Agricultural Production Situation in DPR Korea: 2020

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Agricultural production situation in DPR Korea: 2020

Bir C. Mandal¹
Indrajit Roy²

1. Introduction

The year 2020 was extremely challenging for DPRK’s agriculture. In the wake of the outbreak of COVID-19 epidemic in neighbouring China in December 2019, DPR Korea acted swiftly and decisively. The Government announced lockdown and rolled out sweeping restrictive measures as early as January 2020 which led to shutting down of border trade with China. The consequence of these measures for DPRK’s cooperative farms was quite significant because the timing coincided with field preparations for the upcoming 2020 farming season.

Traditionally dependent on cross-border trade with China for procurement of vital agricultural inputs (fertilizer, irrigation pumps, spare parts for farm machinery, seeds and other supplies), cooperative farmers had to finish early season spring planting and main season summer planting with limited resources domestically available, which were not adequate for supporting optimum crop growth and development with high yield potential. On top of COVID-19, natural disasters – flood and three cyclones which hit DPRK in quick sequence during August–September 2020 also played a role in further diminishing the prospects of 2020 crop harvests.

2. Weather conditions

Abnormal weather conditions prevailed in DPR Korea during March – April 2020. There has been considerable variation between regions in rainfall and unstable changes in temperature. It rained and snowed frequently in the northern inland areas in early and mid-March, resulting in a higher monthly average rainfall in the areas than the average and a very low precipitation in the areas south of the central part of the country. It rained very little in the whole of the country in late March and early April and a long spell of dry weather persisted in most of the west coastal areas with frequent strong wind and a very low atmospheric humidity in daytime. In this period the temperature mostly remained higher than the annual average and suddenly dropped from April 20, with a low temperature severely affecting the whole country. The maximum temperature at noon on April 21 and 22 was 7–10 degrees C lower than the average. In particular, it snowed lightly with a strong wind in some west coastal areas as very cold air flowed into Korea to form a snow cloud all of a sudden on April 21.

According to FAO GIEWS data, in March cereal bowl regions (southern, south-western, and western) received rainfall less than the long-term average (LTA) by 40-60 percent; rainfall exceeded the LTA by 60 to 80 percent in northern region and east coast areas. From the end of March to early April, a dry spell prevailed over most of the country; in the middle of April it rained heavily in the cereal bowl provinces, while in other regions rainfall was below the LTA by 20 to 40 percent. Overall, rainfall in

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April was below the LTA by 20 to 80 percent over the entire country. Rain resumed at the beginning of May, it rained heavily exceeding the LTA by 20 to 80 percent throughout the country.

In the first dekad of June, rainfall in the southern and south-western provinces of South Pyongan, Pyongyang, Nampo, South Hwanghae, and parts of Kangwon varied from being normal to exceeding the LTA by 10 to 80 percent. Heavy monsoonal rains resumed in August. The country was hit by torrential rain caused by the seasonal rainy front and Typhoon Francisco, (Typhoon 4 as it is named in DPRK), from 1 to 6 August 2020 (shown below).

According to the State Hydro-meteorological Administration on 6 August 2020, more than 200 mm of heavy rain lashed on North and South Hwanghae, North Phyongan and Kangwon provinces, Kaesong City and other areas of the country from 1 to 6 August. In particular, the precipitation rate was at 851.5 mm in Pyonggang county, 650.1 mm in Jangpung county, 637.8 mm in Kusong city, 629 mm in Sepho county, 626.1 mm in Singye county, 619.1 mm in Hoeyang county, 617.7 mm in Pyongsan county, 565.6 mm and 511.2 mm in Unsan and Paechon counties resulting in flood.

The flood affected the provinces of North Hwanghae, South Hwanghae, North Pyongan, South Pyongan, and Kangwon inflicting severe damages. According to Government data, the flood damaged 22 029 hectares (ha) of crop land with the most affected in North Hwanghae province 19 075 ha followed by South Hwanghae 1 974 ha; Kangwon 682 ha. In addition, 20 495 ha of arable land was submerged, 895 ha was buried and 190 ha was washed away. Therefore, the total crop damage inflicted by the fresh flood is 42 524 ha, which is quite significant.

