* season paddy production is tentatively forecast by the Mission at 1.15 million tonnes, 24 percent below last year's already reduced level and considerably below the average of the previous five years (Table 4). This could result in two successive crop failures for many farmers, with obvious implications for food security and incomes. Figure 12 shows tank water levels in mid-May and end of May 2017, critical period for the *yala* planting and compares these levels with those at the same time in 2016. Apart from Kurunegala, Habantota and Mannar, all levels had declined over the course of one month relative to the 2016 levels.

Figure 12: Sri Lanka - Water levels in the major irrigation tanks, February and March 2017



3.5 Aggregate paddy production, 2017

National paddy production in 2017, including the 2016/17 *maha* and the ongoing 2017 *yala* seasons, is forecast by the Mission at 2.74 million tonnes, 35 percent lower than the five-year average and the lowest harvest in the country since 2004. The sharp year-on-year reduction is the result of both area and yield reductions following the drought.

Table 3. Sri Lanka - Comparison between *maha* season 2017, 2016 and five-year average area, yield and production of paddy

Province	District	Area harvested					Yields					Production				
		2016/ 17	2015/ 16	Change: 2016/17 over 2015/16	Average 2012- 2016	Change: 2016/17 over five-year average ^{1/}	2016/ 17	2015/ 16	Change: 2016/17 over 2015/16	Average 2012- 2016	Change: 2016/17 over five-year average ^{1/}	2016/ 17	2015/ 16	Change: 2016/17 over 2015/16	Average 2012- 2016	Change: 2016/17 over five-year average ^{1/}
West	Colombo	2.6	2.9	-10	3.8	-31	2.9	2.9	2	3.0	-1	7.7	8.4	-9	11.2	-31
	Gampaha	8.5	10.0	-15	10.6	-20	3.0	3.3	-8	3.0	-1	25.5	32.7	-22	32.2	-21
	Kalutara	9.0	11.7	-23	13.0	-31	3.0	3.1	-3	3.0	-1	27.0	36.3	-26	39.3	-31
Central	Kandy	9.8	11.7	-16	12.1	-19	3.0	3.0	-1	3.2	-8	28.9	34.9	-17	38.8	-25
	Matale	12.4	19.7	-37	19.4	-36	4.0	4.0	-2	3.9	1	48.9	79.1	-38	76.2	-36
	Nuwara Eliya	2.8	4.9	-42	5.2	-46	2.1	2.1	-2	2.4	-12	5.9	10.4	-44	12.4	-53
South	Galle	8.3	10.1	-18	13.2	-37	2.5	2.3	6	2.7	-10	20.3	23.5	-13	35.9	-43
	Matara	13.0	11.8	10	14.0	-7	3.0	3.2	-6	3.1	-4	39.0	37.9	3	43.6	-11
	Hambantota	23.0	27.1	-15	27.1	-15	4.6	4.7	-3	5.1	-9	105.8	128.4	-18	137.5	-23
North	Jaffna	3.0	8.4	-64	7.9	-62	1.5	2.1	-28	2.1	-30	4.5	17.5	-74	18.0	-75
	Mannar	11.0	18.7	-41	13.8	-20	4.2	4.8	-12	4.9	-14	46.1	89.1	-48	67.3	-31
	Vavuniya	12.0	17.5	-31	14.7	-18	3.1	4.1	-25	3.9	-20	37.2	71.9	-48	58.0	-36
	Mulativu	15.0	13.4	12	10.8	39	2.1	3.4	-37	3.5	-39	32.2	45.9	-30	38.1	-16
	Killinochchi	19.0	24.2	-21	18.1	5	3.1	3.5	-12	3.1	-1	58.9	84.9	-31	54.9	7
East	Batticaloa	50.0	56.4	-11	56.9	-12	1.8	2.7	-34	2.6	-31	88.3	150.4	-41	144.9	-39
	Ampara	60.5	80.8	-25	78.2	-23	3.6	4.3	-16	4.3	-16	217.8	344.8	-37	336.1	-35
	Trincomalee	15.1	34.2	-56	29.1	-48	3.7	4.2	-13	4.0	-9	55.9	145.3	-62	117.0	-52
North Western	Kurunegala	40.0	80.6	-50	70.2	-43	3.6	4.1	-13	4.1	-12	144.0	333.1	-57	289.7	-50
	Puttalam	7.0	19.6	-64	16.3	-57	3.0	3.4	-12	3.5	-15	21.0	66.5	-68	57.7	-64
North Central	Anuradhapura	24.5	95.9	-74	82.3	-70	3.2	3.8	-16	3.7	-13	78.4	366.0	-79	308.5	-75
	Polonnaruwa	24.5	65.1	-62	65.9	-63	4.0	4.5	-11	4.5	-10	98.0	291.3	-66	293.9	-67
UVA	Badulla	10.2	27.3	-63	27.1	-62	3.6	3.7	-2	4.0	-9	36.6	99.8	-63	107.5	-66
	Monaragala	16.5	37.7	-56	33.2	-50	3.6	3.7	-4	4.0	-10	59.4	140.9	-58	132.0	-55
Sabaragamuwa	Ratnapura	6.3	11.1	-43	12.0	-47	3.4	3.3	2	3.2	4	21.3	36.7	-42	38.8	-45
	Kegalle	3.5	5.7	-39	6.0	-42	3.6	3.7	-2	3.5	3	12.6	21.0	-40	20.9	-40
SRI LANKA	Uda Walawe	1.1	12.2	-91	12.5	-91	5.6	5.8	-3	6.1	-8	6.2	70.8	-91	75.7	-92
	Mahaweli	55.2	24.0	130	23.7	133	4.7	5.6	-17	5.5	-14	259.4	135.5	92	129.8	100
	SRI LANKA	463.8	742.7	-38	696.8	-33	3.4	3.9	-12	3.9	-12	1 586.7	2 902.7	-45	2 715.8	-42

Source: Department of Census and Statistics from 2011/12 to 2015/16 and 2016/17 mission's estimates.

^{1/} Five-year average: 2011/12 and 2015/16.

Table 4. Sri Lanka - Comparison between *yala* season 2017, 2016 and five-year average area, yield and production of paddy

Province	District	Area harvested					Yields					Production				
		2016/ 17	2015/ 16	Change: 2016/17 over 2015/16	Average 2012- 2016	Change: 2016/17 over five-year average ^{1/}	2016/ 17	2015/ 16	Change: 2016/17 over 2015/16	Average 2012- 2016	Change: 2016/17 over five-year average ^{1/}	2016/ 17	2015/ 16	Change: 2016/17 over 2015/16	Average 2012- 2016	Change: 2016/17 over five-year average ^{1/}
West	Colombo	0.4	0.4	-12.1	1.0	-63.8	2.1	2.2	-3.8	2.3	-8.1	0.7	0.9	-15.4	2.2	-66.4
	Gampaha	3.0	1.9	60.0	3.9	-24.0	2.2	2.3	-4.2	2.6	-15.6	6.6	4.3	53.2	10.4	-36.7
	Kalutara	5.0	2.8	79.5	6.2	-19.2	2.7	2.7	-0.9	2.6	3.0	13.5	7.6	77.8	16.2	-16.7
Central	Kandy	6.0	7.6	-20.6	7.6	-21.1	2.8	2.8	-1.6	2.9	-4.2	16.5	21.1	-21.8	21.9	-24.5
	Matale	6.3	7.4	-14.5	7.7	-17.7	4.2	4.4	-4.4	3.8	10.6	26.4	32.4	-18.3	29.6	-10.6
	Nuwara Eliya	1.8	2.0	-8.7	1.8	2.4	1.9	1.9	0.1	2.0	-7.3	3.4	3.7	-8.6	3.6	-6.3
South	Galle	2.0	1.2	69.5	3.9	-48.2	2.4	2.5	-2.2	2.2	7.8	4.8	2.9	65.7	8.5	-43.0
	Matara	5.0	6.3	-21.1	10.7	-53.3	2.9	2.9	-1.2	2.8	4.9	14.5	18.6	-22.0	29.5	-50.8
	Hambantota	20.6	22.0	-6.3	22.9	-10.0	4.6	4.6	-1.0	4.4	3.9	93.9	101.3	-7.2	100.7	-6.8
North	Jaffna															
	Mannar	1.2	2.0	-40.3	2.0	-40.8	3.9	4.0	-1.9	4.3	-8.3	4.7	7.9	-41.4	8.8	-47.2
	Vavuniya	1.0	1.1	-10.8	2.8	-64.5	3.8	3.9	-3.3	4.2	-8.5	3.8	4.4	-13.7	12.3	-69.1
	Mulativu	3.0	5.3	-43.9	3.8	-21.9	3.7	4.1	-8.7	4.0	-7.9	11.1	21.7	-48.8	16.2	-31.4
	Killinochchi	2.0	2.4	-18.1	4.1	-50.6	3.7	3.9	-4.4	4.1	-9.9	7.4	9.5	-21.7	17.3	-57.1
East	Batticaloa	21.0	27.3	-23.2	25.2	-16.7	2.9	3.1	-7.1	3.7	-22.0	60.9	85.3	-28.6	93.9	-35.1
	Ampara	55.0	64.0	-14.1	59.7	-7.9	4.5	4.6	-1.2	4.6	-1.6	247.5	291.5	-15.1	273.5	-9.5
	Trincomalee	10.0	21.0	-52.3	17.9	-44.1	4.4	4.5	-3.2	4.3	1.6	44.0	95.3	-53.8	78.2	-43.8
North Western	Kurunegala	45.0	49.4	-8.8	46.1	-2.5	3.5	3.5	-1.1	3.5	-0.5	157.5	174.6	-9.8	163.1	-3.4
	Puttalam	10.0	13.6	-26.3	10.9	-8.5	2.7	2.8	-3.2	3.1	-14.0	27.0	37.9	-28.7	34.3	-21.3
North Central	Anuradhapura	25.0	38.2	-34.6	34.7	-27.9	3.4	3.5	-1.5	3.5	-2.6	85.0	132.0	-35.6	121.8	-30.2
	Polonnaruwa	35.0	56.2	-37.8	52.1	-32.8	4.4	4.5	-1.5	4.2	3.6	154.0	251.1	-38.7	222.3	-30.7
UVA	Badulla	12.0	12.7	-5.4	12.7	-5.5	3.8	3.8	-0.1	3.8	-1.0	45.0	47.6	-5.4	48.1	-6.5
	Monaragala	8.0	9.4	-14.7	11.9	-32.9	4.0	4.3	-6.4	3.9	3.1	32.0	40.1	-20.2	46.1	-30.5
Sabaragamuwa	Ratnapura	6.0	6.1	-2.2	7.9	-23.9	3.4	3.5	-4.1	3.2	6.5	20.4	21.7	-6.2	25.0	-18.4
	Kegalle	2.0	2.4	-17.3	3.6	-44.3	3.1	3.1	-1.2	2.8	9.9	6.2	7.6	-18.3	10.2	-39.0
SRI LANKA	Uda Walawe	10.3	10.6	-2.9	11.4	-9.9	6.0	6.2	-3.8	5.8	4.2	61.7	66.0	-6.6	65.5	-5.8
	Mahaweli	6.0	6.6	-9.5	9.1	-34.4	4.5	4.6	-1.8	4.6	-2.4	27.0	30.4	-11.1	42.5	-36.5
	SRI LANKA	302.6	380.0	-20	381.7	-21	3.8	4.0	-5	3.9	-2.0	1 151.4	1 517.4	-24	1 501.6	-23

