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1. HIGHLIGHTS

- **Prolonged dry spells, abnormally high temperatures and floods, coupled with limited supplies of agricultural inputs, had a severe impact on yields** of the 2018 main crops harvested last September/October.
- **Production prospects for the 2018/19 early season crops – to be harvested in June – are unfavourable** due to widespread low rainfall and lack of snow cover, which left crops exposed to freezing temperatures during winter.
- **Post-harvest losses from harvesting to storage are expected to be higher than usual** as shortages of fuel and electricity hampered the timely transport and processing of crops as well as the ventilation of stocks.
- **The 2018 aggregate food crop production is estimated to be below-average** at 4.9 million mt, 12 percent below the previous year's near-average level and the lowest level since the 2008/09 season.
- Cereal import requirements in the 2018/19 marketing year (November/October) are estimated at 1.59 million mt. With commercial imports officially planned at 200,000 mt and food assistance (already received or pledged) set at about 21,200 mt, **the uncovered deficit for the full marketing year is estimated at an elevated level of about 1.36 million mt.**
- **Food consumption levels are low and dietary diversity is very poor.** Diets mainly consist of rice, maize or potatoes complimented by kimchi (cabbage) or vegetables and greens, when available. Protein intake is very low. Poor food consumption is widespread in the surveyed population in both November (37 percent) and April (46 percent) assessments and only a few households have an acceptable diet.
- **Food-related coping strategies are widely adopted, including reducing consumption by adults for children to eat and reducing meal sizes.** Urban households who typically rely on relatives in rural areas to access food and diversify their consumption are no longer able to do so to the same extent, as also rural households increasingly face food shortages.
- **Since January 2019, rations of the Public Distribution System (PDS) have been reduced to 300 grams per person per day (g/pp/day),** which compares to 380 grams during the same period in 2018. Rations may decline further during the July to September period, when PDS rations are typically lower compared to other months of the year.
- **Overall, it is estimated that 10.1 million people (40 percent of the population) are food insecure and in urgent need of food assistance.** The situation could further deteriorate during the lean season from May to September, if no proper and urgent humanitarian actions are taken.

2. MISSION OBJECTIVES AND METHODOLOGY

OBJECTIVES

Climate-related shocks combined with political and economic factors in the Democratic People's Republic of Korea (DPRK) have hampered the food security situation in the country for many years. According to the 2018 State of Food Security and Nutrition in the World (SOFI) report, the prevalence of undernourishment stands at 43 percent, resulting in 11 million people in DPRK being undernourished.

At request of the Government, a joint FAO/WFP rapid Food Security Assessment Mission (rFSA) visited DPRK from 29 March to 12 April 2019. The overall objective of the joint FAO/WFP Mission was to conduct an independent assessment of the 2018 production shortfall and the food security situation in the country. Provision of accurate, timely and credible information through this exercise is critical to inform appropriate interventions by the Government, the international community and others to mitigate the impact of the reported drops in harvest output.

THE MAIN OBJECTIVES WERE TO:

- Review and verify the 2018 main season crop production and forecast the 2018/19 spring/winter crop production following damage due to erratic precipitation (snow and rainfall);
- Compile the supply/demand balance for main food commodities for the 2018/19 marketing year;
- Assess agricultural input supplies for the 2019 main agricultural season;
- Assess the functioning of food markets, including food availability and price trends; and
- Estimate the number of food insecure people who are in need of food assistance.

METHODOLOGY

The Mission comprised eight FAO and WFP senior agriculture and food security technical experts. A variety of methods were used to triangulate information gathered: a literature and secondary data review¹, field visits, key informant interviews at national and county level, as well as a household survey with PDS dependent and cooperative farmers.

The Mission carried out a retrospective analysis of official production data for the 2018 main harvest, made an early forecast to produce the 2018/19 winter and spring crops, and estimated food crop import requirements for the 2018/19 marketing year (November/October). Satellite-based imagery was used to validate the official information on production of the 2018 main season crops that were harvested at the end of 2018.

Accompanied by experts from the Central Bureau of Statistics (CBS), the Mission, divided into four teams, covered 12 counties in 6 provinces. During the field visit, the Mission met with county-level government representatives and participated in the interviews conducted by CBS staff to assess the food security situation at household level. The Mission also visited cooperative farms, Public Distribution Centres (PDCs), child nurseries, as well state and vegetable shops.

Moreover, 25 additional counties in 9 provinces were covered during the food security assessment conducted by WFP in November 2018.

In both assessments, the visited area was widely diversified in terms of contribution to national food production, as well as the severity of weather shocks experienced during the previous agricultural seasons and general food security conditions. The areas covered both urban and remote rural areas, as well as counties with and without WFP operational presence.

The assessment tools were jointly developed with CBS, and the household questionnaire contained WFP core standard food security indicators. Prior to the field assessment, training sessions were conducted by WFP and FAO with all CBS interviewers on the household survey tool and key informant checklists.

The assessment team drew conclusions from two household assessments, the first conducted in November 2018, where 125 households were interviewed, and the second conducted in April 2019, where an additional 54 households were interviewed using the same survey tool with some slight adjustments. Mission team members were present during household-level interviews as part of both assessments.

Therefore, in total, the analysis included in this report is based on visits to 37 counties and interviews with 179 households (see also Map on page 7).

¹ - The Government provided the Mission with the following official data: estimates of areas harvested; yields and production by main food crops at county, provincial and national level; supply of agricultural inputs; livestock numbers; Public Distribution System (PDS) ration levels, and meteorological data. The Mission cross-checked official data against information gathered during interviews with key informants in the capital as well as during the work in the field.

TABLE 1: DPRK - SURVEYED HOUSEHOLDS BY TYPE

	Number of Households	Number of Counties	PDS Dependent Households	Cooperative Farming Households	Mixed Households
November 2018	125	25	78	37	10
April 2019	54	12	40	14	
TOTAL	179	37	118	51	10

Household selection of both assessments were purposively done by the CBS based on specific criteria agreed beforehand (distribution of PDS-dependent households vs. cooperative farming households, urban/rural distribution, occupation types of household head, etc.). Out of the total sample of 179, 118 households were PDS-dependent and 51 were cooperative farmers. Moreover, 101 households are defined as urban and 79 as rural. Overall, 22 households contained a pregnant or breastfeeding woman. All data were processed and analysed at the CBS with WFP officers present at the CBS premises throughout.

Upon return from the field, the Mission held a technical meeting with officials from the Ministry of Agriculture, the CBS, the Ministry of Land and Environment Protection, the Ministry of Food Procurement and Administration, the Ministry of Commerce and the National Coordinating Committee (NCC) with the aim to gain more in-depth knowledge on specific issues and to request additional information needed.



FAO/WFP assessment team visit to a cooperative farm in Sinchon County, South Hwanghae Province, April 2019.

Prior to departing the country, the Mission briefed the NCC and the CBS on its main findings. Short debriefing meetings were also held with staff of UN agencies, resident NGOs (known locally as EU Project Support Units or EUPS)

as part of the Food Security Sector Working Group, and members of the donor and diplomatic community.

LIMITATIONS

The Mission took place outside the pre-harvest/harvest period of the main crop season, therefore the validation of production data could only be made retrospectively, without observing the crop conditions in the field. In addition, there are no official production statistics for sloping land (above 15 degrees), because framing in these areas, besides agro-farming, is officially discouraged by the Government. The Mission was informed that since 2014, the government has initiated a reforestation programme that is resulting in a gradual decline in production from sloping lands.

As described in the methodology section, a purposive sampling methodology was applied by CBS to ensure representation of relevant population groups. This means that findings are indicative of the situation, however, do not provide statistically representative findings at national or sub-national level.

The urban and rural categories applied during this assessment are based on the official consideration of interviewed households and the official statistics. It is worth noting that in DPRK, urban-rural boundaries are not clearly delimited by population or infrastructure densities, but by the administration that controls any given area. If it falls under the “Up” administration, the area is considered an urban area. If it falls under the “Ri”, the administration is rural. Many of the “Up” areas covered could be considered as rural in terms of their geographic and livelihoods characteristics. The Mission therefore decided not to present findings by urban and rural in this report.

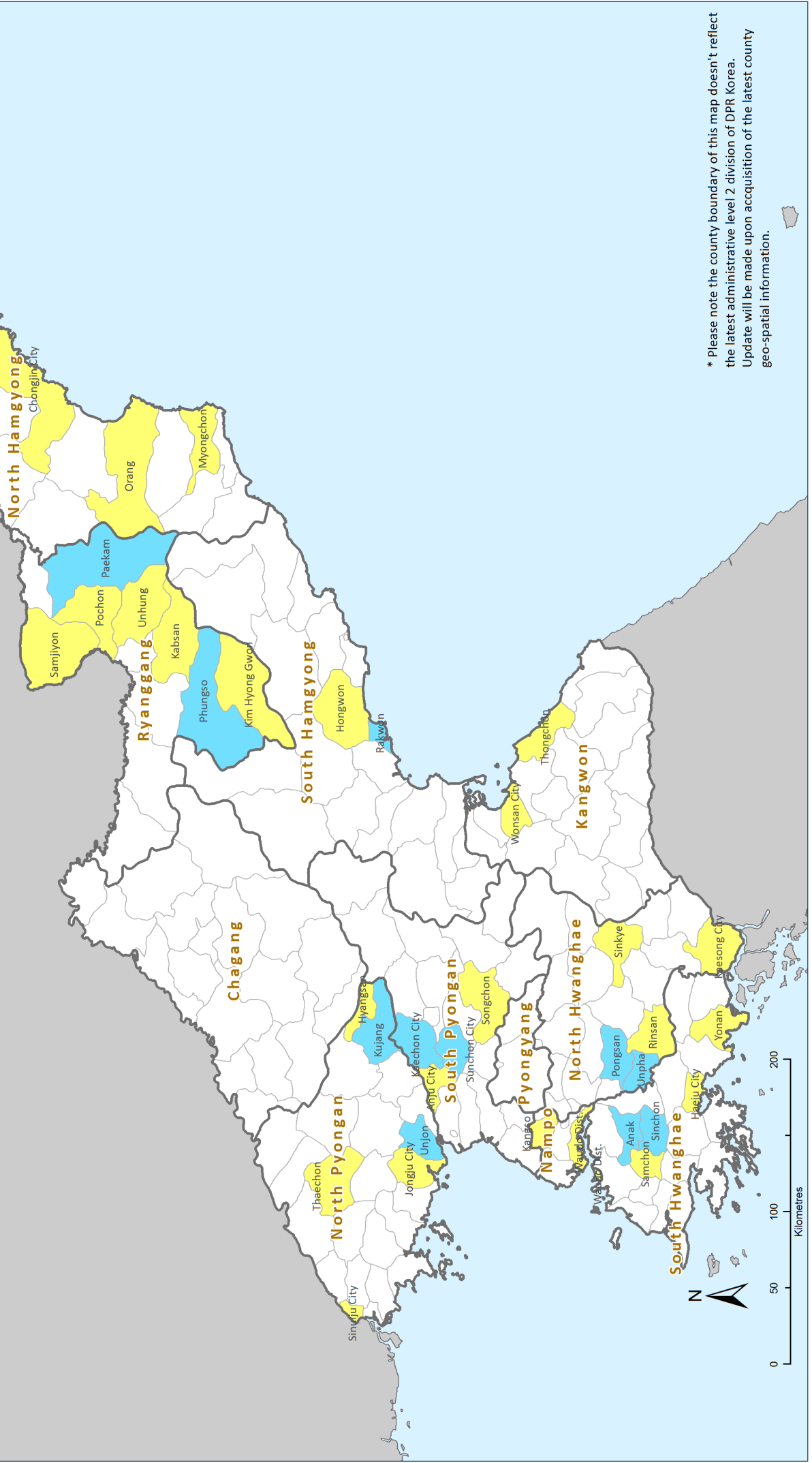
It is worth noting that all data collected is owned by the Government’s CBS, which is also responsible for all data analysis according to national law. Mission members agreed with CBS on the analysis plan in line with the agreement between FAO/WFP and CBS. However, additional analysis beyond the agreed data outputs proved to be challenging to obtain due to time limit.

The Mission was able to visit PDCs, but it was unable to observe direct distributions of rations to PDS-dependent households during the Mission.

The assessment team also experienced challenges in

Sampled Locations by Assessment Teams

- WFP TEAM in 25 counties (November 2018)
- WFP/FAO TEAM in 12 counties (April 2019)



* Please note the county boundary of this map doesn't reflect the latest administrative level 2 division of DPR Korea. Update will be made upon acquisition of the latest county geo-spatial information.



FAO/WFP assessment team visit to a cooperative farm in Pongsan County, North Hwanghae Province, April 2019.

accessing markets and acquiring market-related data. However, the team was not able to visit farmers' markets during the field visit. While authorization was granted at national level to visit farmer's markets, county authorities informed that they were not able to receive any foreign delegation on the day. Market visits are highly recommended to fill this information gap in future assessments. Finally, the team could only gather limited information on people's incomes and expenditures² during the household surveys.

² - The November assessment was able to collect 30-day expenditure information from 41 households on food purchased in farmer's markets or through coupons in regulated state shops and some other non-food items. Only preliminary findings are available as data is still being analysed.

SOCIO-ECONOMIC CONTEXT

3. SOCIO-ECONOMIC CONTEXT

TABLE 2: DPRK - KEY ECONOMIC INDICATORS, 2014 - 2018

	2014a	2015a	2016a	2017a	2018b
GDP at market prices (Won bn)	1,717.7b	1,751.3b	1,809.0b	-	-
GDP (US\$ bn)	17.4b	16.3b	16.8b	-	-
Real GDP growth (%)	1.0b	-1.1b	3.9b	-3.5b	-1
Exports (US\$ m)	4,365	4,150	2,990	1,850	-
Imports (US\$ m)	-5,585	-4,820	-3,860	-3,930	-
Trade balance (US\$ m)	-1,220	-670	-870	-2,080	-

Source: Economist Intelligence Unit (EIU); a- actual, b-EIU estimates

3.1 MACRO-ECONOMIC SITUATION

DPRK does not officially release economic data and widely varying estimations of macroeconomic numbers exist. Estimations of the Bank of the Republic of Korea suggest that in 2016 the local economy grew at its fastest pace in 17 years, when for the first time, GDP per capita surpassed the US\$ 1,000 mark. More recent analyses by the Economist Intelligence Unit (EIU) suggest that the country experienced an economic downturn in 2017 and 2018, amid reduced trade activities as a consequence of sanctions targeting top-earning export sectors, such as coal, minerals and textiles (Table 2).

The primary economic activities in the DPRK are mining, some heavy industry, agriculture and fisheries. The agricultural sector is estimated to contribute to roughly one quarter of the country's GDP, with significant fluctuations over the years due to frequent climatic shocks impacting agricultural production.