The early August flooding was followed by three typhoons that struck different parts of the country in a two-week period: Bavi (Typhoon 8) (August 26-27), Maysak (Typhoon 9) (September 2-3) and Haishen (Typhoon 10) (September 7). These storms brought further damage to already hard-hit communities, and new levels of hardship to other cities and regions, such as South and North Hamgyong that were spared mass flooding earlier in the season. The Government didn’t share data on the extent of crop damages and losses due to typhoons.

Overall, rainfall in 2020 followed two back to back poor seasons as the 2018 aggregate food production resulted in the lowest level since 2008 due to prolonged dry spells, high temperatures, flooding, and limited access to agricultural inputs, and the 2019 season experienced one of the worst
droughts in decades as the country received only 42 percent of average rainfall in spring 2019. In some areas, the rains in 2020 surpassed the record 2007 rainfall levels when widespread flooding caused severe damage to 223,381 hectares of cultivated land.

3. Early season planting


4. Main season planting

Cooperative farms started setting up nurseries for growing rice seedlings since the middle of March. Many farms prepared the seed beds, applied fertilizers and treated seeds for production of healthy seedlings. Some cooperative farms in South Pyongan province spread humus soil on seedbeds. In South Hwanghae, cooperative farms in Yonan, Unnyul, Anak and other counties applied fertilizers and herbicides in seedbeds to increase sprouting rate of seeds. By the end of April, more than 85 percent of cooperative farms completed sowing of rice seeds in nurseries. To protect the growing seedlings from cold and low temperatures, seedbeds were covered with plastic/vinyl sheets.

By the end of April, maize transplanting was going on in the provinces of South Hwanghae, North Pyongan, North Hwanghae, South Pyongan, Pyongyang, and Nampo covering about half of the countrywide maize cultivated areas. In North Hwanghae, cooperative farmers raised seedlings by sowing seeds in humus-filled pots laid out in seedling beds. In South Pyongan and North Hwanghae, many cooperative farms introduced surface coating cultivation and direct sowing of nutritive maize.

3 Wheat and Barley Harvest Nears Completion in DPRK, 16/07/2020 KCNA.
seeds and mulching which help raising weeding effectiveness and germinating rate. Maize planting was successfully completed in the main producing areas of the country by May 22.

According to national media reports, despite unfavourable weather conditions rice transplanting began in early May 2020 at the Wonhwa Co-op Farm in Phyongwon County in South Pyongan province. By mid-May, rice seedlings were planted in more than ten thousand hectares of rice paddies in the provinces of South Hwanghae, North Phyongan, North Hwanghae, Kangwon, Pyongyang, Nampo, and South Hamgyong. Potato planting in the main season in Ryanngang province was completed by May.

Rice transplanting on the Chongsan-ri cooperative farm, May 12, 2020, in Nampo

Harvesting of rice began at the end of September 2020. Maize harvesting was completed by mid-October followed by the beginning of threshing. Farms in Ryanggang province finished harvesting potato by mid-October. As reported by KCNA on 12 November, threshing was at its height in the countryside of the DPRK with about 85 percent of the harvested cereals threshed. Harvesting and grain threshing operations were rounded off throughout the DPRK by the third week of November 2020.

5. Crop production in 2020

Official data provided by National Committee of DPRK for FAO on 23 March 2021 shows total agricultural production in 2020 at 5 523 118.80 tonnes in cereal equivalent which is almost equal to the seven-year (2012-2018) average of 5.542 million tonnes and less than the record production of 2019 (6.654 million tonnes) by 17 percent (Figure 1 and Table 2).

Better than expected crop performance in 2020 was the result of favourable crop conditions which occurred widely across the major rice and maize growing regions in the western provinces. South Hwanghae, North Hwanghae, and Pyongyang benefitted most from above-average rainfall, and surface soil moisture assessments and vegetative conditions were above average. There was some variation within the country’s cropping regions, where the north-eastern part of the country experienced more dryness compared to western cropping regions (shown in the Figure below).

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4 Rice-Transplanting Begins in Wonhwa-ri, KCNA, 10/05/2020

5 Harvesting and threshing completed across DPRK, Pyongyang Times, 23 November 2020
Of the total production, key food crops – rice, maize, wheat, barley, potato (cereal eq.), and soybean – accounted for 5,362,094.50 tonnes in which rice contributed 39.4 percent, maize 41.3 percent, potato 12.3 percent, soybean 4.3 percent, and wheat and barley 2.7 percent. Vegetables, fruits and other minor crops such as sorghum, millets, oilseeds accounted for the remainder 161,024 tonnes of production. Production of early season crops (potato, wheat and barley) was 402,071.2 tonnes which constituted 7.5 percent of the total production of major food crops in 2020. The breakdown of total production by crops is shown in the Table 1.