Source: Department of Census and Statistics from 2011/12 to 2015/16 and 2016/17 mission's estimates.

^{1/} Five-year average: 2011/12 and 2015/16.

3.6 Maize production forecasts in 2017

Although it occupies only a small fraction of the cropping land, maize is becoming increasingly important for livestock feed. The current national requirement is estimated at 550 000 tonnes. Between 80 and 90 percent of the production comes from the *maha* season. It is estimated that only about 151 000 tonnes were produced in the 2016/17 *maha* season, which is 73 percent of the previous *maha*'s production. As is shown in Table 5, the reduced production was attributable to low yields, while area under maize cultivation increased

Table 5: Sri Lanka - Maize production, *maha* 2012/13-2016/17

	2012/13	2013/14	2014/15	2015/16	2016/17
Area '000 hectares	51	56	58	57	62
Production '000 tonnes	166	173	211	207	151
Yield tonne/hectare	3.3	3.1	3.6	3.6	2.4

3.7 Other crops

Other crops, such as green chilli, red and big onion, cow pea and ground nut were also negatively affected by the drought, with production estimated to have decreased in the range of 22 and 66 percent. The 2017 output of millet and green gram is estimated to have decreased by half compared with normal levels. The Mission notes that the adoption of sorghum, cassava and other more drought-tolerant crops was limited. Drought-tolerant crops need to be promoted and supported as a part of the crop diversification strategy.

3.8 Vegetables, fruits and other crops in 2016/17

Vegetable prices in Sri Lanka often follow a two-year cycle, largely because of inadequate market intelligence. If prices of a vegetable commodity are high in one year because of an under-supply, growers tend to produce more of that commodity in the following year, thereby creating a glut and lowering the market price. This year's temperate vegetable production in the highlands was especially good as a result of low cloud cover, high levels of insolation, and low levels of disease incidence due to the relatively dry conditions. Consequently, market prices of many vegetables fell substantially below the cost of production. For instance, in Nuwara Eliya, leeks, the cost of production of which was approximately LKR 20/kg, were selling in March for LKR 5/kg. The situation was similar for cabbage, carrots and beetroot. Some upland areas reported that vegetables had been fed to livestock because of the low market price. Potatoes, however, held their usual price, mainly because imported potatoes (mostly from India, Pakistan, Bangladesh and China) are subject to a high import tax.

Pineapple and coconuts were also negatively affected by the poor rains, with the price of the latter doubling in most markets.

Farmers have been encouraged to diversify into less water-demanding crops than paddy in view of anticipated climate change. The area planted to black gram, the most popular of such crops, increased from 9 267 hectares in 2015/16 to 14 185 hectares in 2016/17. However, because of moisture stress the average yield in 2016/17 was 570 kg/hectare, down from 970 kg/hectare the previous year.

3.9 Livestock production in 2016/17 and prospects for 2017

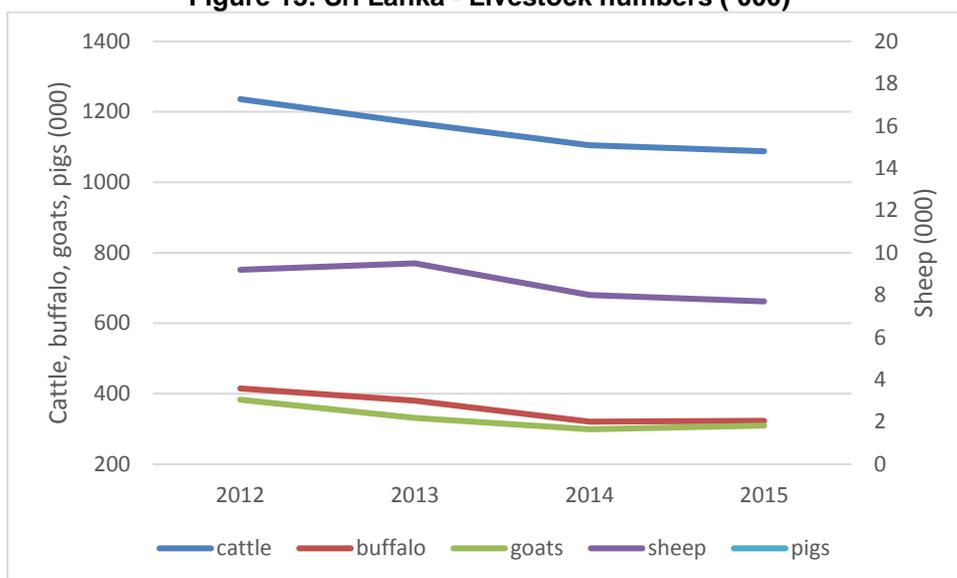
Numbers of the principal livestock species - cattle, buffalo and goats - declined slightly between 2012 and 2015 (Table 6 and Figure 13), but cattle numbers are reported to have recovered since 2015 to about 1.2 million (Ministry of Rural Economic Affairs). The decline in buffalo numbers may be attributed to the increasing mechanization of land preparation.

Table 6. Sri Lanka - Livestock numbers (000)

	2012	2013	2014	2015
Cattle	1 236	1 169	1 105	1 088
Buffalo	415	381	321	323
Goats	383	331	299	309
Pigs	89	81	105	70
Sheep	9	9	8	8

Source: Department of Census and Statistics.

Figure 13: Sri Lanka - Livestock numbers ('000)



Source: Department of Census and Statistics.

Cattle are kept for both milk and meat production. Milk yields are low, especially in the dry zone where local breeds typically produce 2 litres per day. Milk production from hybrid cows in the wet zone is better, but it is still low at around 6 litres per day. Annually, Sri Lanka produces some 410 million litres of milk, 24 percent of which comes from buffaloes. This provides the country with about 40 percent of its milk requirement, the rest being imported as milk powder, mainly from Australia and New Zealand. About 160 000 cattle are slaughtered each year, and beef imports are negligible.

Goats are found mainly in the dry zone where they are kept for meat production; about 50 000 are slaughtered each year. With a poultry population of about 16 million, Sri Lanka is self-sufficient in poultry meat and eggs, with some eggs being exported to the Maldives.

The unusually low rainfall during the last three months of 2016 resulted in poor pasture conditions (refer to NDVI figures to show extent of drought impact on pastures) and a slight decline in milk production. Some small cattle owners, whose paddy production had been compromised during this period, sold off one or two animals for cash, but such sales are not uncommon. No livestock deaths were reported as a result of the dry conditions. With the above-average rainfall received in January and February, pastures, livestock condition and milk production began to recover, and in areas where the harvesting of paddy had just finished, stubble-grazing further increased the availability of fodder.