3.2 AGRICULTURAL SECTOR

The geography of the country is largely mountainous, with only 15 percent of the land (or 1.9 million ha) suitable for agriculture. Of this, about 30 percent is irrigated, mostly paddy fields and winter/spring crops. The most productive agricultural land is located in the western plains of the country, and narrow strips along the east coast. Rice, maize and potatoes constitute the major food crops, with the first two commodities contributing 45 and 34 percent of overall grain production respectively. However, the proportion of each crop produced and consumed in local diets varies greatly in different parts of the country. Soybean, barley and wheat are also widely cultivated as well as minor grains such as millet, sorghum, oats and rye.

The organization of the rural economy is mostly characterized by the operation of cooperative farms, with a smaller number of state farms. According to the CBS, the farming population involves 2,513 cooperative farms with 2.54 million farmers and 707 state farms, employing 802,000 farmers. State farms tend to be specialized in large-scale production of livestock, fruits, vegetables and other cash crops. By contrast, cooperative farms are responsible for producing most of the grains and staple foods. They also produce vegetables, fruits and livestock, which are sold into the government marketing system and distributed to cooperative farm members.



Cooperative farmers prepare the land for planting of rice crop in Anak County, South Hwanghae Province, April 2019.

Cultivated lands with slopes below 15 degrees are managed by cooperative farms, while lands above 15 degrees of slope are officially administered by the Ministry of Land and Environmental Protection (MoLEP). Sloping lands are also used by households, both from cooperative farms and from urban areas, to grow maize, soybean, vegetables and other crops for their own consumption. This practice dates back to the late 1990's when, due to the general shortages of food, land use regulations were relaxed and households expanded cultivation onto sloping lands. In 2014, however, the government initiated a reforestation programme that is resulting in a gradual decline in production from sloping lands.

The government sets annual production targets for cooperative farms. At harvest, a part of staple food is allocated to farmers for their consumption, and anything in excess of this is sold to government agencies at centrally-determined prices. Other production such as vegetables and livestock beyond the targets can be made use of through sale or barter. The government is also responsible for providing agricultural inputs to cooperative farms based on a national planning system. These inputs are also provided at centrally-determined prices. Monetary transactions are made through bank transfers, as the banking system seems to be reliable, as per the key informant meetings at county level.

Cooperative farm members earn work points for their labour and, following the harvest at the end of a year, receive their grain allocations based on the work points earned during the year. The national average is set at 600g/pp/day. Kitchen gardens play an important role in food consumption, and are relatively common among cooperative farmers and rural PDS-dependent households. On average, kitchen gardens are 30 pyong (approximately 100 m²), but the size varies between farms and across different parts of the country (i.e. bigger in Ryanggang than in southern provinces). These gardens provide an important source of dietary diversity for cooperative farm members and generate a surplus that can be bartered or sold.

The principal objective of the five-year strategy for national economic development (2016-2020) is to stimulate agricultural production. Specifically, the strategy aims to promote the adoption and use of high-yielding seed varieties and advanced crop cultivation and management techniques, which is foreseen to assist in increasing production of cereals, fruits and vegetables. In addition, the strategy aims to address areas that have impeded livestock production, and therefore supports the establishment of joint stockbreeding by cooperative farms and sideline stockbreeding by individual farmers, with the

intention to improve the supply of meat and eggs for households. Regarding the fisheries and aquaculture sector, the strategy targets the upgrading of fishing boats and the expansion of offshore and cage-net fish farming, focusing on the promotion of offshore cultivation of shellfish and seaweed.

CROPS

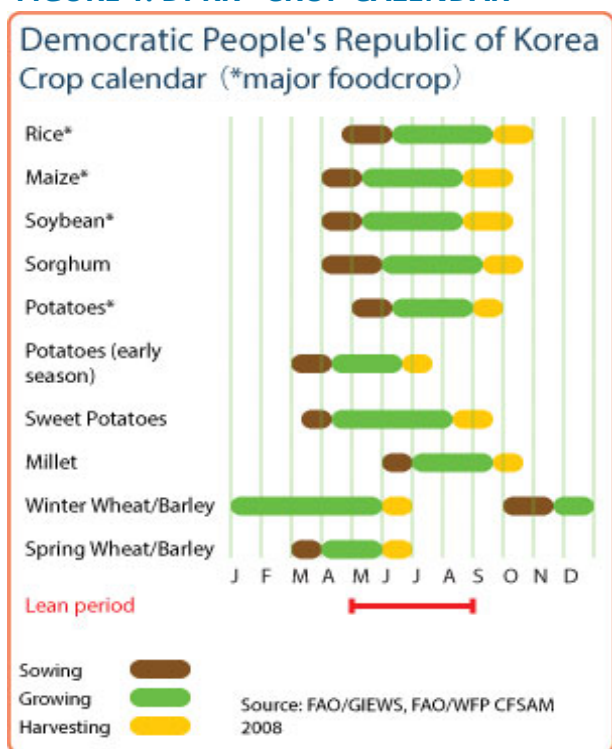
The main agricultural season starts in April, with the arrival of the spring rains, and the harvest normally takes place between September and October (Figure 1). Low temperatures at the beginning of the season mean that farmers need to considerably raise seedlings for rice and



FAO/WFP Mission teams observing early season crops in Unpha County, North Hwanghae Province, April 2019.

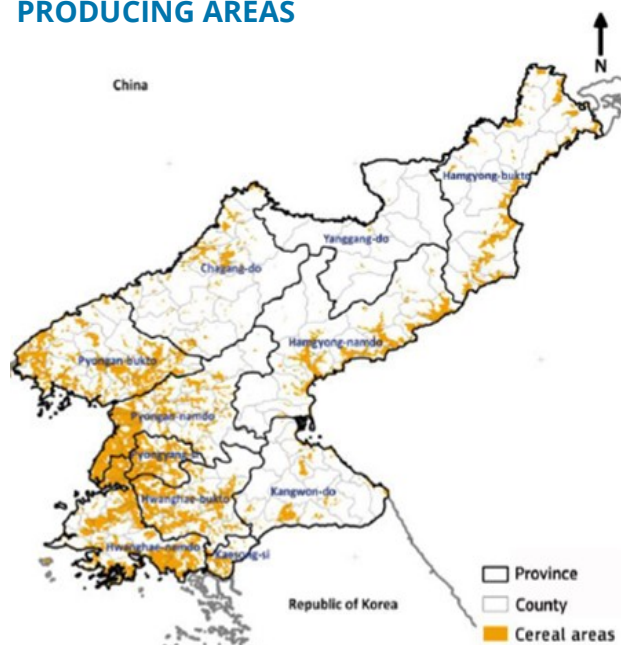
maize in protected beds for subsequent transplanting when field conditions become suitable. The availability of water for irrigation is critical in determining the main season output, particularly in the case of paddy crops. Paddy and maize are predominantly grown in the southern and central provinces of the country (Figure 2). Early season crops, including winter wheat and barley sown in October/November, are harvested between June and early July, depending on the geographic location within the country. Areas planted with wheat and barley crops have declined since 2003 and have gradually been replaced mostly by early season potatoes. Despite a small output compared to the main crops (they make up 8 percent of total production), the early crops play an important role for food security as they contribute to mitigating the food gaps and high prices for other staples during the lean season.

FIGURE 1: DPRK - CROP CALENDAR



Source: FAO/GIEWS

FIGURE 2: DPRK - MAIN CROP PRODUCING AREAS



Source: European Commission's Joint Research Centre (JRC).

Given the limited amount of arable land, the short growing seasons and the recurrent climatic hazards (that are expected to become more frequent and intense due to the effects of global warming), the production of an adequate

amount of food is a perennial challenge in DPRK. Annual shortfalls over the past decade range between 400,000 mt and one million mt. Several strategies are being pursued to increase production, including the introduction of improved seeds and improved varieties, improving soil health and fertility, and integrating crop and livestock production.

One important element for achieving food security involves expanding the area under double cropping as broadly as possible through practices such as using greenhouses to produce seedlings for transplanting to open fields, using tunnel houses and plastic mulch to preserve soil moisture, and the introduction of short-season and cold-tolerant varieties that can extend the growing season. Efforts to expand the area under double cropping are hindered when inputs, such as seeds and fertilizers, are received late or when there is insufficient labour to plant at the earliest opportunity, or to bring the first crop in from the fields in time to get the second crop planted and in the ground. The speed with which farming operations can be completed has important implications for the opportunity to expand double cropping. Delays in planting or harvesting operations can result in the loss of critical days that are necessary for successful double cropping during the short growing season.

VEGETABLES

The availability of vegetables in the winter months is very limited. Traditionally in October/November both urban and rural households use cabbage to make kimchi as their main source of vegetables until the following March/April. Some rural households reported that in winter and spring their diets largely consist of kimchi, salted pepper or dried radish leaves with rice or potatoes. Increased vegetable production offers an important opportunity to improve the nutrition and health of the population and is especially important for providing essential vitamins and minerals for pregnant and breastfeeding women, and the young. Vegetables are produced both by cooperative and state farms, as well as by households using their kitchen gardens. In some urban areas, residents are also often allocated a small plot of land for their own use to grow vegetables. Households growing vegetables reported using their own seeds retained from the previous season for vegetables.

Assessing the national gap in vegetable production is complicated by the fact that statistics include only vegetable production by cooperative and state farms and do not include production from household gardens. Assuming average productivity of 15 mt/hectare from an area of 30,000 hectare on cooperatives and state farms, vegetable production could be estimated at about 0.45

TABLE 3: DPRK - LIVESTOCK POPULATION 2015-2017 (000 HEADS)

	Cow	Pig	Goat	Rabbit	Chicken	Duck	Geese
2015	576	2,412	3,685	32,139	15,452	6,988	2,133
2016	576	2,582	3,682	31,819	15,322	6,825	2,134
2017	576	2,601	3,684	32,009	15,393	6,932	2,135
2017 change from 2015 (%)	-0.02	7.82	-0.03	-0.4	-0.38	-0.79	0.1

Source: CBS.

million mt. This compares to a requirement of 2.7 million mt based on a recommended minimum consumption of 300 g/pp/day, suggesting a gap of vegetables as high as 2 million mt. Some of this shortfall is obviously made up through production on kitchen gardens, but the need for expanding vegetable production is clear.

LIVESTOCK

Animal-sourced food is important for adding protein, minerals and vitamins to diets and increasing dietary diversity. Increasing the availability of animal-sourced food can contribute significantly to improving food and nutrition security, particularly for segments of the population considered most vulnerable. The national five-year development plan calls for an increase in livestock production and the government is encouraging the establishment of joint stockbreeding by cooperative farms and the side-line stockbreeding by individual farmers, with the aim to supply households with more meat and eggs. Nevertheless, national level data shows minimal change to the overall number of livestock between 2015 and 2017, with the exception of pigs, which increased by about 8 percent from 2.41 million head in 2015 to 2.6 million head by 2017 (Table 3).

Government data on livestock numbers includes only animals raised by cooperative and state farms and does not include those raised by households. Many cooperative households use their kitchen gardens to raise small livestock, such as poultry, pigs, goats and rabbits for their own consumption, and for barter or sale. Some families classified as urban and PDS-dependent also raise small livestock. Opportunities for increasing livestock production can be found through integrated crop/livestock production models involving fodder crops and crop residue for feed and using manure to improve soil fertility and soil structure.

However, the livestock sector is highly vulnerable to outbreaks of contagious diseases which can spread quickly and widely, decimating livestock populations and further endangering food security. The capacity to detect and control diseases is very weak due to a shortage of testing equipment and supplies. In addition to diseases affecting

poultry and rabbits, Foot and Mouth Disease poses a threat to swine, sheep, goats and cattle. The highly contagious African Swine Fever, for which there is no cure or vaccine, is considered a high risk as it has already been found in neighbouring provinces of China.

There is also potential to increase fish production and improve the availability of nutritious food using fish ponds and caged fish farming on lakes and reservoirs.

ENVIRONMENT AND LAND DEGRADATION

Since the early 1990s, afforestation and forest conservation have been promoted actively. However, as reported in the DPRK National Agroforestry Strategy and Action Plan 2015–2024, forests have been massively damaged and degraded due to the temporary economic difficulties and consecutive natural disasters in the mid-1990s. During this period, the country faced economic difficulties and became increasingly dependent on forest resources, which led to excessive deforestation for timber, non-timber forest resources and firewood collection which is largely used for cooking and heating at household level.

To make matters worse, repeated natural disasters resulted in increased cutting of timber required for rehabilitation works. Tens of thousands of hectares of forest lands were cleared to produce food, damaging degraded forests completely. Slash-and-burn farming practices have become causes of forest fire, accelerating deforestation and forest degradation. Since late 1990s, the number of forest fires and the damaged area increased rapidly. The area damaged by forest fires from 1995 to 2014 reached tens of thousands of hectares. Deforestation and forest degradation reduced forest health and increased pest breakouts, in particular pine caterpillar.

Forest depletion and degradation and the loss of forest cover has resulted in reduced water infiltration, increased soil erosion and landslides, and contributed to the sedimentation of rivers. Serious sedimentation also happened in lakes and reservoirs, remarkably reducing water storage capacity. Rivers and streams dried up, causing severe drought damage.



Cooperative farmer in kitchen garden in Anak County, South Hwanghae Province, April 2019.

Frequent floods and droughts reduced the regeneration capacity of forests and inflicted huge damage to agricultural production, industrial facilities, people's lives, and properties. The degradation of agricultural land occurs also due to construction of reservoirs, roads and river dykes. The country has no traditional rangelands, but some forest lands has been converted to grazing lands totalling up to about 200,000 ha. However, the lack of sustainable grazing methods and practices eventually leads (to some extent) to the decline of ecological carrying capacity of rangelands. Climate change and variability, and the increasing frequency and intensity of extreme weather events in the recent years have made the above situation even more acute.

UNINTENDED IMPACT OF SANCTIONS ON AGRICULTURAL PRODUCTION

The sanctions imposed on the country by the United Nations Security Council (UNSC) in December 2017 were the strictest yet. The text of the resolution states that sanctions "are not intended to have adverse humanitarian consequences for the civilian population of the DPRK". Nevertheless, the unintended negative impact sanctions can have on agricultural production, through both direct and indirect impacts, cannot be ignored. The most obvious are restrictions on the importation of certain items that are necessary for agricultural production, in particular fuel, machinery and spare parts for equipment.

In 1991, the country's oil consumption amounted to 3.8 million mt/year, subsequently falling to 750,000 mt by 2017. According to data received from CBS, the national allocation of fuel for agriculture in 2018 was 44,502 mt, including 40,502 mt of diesel and 4,000 mt of petrol. Given an average annual amount of 1.4 million hectares cultivated between 2012 and 2018, this amounts to 31 kg of diesel fuel per hectare. Shortages of fuel, electricity and pumping equipment limit the ability to irrigate, reducing yields and making crops susceptible to extreme weather shocks, such as drought and heatwaves.