Table 1 Crop production in DPR Korea in 2020

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (ha)</th>
<th>Production (tonne)</th>
<th>Yield (tonne/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1,490,450.0</td>
<td>5,523,118.80</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>470,294.7</td>
<td>2,113,018.60</td>
<td>4,493</td>
</tr>
<tr>
<td>Maize</td>
<td>583,262.60</td>
<td>2,214,121.00</td>
<td>3,796</td>
</tr>
<tr>
<td>Potato</td>
<td>146,736.60</td>
<td>661,092.00</td>
<td>4,505</td>
</tr>
<tr>
<td>Soybean</td>
<td>163,713.60</td>
<td>229,892.30</td>
<td>1,404</td>
</tr>
<tr>
<td>Wheat and barley</td>
<td>73,884.10</td>
<td>143,970.60</td>
<td>1,949</td>
</tr>
<tr>
<td>Other crops</td>
<td>52,558.4</td>
<td>161,024</td>
<td></td>
</tr>
</tbody>
</table>

The total harvested area in 2020 was 1,490,450 hectares (ha), which was 2.2 percent above the 2019 level and 4.5 percent above the seven-year average (Table 2). In order to increase availability of arable land, the DPRK Government has put in place various land reclamation and development projects to increase the availability of arable land.

According to the DPRK Ministry of Agriculture, more than 16,600 hectares of new land have been secured throughout the country in 2020, through such projects as river improvement, straightening of waterways and relocation of public buildings. At least 2,000 hectares of new land were acquired each in South Hwanghae, North Hamgyong and North Phyongan provinces, 1,800 hectares in North Hwanghae Province, 1,700 hectares in South Hamgyong Province and 1,600 hectares in South
Phyongan Province. Preparations were going on to cultivate rice, corn and other grain crops in the newly cultivated lands.\(^6\)

### 5.1 Rice (Paddy)

Rice is DPRK’s most important food crop. It is grown mainly in the central, south-western and south-eastern parts of the country (the lowland parts of North and South Pyongan, North and South Hwanghae, Pyongyang, Nampo and Kaesong, collectively known as the “Cereal Bowl”) and the narrow eastern coastal strip comprising parts of Kangwon, and North and South Hamgyong Provinces. Smaller areas are also cultivated in Chagang and Ryanggang Provinces. Over the period 2012-2020, the share of rice in total farm cultivated area was 34.6 percent and contribution in total crop production 44.1 percent.

![Figure 1: Total planted area and crop production, 2012-2020](image)

**Table 2: DPRK farm production, 2012-2020**

<table>
<thead>
<tr>
<th>Year</th>
<th>Farm cultivated area (ha)</th>
<th>Production (tonnes)</th>
<th>Yield (tonne/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1 443 000</td>
<td>5 430 000</td>
<td>3.76</td>
</tr>
<tr>
<td>2013</td>
<td>1 430 000</td>
<td>5 689 000</td>
<td>3.98</td>
</tr>
<tr>
<td>2014</td>
<td>1 397 200</td>
<td>5 648 100</td>
<td>4.04</td>
</tr>
<tr>
<td>2015</td>
<td>1 433 700</td>
<td>5 141 200</td>
<td>3.59</td>
</tr>
<tr>
<td>2016</td>
<td>1 480 127.9</td>
<td>5 891 422.2</td>
<td>3.98</td>
</tr>
<tr>
<td>2017</td>
<td>1 407 874.6</td>
<td>5 454 060.7</td>
<td>3.87</td>
</tr>
<tr>
<td>2018</td>
<td>1 387 533.0</td>
<td>4 951 025.7</td>
<td>3.57</td>
</tr>
<tr>
<td>2019</td>
<td>1 458 366.3</td>
<td>6 462 192</td>
<td>4.56</td>
</tr>
<tr>
<td>2020</td>
<td>1 490 450</td>
<td>5 523 118</td>
<td>3.70</td>
</tr>
<tr>
<td>Av. (2012-2018)</td>
<td>1 425 633.6</td>
<td>5 542 297.1</td>
<td>3.89</td>
</tr>
</tbody>
</table>