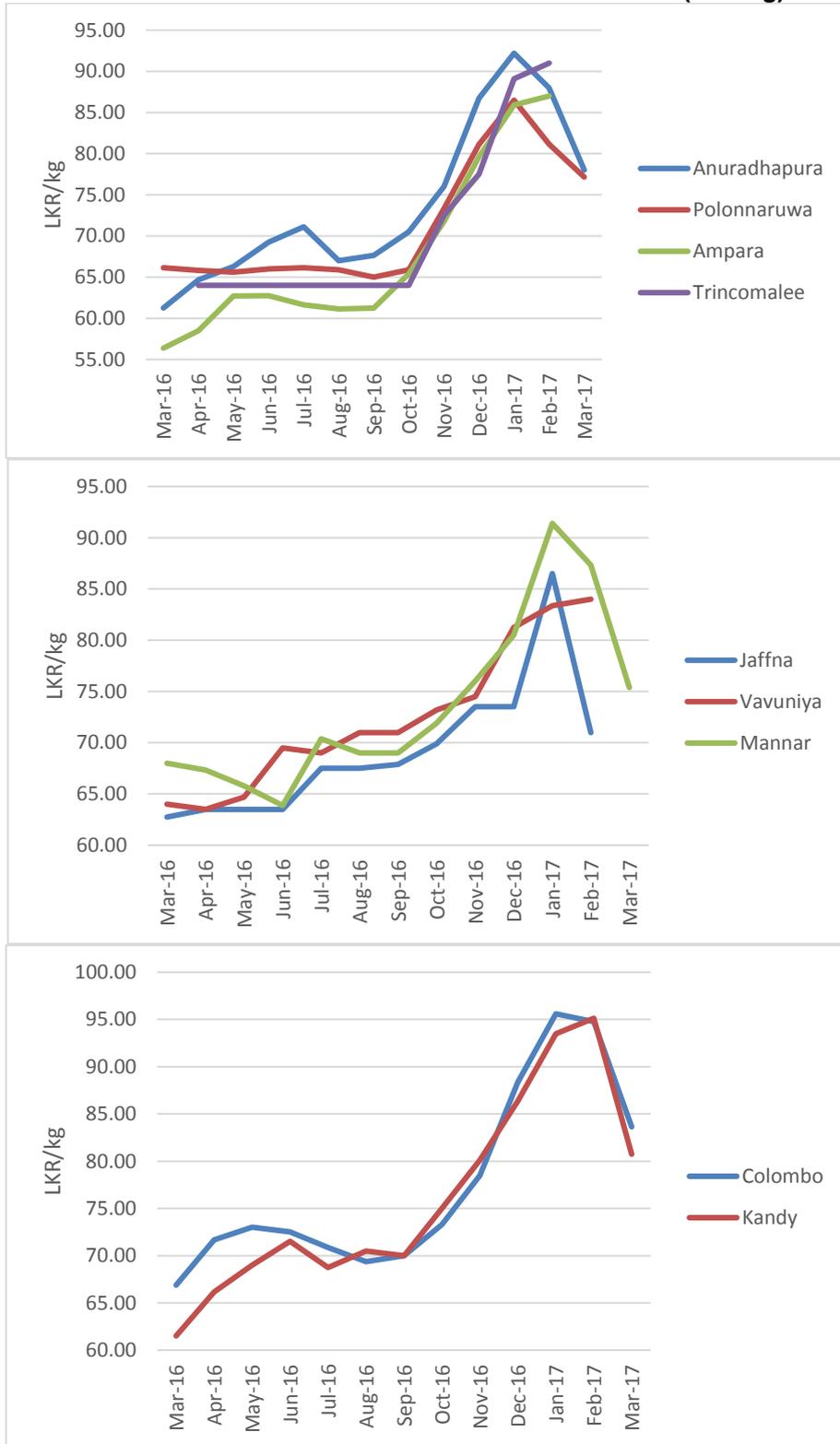
Apart from reduced productivity resulting from a shortage of good pasture, livestock health has been generally good. Haemorrhagic septicaemia, which was previously common in the wet zone, has been under control. Likewise, following a series of outbreaks, Foot-and-Mouth Disease (FMD) is now controlled by a programme of vaccination. The most recent significant outbreak may have accounted for some of the decline in the cattle population between 2013 and 2015.

The area under maize, which is largely used for livestock feed, has been increasing in recent years, encouraged by Government subsidies for seed and fertilizer. Sri Lanka normally produces about 75 percent of its maize requirement, with the remaining 25 percent being imported from, amongst others, India, Ukraine and Pakistan. The expected sharp reduction in maize production in 2016/17 as a result of poor rainfall will have a negative impact on the availability of livestock in the coming months and will presumably necessitate an increase in imports. Without such imports, the number of livestock sold for slaughter may increase.

4. FOOD SUPPLY AND DEMAND SITUATION

4.1 Rice price trends

Figure 14: Sri Lanka–Rice (white) retail prices (nominal terms) in selected markets from March 2016 to March 2017 (LKR/kg)



Source: Department of Census and Statistics (<http://www.statistics.gov.lk>).

Retail price of rice seasonally declines between January and March following the start of the main harvest, and remain generally stable until July, when it normally softens again in August and September with the harvest of the secondary season crop. Prices normally peak between October 2016 and January 2017, prior to the

main season harvest. As illustrated in Figure 13 retail prices of the main consumed white rice in most markets have been characterized by steady upward trend since September 2016, reaching record levels in December 2016 and January 2017, and in some regions they continued to rise until February, reflecting tight market availabilities, following the sharp decrease of the 2016 secondary *yala* and 2016/17 main *maha* season outputs. Domestic rice prices start declining between January and March 2017 with the harvest of the 2016/17 *maha* crop and Government measure to contain prices, including increased stock releases, reductions in charges levied on imports and imposition of new maximum retail prices for rice (Table 7). However, rice prices in March-April 2017 were at high levels, averaging 15 percent higher than a year earlier and 5 percent above the five-year average for the same month.

Tight market availabilities in 2017 are expected to further underpin already high rice prices, raising concerns about food access by most vulnerable sections of the population.

4.2 Spatial market integration

According to the price data provided by Department of Census and Statistics price variations exist between districts, however they are relatively small, implying an overall good spatial market integration. Road density in Sri Lanka is 173.9 km per 1 000 km² being one of the highest among South Asian countries, and roads conditions are overall good, allowing a fast and economical movements of goods throughout the country.

Table 7: Sri Lanka – Rice policy developments, 2017

2017	Policy Instrument	Description
January	Import tariff	The Government reduced taxes on certain types of imported rice. Several previous taxes (Customs Duty, Value Added Tax, Port and Airport Levy and National Building Tax) that summed up to LKR 80 (USD 0.53) per kg of imported rice have been removed and replaced by a Special Commodity Levy of only LKR 15 (USD 0.1) per kg. The concession will apply to the imports of Samba, Naadu and Red rice but not Basmati rice and was meant to be effective for three months starting 7 January 2017.
January	Import tariff	Reduced the Special Commodity Levy on rice imports to LKR 5 (USD 0.03), down from a previous rate of LKR 15 (USD 0.1) per kg. The concession was effective until 26 February 2017 and applied to the imports of brown raw rice, Samba and Nadu, but not Basmati rice.
February	Consumer price	The Consumer Affairs Authority (CAA) set the maximum retail prices (MRP) for three varieties of rice. The price of Nadu rice was set at LKR 72 (USD 0.47) per kg, Samba rice (excluding Keeri Samba and Suduru Samba) at LKR 80 (USD 0.53) and raw rice at LKR 70 (USD 0.46).
February	Consumer price	Issued orders clarifying that the maximum retail prices announced on 8 February 2017 would apply to imported rice. For local produce, price ceilings were set at LKR 90 per kg (USD 597 per tonne) in the case of Samba (excluding Keeri Samba and Suduru Samba), LKR 80 per kg (USD 530 per tonne) for Nadu rice and at LKR 78 per kg (USD 517 per tonne) for Raw rice, effective 17 February 2017.
March	Import tariff	Extended the validity of the LKR 5 per kg (USD 0.03) Special Commodity Levy on rice imports until 31 March 2017.
March	Import tariff	Extended again the validity of the LKR 5 per kg (USD 0.03) Special Commodity Levy on rice imports until 30 May 2017.

4.3 Cereal supply and demand balance for 2016/17

The Mission presents a disaggregated version of the national cereal supply/demand balance, considering separately rice, maize and wheat. The forecast supply and demand situation for the 2017 marketing year (January/December) is summarised in Table 8 and is based on Mission's production estimate for the 2016/17 *maha* season and forecast of the 2017 *yala* crop and on the following assumptions:

- **Population:** The total national population at 1 July 2017 is forecast by UN-DESA at 20.9 million. This figure is used as the mid-year population for the 2017 marketing year (January/December).
- **Production:** In aggregate, paddy production in 2017, including a forecast for the ongoing 2017 secondary *yala* season, is estimated by the Mission at 2.73 million tonnes (in paddy terms). Maize production in 2017 is estimated at 171 000 tonnes.

- **Milling rate for rice:** Ratio paddy to rice is 68 percent.
- **Stocks:** The Mission gathered some information on the total level of cereal stocks held in the country at the beginning and the end of the marketing year (i.e. in the hands of the Government, millers and traders). However, given the lack of reliable data, in particular for the amount of private stocks, for the purpose of the balance only the estimated variation in stocks during the year is shown. The Mission assumes a 250 000 tonne draw-down of rice stocks during the 2017 reflecting the lower output forecast, while no change is envisaged for wheat and maize.
- **Seed rate:** The average seed rate for rice paddy is estimated at 103 kg per hectare, based on the prevailing seed rates used in the country, allowing for some multiple planting for 2017/18, total seed use is estimated at 80 000 tonnes (milled basis). The maize seed rate is estimated at 15 kg per hectare.
- **Feed:** Feed requirement, mostly maize, is estimated by the Mission at 140 000 tonnes considering the five-year trend.
- **Post-harvest losses:** Post-harvest losses for rice are estimated at 9 percent, while for maize at 5 percent. Storage losses for the imported wheat are estimated at 2 percent.
- **Cereal consumption:** The 2012/13 Household Income and Expenditure Survey estimated the average rice consumption per year per person at 110.2 kg. However, these estimates do not include out of home rice consumption, gifts or other non-paid receipts, rice based processed food, such as cakes, biscuit, noodles, snacks and chips. Pending more accurate figures on milled rice consumption in the country, an annual per capita consumption of 122 kg per person/year is used in the construction of the cereal balance. This rate is based on the apparent average consumption of the previous five years using data from FAO/GIEWS Country Cereal Balance Sheets. Per capita consumption of wheat is estimated at 42 kg per person per year, while that of maize at 5.8 kg per person per year.

Table 8. Sri Lanka - Cereal supply and demand balance sheet, 2017 ('000 tonnes)

	Rice	Maize	Wheat	Total
Total domestic availability	2 112	171	0	2 283
Production	1 862	171	0	2 033
Stock draw-down	250	0	0	250
Total utilization	2 798	271	998	4 067
Food	2 550	121	878	3 550
Feed	0	140	0	140
Seed	80	1	0	81
Post-harvest losses	168	9	20 ^{1/}	196
Exports	0	0	100	100
Stock build-up	0	0	0	0
Estimated import requirements	686	100	998	1 784
Anticipated commercial imports	686	100	998	1 784

Note: Rice in the balance sheet is in milled terms.

^{1/} Storage losses.

