

## 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)<sup>3</sup>, 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*<sup>4</sup> 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.

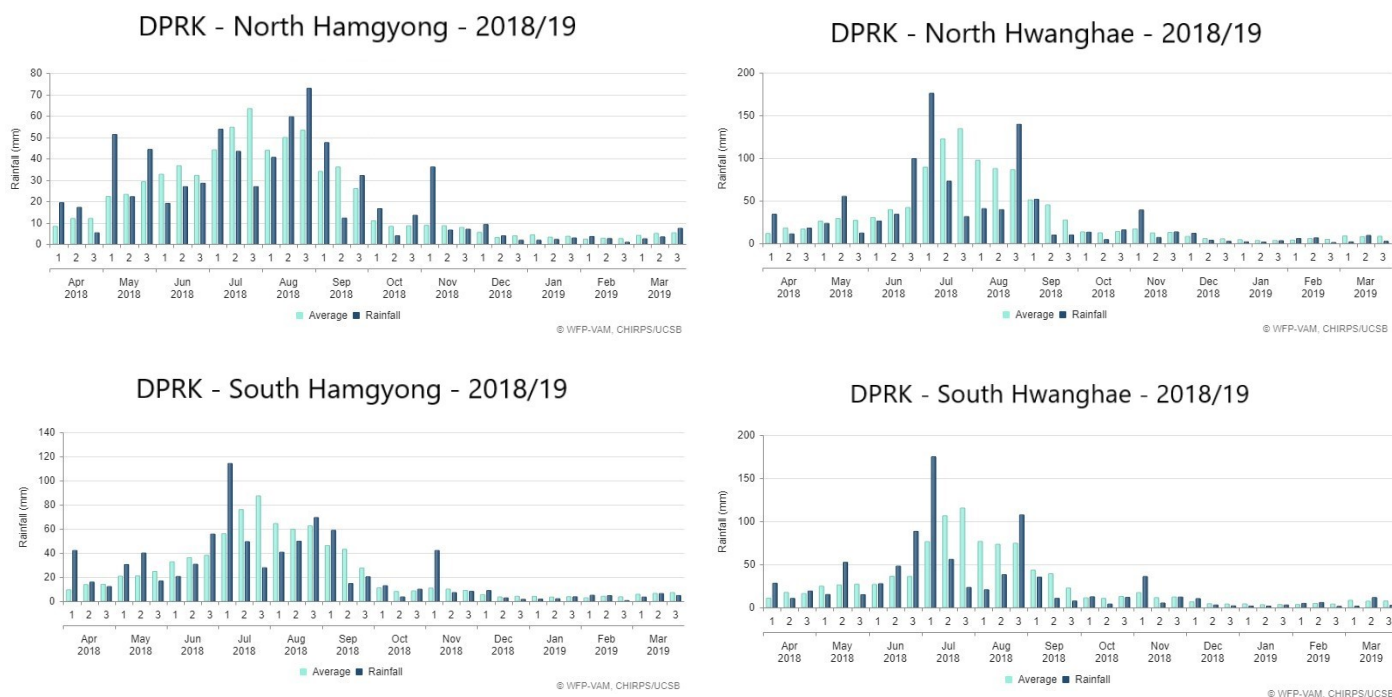
Similarly, the maize area harvested is officially estimated at below-average 508,000 hectares, mostly reflecting area losses due to unfavourable weather conditions during the cropping season. The 2018 harvested area of soybeans has decreased for the second consecutive year and it is estimated at 107,000 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.