There is a starkly diminished level of agricultural mechanization in the country as machinery ages, spare and replacement parts are unavailable, and fuel is in short supply. Delays are experienced in agricultural operations because manual labour and animals substitute for mechanized operations. These delays in turn limit the possibilities for increasing the area under double cropping, while at the same time increasing post-harvest losses. The deterioration of infrastructure, reduction in electricity supply and wearing out of machinery and equipment undoubtedly results in the levels of post-harvest losses increasing year after year.

Most cooperative farms are equipped with stationary threshers, large machines permanently fixed in one place for threshing rice or wheat. Grain cut in the fields, including straw, is carried to the threshing site. Without enough tractors, the transport of the grain and straw from the fields to the threshing site is done using ox-carts that can carry a maximum of 250 kg in one load. The need to transport grain from the field to the threshing floor results in delays, sometimes of several weeks, during which the grain could deteriorate from being exposed to the different factors. In particular, rains, rodents and pests during this period can lead to larger losses.

Equipping cooperatives with mobile threshers that can be taken out to the fields, overcoming the need to carry grain and straw to a central location, would significantly reduce the time needed to thresh the harvest. Moreover, only the threshed grain would have to be transported to storage, leaving the straw and residue in the fields. It is estimated that mobile threshing machines could reduce post-harvest losses by up to 10 percent.

Once the grain is threshed, it has to be dried to a maximum moisture content of 14 percent before being moved to storage. Electricity is the most common energy source for grain driers. Lack of energy can result in grain with high moisture content going into storage, making it susceptible to spoilage or the occurrence of mould, fungus and mycotoxins. In the absence of grain driers or with a shortage of electricity, the common practice is to dry grain

by spreading it on the open ground, but this practice leaves grains susceptible to damage in case of rain or cool temperatures. Storage of crops in facilities lacking proper ventilation, temperature and humidity control can further add to post-harvest losses. Potatoes are particularly sensitive to humidity and temperature, and post-harvest losses of potatoes in storage areas are reportedly as high as 20 percent. Improving storage facilities for potatoes could be done by providing wooden pallets and plastic to keep potato storage areas dry and improving ventilation.

Processing products into items like biscuits, bean paste or starch noodles can increase storage life and improve food availability during the lean season months prior to the annual harvest. However, facilities for food processing also remain idle due to the shortage of electricity as well as deteriorating equipment and a lack of spare parts.

LOSSES AT HOUSEHOLD LEVEL

While PDS-dependent households reportedly receive their allocations of staple food twice a month, households on cooperative farms reportedly receive their allocations of grain and staples in two distributions after the harvest (where two growing seasons take place) and one single distribution in areas with just one cropping season.

In the potato growing region such as Ryanggang Province, families may receive two mt of potatoes or more at distribution and be responsible for storing them until the food distribution in the following year. Storage at a household level in rudimentary facilities undoubtedly results in a high degree of household waste. Interviews with households suggested higher losses at farms' level as compared to PDS households due to larger quantities to be stored and poor storage facility.

FOOD
PRODUCTION
IN 2018

4. FOOD PRODUCTION IN 2018

4.1 WEATHER CONDITIONS

The weather conditions analysis is based on data provided by WFP and FAO on Remote Sensing Rainfall Estimates (RFEs) and Vegetation Health Index (VHI)³, as well as satellite images on temperature elaborated by the Joint Research Centre of the European Commission.

Although overall cumulative amounts were slightly above average, the spatial and temporal distribution of 2018 rains was erratic over most cropping areas of the country. The seasonal rains (normally starting in April and intensifying between July and September, these three months account for 80 percent of the country's annual rainfall) started on time in early April and amounts of rainfall and overall weather conditions were generally favourable during April, May and June, benefitting planting activities and early development of the main season crops (Figure 3). Subsequently, prolonged dry spells and abnormally high temperatures (up to 40°C) were reported from mid-July to mid-August, normally the wettest period, in the main cropping areas. Drought and the heatwave affected the main season paddy, maize and soybean crops during the critical pollination stages, particularly in the provinces of South and North Hwanghae, South and North Hamgyong and South Pyongan and southern parts of North Pyongan, which is clearly captured by the VHI (Figure 4).

It is reported that the most productive south-western regions counted more than 20 consecutive days with daily mean temperatures of more than 2.5°C above the long-term average, and up to 10 days exceeding 5°C (Figure 5). Farmers in visited counties reported that the combined effect of the poor rains and high temperatures led to a serious reduction in yields for the main season crops and even resulted in the wilting of crops. From late August to the first *dekad*⁴ of September, above-average rains restored soil moisture and had a positive impact on vegetation conditions. However, heavy rains (up to 75 mm above the long-term average) triggered flash floods in parts of the main crop producing areas of North and South Hwanghae provinces, causing damage to crops just before harvest. Overall, the performance of the 2018 rainy season has been unfavourable, leading to a significant reduction in yields compared to 2017.

The 2018/19 early season started in November and, up to the Mission's visits in early April, precipitations have been below average with an erratic spatial and temporal

distribution over most of the cropping areas of the country. Snowfall has been exceptionally low in terms of number of snow events and quantity. It provided very limited snow coverage and early winter season wheat and barley have often been exposed to freezing temperatures, with consequent loss of germinated crops. The negative impact of low snowfall during winter months was protracted in March-April in terms of reduced soil moisture that normally comes from snow melting, with negative consequences on already weak crops.

4.2 HARVESTED AREA

The total harvested area for the 2018 main crops is officially estimated by the CBS at 1.2 million hectares, a slight decrease compared to the 2017 level and 5 percent below the five-year average (Table 4). Although favourable rains at the start of the season supported planting operations, the estimated decrease reflects a combination of weather-related area losses, dysfunctional agricultural equipment and limited availability of agricultural inputs. The 2018 paddy area is reported at 471,000 hectares, similar to previous year's below-average level mostly due to the limited availability of irrigation water. Since 2015, paddy area has been recorded at its lowest levels in more than 20 years (FAOSTAT), constrained by recurrent precipitation shortages and limited availability of irrigation water, which have meant that some fields have shifted away from paddy in favour of other crops with relatively lower water requirements, including sorghum and millet.

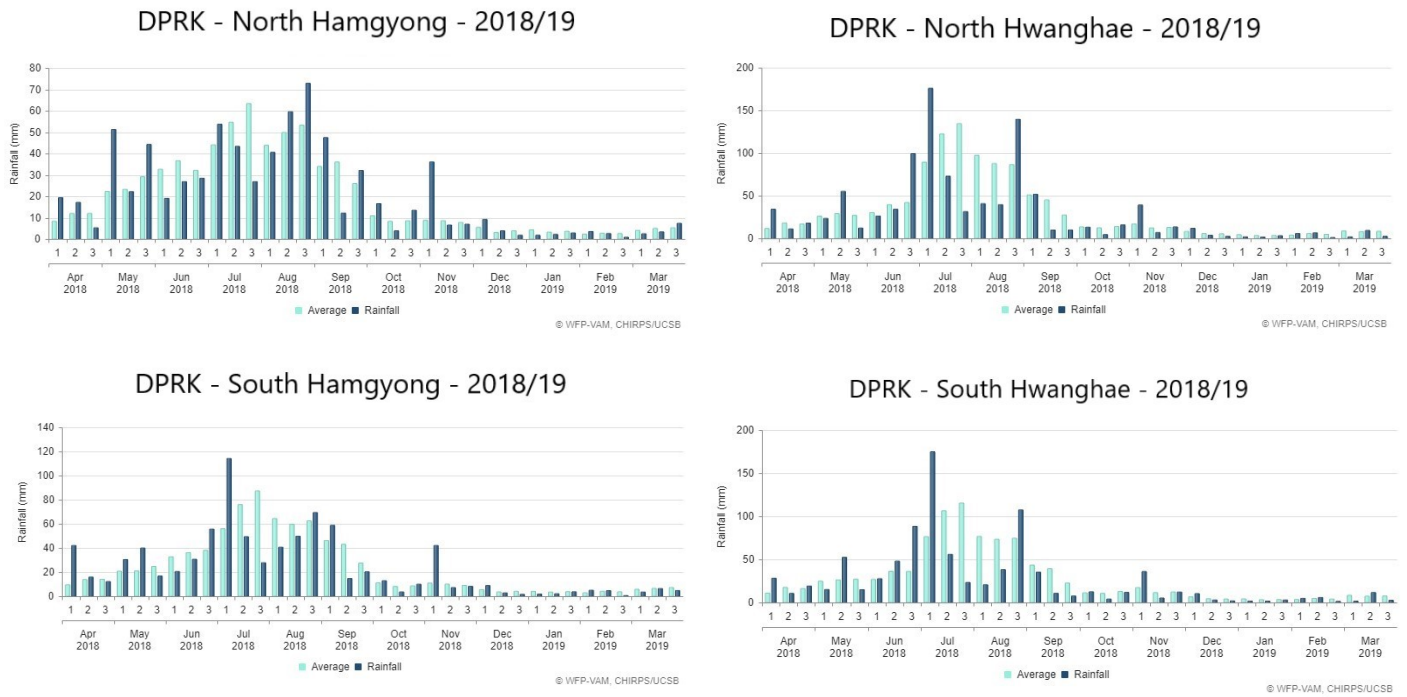
Similarly, the maize area harvested is officially estimated at below-average 508,000 hectares, mostly reflecting area losses due to unfavourable weather conditions during the cropping season. The 2018 harvested area of soybeans has decreased for the second consecutive year and it is estimated at 107,000 hectares, about 40 percent below the area harvested in 2016. Overall, the area planted with the soybeans has been steadily increasing between 2013 and 2016, reflecting government efforts to enhance nutrition security and diet diversity. Areas harvested with other field crops (which are relatively drought-tolerant), including sorghum, buckwheat and millet, and are officially estimated at 64,000 hectares, a 15 percent increase compared with last year's high level, continuing the increasing trend registered in recent year.

In 2014, the government initiated a reforestation programme that resulted in a gradual decline in production

³ - The Vegetation Health Index (VHI) illustrates the severity of drought based on the vegetation health and the influence of temperature on plant conditions. It combines both the Vegetation Condition Index (VCI) and the Temperature Condition Index (TCI). The TCI is calculated using a similar equation to the VCI, but relates the current temperature to the long-term maximum and minimum, as it is assumed that higher temperatures tend to cause a deterioration in vegetation conditions. A decrease in the VHI would, for example, indicate relatively poor vegetation conditions and warmer temperatures, signifying stressed vegetation conditions, and over a longer period would be indicative of drought.

⁴ - A *dekad* is 10-day period.

FIGURE 3: DPRK - RAINFALL AMOUNTS (RFE) FROM APRIL 2018-MARCH 2019



Source: WFP-VAM CHIRPS/UCSB

FIGURE 4: DPRK - ANOMALIES OF THE VEGETATION HEALTH INDEX FOR THE PERIOD FROM SECOND DEKAD OF JULY TO THE SECOND DEKAD OF AUGUST 2018

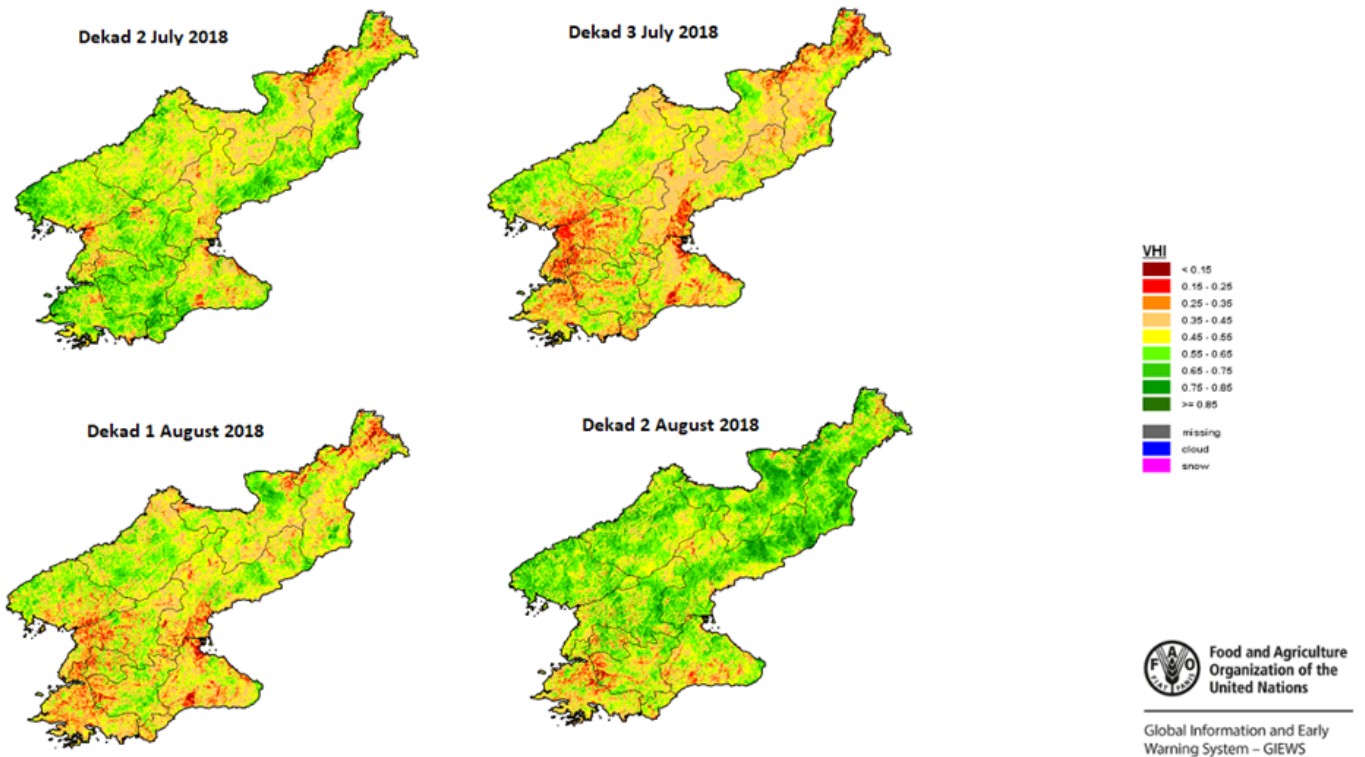
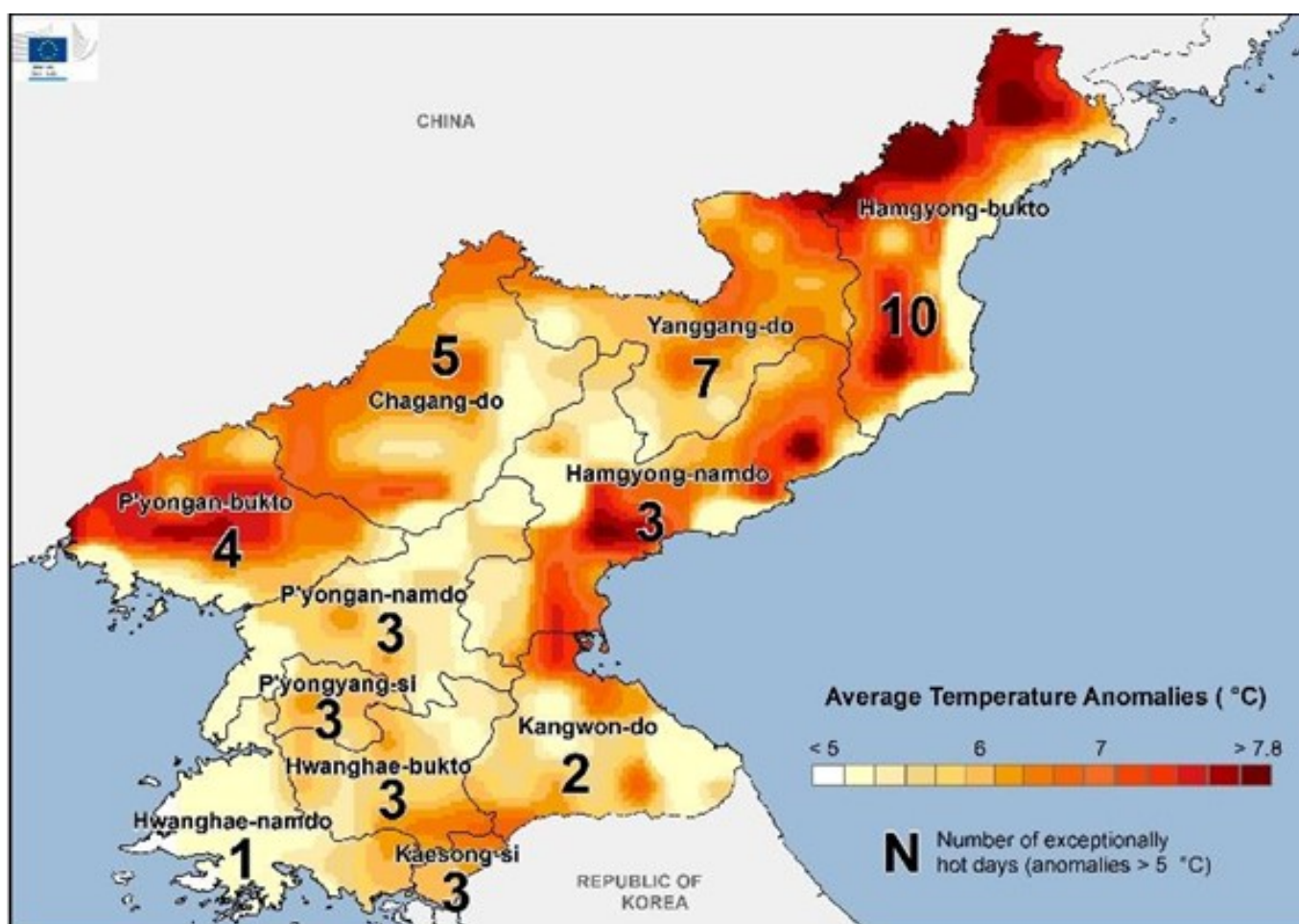