Estimated import requirement: The cereal import requirement in 2017 is forecast at about 1.78 million tonnes. It comprises 998 000 tonnes of wheat and 100 000 tonnes of maize. For rice, the import requirements are estimated at 686 000 tonnes for 2017. This is well above the five-year average and considerably up from a mere 30 000 tonnes imported in 2016 (Figure 6), when ample inventories and higher duties discouraged imports. However, this year's rice imports are expected to be close to or above the 2014 level, when they reached 600 000 tonnes, in response to a drought-reduced rice production. In the first four months of 2017, the country has already imported 288 038 tonnes of rice, considerably above the 9 540 tonnes imported during the corresponding period of last year. The increased imports this year were supported by a decision taken by the Government in early January to replace all charges levied on imported rice, namely Customs Duty, Value Added Tax, Port and Airport Levy and National Building Tax that summed up to LKR 80 (USD 0.53) per kg, with a Special Commodity Levy of only LKR 15 (USD 0.1) per kg (see Table 7). Successive decisions further lowered this rate to LKR 5 (USD 0.03) per kg, extending its validity until 30 May 2017. Based on country's import capacity, the Mission expects that the entire cereal import requirement will be covered by commercial imports.

5. HOUSEHOLD FOOD SECURITY AND VULNERABILITY

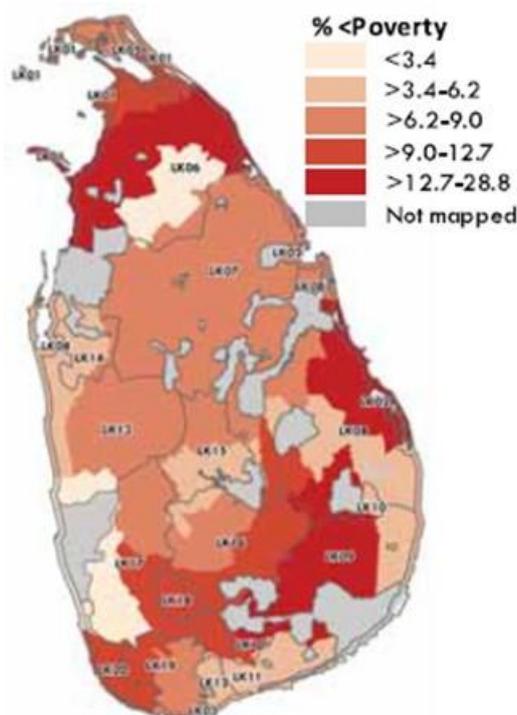
Food security in terms of availability, access and utilization of food can be affected by vulnerability contexts and external factors. These include policies, economic shocks, the social position of households, geographic localities and climate hazards. An assessment of the impact of such factors on livelihoods, along with an analysis of people's coping strategies and ability to recover, allows to inform decision-making processes and help determine entry-points for the provision of assistance.

5.1 Background information and food security

Despite Sri Lanka's progress in key economic and social indicators, vulnerability to food insecurity still exist in the country. Extreme poverty has decreased from 13 percent in 2002 to less than 3 percent in 2012/13, but geographical pockets of severe poverty persist, particularly in the northern and eastern districts (World Bank, 2016).

Half of Sri Lanka's poor and 43 percent of near-poor workers are employed in the agricultural sector, which accounts for 30 percent of the population (WFP, 2015; World Bank, 2016). Poverty remains one of the main drivers of food insecurity, with the majority of the poor living in rural areas and having low resilience to shocks and climate variability.

Figure 15: Sri Lanka - Poverty rates in percentage mapped at district level and overlaid with livelihood zones

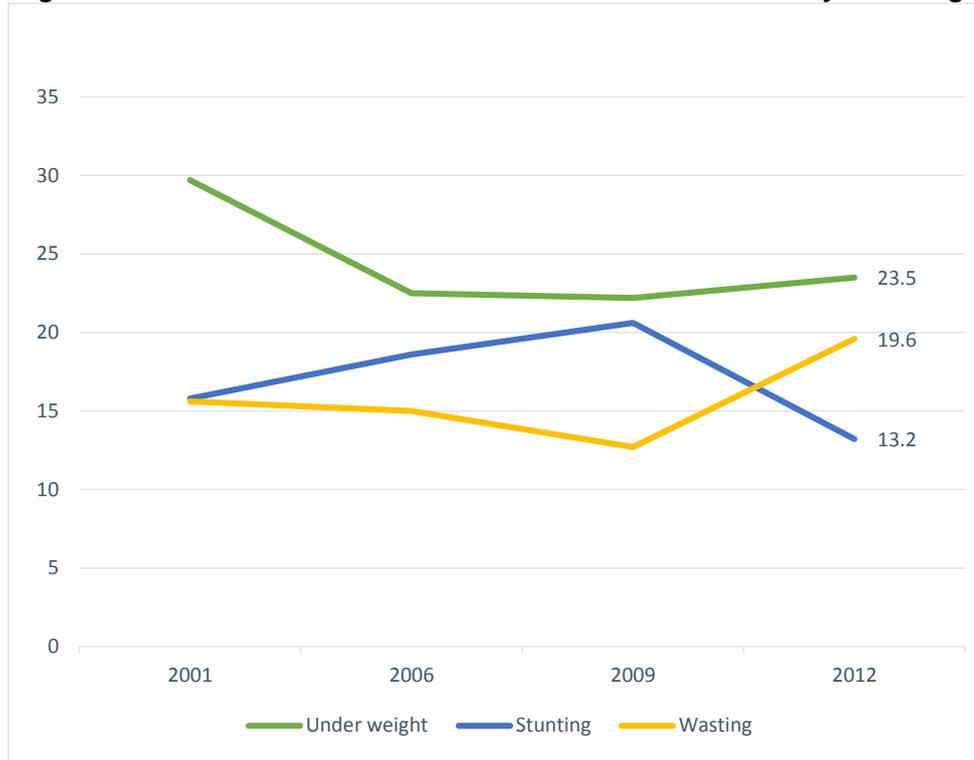


Source: DCS, 2014.

Also malnutrition remains a challenge in the country, with malnutrition rates having shown little improvement over the past decade. According to the most recent National Nutrition Survey of 2012, the prevalence of acute malnutrition (wasting) at 19.5 percent in children 6-59 months is among the highest in the world⁵. Severe acute malnutrition (SAM) was reported as 2.3 percent, whereas the level of stunting decreased to 13.2 percent (see Figure 16). Children in the estate sector such as in Nuwara Eliya (23.8 percent) and Badulla (22.3 percent) show a level of stunting that is nearly three times higher than in urban areas such as Colombo (8 percent). The districts of Kilinochchi (34.9 percent) and Moneragala (28.8 percent) show the highest wasting rates (SAPRI, 2017).

⁵ See Annex 3 for the prevalence of wasting and stunting across the country.

Figure 16: Sri Lanka - Malnutrition trends in children under five years of age



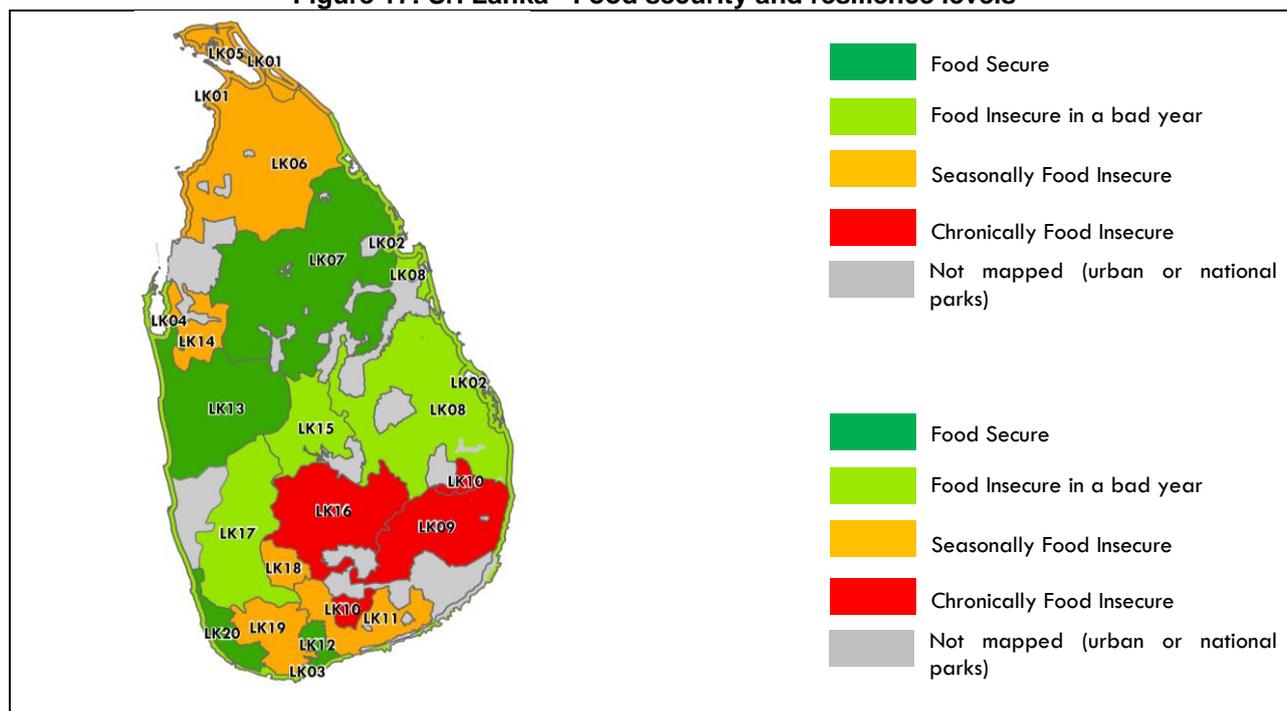
Source: National Nutrition and Micro-Nutrient Survey, 2012.

Economic access to nutritious food is not the only determinant of malnutrition, but nonetheless represents a main prerequisite and should be taken into account. Indeed, results from the latest study on the minimum Cost of Diet (COD) estimate that the inability of households to access sufficient nutritious food could be a key contributing factor of malnutrition in the country (WFP and HARTI, 2015). While poverty rates take into account the affordability of sufficient calories, the COD shows whether households have access to a diet that meets all nutrient requirements. According to the study capturing a one-year timeframe (from October 2013 to September 2014), more than half of the households in the Eastern Province could not afford an adequately nutritious diet, in the Uva Province it ranged between 39 and 48 percent, and in the Northern and Central Provinces the percentage ranged between 27 and 36 percent (WFP and HARTI, 2015).