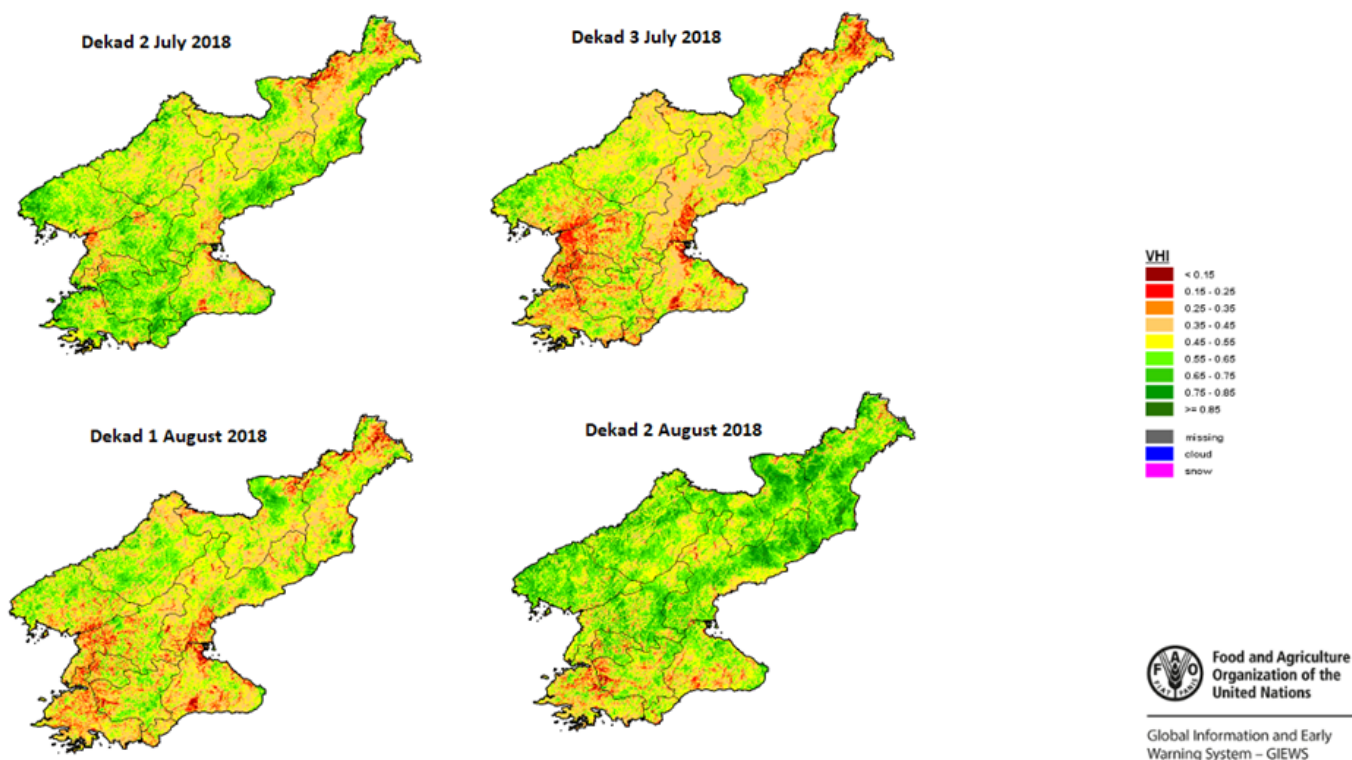
4 - A *dekad* is 10-day period.