FIGURE 5: DPRK - HOTSPOTS OF EXCEPTIONALLY HOT TEMPERATURES (DAILY MEAN TEMPERATURE ANOMALIES +5°C) BETWEEN 15 JULY - 15 AUGUST



Source: European Commission (EC) Joint Research Centre (JRC).

from sloping lands and since 2017, the area planted with crops on sloping lands is estimated to be negligible.

4.3 FACTORS AFFECTING YIELD

SEEDS

The availability of seeds for all crops during the 2018/19 agricultural season was generally adequate, especially in the key growing provinces in the south-western part of the country. The National Academy of Agricultural Sciences regularly releases cereal varieties that are deemed especially suitable to specific agroecological zones of the country. Improved breeder seeds are then multiplied by specialized cooperatives and state seed farms, which then provide certified seeds to cooperative farms through the government's distribution system.

PLASTIC SHEETING

Paddy rice and maize are typically sown in nurseries under plastic sheeting at the beginning of April and transplanted in late May or early June. Low temperatures at the

beginning of the main agricultural season highlights the need for plastic sheeting to ensure a timely start of the season. The adequacy of plastic sheeting supplies was commonly reported as being between 60 and 80 percent of the actual needs, with only few farms, mainly in the key growing areas, reporting 100 percent. Some cooperatives also reported recycling used plastic sheeting for a second or even third year, but it was noted that the quality of the product was largely unsatisfactory.

FERTILIZERS

While the supply of nitrogenous fertilizer was generally adequate, visited counties and farms consistently reported significant shortages of phosphate and potash. This is consistent with official data from government sources, which indicate that the 2018 national supply of phosphate at 4,174 mt and potash at 2,915 mt was 70 percent and 50 percent respectively, below the five-year average. To reduce the fertilizer shortfall, some farmers reported to produce self-made fertilizer, which normally included well-rotted mix of crop residuals, used straw and manure (Table 5).

TABLE 4: DPRK - NATIONAL HARVESTED AREA BY MAIN SEASON FOOD CROP BETWEEN 2018/19, 2017/18, AND 5-YR AVERAGE

Area	2018/ 2019	2017/ 2018	Average	Change 2018/19 from 2017/18	Change 2018/19 from Average
	('000 ha)			(%)	
Paddy	471	475	496	-0.8	-5.0
Maize	508	510	535	-0.4	-4.9
Other cereals	64	55	45	15.4	42.7
Potatoes	45	30	32	48.1	40.4
Soybeans	107	150	148	-28.6	-27.9
TOTAL	1196	1220	1256	-2.0	-4.8

Source: CBS.

FARM POWER AND FUEL

During interviews with key informants, farm power, in form of machinery, spare parts and fuel, was the most frequently cited constraint experienced during the 2018/19 cropping season. Farm managers explained that available tractors were few and old, not sufficiently powerful to plough to the required depth and were too slow for the amount of land preparation that needs to be completed in a short space of time. Cooperative farms reported that they were able to use mechanical power in only 60-70 percent of their farming operations due to shortage of fuel and lack of spare parts. Oxen and manpower were largely

used to substitute for mechanized power, resulting in reduced production and high post-harvest losses. According to official information, the total amount of diesel and petrol supplies in 2018 was 40,502 mt, about 25 percent below previous year's low level and 30 percent below the average (Table 6).

CROP PEST AND DISEASE CONTROL

There were no significant outbreaks of crop pests or diseases this year. Some localized armyworm and water weevil attacks were reported, but they were effectively controlled. Several cooperative farms also reported receiving less plant protection materials such as pesticides and herbicides. Some cooperative farms reported making a traditional pesticide using locally available herbs and plants, but it was noted that its efficacy was far less than that of chemical pesticides. In the 2018/19 cropping season, the overall availability of crop protection materials, including herbicide, insecticide and germicide, was 1,463 mt, well below the five-year average.

IRRIGATION

The persistent country-wide drier-than normal conditions in 2018/19 cropping season, resulted in low levels of water

TABLE 6: DPRK - FUEL SUPPLY FOR 2017, 2018 AND 5-YR AVERAGE (IN MT)

Fuel Type	2018	2017	5 yr average	2017-2018 change	2018 change from 5 yr average
	mt			%	
Diesel	40,502	54,350	57,727	-25	-30
Petrol	4,000	6,000	6,500	-33	-38
TOTAL	44,502	60,350	64,227	-26	-31

Source: CBS.

TABLE 5: DPRK - FERTILIZER STATISTICS FOR 2018, 2017 AND 5-YRS AVERAGE (MT)

Type of fertilizer	2018 (mt)	2017 (mt)	5 Yr average (mt)	% Change 2018 from 2017	% Change 2018 from 5 yr average
N Ammonium sulphate equivalent, approx. 20.5 % N	624,086	599,017	692,478	4	-10
P Superphosphate equivalent, approx. 17% P2O5	4,174	10,776	13,575	-61	-69
K KCl-muriate of potash, 48-62% K2O	2,915	2,343	5,815	24	-50
TOTAL	631,175	612,136	711,868	3	-11

Source: CBS.

in irrigation reservoirs. Official data indicate that water availability in irrigation reservoirs during the 2018 main season was well below the five-year average. Most farmers reported that they also faced difficulties in pumping water to irrigate fields due to lack of fuel and erratic supply of electricity.

4.4 CROP YIELDS AND PRODUCTION

YIELDS

Yields of both main and early season crops were particularly low in the 2018/19 cropping season. Key producing provinces, namely North and South Hwanghae, North and South Pyongan, and South and North Hamgyong, collectively known as the country's "Cereal Bowl", registered strong yield reductions compared with the five-year average. The main drivers for the lower yields were the prolonged dry period from mid-July to mid-August in the main growing areas of the country, which affected crops at critical pollination stage. According to information received during the field visits, the effects of the dry weather conditions were compounded by reduced irrigation water supplies caused by shortage of electricity

and fuel. In addition, shortages of agricultural inputs, including fertilizers and crop protection materials also affected crop productivity.

The average yield of paddy in 2018 is set at 4.4 mt/hectare, about 12 percent lower than the 2017 level of 5 mt/hectare (Table 7). All provinces registered severe paddy yield reductions, while crops in Ryanggang and North Hamgyong provinces were less affected by the dry weather conditions and official estimates show an increase in yields compared with 2017. The average maize yield in 2018 is estimated at 3.7 mt/hectare, showing a decline of 14 percent compared with the previous year's level. Key informant interviews revealed that maize was among the crops that were most affected by the dry weather conditions, as farmers preferred to divert water to paddy fields aiming at reducing the impact of drought on yields. Furthermore, in most visited counties, managers of cooperative farms reported that maize growth and grain development were affected by a significant shortage of potassium fertilizer.

Yields of soybean are set at 1.3 mt/hectare, about 15 percent below the previous year's above-average level. The only exception were yields of crops which are more

TABLE 7: DPRK - 2018/19 AND 2017/18 OF PADDY, MAIZE AND SOYBEAN, BY PROVINCE

Province		Pyongyang	S. Pyongan	N. Pyongan	Chagang	S. Hwanghae	N. Hwanghae	Kangwon	S. Hamgyong	N. Hamgyong	Ryanggang	Nampo City	DPRK Total
Paddy	2018/19	5.7	4.9	4.3	4.8	4.2	4.4	4.0	4.4	4.2	3.4	4.7	4.4
	2017/18	6.5	5.0	5.1	4.9	5.3	4.9	4.2	4.9	4.0	2.8	4.9	5.0
	2018/19 vs. 2017/18	%	-13.0	-0.8	-15.8	-1.2	-19.9	-10.1	-4.4	-10.6	4.9	20.4	-3.3
Maize	2018/19	4.9	3.9	4.5	4.1	2.9	2.8	4.3	4.7	3.3	2.3	4.4	3.7
	2017/18	4.7	4.3	4.4	3.9	4.3	4.3	4.0	5.2	4.2	2.1	4.6	4.3
	2018/19 vs. 2017/18	%	5.8	-10.1	2.1	5.1	-33.0	-33.3	6.7	-9.1	-20.2	9.2	-4.1
Soybeans	2018/19	1.4	1.3	1.4	1.4	0.8	1.6	1.3	1.5	1.2	0.8	1.5	1.3
	2017/18	1.7	1.5	1.6	1.8	1.3	2.0	1.3	1.7	1.4	0.7	1.7	1.5
	2018/19 vs. 2017/18	%	-18.0	-10.2	-11.3	-23.2	-35.5	-19.1	1.3	-11.1	-14.8	22.9	-13.2

Source: CBS. Note: Excluding main season potatoes yields. According to official information the average yield for main season potatoes is set at 5.6 mt/ha, 14 percent above the 2017 level of 4.9 mt/ha.

resistant to dry weather, such as sorghum, millet, and buckwheat and potatoes. The average yields other cereals, including sorghum, millet, and buckwheat, is officially estimated to have increased by 13 percent compared with the previous year's level and were also well above average. The yields of the main season potatoes is officially estimated at 5.6 mt/hectare, 14 percent above the 2017 level of 4.9 mt/hectare.

PRODUCTION

The aggregate 2018/19 cereal production is estimated at about 4.9 million mt (in cereal equivalent and paddy terms), 12 percent below the 2017 near-average output. The overall decline is mainly due to a reduction in yields (Table 8).

Rice production in 2018 is officially estimated at 2.1 million mt (in paddy terms), 12 percent below previous year below-average level. Output declined in all provinces, except in North Hamgyong and Ryanggang (Table 8). Production of maize crop is estimated at 1.9 million mt, the lowest since 2011 and 15 percent below 2017 near-average level. The sharpest output declines, ranging from 17 to 38 percent year-on-year, were recorded in South and North Hwanghae, and North Hamgyong provinces, which together account for almost half of the total maize output.

The output of soybeans is officially estimated at 135,000 mt, and is the lowest level since 2008, reflecting a decrease both in area harvested and yields. On the other hand, the output of the main season potatoes is estimated to have nearly doubled from the previous year's reduced level and well above the five-year average, with higher plantings more than compensating for the significant decline in yields.

Taking into account the impact of the unfavourable weather conditions from October to April (mainly lack of snow and exposure of newly germinated crops to freezing temperatures) on the early season crops and reported shortages of irrigation water and other agricultural inputs, the Mission lowered the official production estimate of the 2018/19 early season output (consisting of wheat and barley and potato crops) by 20 percent. Consequently, the production of wheat and barley is estimated at 57,000 mt and potatoes production is estimated at 250,000 mt (Table 9), 32 and 22 percent below the 2017/18 above-average level, respectively.