In terms of geographic distribution, a qualitative evaluation of relative food security among the poorest households evidenced chronic food insecurity and poor resilience in the southeastern livelihood zones (Figure 16). In these zones⁶ the majority of poor households depend either on rainfed paddy farming or on low wage labour in the up-country tea production (WFP, 2015). The main drivers of food insecurity and poor resilience in these areas were identified in the limited production of own food – and hence the higher reliance on the market – coupled with poverty and low diversification of livelihoods. Seasonal food insecurity and low resilience were reported in the northern districts and in certain areas of the south (WFP, 2015).

⁶ See Annex 2 for a detailed breakdown of livelihoods zones in Sri Lanka.

Figure 17: Sri Lanka - Food security and resilience levels



Source: WFP and MED, 2014.

Over the past ten years Sri Lanka experienced a cycle of hydro-meteorological disasters such as floods (in 2011, 2012, 2013, and 2016) and droughts (in 2010, 2012, 2013, 2014, and 2016/17). As has been highlighted by a series of assessments carried out by WFP (WFP, 2011, 2014, 2015 and 2016), these extreme weather events disproportionately affect the poorest and already food insecure households who depend on/are engaged in agriculture activities through a combination of decreased production and resource availability. At the same time, climate hazards play a key role on people's income due to the country's high reliance on climate-sensitive income activities. With nearly 80 percent of the population considered rural, livelihoods are closely intertwined with agricultural industries (as producers, processors, traders, retailers, etc.). Particularly climate-sensitive income include daily/seasonal agricultural labour or sale of rainfed crops (see Table 9). As a consequence, these livelihood groups are more likely exposed to climate variability and shocks, and hence more rapidly at risk of food insecurity.

Table 9: Sri Lanka - Livelihoods and climate sensitivity

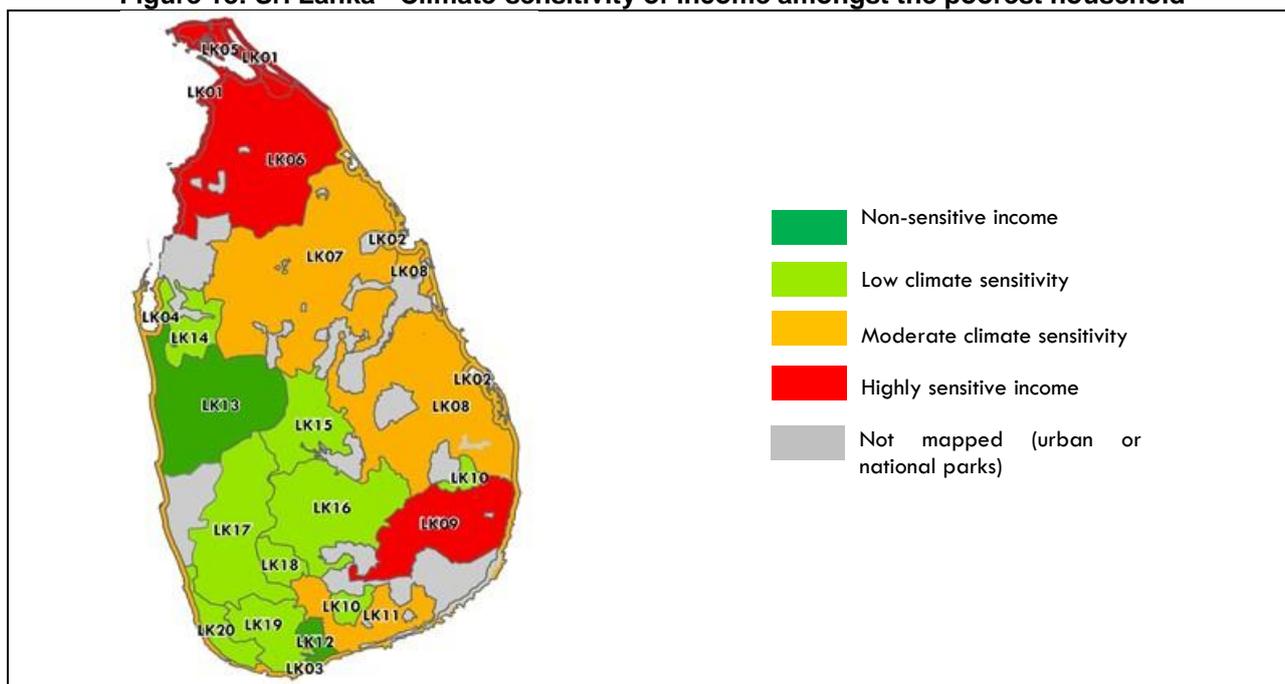
Not climate-sensitive livelihoods	Low climate-sensitive livelihoods	Medium climate-sensitive livelihoods	High climate-sensitive livelihoods
<ul style="list-style-type: none"> - Gem mining - Timber products - Urban areas/factory workers - Civil servants 	<ul style="list-style-type: none"> - Mixed cash crops and paddy farming (cash crops as dominant livelihood) - Peri-urban farming and garment work 	<ul style="list-style-type: none"> - Mixed paddy farming and cash crops - Mixed paddy farming and petty trade - Irrigated paddy farming (<i>yala</i> season crops) 	<ul style="list-style-type: none"> - Rainfed upland paddy farming - Coastal fishing - Livestock rearing - <i>Maha</i> season crops

Source: WFP, 2015.

In Sri Lanka, rain is a key climatic variable influencing food security. It is required not only for rain-fed crop cultivation, but also to replenish and maintain water levels in the tanks and reservoirs, on which particularly the northcentral and eastern parts of the dry zone depend for irrigation. Indeed, in geographic terms, poor households in areas with a more climate-sensitive income (Figure 18) show also higher levels of food insecurity and lower levels of resilience (Figure 16). Rain also affects vegetation growth on which animals graze. Animal rearing is a common practice among most of the subsistence farmers especially important for livelihood zones LK 14, LK 13, LK 16 and LK 07 in the country⁷.

⁷ See Annex 2 for a detailed breakdown of livelihoods zones in Sri Lanka.

Figure 18: Sri Lanka - Climate-sensitivity of income amongst the poorest household



Source: WFP and MED 2014.

5.2 Impact of current drought on livelihoods

In 2016 and progressing into 2017, rainfall was erratic and below normal as both the southwest and northeast monsoons failed to bring sufficient rain. The dry spells affected in particular paddy cultivation during the 2016/17 *maha* season (September-March), which usually provides two thirds of the annual national domestic supply of rice, Sri Lanka's main staple food. At the same time, in 2016 Sri Lanka experienced floods over its Central and South-western regions, in particular in Colombo, Gampaha and Kegalle district.

The timing of the dry spells, which coincided with the start of the *maha* season, has been detrimental for paddy farmers especially in rain-fed areas of the dry and intermediate zones. Community based discussions with paddy producing farmers revealed that on average they lost one third of their fields. Most affected farmers lost their entire crops. The lack of water often promoted them to abandon their fields even at flowering stage after the application of herbicides, fertilizers and other inputs (i.e. about 2 months after planting). Albeit to a lesser extent, paddy cultivation was affected also in certain areas under minor and major irrigation because of the lack of the timely availability of water. Irrigation in these areas of the dry zone is possible thanks to an extensive network of micro-tanks which depend on water from the monsoons. As water levels in tanks were extremely low, there were some delays in irrigation water supply and in some instances the Ministry of Irrigation advised farmers not to grow paddy.

In Kurunegala, Mannar, Vavuniya and Kilinochchi some farmers had adopted a risk adverse strategy by cultivating alternative crops such as sweet potatoes, green gram and cassava or left land fallow. In these districts, the Department of Agriculture had provided seeds and/or other agricultural inputs, although this support was available only to a small percentage of affected farmers. Especially in rainfed areas, many households reported that also maize, green gram, and sesame had been affected by water shortage and in most cases households indicated that the sales of these crops would not cover their expenses.

Interviews with villagers conducted during the Mission revealed that particularly in the dry and intermediate zones, farming households experienced a significant loss of income because of drought conditions. This resulted mainly from the limited amount of paddy available for sale, coupled with a reduction of rice availability for own consumption, and exacerbated by higher than normal rice prices.

The Joint Assessment of Drought Impact on Food Security and Livelihoods (WFP 2017) carried out in February 2017 in ten of the most affected districts, evidenced that 227 000 households (i.e. 885 300 people) had been affected by drought and that around one third of the drought affected population experienced a reduction of their regular income by more than 50 percent. The predominant reasons mentioned during the survey included crop failure, severe yield losses and loss of livelihood. In line with these findings, the CFSAM also confirmed a reduction of income among visited households, and noticed this trend also in other districts such as Kegalle, Kilinochchi and Trincomalee not covered by the Joint Assessment. Agricultural livelihoods have been

adversely affected by drought also in Jaffna district, where agriculture is the leading sector with nearly 28 percent of the population depending on it. Paddy farming is mostly rainfed and as such households' income is highly sensitive to climate variability (see also Figure 17). Indeed, around 30 percent of all farming households in Jaffna were affected by drought (around 16 000 households), with up to 75 percent of cultivated paddy fields damaged throughout the district. For this reason, the Mission suggests to monitor the food security situation in the district in case the dry spell persist also throughout the coming months.

As reported by the Joint Assessment, also the CFSAM holds that not only farmers, but also the livelihood group of agricultural labourers has been largely negatively affected by drought conditions. The overall labour force may have declined, nevertheless a high percentage of casual labourers still engaged in the agricultural sector experienced a decrease of work opportunities during the 2016/17 *maha* season. This appears to be related to the reduction of paddy area planted and harvested compared to 2016 only around 70 percent of the area was planted and only 40 percent was harvested. Compared to the previous year, daily wages remained rather stable throughout the country at LKR 1000 for male and LKR 800 for female unskilled workers respectively, but poor labour market opportunities and increased retail prices of key food commodities impacted upon the income level of agricultural workers, as have increased inflation and the devaluation of the currency making imports more expensive. Discussions with daily labourers revealed that on average this *maha* season they had 30 percent less employment compared to the previous year, namely only 15 days instead of 21 during the cultivating and harvesting months.