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

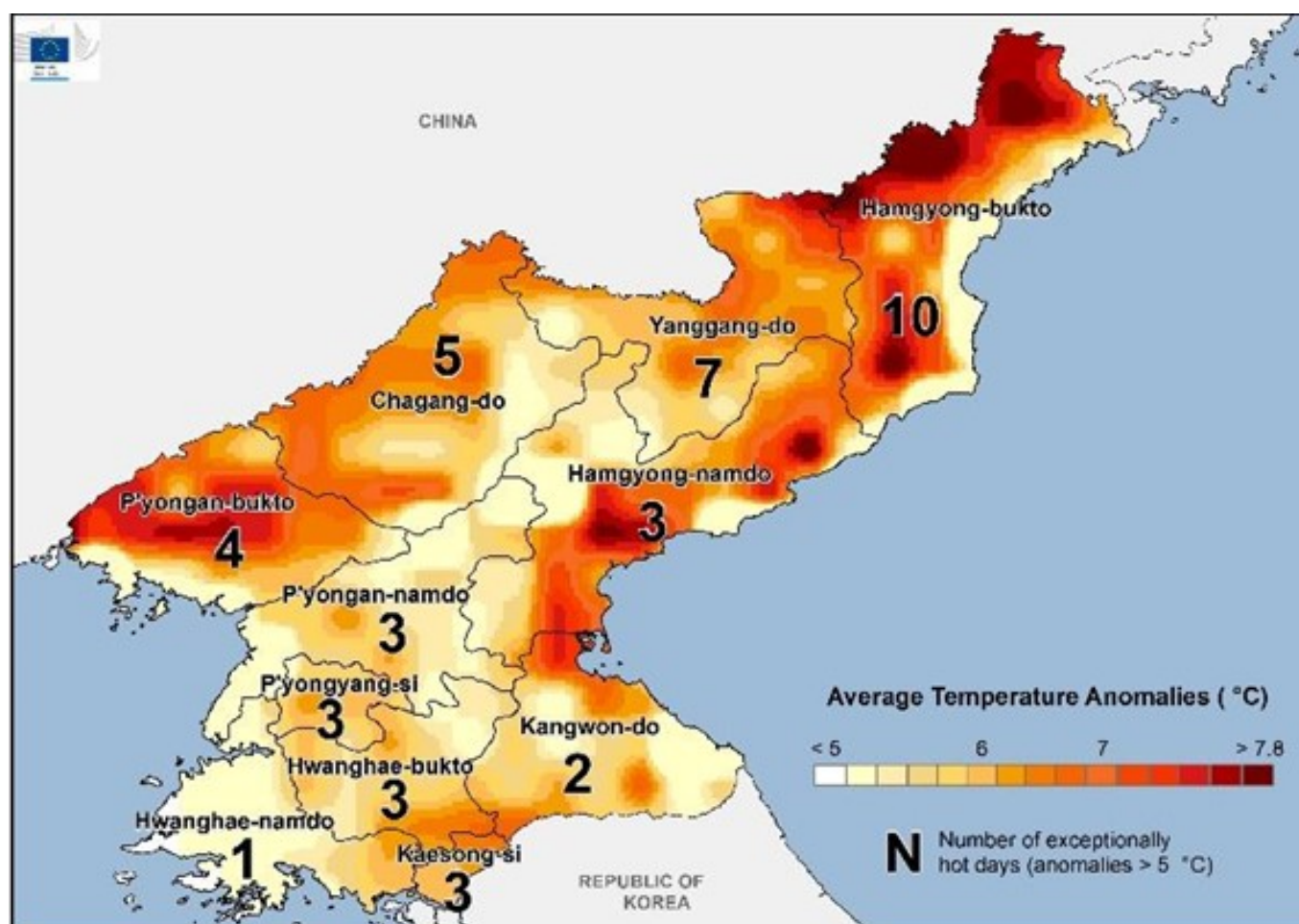


Source: WFP-VAM CHIRPS/UCSB

**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

**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
<b>TOTAL</b>	<b>1196</b>	<b>1220</b>	<b>1256</b>	<b>-2.0</b>	<b>-4.8</b>

Source: CBS.

produce self-made fertilizer, which normally included well-rotted mix of crop residuals, used straw and manure (Table 5).

## 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.

**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
<b>TOTAL</b>	<b>44,502</b>	<b>60,350</b>	<b>64,227</b>	<b>-26</b>	<b>-31</b>

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
<b>N</b> Ammonium sulphate equivalent, approx. 20.5 % N	624,086	599,017	692,478	4	-10
<b>P</b> Superphosphate equivalent, approx. 17% P2O5	4,174	10,776	13,575	-61	-69
<b>K</b> KCl-muriate of potash, 48-62% K2O	2,915	2,343	5,815	24	-50
<b>TOTAL</b>	<b>631,175</b>	<b>612,136</b>	<b>711,868</b>	<b>3</b>	<b>-11</b>

Source: CBS.

## IRRIGATION

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

**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	mt/ha	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	- 11.7
Maize	2018/19	mt/ha	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	- 14.4
Soybeans	2018/19	mt/ha	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	- 15.2

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.

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 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	2087.6
	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	2383.3
	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	1876.2
	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	2199.8
	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 grams<sup>5</sup> 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.

<sup>5</sup> - 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)			(%)	
<b>MAIN SEASON</b>	<b>4,546</b>	<b>5,105</b>	<b>5,178</b>	<b>-11.0</b>	<b>-12.2</b>
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
<b>EARLY SEASON (winter and spring)</b>	<b>307</b>	<b>404</b>	<b>345</b>	<b>-24.1</b>	<b>-10.8</b>
Wheat and barley	57	83	61	-31.7	-6.8
Potatoes	250	321	284	-22.1	-11.7
<b>TOTAL</b>	<b>4,853</b>	<b>5,510</b>	<b>5,523</b>	<b>-11.9</b>	<b>-12.1</b>