TABLE 8: DPRK - 2018/19 AND 2017/18 MAIN SEASON PRODUCTION OF PADDY, MAIZE AND SOYBEANS, BY PROVINCE

Province			Pyongyang	S. Pyongan	N. Pyongan	Chagang	S. Hwanghae	N. Hwanghae	Kangwon	S. Hamgyong	N. Hamgyong	Ryanggang	Nampo City	DPRK Total
Paddy	2018/19	'000 tones	65.9	340.5	439.7	30.1	559.4	133.3	64.8	235.7	113.6	4.7	100.0	2,087.6
	2017/18	'000 tones	76.0	346.5	527.3	30.9	685.0	161.1	70.6	276.4	102.6	3.9	102.9	2,383.3
	2018/19 vs 2017/18	%	- 13.4	- 1.8	- 16.6	- 2.7	- 18.3	- 17.2	- 8.2	- 14.7	10.7	20.2	- 2.8	- 12.4
Maize	2018/19	'000 tones	18.8	216.7	376.9	139.0	287.8	201.1	139.7	231.2	203.2	23.4	38.3	1,876.2
	2017/18	'000 tones	17.4	240.3	358.4	124.8	446.7	325.4	133.6	242.3	244.8	21.2	44.6	2,199.8
	2018/19 vs 2017/18	%	7.8	- 9.8	5.1	11.3	- 35.6	- 38.2	4.5	- 4.6	- 17.0	10.2	- 14.2	- 14.7
Soybeans	2018/19	'000 tones	1.5	17.8	22.7	11.5	15.4	15.5	10.7	17.9	13.6	4.9	3.8	135.3
	2017/18	'000 tones	2.6	26.1	35.9	16.4	33.5	26.2	17.0	31.4	22.5	5.6	6.2	223.3
	2018/19 vs 2017/18	%	- 40.5	- 31.7	- 36.7	- 29.9	- 54.1	- 40.9	- 37.1	- 43.0	- 39.3	- 13.2	- 39.1	- 39.4

Source: CBS. Note: Excluding main season potato production. According to official information the main season potato output is set at 249,500 mt, almost double the 2017 level of 148,300 mt.

FOOD CROP SUPPLY/
DEMAND BALANCE
2018/2019

5. FOOD CROP SUPPLY/DEMAND BALANCE 2018/19

The national food crop supply/demand balance for marketing year 2018/19 (November/October) is summarized in Table 10. It considers rice separately (in milled terms), maize, wheat, barley, other minor cereals, plus soybeans and potatoes (in cereal equivalent). In drawing up the national food crop balance, the following assumptions were made:

- **Total food production** (in milled terms and cereal equivalent) is estimated at about 4.2 million mt, including a forecast of 307,000 mt of early crops (wheat, barley and potatoes) to be harvested by mid-June 2019.
- **Food use** is estimated at 4.5 million mt, using the UN-projected 2019 mid-year population of 25.7 million people and a per capita average consumption of about 175 kg of cereals, potatoes and soybeans. The adopted consumption rate corresponds to an average daily intake of about 480 grams⁵ per capita and is consistent with the apparent per capita national consumption of the previous five years based on data from cereal balance sheets maintained by FAO's Global Information and Early Warning System on Food and Agriculture (GIEWS). The individual items are adjusted to match with the estimated availability during the current marketing year and to maintain a zero balance of non-traded commodities such as other cereal and potatoes. Per-capita consumption comprises 63 kg rice (milled), 82 kg of maize, 8.5 kg of wheat/barley, 6 kg of other cereals, plus 10.5 kg of potatoes and 5.4 kg of soybeans (both in cereal equivalent).
- No changes in the **food stock** levels are foreseen during the 2018/19 marketing year (November/October).
- **Feed use** is officially forecasted at 157,000 mt.
- **Seed requirements** for the 2019/20 seasons are estimated at about 214,000 mt on the basis of the recommended seed rates used in the country allowing to plant about 1.4 million hectares as in 2018/19. The following seed rates have been used: 97.5 kg/ha for paddy, 51 kg/ha for maize, 200 kg/ha for wheat, barley and other cereals, 500 kg/ha for potatoes and 60 kg/ha for soybeans.
- **Post-harvest losses**, from harvesting to processing and during storage, are estimated at 871,000 mt, with rates ranging from 20-22 percent for cereals, 30 percent for potatoes and 10 percent for soybeans. Losses for cereals are expected to be higher than usual as shortages of fuel and electricity as well as spare parts for machines did not allow farmers to timely transport and process crops (threshing). Storage losses for potatoes are likely to increase as ventilation is severely constrained by the erratic supply of electricity.
- The **total cereal import requirements** in the 2018/19 marketing year (November/October) are estimated at 1.59 million mt. With commercial imports officially planned at 200,000 mt and food assistance (already received or pledged) set at about 21,200 mt, the uncovered deficit for the full marketing year is estimated at an elevated level of about 1.36 million mt.

⁵ - The 480 g/pp/day or 175 kg/pp/year on average represents about 1700 kcal/pp/day, which may vary slightly depending on the diversity of crop intake. It is assumed that the remaining energy and other nutrients required are derived from the limited quantities of livestock, fish, vegetables, etc.

TABLE 9: DPRK - 2018/19, 2017/18 AND 5-YR AVERAGE NATIONAL FOOD CROP PRODUCTION IN CEREAL EQUIVALENT

Production	2018/19	2017/18	5 yr average	2018/19-2017/18 change	2018/19 change from average
	('000 mt)			(%)	
MAIN SEASON	4,546	5,105	5,178	-11.0	-12.2
Paddy	2,088	2,383	2,479	-12.4	-15.8
Maize	1,876	2,200	2,207	-14.7	-15.0
Other cereals	197	151	117	30.6	68.9
Potatoes	249	148	166	68.3	50.0
Soybeans	135	223	210	-39.4	-35.5
EARLY SEASON (winter and spring)	307	404	345	-24.1	-10.8
Wheat and barley	57	83	61	-31.7	-6.8
Potatoes	250	321	284	-22.1	-11.7
TOTAL	4,853	5,510	5,523	-11.9	-12.1

Source: CBS. Note: 2018/2019 early season crop mission forecasts.

TABLE 10: DPRK – FOOD BALANCE SHEET FOR MARKETING YEAR, NOVEMBER 2018 – OCTOBER 2019, (000 MT)

	Rice (milled) ¹	Maize	Wheat and Barley	Other cereals	Potatoes ²	Soybeans ³	Total
DOMESTIC AVAILABILITY	1,378	1,876	57	198	499	162	4,170
Main-season production	1,378	1,876		198	249	162	3,863
Winter/spring production			57		250		307
TOTAL UTILIZATION	1,942	2,710	244	198	499	162	5,755
Food use	1,621	2,110	219	156	269	139	4,513
Feed use		137			20		157
Seed requirement	46	51	13	13	85	6	214
Post-harvest losses	276	413	12	30	125	16	871
Stock build-up	0	0	0	0	0	0	0
IMPORT REQUIREMENTS	564	834	187	0	0	0	1,585
Anticipated commercial Import							200
Food assistance (received or pledged)							21
Uncovered deficit							1,364

Source: CBS. Note: Figures may not add up exactly due to rounding. 1/ Paddy to rice milling rate of 66 percent. 2/ Including potatoes in cereal equivalent at 25 percent conversion rate. 3/ Soybeans cereal equivalent using a factor of 1.2.



FAO/WFP assessment team visit to a Public Distribution Centre (PDC) in Sinchon County, South Hwanghae Province, April 2019.

FOOD SYSTEMS AND SOURCES

6. FOOD SYSTEMS AND SOURCES

TABLE 11: DPRK - HOUSEHOLD FOOD SOURCES

Household Type	Food sources					Cash
PDS-dependent	PDS rations	Kitchen gardens*	State shop coupons	Private farmers' market	Relatives	Wages
Cooperative farmer	Post-harvest allocations (1-2 per year)	Kitchen gardens** & slope land cultivation	State Shop coupons	Private farmers' market	Relatives	Cash allocation after harvest

*40% of PDS-dependent households have a kitchen garden **most cooperative farming households have a kitchen garden

In broad terms, in DPRK households access food through multiple and diverse avenues (Table 11). According to the government, most of the population gets its greatest share of food staples from PDS rations (if the household is headed by workers, governmental officials or pensioners) while the rest receive staples directly through post-harvest allocations (if the household is headed by a cooperative or state farmer). In 2017, 17.5 million people (71.5 percent of population) were reported to be PDS-dependent⁶, while 7 million people were either working in cooperative farms (6.1 million) or state farms (800,000) and therefore not PDS-dependent (Table 12). Across the country, farmers work in 3,220 farms (2,513 cooperative farms and 707 state farms) distributed in almost every county.

In addition to staple food, food is also accessed at household level through kitchen gardens, state shops, farmers' markets and through relatives. Cash plays an important role in accessing food purchased at farmers' markets as well as in collecting food from state shops and at PDS distribution centres where in both cases commodities need to be paid for, though at highly subsidized prices, as reported to the FAO/WFP team in different counties. Eating meals in institutions is also a common food access strategy. For example, children from six months of age, commonly attend nurseries where they receive three meals per day.

The section below describes in further detail the different

TABLE 12: DPRK - 2017 DISTRIBUTION OF POPULATION ACROSS PDS AND FARMS

Total Population	PDS-dependent population	Cooperative/ State farmers
24,584,652*	17,581,362	7,003,290
	71.5%	28.5%

*Army staff is excluded as explicitly stated in data provided by CBS.

6 - While some sources suggest that the PDS in reality covers a smaller portion of the population – especially in larger cities where more diverse income opportunities exist. The Mission was not able to independently verify this hypothesis, and additional verification of PDS registration would be needed.

7 - Exchange rate as of 01 May from www.XE.com at 1 USD = 900 KPW.

food sources available to PDS dependent and cooperative/state farmers.

6.1 PUBLIC DISTRIBUTION SYSTEM (PDS) RATIONS AND POST-HARVEST ALLOCATIONS PDS RATIOS: HOW DO THEY SUPPOSEDLY WORK?

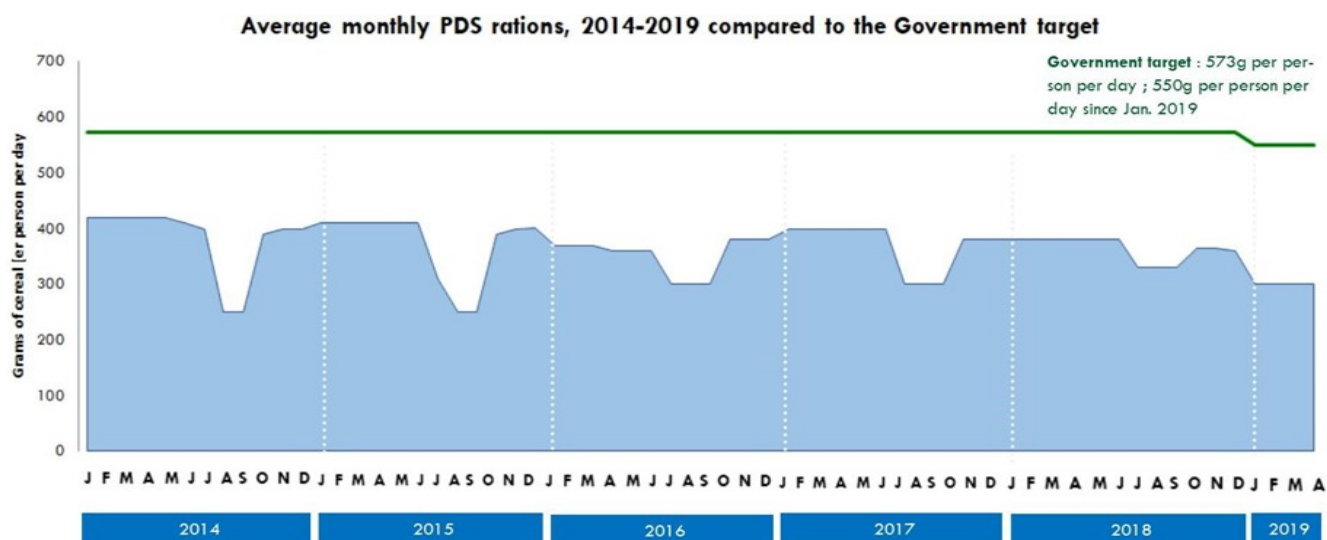
The Food Procurement and Distribution Authority sets the average monthly ration for the coming month, one month ahead of time. Based on that target, county authorities review food availability at county level and plan distributions, establishing the need to import from other counties or not. Based on the current food policies, the county is the first entity where the meeting of staple food needs is addressed (moving food from one cooperative farm to another and using the county warehouses as main source). If monthly food needs cannot be met, there can be a mobilization of food from other surplus counties in the same Province (first) or other provinces (second). The biggest inter-provincial flows are between southern rice-producing provinces and the northern rice-deficit provinces, and towards big cities such as Pyongyang, Pyongsong, Chonjin and Sinuju.

Distributions take place twice per month, normally between 1st - 5th and 15th - 20th day of each month following a distribution schedule for registered households managed at the Public Distribution Centres (PDCs).

The PDS rations, distributed through the PDCs, are acquired at fixed subsidized prices (44 KPW/kg for rice, 24 Korean KPW/kg for maize)⁷, relatively low if compared to fluctuating prices for other staple food items (such as soybeans and potatoes) in the farmers' markets or state shops.

The PDS rations vary in quantity and composition throughout the year and between years (see Figure 6). Data shows that the ration has been steadily decreasing

FIGURE 6: DPRK - DECREASING NATIONAL MONTHLY AVERAGE PDS RATIONS: INTER-ANNUAL REDUCTION AND INTRA-ANNUAL DROPS



Source: CBS.

since 2012, with seasonal drops usually taking place during the lean season between May and September (drops range from 15-40 percent depending on the year).

The official national target ration for planning was 573 g/pp/day for several years, but for 2019 it has been lowered by 5 percent to 550 g/pp/day. At time of writing, the reported effective PDS ration is 300 g/pp/day (January-April 2019), which represents a sharp reduction compared to the 2018 ration size (that started with 380 g/pp/day in January and ended with 360 g/pp/day in December), and the lowest registered for the initial months of any calendar year.

POST-HARVEST ALLOCATIONS FOR COOPERATIVE FARMERS

In lowland and warmer areas of the country (all provinces except Ryanggang, Chagang and North Hamgyong), where two seasons can be cultivated, cooperative farmers receive post-harvest distributions twice per year. In areas with two harvests, first distributions take place in June, when early crops are harvested (potato, wheat and barley). The second distribution of the main cropping season takes place in November, after the main harvest (in mountainous areas with only one harvest, this is the only distribution). In total, the farmer's share reportedly contains on average an amount of 600 g/pp/day.

The final consumption of post-harvest distribution by cooperative farming households are affected by multiple factors. As farmers are receiving their allocations once or maximum twice per year, they are bearing the risk of storage losses at household level. When cooperative

farming households receive more g/pp/day than the average target in a good harvest year, they may support relatives that are in need (who are often PDS-dependent living in urban areas).

In order to satisfy food and non-food expenditure needs a part of that post-harvest allocation may need to be traded or bartered (especially those staples that can be legally traded in the market, such as potatoes or cabbages) to acquire additional commodities including non-food items.

ANALYSIS OF PDS RATIONS AND POST-HARVEST ALLOCATIONS: QUANTITIES AND CALORIC CONTRIBUTION

On average, households (including both PDS-dependent and cooperative farmers) surveyed in April 2019 received 1,393 kcal/pp/day in the form of PDS rations or post-harvest allocations (with 394 g/pp/day on average⁸) whereas those surveyed in November 2018 got higher rations on average (1,529 kcal/pp/day from 447 g/pp/day⁹). This decline in average food rations received by PDS-dependent and cooperative farmers alike reflects the impact of the declining harvest and the growing food gap that has been announced at the national level.