5.3 Access and coping mechanisms

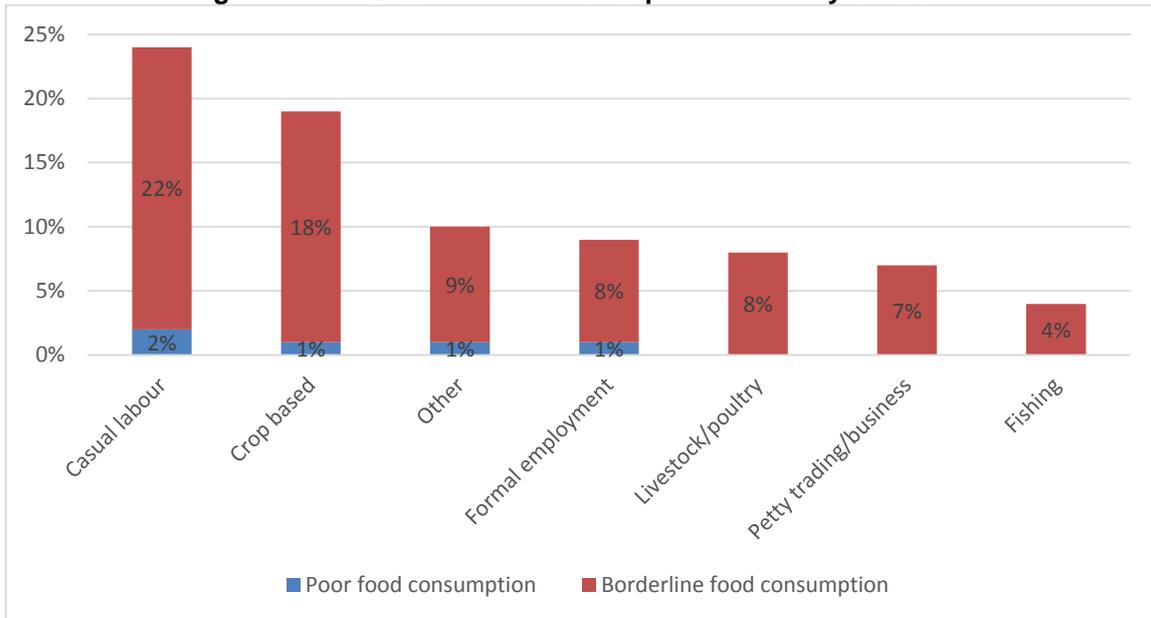
Through different livelihood strategies people aim at countering external factors that may impact their access to food as for example price volatility, low production or reduced employment opportunities. An analysis of coping strategies therefore contributes to achieve a better understanding of the impact of a shock on food security. Also household food consumption, in terms of dietary diversity, quantity and quality, is a key outcome indicator of food security.

In Sri Lanka, the majority of households visited by the Mission indicated they usually produced their own food for consumption, but given the sharply reduced 2016/17 *maha* output, they were predominantly procuring food from local markets. As such, the high prices of rice and other key commodities such as coconut represented a major challenge in households' ability to afford sufficient and adequate food. At the same time, the rising inflation particularly of food prices, is affecting households' purchasing power along with their ability to afford a nutritious diet.

Households typically consume at least three meals a day, with meals mostly based on rice and accompanied by a variety of coconut-based vegetable, meat and/or fish curries (WFP, 2015). However, the CFSAM noted factors indicating a deterioration of households' food consumption as a way to cope. Interviews at household levels and with market retailers evidenced that people were buying cheaper food whenever possible. Many reported a reduction in the purchase of meat and fish. Notwithstanding these coping mechanisms, when interviewed about their expenditure patterns, many households indicated that compared to the previous year they were spending a higher amount of their income for the purchase of food. At the same time, two thirds of the people interviewed said they were reducing the size of portions. This was particularly the case for farming and agricultural labourers residing in the rain-fed areas of the dry and intermediate zones.

An increase of borderline food consumption particularly among casual agricultural labourers and farming communities was highlighted also by the Joint Assessment carried out in February 2017 (see Figure 19). The survey showed that food security deteriorated among drought affected people, with approximately 227 000 households identified as borderline food insecure in the ten district covered by the assessment.

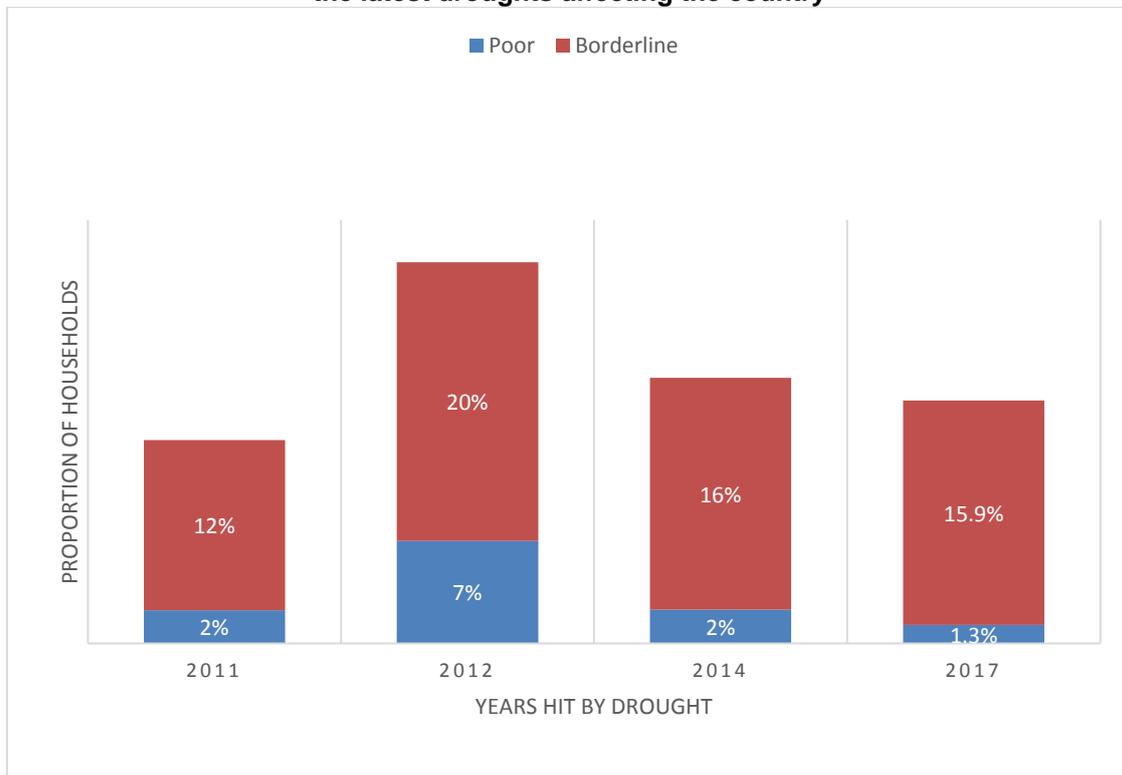
Figure 19: Sri Lanka - Food consumption scores by livelihood



Source: Joint Assessment of Drought Impact on Food Security and Livelihoods, February 2017.

It is worth noting that at present, 23.4 percent of households in Sri Lanka are female headed and that female-headed households are disproportionately represented among the poorest. At the same time, the number of women employed in the agricultural sector is higher than men, and they have been identified as particularly vulnerable to the impact of climate change (SAPRI, 2017). As such, drought conditions are likely having a more severe impact on female-headed households, given that they are less able to apply coping mechanisms such as migrating to seek labour elsewhere or starting additional employment. Indeed, the Joint Assessment conducted in February 2017 stressed that poor food consumption score is three times higher among drought affected female-headed households and this aspect should be carefully considered when planning assistance to affected population.

Figure 20: Sri Lanka - Trends in food consumption scores during the latest droughts affecting the country



Source: WFP.

Comparing trends in food consumption scores during the major droughts that the country experienced over the last decade (Figure 18), the findings show that borderline food consumption among drought-affected people is currently reaching almost the same levels as during the drought of 2014. There is a high likelihood that people affected by the current drought were affected also during previous dry spells. This repeated exposure to climate shocks over a relatively short period of time, has probably undermined households' resilience. At the same time, current estimates for the 2017 *yala* season are unfavourable. Considering the higher vulnerability of affected farming households who already experienced reductions of two consecutive harvest seasons, the loss of another harvest (*yala* 2017) would further erode their livelihoods and would undermine their ability to recover from the shock. Against this backdrop, the situation should be closely monitored over the coming months so as to ensure timely and targeted assistance in the event that food security levels worsen.

In addition to coping measures such as eating less preferred foods and limiting portion sizes, some families interviewed by the Mission were reducing the number of meals consumed per day or started selling their cattle. Some farmers who had lost their entire crop were seeking employment in other less drought-affected districts, as were also some daily labourers.

On the positive side, the CFSAM noticed that in certain districts such as Nuwara Eliya, Kandy, and Matale, the production of vegetables has been particularly favourable resulting in a surplus.

Borrowing and loans were among the prevailing coping strategies for households visited by the Mission. Many farmers explained that loans are a seasonal practice to pay for land preparation, farming inputs and labour, and that they usually settled them at harvest time with the sales of paddy and rice. However, when the crop fails these investments cannot be paid back, and discussions at household level revealed high levels of indebtedness. Many farmers and villagers were not able to settle outstanding loans but had nonetheless taken out new loans or started buying on credit as a way to cope with lower levels of income. Results from the February Joint Assessment indicated that 60 percent of the households surveyed had accumulated short-term debts.

Some farmers met by the CFSAM pointed out having difficulties in accessing loans from formal institutions. For this reason they were increasingly recurring to informal moneylenders or pawning households' assets such as jewels. In certain cases farmers were accepting loans from private middle men or millers who, in turn, at harvest time were in a position of purchasing rice and/or paddy at more favourable prices.