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) <sup>1</sup>	Maize	Wheat and Barley	Other cereals	Potatoes <sup>2</sup>	Soybeans <sup>3</sup>	Total
<b>DOMESTIC AVAILABILITY</b>	<b>1,378</b>	<b>1,876</b>	<b>57</b>	<b>198</b>	<b>499</b>	<b>162</b>	<b>4,170</b>
Main-season production	1,378	1,876		198	249	162	3,863
Winter/spring production			57		250		307
<b>TOTAL UTILIZATION</b>	<b>1,942</b>	<b>2,710</b>	<b>244</b>	<b>198</b>	<b>499</b>	<b>162</b>	<b>5,755</b>
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
<b>IMPORT REQUIREMENTS</b>	<b>564</b>	<b>834</b>	<b>187</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,585</b>
Anticipated commercial Import							200
Food assistance (received or pledged)							21
<b>Uncovered deficit</b>							<b>1,364</b>

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-dependent<sup>6</sup>, 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.

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).

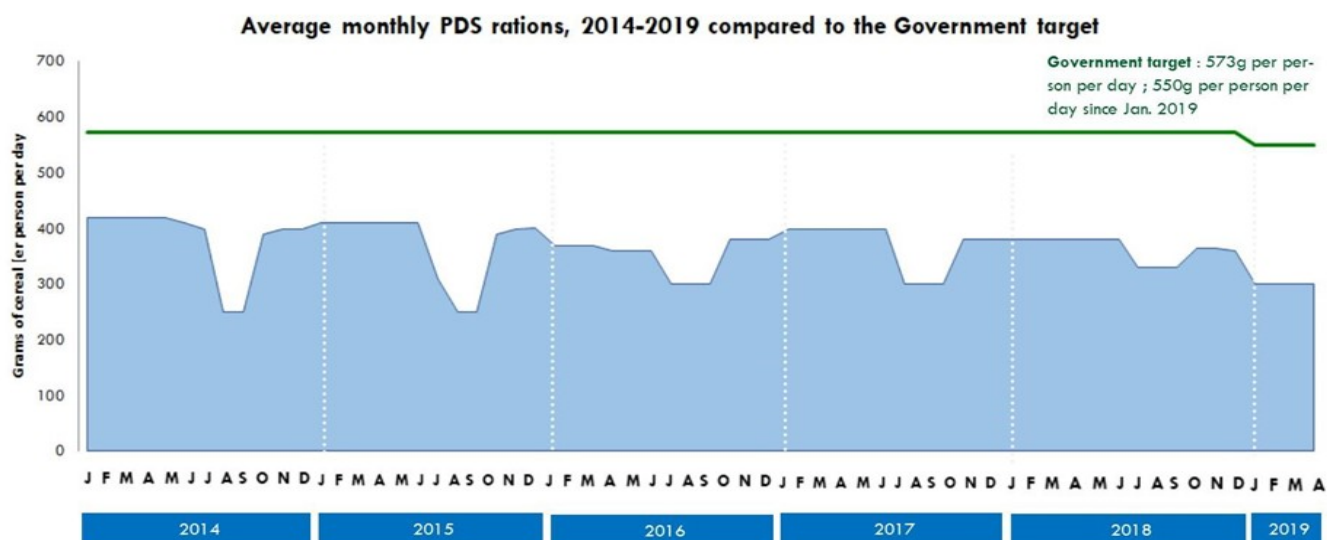
The PDS rations, distributed through the PDCs, are acquired at fixed subsidized prices (44 KPW/kg for rice, 24 Korean KPW/kg for maize)<sup>7</sup>, relatively low if compared to fluctuating prices for other staple food items (such as soybeans and potatoes) in the farmers' markets or state shops.

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

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.