Based on rations reportedly received by the interviewed households, in April 2019, PDS-dependent households could access 1,080 kcal/pp/day (average PDS ration of 306 g/pp/day), while cooperative farmer households could access 2,285 kcal/pp/day (in form of post-harvest allocations of 647 g/pp/day of staples)¹⁰ (see Table 13).

⁸ - PDS rations for workers, officials, retirees and their dependents; and post-harvest allocations in kind for cooperative and state farmers and their dependents

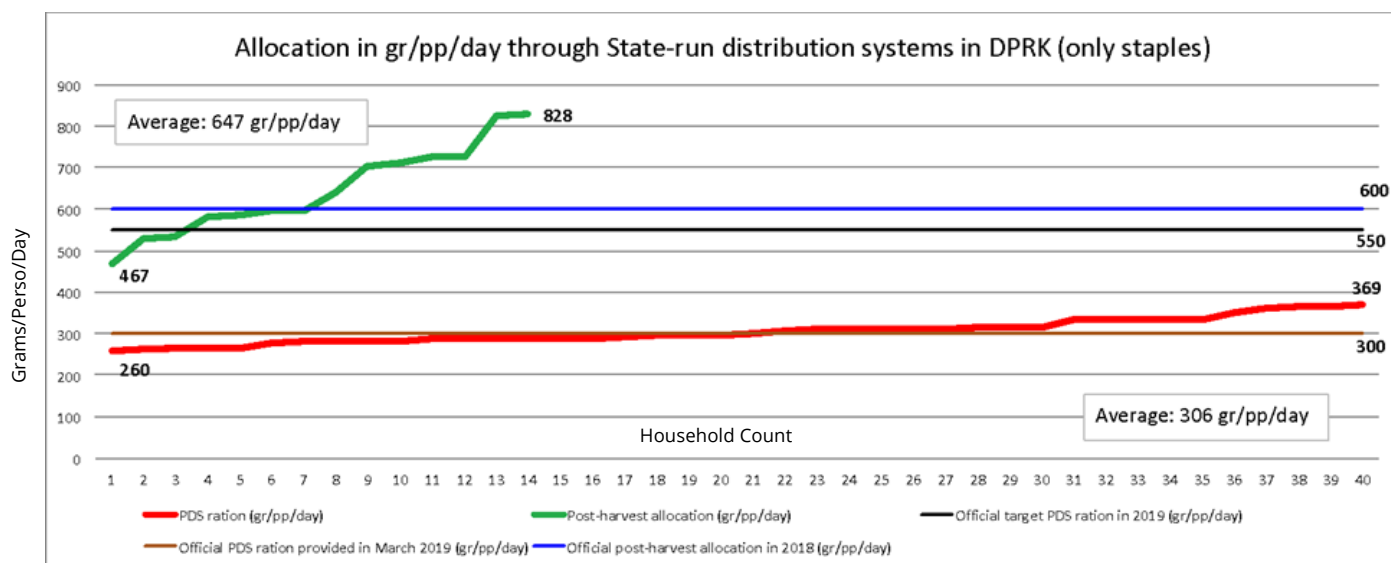
⁹ - To estimate the energy from food rations of both PDS and post-harvest distribution for farmers, energy values from WFP NutVal Analysis Software 4.1 (available at: <http://www.nutval.net>) were adopted for the analysis.

TABLE 13: DPRK - PDS RATIONS SIZE AND KCAL BY HOUSEHOLD TYPE

	Avg. PDS ration (g/pp/day)	PDS rations energy (kCal/pp/day)	Avg. farmer allocation (g/pp/day)	Farmer allocation energy (kCal/pp/day)
November 2018	387	1,369	553	1,957
April 2019	306	1,080	647	2,285

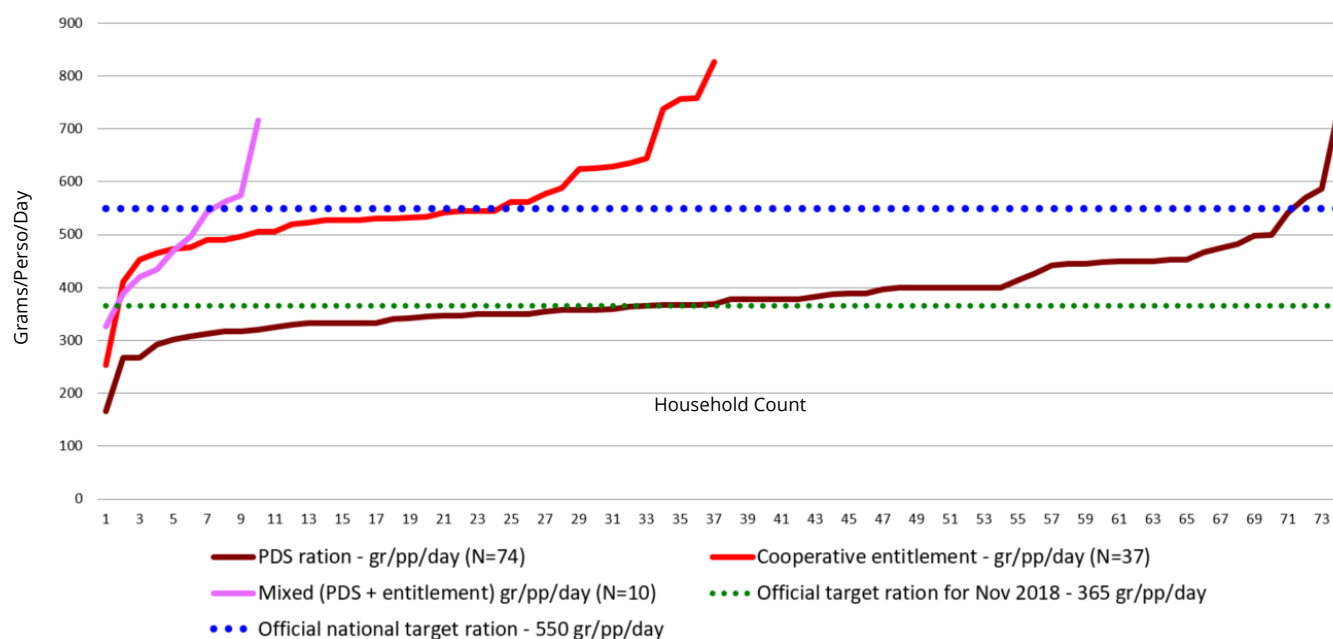
Source: Household survey

FIGURE 7: DPRK - DISTRIBUTION RATIONS AS PER SURVEYED HOUSEHOLDS



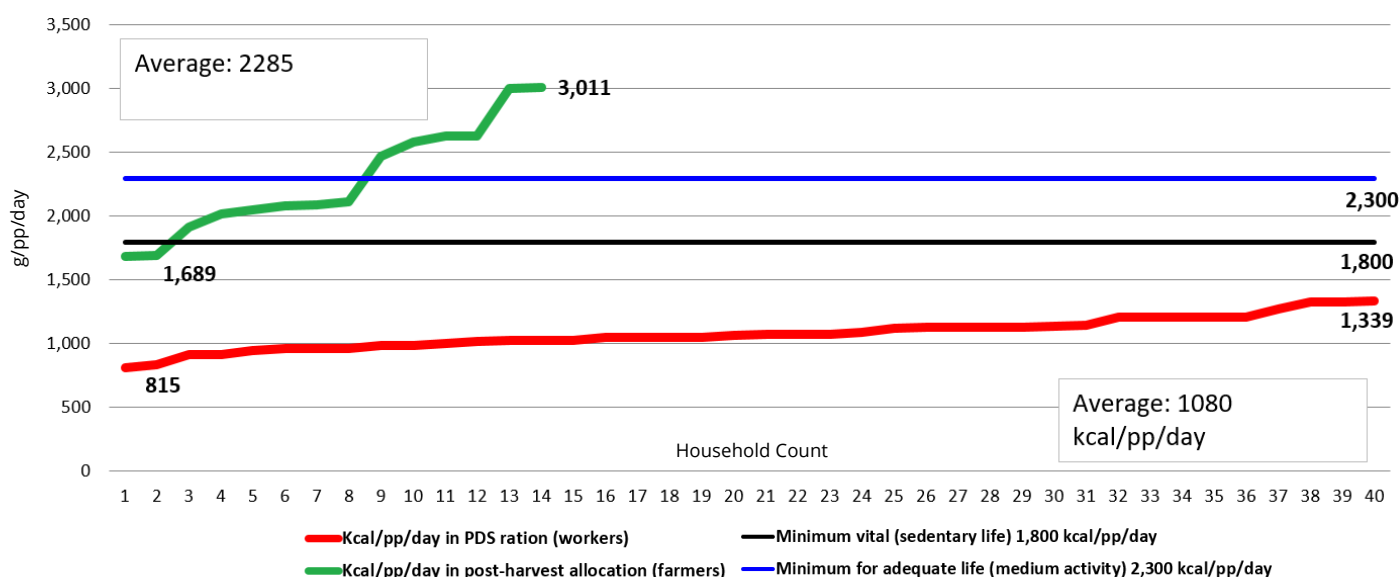
Source: FAO/WFP rapid Food Security Assessment, April 2019

FIGURE 8: DPRK - DAILY RATION IN CEREAL EQUIVALENT FOR PDS-DEPENDENT AND COOPERATIVE FARMING HOUSEHOLD (G/PP/DAY)



Source: WFP Food Security Assessment, November 2018

FIGURE 9: DPRK - CALORIC AVAILABILITY THROUGH STATE-RUN DISTRIBUTIONS SYSTEMS (ONLY STAPLES)



Source: FAO/WFP rapid Food Security Assessment, April 2019

Back in November 2018, PDS-dependent households reportedly received 1,369 kcal/pp/day (from 387 g/pp/day on average), whereas cooperative farmers appeared to have received also much less with 553 g/pp/day (corresponding to 1,957 kcal/pp/day). Both datasets seem to indicate a deteriorating situation for PDS-dependent households while the situation seems to be more stable for cooperative farmers though the figures reported as received at the time of distribution may not reflect the losses at household level over prolonged storage time¹¹.

For the first four months of 2019, the official monthly ration is fixed at 300 g/pp/day (a 21 percent reduction compared to the same period in 2018). It is worth noting that this official ration is an average because in practical terms, different households get different rations depending on the age composition and type of work of household members (Figures 7 and 8).

When analysed from the caloric point of view, PDS-dependent households in the April 2019 dataset are provided with 1,369 kcal/pp/day, which falls short of the recommended daily calorie intake of 2,100 kcal/pp/day by 35 percent and of the minimum basal requirements of 1,800 kcal/pp/day by 24 percent (Figure 9). In absolute terms, the PDS ration size is not enough to provide enough caloric intake. As a result, PDS households need to keep relying on other equally important food sources such as markets and gifts from family in rural areas to fill the food gap. The PDS ration composition exerts an important effect on the caloric content of the ration. In Ryanggang, the PDS rations are mostly composed of potatoes (80-90 percent) and rice or wheat (10-20 percent). While ration sizes for potatoes are higher, their much lower caloric intake (77 kcal/100 gr) compared to maize or rice (360-365 kcal/100 gr) may not compensate in full in terms of energy for the larger ration size. For example, with similar PDS rations,

TABLE 14: DPRK - AVERAGE RATIIONS IN COOPERATIVE FARMING HOUSEHOLDS

Cooperative farming households		g/pp/day	kCal/pp/day	
Ryanggang	Paekam (n=2)	587	1,855	
N.Pyongan	Unjon (n=3)	629	2,201	Only cooperative allocation
S.Pyongan	Sunchon (n=1)	598	2,088	
S.Hwanghae	Sinchon (n=5)	605	2,198	
N.Hwanghae	Unpa (n=3)	788	2,864	

Source: FAO/WFP rapid Food Security Assessment, April 2019

10 - It is the worker/farmer condition of the household member (usually a man) that determines the label applied to every household, irrespective of the category of other working members. That explains the consideration of mixed households (with workers and farmers).

11 - The perceived increase in farmers' allocations between November and April may be largely due to the small sample size and difference in household composition.

TABLE 15: DPRK - AVERAGE RATIIONS IN PDS-DEPENDENT HOUSEHOLDS

Province	County	Households ed	Visit-	PDS ration (corresponding to March 2019)	
				g/pp/day	kCal/pp/day
Ryanggang	Pungso	5		312	977
	Paekan	3		281	888
South Hamgyong	Rakwon	4		293	1,064
	Hungdok	4		282	1,023
North Pyongan	Gujang	3		300	1,089
	Unjon	2		300	1,088
South Pyongan	Kaechon	4		334	1,212
	Sunchon	3		302	1,095
	Anak	5		308	1,113
North Hwanghae	Bongsan	5		314	1,143
	Unpa	2		339	1,229

Source: FAO/WFP rapid Food Security Assessment, April 2019

when calories are compared, surveyed Ryanggang households in April on average receive 944 kcal/pp/day, whereas households in other provinces receive 1,115 kcal/pp/day on average.

For cooperative farmers, the situation seems to appear less challenging as they receive 2,285 kcal/pp/day on average. However, it should be noted that there are differences between farming households depending on where they live (relating to productivity of the area and cooperative). For those who live in a deficit county where local production hardly meets the consumption needs and those who have been on the frontline of natural disasters in the past few years, post-harvest distribution and overall food consumption can be substantially affected in a negative manner. In addition, the issue of food losses at household level may be more challenging given the larger amount of food distributed and the poor storage facilities.

A preliminary analysis of PDS rations to workers and officers, and post-harvest distributions to cooperative and state farmers in different provinces shows variation in the daily amount available, either in the form of grams per household member or in kcal/pp/day (see Table 14-15). However, this analysis is so far based on the April data (only 54 households) as the additional analysis from the November dataset was not available at time of writing. Further research on geographical diversity of rations and allocations is thus needed.

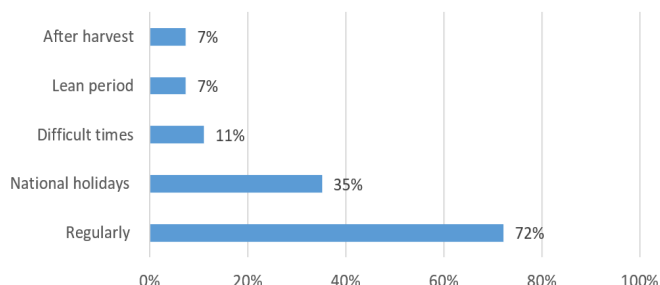
6.2 THE ROLE OF MARKETS IN HOUSEHOLD LIVELIHOODS: FARMERS' MARKETS AND STATE SHOPS

Different types of state shops exist in DPRK and serve as one of the food sources selling daily food items such as salt, oil, bean paste, eggs, other processed foods, as well as vegetables and fruits in specific seasons. Food items at state shops are sold at a fixed, subsidized price, which does not change through the year or by season. People visit the shop, show their coupons and pay in cash. Coupons work as entitlements to buy certain kinds of food items (the amounts per household are indicated on the coupon and those amounts vary by households depending on the household member occupation, hard or light labour, and number of dependents). Coupons are a means to distribute the relatively small supply of certain items as compared to the total population in the area being serviced.