With regard to increased indebtedness, it should further be noted that the level of debt of paddy-producing farmers may further increase as they have to purchase paddy seeds and agricultural inputs for the upcoming *yala* season. As noted above, the production of quality seeds during *maha* 2016/17 has been seriously compromised, which is estimated to result in higher prices for paddy seeds. At the time of the Mission, farming households reported an increase of approximately 15-20 percent of seed prices compared to the previous year and that consequently they would depend on borrowing funds for the procurement of seeds. This would increase vulnerability among the affected populations. As observed elsewhere, increased indebtedness often leads to the sale of households' assets and as such to a further erosion of people's livelihoods and ability to recover from future shocks.

5.4 Preliminary impact of the May floods

Heavy rains in the second part of May 2017 caused severe localised floods and landslides predominantly in the southwestern parts of the country, resulting in displacement of people and damage to agriculture, infrastructure and housing. As of June 2017, according to the Ministry of Disaster Management, some 203 persons have died and at least 646 596 people (168 061 households) have been negatively affected by the floods in 15 districts. Around 68 730 people have been temporarily displaced to 365 camps that are operated by district governments.

The worst affected districts are Kalutara (Western Province), Matara and Galle (Southern Province) and Ratnapura (Sabaragamuwa Province), where flooding of this extent had not been seen since 2003. The heavy rains and related floods and landslides are estimated to have compromised the livelihoods and household's asset especially of the most vulnerable families, who may now experience greater difficulty in recovering from the shock. According to preliminary assessments conducted by the Ministry of Disaster Management and WFP, around 75 000 people are in need of urgent assistance.

6. RECOMMENDATIONS FOR 2017

6.1 Immediate actions

To cover immediate needs following the drought in 2016/17, the Mission recommends the distribution of seeds as well as planting and irrigation equipment for the next 2017/18 *maha* season in the main rice-producing areas with high crop losses, including Kurunegala, Anuradhapura, Moneragala, Polonnaruwa, Ampara and Trincomalee. Government is recommended to provide financial support for the purchase of seed paddy both from registered seed producers and from farmers who are not registered as seed producers but who have got good-quality clean seed for sale. Seed from un-registered producers may give lower yields than that from registered producers, but it is essential that enough seed be made available to farmers for the next 2017/18 *maha* season. For the ongoing 2017 *yala* season it is recommended that herbicides, especially for pest and disease controls as well as irrigation equipment, such as water pumps and boreholes for irrigation, be made available to the most affected farmers.

Considering the country's overall well-functioning domestic food markets, and as long as food prices do not increased steeply, any eventual food assistance is recommended to be provided in the form of cash and/or vouchers. This has also been confirmed by preliminary findings from the market assessment in Sri Lanka that is currently being finalized by WFP. Furthermore, the Mission recommends that immediate food assistance be provided to the most vulnerable households among the affected livelihood groups who may be less able to cope, such as children, elderly and people with disabilities. Particular attention should be given to female-headed households, as these have been found to be disproportionately affected by the drought. At the same time, food assistance should be complementary to any response planned by the Government and target affected groups that would not benefit from the government programme. It is recommended that the Government give incentives for the importation of rice by the private sector to cover the gap resulting from the reduced domestic output.

6.2 Long-term actions

Recognizing the increasing frequency of natural disasters affecting the agricultural sector and the impact on food security, it is also recommended to introduce longer terms measures to increase farmers' and households' resilience to natural disasters and climate change, such as promotion of drought tolerant crops and varieties, and livelihood diversification.

6.3 Institutional development

- Monitoring and early warning

Continuous monitoring and timely dissemination of information on climate hazards and shocks, market information and food security at all levels is crucial so that timely appropriate and coordinated mitigating actions can be taken to safeguard production and to improve the livelihood of the vulnerable population as well as to monitor the evolving situation. In this regard, relevant meteorological forecasting and early warning systems should be strengthened, so as to guarantee timely analyses and rapid access to information by farmers, decision-makers and other stakeholders.

- Weather forecasting

Farmers should be made more aware of long-term weather forecasts. A better communication between farmers, extension workers from the Department of Agriculture and the Department of Meteorology would be needed to better adjust the agricultural production planning and seasonal crop calendars to meteorological forecasts. In this regard, the Mission suggests to establish a real time surveillance systems for evidence-based agricultural production planning. In 2016 many paddy fields were sown at the normal *maha* time of sowing but later failed because of very poor rainfall in the following months. This situation might have been at least partially avoided if farmers had known that the rain forecast for October, November and December was poor.

- Climate change adaptation measures

With regard to the interrelatedness of food security and climate change, and taking into account the increased number of climate induced weather hazards in Sri Lanka, the Mission recommends to ensure appropriate investment on disaster mitigation and climate adaptation. This should include also the promotion of climate-smart seeds and crop varieties, agro-systems that are more tolerant to extreme weather events, livelihood diversification so as to reduce the climate-sensitivity of households' income and the provision of irrigation

support and drought resistance gardening technologies. Such measures will be beneficial for better preparing communities to face climatic challenges in the future.

6.4 Irrigation schemes and water control structures

- Dredging of tanks

Although the dredging of tanks is somewhat long-term, it should be started as soon as possible. The water-holding capacity of many tanks, especially minor tanks, has been greatly reduced over the last several decades/centuries by sedimentation.

- Rehabilitation and upgrade of irrigation schemes

The Ministry of Irrigation and Water Resources Management estimates that the efficiency of conveying irrigation water from tank to farmer's field is about 60 percent, part of the loss is due to evaporation but also partly due to leakage. Overall, the irrigation schemes need to be upgraded and damaged sections of irrigation canals need to be repaired. This will minimize losses of water and will increase water availability on time. Such upgrading of irrigation schemes is a long term measure and will require heavy investments.

- Water control structures

Water control structures need to be strengthened and expanded. Sri Lanka is prone to flooding, and extreme flooding may increase in the future because of climate change, which will be difficult for farmers to predict. This will improve the resilience, mitigation and adaptation of farmers. Additionally, training of extension staff and farmers in selected irrigation schemes needs to be strengthened.

6.5 Agriculture and household food security

- Crop diversification

Where possible, District Agriculture Offices should advise farmers to diversify into other less water-demanding crops than paddy, such as green gram, black gram, cassava etc. The Mission notes that the adoption of sorghum, cassava and other more drought-tolerant crops was limited. Drought-tolerant crops need to be promoted and supported as part of the crop diversification strategy. The financial advantages and food-security benefits of crop diversification should be explained to farmers, and planting material and cultivation instructions should be provided.

- Vegetable production

Vegetable producers should be encouraged to spread their production throughout the year in order to avoid seasonal gluts and low market prices. They should be assisted in this by being trained in off-season production methods, including the construction of rain shelters for vegetables that require a dry period prior to harvesting.

- Affected target groups requiring assistance

The Mission recommends that any government programmes intended to ease the impact of drought conditions should not limit assistance solely to land-owning (registered) farming households. Any potential support schemes should consider also the livelihood group of casual agricultural labourers and landless farmers, as they have equally fragile/vulnerable livelihoods negatively impacted by the drought and which are deemed in need of assistance. Female-headed households should be prioritized as outlined earlier.

- Agricultural loans and micro-credit

As stressed by a recent World Bank report (2016), the limited access of the poor and near-poor to formal credit leaves them with little room to maintain stable incomes when affected by adverse shocks. Especially in difficult periods such as the current drought, affected households engaged in the agricultural sector could be supported by accessing rural financial services, like interest free loan extensions. This measure would avoid that many households increase their level of indebtedness by recurring to taking out informal loans at higher interest rates.

- Insurance

Ensure that the insurance against crop losses/damages is in place, and in case it would be helpful to consider special schemes for particularly vulnerable groups such as female-headed households engaged in the agricultural sector. At the same time, the Mission identified the need to raise awareness of existing insurance programmes and their benefits among farming communities.

- Food storage/reserves

With the objective to improve food availability also in times of drought, a national strategic food reserve would help guarantee the availability of essential commodities and help maintain stable prices in case of reduced production. Hence the Government should consider improving the storage time and size of warehouses by modernizing storage facilities.

- Nutrition

Given that the country has one of the highest wasting rates in the world as well as high stunting and underweight levels, food assistance should focus on the provision of fortified foods and/or the use of vouchers to improve diet diversity and the uptake of nutritious foods. At the same time, considering that available nutrition data and information have not been updated since 2012, the Mission would recommend conducting a new SMART (Standardized Monitoring and Assessment of Relief and Transitions) survey or an equivalent national nutrition survey so as to monitor malnutrition rates and inform decision making for addressing ongoing challenges, as well as providing guidance on the most appropriate market-based intervention modalities to use in Sri Lanka.

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***Maha* paddy production situation by region in 2016/17**

Central Province (Matale, Kandy and Nuwera Eliya districts)

Most of Central Province's paddy is produced under irrigation. Poor rainfall in 2016 resulted in inadequate filling of major and minor tanks and a consequent reduction in planting area. The harvested area was around 20 percent lower the five-year average. Yields of irrigated paddy that received adequate water and of rainfed paddy that was already sufficiently well-established was less affected by the dry spell. Overall, paddy production of the 2017 *maha* crop have decreased on average by around 15 percent.

Eastern Province (Trincomalee, Batticaloa and Ampara districts)

Eastern Province is a major paddy producer. Most of Trincomalee's and Ampara's production is under irrigation whereas that of Batticaloa is mostly rainfed. With low rainfall and low levels of water in the tanks, production was well below average. In all districts the harvested area and yields decreased considerably compared with the five-year average. The expected result for the province is a *maha* production that is 25 percent of the long-term average.

Northern Province (Jaffna, Kilinochchi, Vavuniya, Mannar and Mullaitivu districts)

Apart from some small areas irrigated from wells, Jaffna's paddy production depends entirely on rainfall. At the other end of the scale, Mannar's production depends entirely on irrigation, while Vavuniya, Kilinochchi and Mullaitivu produce under both irrigated and rainfed conditions. Jaffna, which is in any case a minor producer, suffered most from this year's poor *maha* rainfall with less than 40 percent of its usual area being harvested. Mullaitivu, on the other hand, recorded an above-average harvested area. Yields in all five districts were low, giving an overall provincial production that is 74 percent of the long-term average.