**FIGURE 6: DPRK - DECREASING NATIONAL MONTHLY AVERAGE PDS RATIOS: 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 RATIOS 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 average<sup>8</sup>) whereas those surveyed in November 2018 got higher rations on average (1,529 kcal/pp/day from 447 g/pp/day<sup>9</sup>). 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)<sup>10</sup> (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**

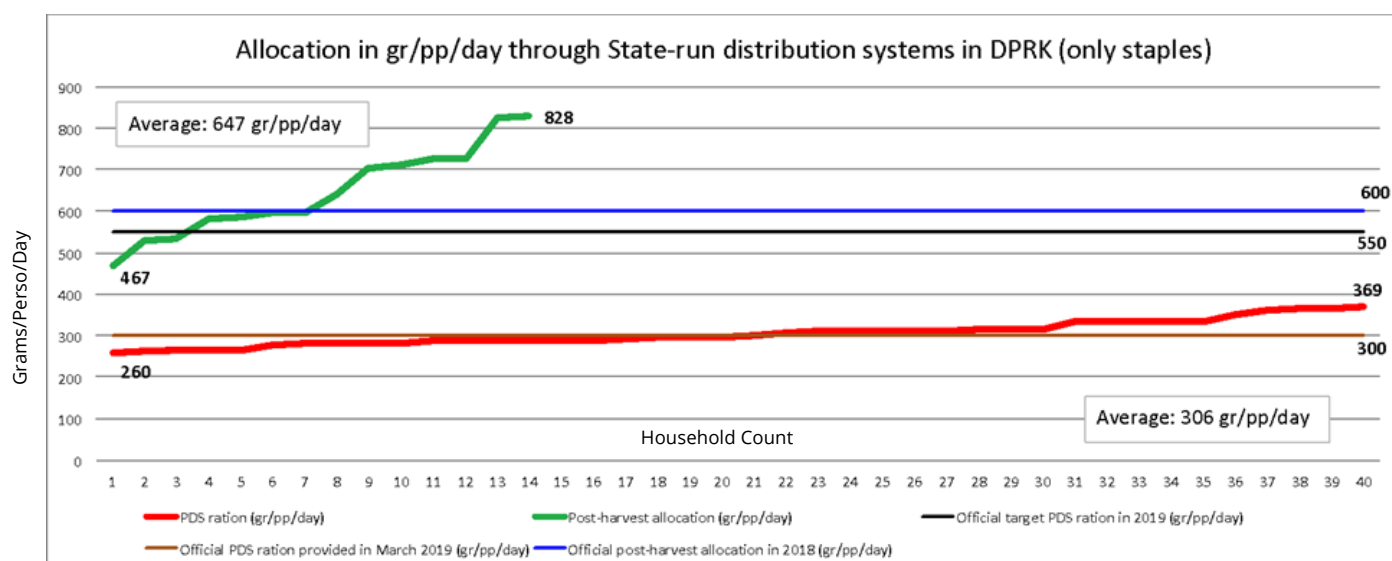
9 - To estimate the energy from food rations of both PDS and post-harvest distribution for farmers, energy values from WFP NutVal Analysis Software 4.1 (available at: <http://www.nutval.net>) were adopted for the analysis.

**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)
<b>November 2018</b>	<b>387</b>	<b>1,369</b>	<b>553</b>	<b>1,957</b>
<b>April 2019</b>	<b>306</b>	<b>1,080</b>	<b>647</b>	<b>2,285</b>