In addition to state shops, markets play an important role in food systems as a place to source foods, receive cash or barter items. The relevance and importance of this mechanism has been growing relentlessly since the severe food shortages in the 1990s but remains poorly understood. One form of market is the farmers' markets, where people from farming families gather on the 11th, 21st and 31/1st of each month and sell or exchange food products (vegetables and animals), largely coming from their kitchen gardens¹². A farmers' market can be as sizable as 600-700 sellers, reflecting the widespread need among people to satisfy their food consumption needs through market exchanges, plus the need for cash to purchase other items. In November 2018, around one third of farming households reported having participated in market selling.

In April, all the surveyed households reported buying food

FIGURE 10: DPRK - FREQUENCY OF HOUSEHOLDS BUYING AT MARKETS



Source: FAO/WFP rapid Food Security Assessment, April 2019

at farmers' markets either in specific periods or on multiple occasions (Figure 10), with 72 percent visiting farmers' markets regularly to purchase food, which is consistent with the November datasets (71 percent of visited households regularly buy at market). These households are assumed to have steady access to cash. For some other households, buying at the market is only possible after their kitchen garden produce is harvested and sold so that they have bartering or purchasing capacity at the market.

Going to the market during the vegetable lean season (April-June) or during difficult food consumption periods (July-September) reflects, to some extent, the market's role in overcoming food challenges for people. The latter is only reported by PDS-dependent households living in urban areas. On the other hand, prices at farmers' markets compared to state shops are substantially higher, which may partially explain the relatively low reporting of visiting markets during periods of financial difficulties.

According to food prices collected by WFP's monitoring and evaluation (M&E) team in DPRK during regular market monitoring surveys in 2018/19, prices of food items sold in state shops are highly subsidised as indicated in Table 16. Prices of sea fish have almost tripled, and basic (and more affordable) sources of proteins such as eggs have double in price from 150 KPW/piece to 300 KPW/piece. It is worth mentioning that eggs in state shops (when available, which is often not the case) only cost 10-12 KPW. However, many interviewed households did not report eating eggs, or barely ate them and if they did, only during special holidays (such as the International Women's Day). This means that

TABLE 16: DPRK - FOOD PRICES IN STATE SHOPS

Rice	44-46 KPW/kg
Maize	24-25 KPW/kg
Wheat	24-26 KPW/kg
Potatoes	9 KPW/kg
Soy bean	25-45 KPW/kg
Bean paste	23 KPW/kg
Cabbage	10 KPW/kg
Eggs	10-12 KPW/unit
Pork meat	170-180 KPW/kg
Fish (dried)	35-80 KPW/kg
Oil	210 KPW/l

Source: Prices were collected during state shop visits in November 2018 and April 2019. All items require coupons to be purchased at subsidized prices.

even when state shops have eggs, any given household cannot access them unless they hold a special coupon that entitles them to buy eggs at low prices. A general trend of increasing market prices can be identified from this sample since last year. The prices spiked in February 2019 and have maintained that new high level in March, which is likely to cause further stress on people's access to food and worsen the overall food consumption situation.

12 - Reports collected during the Mission also indicate those products may come from slope land production or household surplus from post-harvest allocations.

TABLE 17: DPRK - FOOD PRICES AT MARKETS IN 2018, 2019 AND FOOD PRICES IN STATE SHOPS

ITEM	State Shop prices KG 18-19 KPW/	2018		2019			
		11 Apr - S. Hwanghae (Yunan) Up (urban area) 200 sellers + 400 cust. when visited	Jan - S. Pyongan (Tokchon) Prices reported in Feb for this month	21 Aug - Kangwon (Anbyon) Urban area, 100 sellers + 150 cust.	Oct - N. Hamgyong (Pohang) Urban area, 250 sellers + 300 cust.	Dec - N. Hwanghae (Pongsan) Prices reported in Feb for this month	11 Feb - N. Hwanghan (Pongsan) Up, 200 sellers + 300 cust.
Rice	45						
Maize	25						
Wheat	90						
Seaweed (dry)		1,000	500		600		1,150
Sea fish (dried)	35-80	550	600		500	550	1,400
Crab					4,000		
Pork meat	170-80	3,000	3,000	3,500	5,000		7000
Chicken meat					3,000		
Duck meat				3,500	5,000		
Eggs	10-12	150 piece		200 piece	300		
Bean paste	23		650				1,500
Soybean	25-45	700	730		800	720	1,700
Mushrooms		450					
Spinach		500				350	600
Carrot		900	300			300	650
Pumpkin			200	200			450
Tomato					1,500		
Apple			700	800	1,400		1,600
Peach				600			
Grape				600			
Cabbage	10	300	300		400		600
Radish			100		300		230
Onion			500		1,000		1,150
Garlic		1,400		1,200	1,200		
Eggplant				200			
Potato	9		300	300	300	300	600
Chili pepper					1,600		
Cucumber			300			300	700

Source: WFP DPRK Country Office Market Monitoring surveys 2018-2019.

6.3 THE ROLE OF KITCHEN GARDENS

Kitchen gardens are a common household asset, mostly for those living in single-storey houses in semi-urban and rural areas. Around 90 percent of cooperative farmer households have a kitchen garden, while only 40 percent of PDS-dependent households do (according to the both November 2018 and April 2019 datasets). Kitchen gardens serve as a critical food and/or cash source where households can plant, consume and/or sell vegetables and fruits, and raise livestock such as poultry, rabbits, pigs or goats. Among the surveyed households who have a kitchen garden (both in November 2018 and April 2019), the most common vegetables are cabbages (90 percent), spinach (60-70 percent) and radish (50-60 percent). Having a kitchen garden seems to be positively associated with increased food consumption as illustrated in the chart below (Table 18).

6.4 THE INFORMAL NETWORK: SUPPORT FROM RELATIVES AND FRIENDS

Family and social networks have proved to be important in DPRK, despite the fact that there is no marked wealth

difference among most of the population. Mutual aid relationships usually take place between rural farmers with higher amounts of staple food received as post-harvest allocations and from their own kitchen gardens, and their urban relatives/friends with more cash from wages but no harvest from kitchen gardens (70 percent do not have kitchen gardens or livestock).

In November 2018, 17 percent of surveyed households indicated that part of their household income came from friends and relatives, whereas 44 percent indicated receiving food from relatives or friends. Most reported food items that households received as gifts from family and friends are pulses (13 percent of total consumed at home), cereals (10 percent), cabbage and fruits (around 5 percent).

Furthermore, receiving food from people's social networks has become a relevant coping strategy, as 24 percent of surveyed households resorted to other's help during the lean season. With the nationwide decreased food availability since the last harvest, the capacity of people to help and support each other may be compromised accordingly, which will further weaken people's food access and dietary diversity.

TABLE 18: DPRK - HOUSEHOLD FOOD CONSUMPTION AND KITCHEN GARDENS

Household Type	Household Number	Food consumption score		
		Poor	Borderline	Acceptable
Total	54	46%	46%	7%
With kitchen garden	30	40%	47%	13%
Without kitchen garden	24	54%	46%	0%

Source: FAO/WFP rapid Food Security Assessment, April 2019

FOOD SECURITY
AND VULNERABILITY
ANALYSIS

7. FOOD SECURITY AND VULNERABILITY ANALYSIS

7.1 HOUSEHOLD FOOD CONSUMPTION

Close to one third of cooperative farming households, either living in rural or urban areas, has acceptable Food Consumption Score (FCS), against less than 10 percent of PDS-dependent households according to both the November 2018 and April 2019 assessments. Having more than two income earners in the household and a kitchen garden seems to indicate a positive effect on the FCS, although the difference is not statistically significant due to the sample size. Food consumption seems to have worsened for PDS-dependent households between November 2018 and April 2019 but appears to have remained stable for cooperative farming households.

The FCS, as a proxy indicator reflecting household level food access and dietary diversity, points to an overall alarming situation. Among surveyed households in April 2019, only 7 percent had an acceptable diet with a more frequent intake of high-protein foods and fruits (see Table 19). The other 93 percent (poor and borderline food consumption) of the households reported a daily diet that is insufficient in diversity and nutrients.

When compared to the November 2018 dataset, the food security situation is clearly worsening (as seen in Table 19), with poor food consumption rising and acceptable

consumption diminishing. Likewise, the current situation is much worse than the one reported in 2013.

The distribution of this indicator has shown obvious differences between PDS-dependent and cooperative farming households (Table 20a). Rural cooperative farmers seem to have an overall better food consumption than urban PDS-dependent households, yet consistently in both surveys 29-35 percent of cooperative farmers have poor food consumption.

No surveyed PDS-dependent households' diet reached acceptable levels in April 2019, while 29 percent of cooperative farming households have acceptable food consumption. In November 2018, only 9 percent of PDS-dependent households had an acceptable food consumption, compared to 24 percent among cooperative farming households (Table 20b).

The number of income earners that contribute to the food basket seems to positively influence food consumption at the household level. The prevalence of poor food consumption among households that have more than three income earners (29 percent) is almost half of that found among households that have only one income earner (62 percent). This trend is confirmed by the November dataset.

TABLE 19: DPRK - FOOD CONSUMPTION SCORE BY DATASET

Field research dates	Food Consumption Score		
	Poor	Borderline	Acceptable
November 2013 (CFSAM 2013 data)	34%	51%	16%
November 2018	37%	50%	13%
April 2019	46%	46%	7%

Source: FAO/WFP rapid Food Security Assessment, April 2019

TABLE 20A: DPRK - FOOD CONSUMPTION SCORE FOR NOVEMBER 2018 DATASET

November 2018 Household type	Food Consumption Score		
	Poor	Borderline	Acceptable
PDS	37%	54%	9%
Cooperative Farmer	35%	41%	24%
Mixed (Farmer + PDS)	40%	60%	0%

Source: FAO/WFP rapid Food Security Assessment, November 2018

TABLE 20B: DPRK - FOOD CONSUMPTION SCORE FOR APRIL 2019 DATASET

April 2019 Household type	Food Consumption Score		
	Poor	Borderline	Acceptable
PDS	53%	48%	0%
Cooperative Farmer	29%	43%	29%

Source: FAO/WFP rapid Food Security Assessment, April 2019

Analysis of household expenditures from the November assessment confirms the importance of cash at household level to access food and non-food items from markets and state shops. Preliminary findings indicate better food security for households with higher expenditures.

As per our analysis, the education level of the household head¹³ does not seem to be relevant in explaining the FCS. Neither does the occupation of the household head (either worker, officer or retiree), nor the size of the household. Only cooperative farmer households, as expected by the high post-harvest allocations, stand out from other professions as the only ones having acceptable food FCS (24-29 percent) although to be taken with caution given the small sample size of cooperative farmers in April assessments (10 households).

7.2 QUALITY OF DIETS

Dietary diversity is low and dependent on PDS rations and post-harvest allocations; animal protein consumption is also very low, reported mostly during national holidays (when subsidized meat is found in state shops) or anniversaries. These facts correspond well with the very low food consumption scores, especially for PDS-dependent households. Almost all surveyed households, regardless of the different wealth levels observed, had poor dietary diversity.

Carbohydrates dominate the diet (rice, maize or potatoes), often prepared in different forms (soup, porridge, fried, noodles), and supplemented by with small portions of dried seaweed, dried radish leaves, and more rarely bean paste. In addition, a typical meal contains kimchi (processed cabbage with spices, salt and vinegar) and usually seasoned with salted vegetables (either from own kitchen garden or purchased in the market when prices are low and then preserved in salted water at home).

The low food consumption score can be attributed to the very low consumption of animal proteins and low level of vegetable proteins. Most households visited consume no or only small quantities of meat, with those meals restricted to anniversaries, when guests arrive or during occasional events such as a visit to Pyongyang or feasting of ancestors. For anniversaries or unexpected visits, households either have to buy meat in the market (at prices that are 20 times more expensive than those in state shops) or to sacrifice one of their own animals. Another source of relatively affordable animal protein is eggs. However, there is a huge price gap between state-fixed prices (10-12 KPW/piece) and commercial market prices (300 KPW/piece in October 2018), which limits access to those households who do not have hens or cannot procure eggs through state shops.

13 - Everybody has a level above primary school (mandatory) in DPRK

7.3 HOUSEHOLD LEVEL COPING MECHANISMS CONSUMPTION COPING MECHANISMS

Corresponding to the widespread suboptimal food consumption is the frequent adoption of food-related coping behaviours at the household level to mitigate food shortages. This is also verified by the higher rate of coping behaviours among households with poor food consumption compared to those with a borderline or acceptable diet.

The most frequently-adopted strategy for both PDS and cooperative farming households is "consuming less preferred foods". Among the surveyed PDS-dependent households in the November 2018 and April 2019 datasets, 89 percent and 82 percent respectively reported using this coping behaviour in the week prior to the survey while 57 percent and 76 percent of cooperative farming households respectively reported it in April and November (see Table 21). Other most frequently adopted coping strategies are "limiting the portion sizes", "restricting adult intake for children to eat", "borrowing food or relying on help from family or relatives" and "reducing number of meals". And both Nov and Apr datasets show that PDS dependents resort to these coping behaviours more often than the cooperative farming households. In several areas in Ryanggang, urban households reported that they are no longer able to depend on their relatives living in rural areas as they are affected by lower vegetable production.

LIVELIHOOD COPING MECHANISMS

Besides tackling food consumption challenges through consumption related behaviour, households also reported adopting livelihood coping strategies to overcome food related difficulties during the April assessment. Compared to the November dataset, in which no households reported adoption of livelihood-based coping strategies, we may

TABLE 21: DPRK - CONSUMPTION COPING MECHANISMS

Coping Strategy	Nov.2018		Apr.2019	
	PDS Households	Cooperative Farmer	PDS Households	Cooperative Farmer
Consuming less preferred foods	89%	76%	82%	57%
Borrowing food or relying on help from family or relatives	60%	35%	29%	0%
Limiting the portion sizes	47%	76%	57%	29%
Restricting adult intake for children to eat	40%	19%	40%	14%
Reducing number of meals	6%	0%	18%	0%

Source: November 2018 and April 2019 datasets.