North-Central Province (Anuradhapura and Polonnaruwa districts)

Along with Eastern Province, North-Central Province is normally one of Sri Lanka's major paddy producers. About 90 percent of the province's production is irrigated. Inadequate tank-filling prior to the 2016/17 *maha* season followed by very poor rainfall at the end of 2016 resulted in severe reductions in planted and harvested areas. Fields that were harvested yielded slightly below average, but the substantial reduction in area resulted in production that was less than 70 percent of the province's long-term average. Given that the province usually provides almost a quarter of the country's overall production, this result is especially serious.

North-Western Province (Kurunegala and Puttalam districts)

Much of North-Western Province's paddy production is irrigated, especially in Puttalam District. Inadequate tank-filling prior to the *maha* season combined with delayed and low *maha* rainfall resulted in significant reductions in area planted, area harvested and yields. The province's overall paddy production is estimated at 60 percent of the long-term average.

Saberagamuwa Province (Kegalle and Ratnapura districts)

Parts of Saberagamuwa Province are vulnerable to flooding, so the drier *maha* conditions at the end of 2016 had little effect on paddy yields, especially in Ratnapura District. However, low tank levels and delayed and low rainfall limited the area planted. The estimated overall production of 40 percent of the long-term average is attributable mostly to the reduction in harvested area.

Southern Province (Galle, Hambantota and Matara districts)

Southern Province was the least affected by the poor *maha* season in terms of production. Hambantota District, which depends very largely on irrigation and usually contributes more than 60 percent of the province's production, had access to enough water from six major tanks to plant almost 90 percent of its usual paddy area, although with somewhat reduced irrigation.

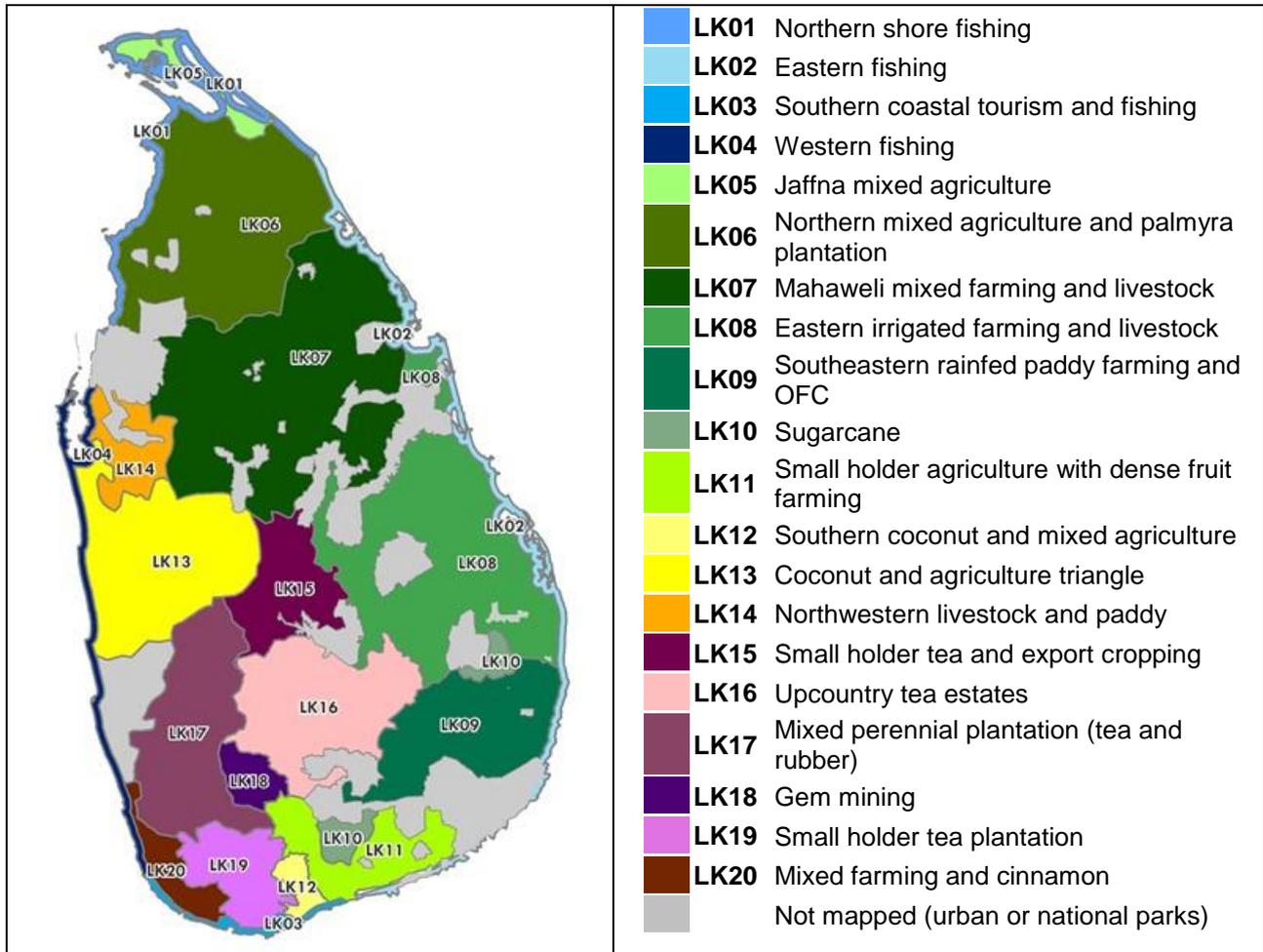
Western Province (Colombo, Gampaha and Kalutara districts)

Western Province is Sri Lanka's most urbanized province. Paddy production is predominantly rainfed and the province is vulnerable to recurrent flooding. Rainfall during *maha* season was well below average, but not to the extent experienced in most other parts of the country. In fact, some areas benefited from a lack of flooding. The overall area planted was below average and the area harvested was down by about 30 percent. However, yields of harvested paddy were only slightly reduced, resulting in a production estimate of 65 percent of the long-term average.

Uva Province (Badulla and Moneragala districts)

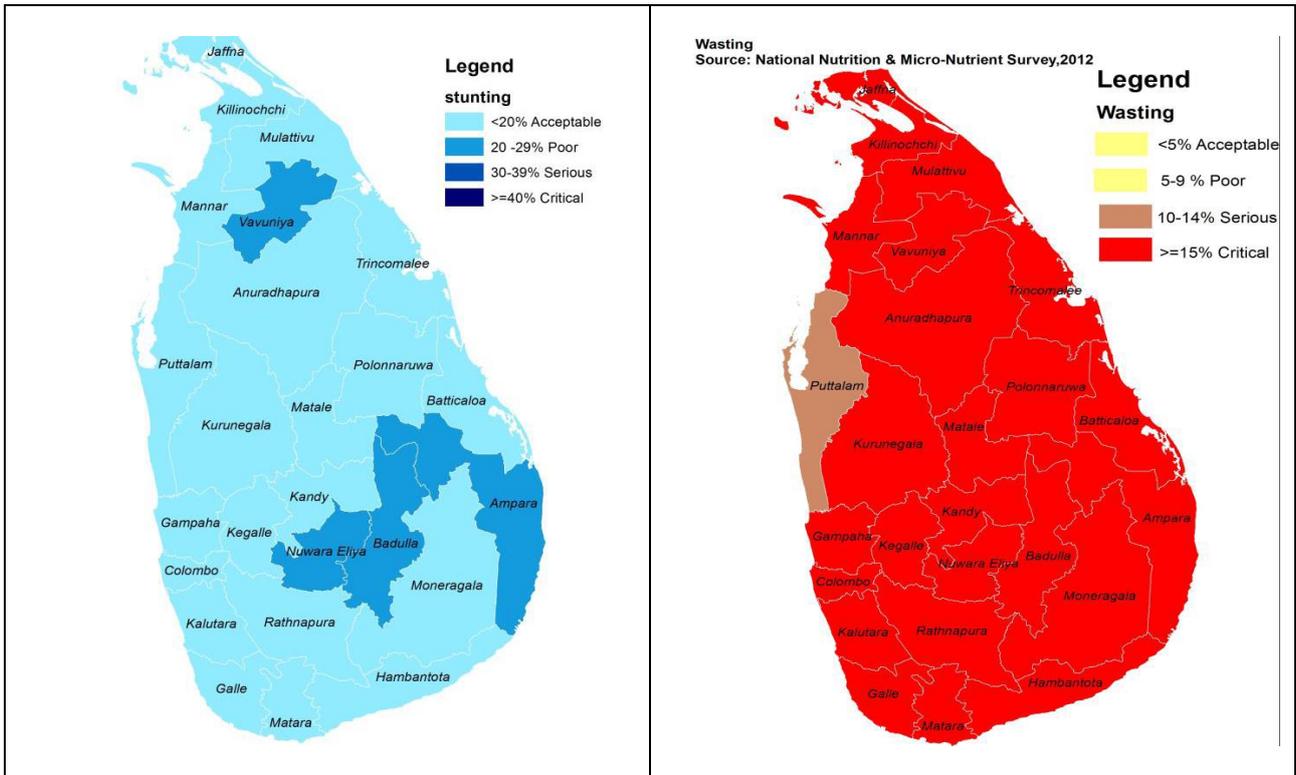
Paddy production in Badulla depends largely on irrigation while about half that of Moneragala is rainfed. Inadequate filling of major and minor tanks prior to the *maha* season and the subsequent very poor rainfall during the last three months of 2016 resulted in significant reductions in planted area, harvested area and yield. Production is estimated at 32 percent of the long-term average.

Livelihood zones in Sri Lanka



Source: WFP and MED 2014.

Prevalence of stunting and wasting



Source: National Nutrition and Micro-Nutrient Survey, 2012.

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