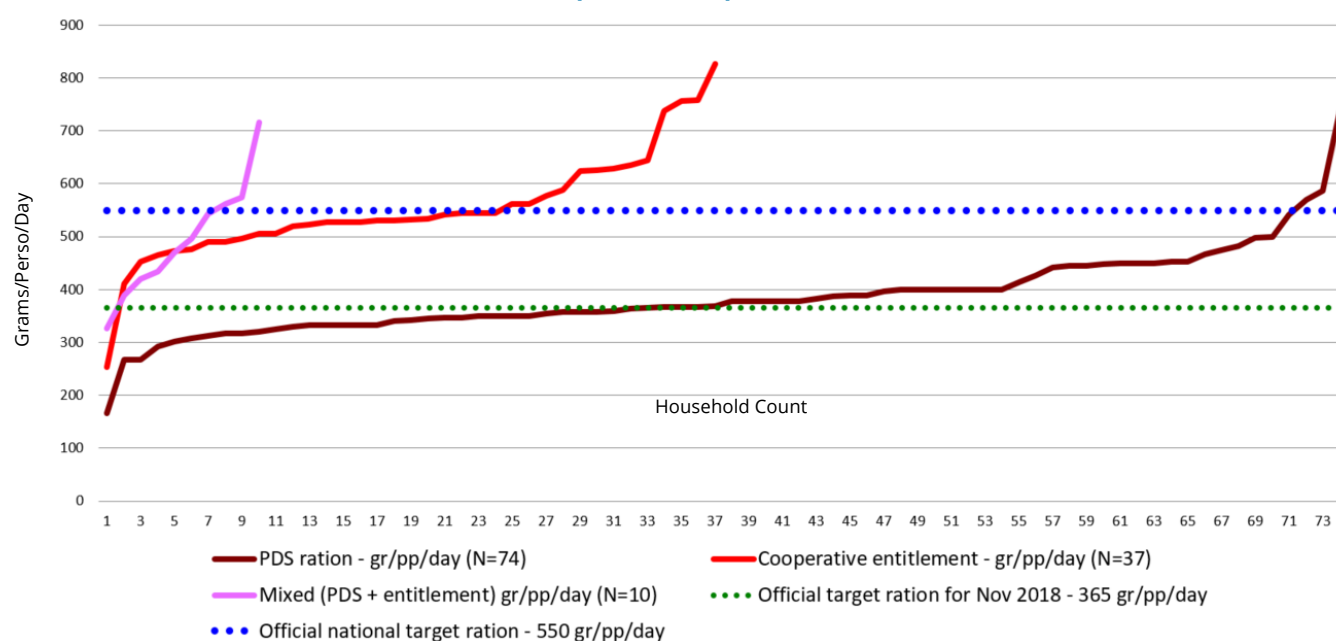
Source: Household survey

**FIGURE 7: DPRK - DISTRIBUTION RATIONS AS PER SURVEYED HOUSEHOLDS**



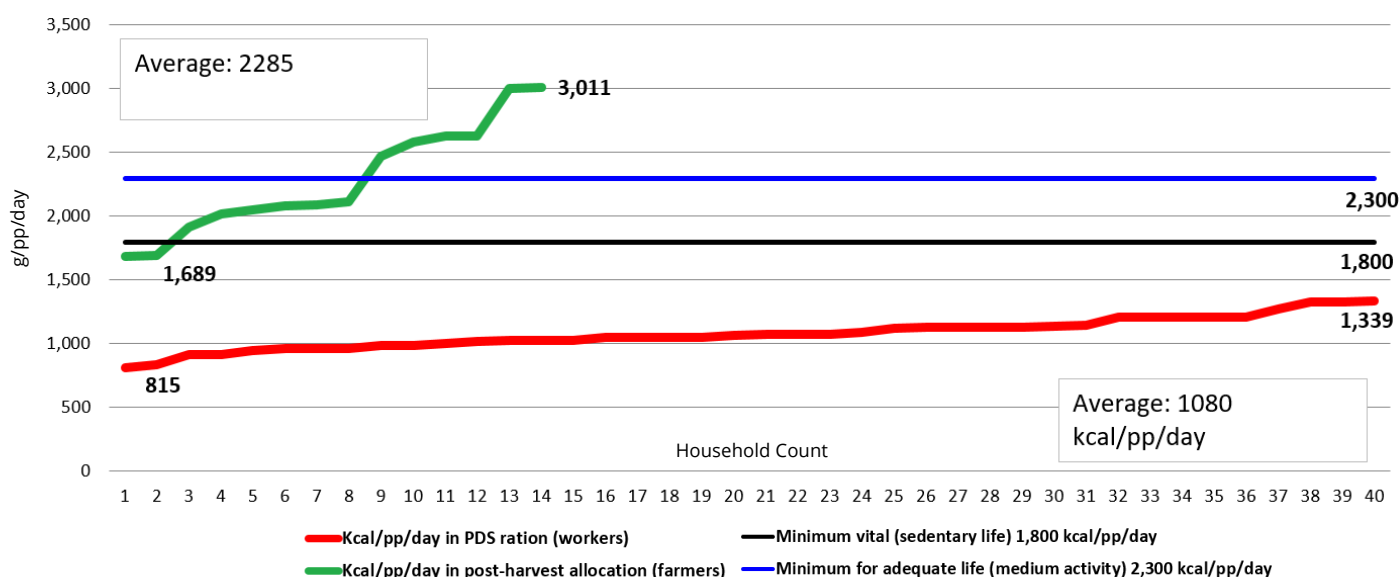
Source: FAO/WFP rapid Food Security Assessment, April 2019

**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 time<sup>11</sup>.

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	Only cooperative allocation
N.Pyongan	Unjon (n=3)	629	2,201	
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.