TABLE 22: DPRK - LIVELIHOOD COPING MECHANISMS

Livelihood coping mechanisms used in the last 30 days due to lack of food or money to buy food		
	PDS Households	Cooperative Farmer
Spent savings	48%	29%
Borrowed money	30%	7%
Bartered or sold animals or household goods	5%	14%
Send children to eat at public institutions or relative's home	20%	14%

Source: FAO/WFP rapid Food Security Assessment, April 2019

safely assume the household resilience in food security has declined as a combined result of reduced PDS ration, rising prices at food markets and other factors.

Consistently with other results, PDS-dependent households show higher adoption rates of livelihood-related coping strategies than their cooperative farmer counterparts (except in selling livestock because they do not have any). Among both groups, spending savings has been the most resorted to short-term solution, indicating a lack of monetary resources at household level to maintain or improve their food security situation. Borrowing money is far more frequent within PDS-dependent households (most likely in urban areas) than rural farmers. On the contrary, selling livestock is the second most used mechanism in rural areas (Table 22).

7.4 SEASONALITY AND STORAGE

A marked pattern of seasonality easily emerges in DPRK when it comes to food consumption difficulties¹⁴ and food storage challenges. Both November and April datasets confirm that May and June are the peak months when food consumption challenges are reported (see Figures 11 & 12). One of the main reasons behind this is that the first season crops are not yet harvested, the winter stocks of kimchi are running out, and the lack of vegetables during these two months coupled with the consequent relatively high prices of vegetables at the market (Figure 13). The reported period where most difficulty in terms of food consumption is between April and September. Also, for cooperative farming households, October-December can be challenging as they are likely to experience a food gap while finishing their distribution from last year's harvest and waiting for the new post-harvest distribution to arrive.

Another factor that affects food consumption at household level is related to storage conditions. In April, more than 75 percent of households reported experiencing difficulties in stocking food for some months of

the year. July and August are clearly the worst months to preserve stored food reserves (Figure 14), as they are the hottest months of summer with high humidity due to the rainfall and the storms. Additionally, the frequent occurrence of natural disasters during these two months including floods and heat waves have further stressed the storage condition and caused further loss. Such trends are also verified by the November dataset, with half of interviewed households recalling storage challenges in July and August.

Almost a third of households indicated no particular facilities available at home to store food (often stored in one of the rooms of the house or apartment). Additionally, 14 percent indicated open-air storage, a similar percentage mentioned traditional storage facilities, and only a few reported underground storage cells (6 percent), mostly for potatoes in Ryanggang. However, a closer look at the sample shows the differences between PDS-dependent and cooperative farming households. Food stocking challenges were mentioned by half of the visited farming households. Compared to PDS households, cooperative farmer households face higher risks of spoilage during storage.

7.5 MATERNAL, INFANT AND YOUNG CHILD NUTRITION

According to the 2017 Multi Indicator Cluster Survey (MICS) carried out by CBS with technical and financial support from UNICEF, higher stunting rates are registered in older children. According to the survey, the prevalence of stunting in DPRK can be as high as 32 percent in some provinces. It also showed that young children in rural areas are more likely to be stunted than those living in urban areas.

During the April 2019 assessment, Mission teams visited eleven nurseries to better understand the daily food consumption and nutrient intake among children between 6-59 months. All the nurseries report serving

¹⁴ - A time period when households report having difficulties to get access to enough food to satisfy needs. This period is commonly known as "food gap".

FIGURE 11: PDS AND FARMING HOUSEHOLDS REPORTING FOOD CONSUMPTION DIFFICULTIES BY MONTH, APRIL 2019 (%)

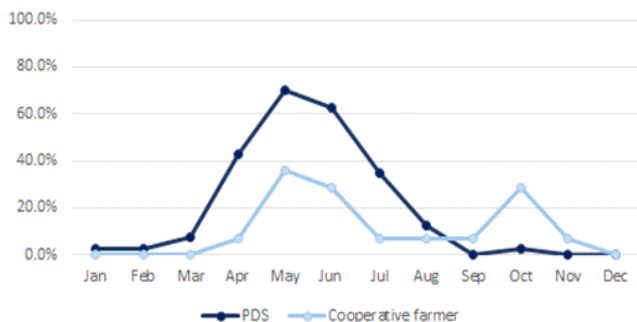


FIGURE 12: PDS AND FARMING HOUSEHOLDS REPORTING FOOD CONSUMPTION DIFFICULTIES BY MONTH, NOVEMBER 2018 (%)

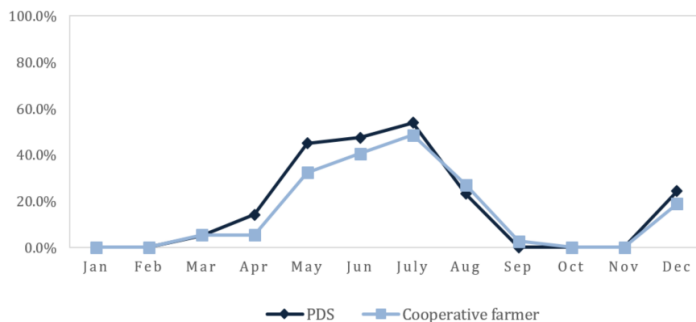
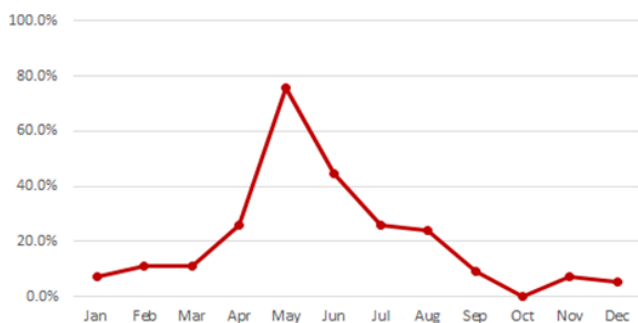
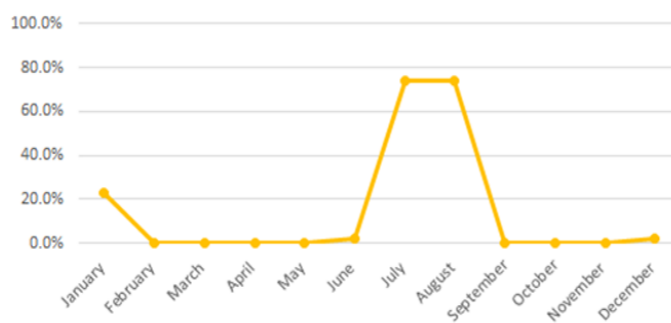


FIGURE 13: HOUSEHOLDS REPORTING HIGHER FOOD PRICES, BY MONTH (%)



Source: FAO/WFP rapid Food Security Assessment, April 2019

FIGURE 14: HOUSEHOLDS REPORTING FOOD STOCKING DIFFICULTIES, BY MONTH (%)



Source: WFP Food Security Assessment, November 2018

three meals per day and have a regular height and weight monitoring system to supervise the adequate growth of the children. Based on that monitoring system, several nurseries reported percentages of undernourishment between 15-25 percent.

Like the household dietary structure, staple cereals and vegetables are the most frequently consumed foods. Soybeans are usually provided two-three times per week in the format of soymilk or bean soup. Meat and fish are consumed at intervals across all the nurseries visited. For meat (in most cases pork), the consumption frequency ranges from once per month to 3 or 4 times per year. Fish is usually eaten once per month or once per quarter. Fruits are

consumed seasonally only during June to October.

Among visited nurseries, kitchen gardens did not play a significant role in the food supply of these institutions. Of the 11 visited nurseries, 6 had kitchen gardens of sizes from 20 pyong to 100 pyong (1 pyong=3.3 square meters). However, the reported contribution from garden harvest is mainly vegetable and the proportion of such produce among overall consumption is minimal (about 15 percent on average).

CONCLUSIONS & RECOMMENDATIONS

8. CONCLUSIONS AND RECOMMENDATIONS

TABLE 23: DPRK - ESTIMATED FOOD INSECURE POPULATION

	Poor food consumption (%) <i>(Nov 2018/April 2019 weighted sample)</i>	2019 population (millions) <i>(source: CBS)</i>	Estimated food insecure population (millions)
PDS Dependents	43%	17.5	7.5
Cooperative Farmers	34%	7.7	2.6
TOTAL	40%	25.2	10.1

Based on the analysis and converging findings of the November 2018 and April 2019 household assessments, the Mission estimated that 10.1 million people are food insecure and in urgent need of assistance, including 7.5 million PDS dependents and 2.6 million farmers (Table 23).

The food gap stands at 1.36 million mt for the whole marketing year 2018/2019.

IMMEDIATE ACTIONS

The Mission concluded that the food insecurity situation is serious and could become critical during the upcoming lean season. A humanitarian intervention is therefore urgently required to mitigate the food production shortfall. The 2019 production season has already begun and in addition to the immediate humanitarian actions, there is an urgent need to ensure that food security needs are met for the winter of 2019-2020 through to the main harvest in the autumn of 2020. The following immediate actions are recommended:

FOOD SECURITY

- **Targeted general food distribution of a diversified basket containing cereals and pulses** (preferable soybeans or other culturally accepted pulses) for an original duration of six months (June to November 2019).
- **Prioritise counties where food deficits per capita are higher, and counties that have been most affected by climatic extremes** in 2018 (heatwave, localized floods and frosts) and the dry spell in 2019 (affecting the early cropping season).
- **Expand coverage of nutrition programmes and provide additional fortified foods and pulses to highly vulnerable groups** (including children in

nurseries and kindergartens, Tuberculosis patients in hospitals and outpatients, institutions for disabled children, and pregnant and breastfeeding women and girls (PLW) in prioritised counties).

- **Expand food distributions** through asset creation programmes focused on disaster risk reduction work to mitigate potential negative impacts of climate events during the next season.
- **Ensure a robust monitoring system** to verify effective distributions of humanitarian assistance to prioritised groups and areas.
- **Conduct an update of the food security situation at the end of the lean season (August/September)** to assess the outcome of the main agricultural season in 2019, to estimate the food insecurity situation for the next agricultural year starting November 2019 and to inform the duration of the required humanitarian assistance.

AGRICULTURE

- **Provide mobile water pumps** in preparation for the summer season, to be distributed where they are needed to avert crop failures.
- **Import agriculture chemicals** for the control of pests and diseases, to be distributed where they are most needed during the cropping season in response to any significant outbreaks of pests or diseases.
- **Provide ready-to-install greenhouses and plastic sheeting** to extend the growing season for vegetables in 2019 and allow early preparation of seedlings for the 2020 planting season.

- **Provide high quality vegetable seeds** - using a nutrition-sensitive agriculture perspective - for growing in greenhouses over the fall/winter of 2019, supplying households for use in kitchen gardens (both in for cooperative members and urban agriculture) and preparing seedlings for early transplanting in the 2020 planting season.
- **Improve the level of biosecurity of livestock farms** and strengthen the capacity of farmers and cooperatives for early detection, reporting and control of animal disease outbreaks.
- **Provide appropriate amounts of veterinary drugs, medicines, disinfectants and other supplies** to allow a rapid response to any outbreaks of animal diseases.
- **Import appropriate amounts of phosphatic and potassic fertilisers.** Alternative sources of potassium and phosphates need to be urgently identified and their equitable distribution organised.
- **Provide equipment for drying or desiccation** of vegetables, fruits, mushrooms and other foodstuffs for preservation over the winter season, thus providing a varied and more nutritious diet over the winter months.
- **Improve facilities and equipment for food processing and transformation** (e.g. noodles, starch, pickles and preserves) to ensure a more varied and healthy diet in the lean months prior to the main harvest for 2020.
- **Improve the capacity for detecting and controlling outbreaks** of African swine fever.
- **Establish a robust food security and nutrition monitoring system** that can provide regular, seasonal data on food security and nutrition across the country, allowing the detection of potential deterioration and identification of appropriate timely responses.

MEDIUM TO LONGER TERM RECOMMENDATIONS

- **Sustain nutrition and food security operations** with longer-terms objectives to prevent a deterioration of the nutrition situation, and strengthen disaster-risk reduction capacities and building resilience.
- **Provide machinery and equipment**, such as transportation vehicles and mobile threshers, to facilitate the rapid harvest and threshing of the 2019 main season.
- **Provide assistance to improve and upgrade storage facilities** to minimize post-harvest losses. This includes the upgrade, repair or provision of grain-drying equipment to ensure grains going into storage have adequate levels of moisture content, thereby reducing storage losses and avoiding the occurrence of mold, fungus and mycotoxins. The use of solar grain driers or other alternative forms of energy should be prioritized.
- **Introduce measures to diversify crop production** towards a more resilient and nutrition sensitive agriculture.

Acronyms

CBS	Central Bureau of Statistics
DPRK	Democratic People's Republic of Korea
EIU	Economist Intelligence Unit
FAO	Food and Agriculture Organization of the United Nations
FCS	Food Consumption Score
GDP	Global Domestic Product
GIEWS	Global Information and Early Warning System on Food and Agriculture
HA	Hectare
HH	Household
ICRC	International Committee of the Red Cross
ICSP	Interim Country Strategic Plan
JRC	Joint Research Centre – European Commission
KPW	Korean Won
M&E	Monitoring and Evaluation
MICS	Multiple Indicator Cluster Survey
MoLEP	Ministry of Land and Environmental Protection
Mt	Metric Ton
NCC	National Coordinating Committee
PDC	Public Distribution Centre
PDS	Public Distribution System
RFE	Remote Sensing Rainfall Estimates
rFSAM	Rapid Food Security Assessment Mission
UNSC	United Nations Security Council
US\$	United States Dollar
VHI	Vegetation Health Index
WFP	World Food Programme

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For further information, contact GLEWS1@fao.org or wfp.vaminfo@wfp.org.

For media enquiries please visit fao.org/news/contacts or wfp.org/media-contacts.

The report was prepared by Mario Zappacosta, Cristina Coslet, Tim Zachernuk, Sunder Subramanian (FAO), and Nicolas Bidault, Claudia Ah Poe, Yingci Sun, Jose-Luis Vivero, James Belgrave (WFP). Data collected in November 2018 & April 2019.

Food and Agriculture Organization of the United Nations Headquarters:
Viale delle Terme di Caracalla, Rome, 00153, Italy. T +39 06 57051 www.fao.org

United Nations World Food Programme Headquarters:
Via C.G. Viola 68, Parco dei Medici, Rome, 00148, Italy. T +39 06 65131 www.wfp.org



World Food Programme

Via Cesare Giulio Viola 68/70,
00148 Rome, Italy
T +39 06 65131 wfp.org



**Food and Agriculture
Organization of the
United Nations**

Food and Agriculture Organization of the United Nations

Viale delle Terme di Caracalla,
00153 Rome, Italy
T +39 06 57051 fao.org