\(^6\) Many Hectares of New Land Acquired, KCNA, 23 October 2020
The 2020 rice area was reported at 470,294.70 ha, a 1.0 percent increase from the level of 2019. Rice production in 2020 amounted to 2,113,018.60 tonnes, decreasing from the level of 2019 by 27.9 percent. It was the lowest during 2012-2020 barring drought-affected seasons of 2015 and 2018 (Figure 2). The flood-affected provinces of North and South Pyongan, North and South Hwanghae and Kangwon together contribute about 70 percent to national rice production. South and North Hamgyong provinces which spared the impact of flooding were hit by typhoons when the crop was close to maturity. It had impacted final crop harvests. Compared with 2019, rice production in 2020 decreased by 30.0 percent in South Hwanghae; 29.0 percent in North Hwanghae; 36.5 percent in South Pyongan; 12.3 percent in North Pyongan and 45.7 percent in Kangwon provinces.

In 2020, cooperative farmers introduced on a wide scale improved rice production technology, modified System of Rice Intensification (SRI), developed with FAO’s technical assistance in 2015, in rice cultivation this year. Among them were farmers at the Chongsan cooperative farm in Kangso district, Nampho, who applied SRI to a large area under rice. The key elements of the technology DPRK farmers applied are: choosing of improved rice variety suited to local conditions, tall seedlings (aged about 30 days), number of clumps per unit area, number of seedlings per clump, intermittent irrigation, application of about 20 tonnes/ha of organic manure as basal dose. In addition, DPRK farmers refashioned rice transplanting machines to suit planting of tall seedlings at appropriate soil depth.

Decrease in rice production was also reflected on yields. Average rice yield in 2020 was 4.493 tonnes/ha, almost the same as in 2018 and 8.7 percent below the 7-year average (2012-2018).

5.2 Maize

Maize is the second most important cereal crop of DPR Korea. It is grown mainly under rainfed conditions and is more universally distributed than paddy. DPRK is the only country worldwide to have adopted maize transplanting on a wide scale, a locally innovative technology to suit double cropping.

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7 Rice-transplanting starts, Pyongyang Times, 15 May 2020
strategy and the relatively short warm growing season. Over the period 2012–2020, the share of maize in total farm cultivated area was 37.7 percent and the share in total crop production 39.2 percent. Maize cultivation is concentrated in the provinces of North Pyongan, South Hwanghae, North Hwanghae, South Pyongan, Kangwon, South Hamgyong, and North Hamgyong. It is also grown in smaller areas in upland Chagang and Ryanggang provinces.

Production of maize in 2020 was reported at 2 214 121.00 tonnes, which exceeded the 7-year (2012-2018) average by 3.4 percent but was below the previous year’s record level by 13.7 percent (Fig.3). Total harvested area under maize in 2020 was 583 262.60 ha, the highest during 2012-2020 period. Average maize yield in 2020 was 3.796 tonnes/ha, below the 7-year (2012-2018) average yield (4.03 t/ha) by 5.7 percent. Maize yields varied among the provinces from 2.682 t/ha in Kaesong city to 4.691 t/ha in Chagang, the northern province which escaped the impacts of flood and cyclones during August-September. As stated in the foregoing, total crop damage due to flood affected 42 524 ha of mostly paddy and maize fields. There were also significant crop damages due to a series of cyclones that occurred in the wake of flood.

The Ministry of Agriculture undertook agricultural rehabilitation efforts to salvage mature crops and minimize crop damage to the extent possible. In many areas various plant-activating fertilizer and other nutrition- and growth-stimulating agents and germicide solutions were applied to support crop growth in damaged fields to prevent pest attack and improve crop growth. Upper leaves and dead leaves from damaged maize plants were ripped off to ease ventilation and allow better sunshine conditions in the fields. Measures were also taken to erect fallen paddy and maize plants to hopefully allow them time to finish ripening for harvest. These measures seemed to have contributed to minimizing harvest losses.

![Figure 3: Area and production of maize, 2012-2020](image)

**5.3 Potato**

Over the past decade, potato has emerged as a staple crop next to rice and maize in DPR Korea. In part it was due to expansion of potato-based double cropping in most parts of the country. Since the early 2000s, FAO provided assistance to DPRK to promote double cropping under the projects –

Potato contributes about 8.0 percent to annual output of food crops (in cereal equivalent). It is also widely grown in home gardens contributing to household food security. With the onset of spring, the early season potato is sown in March-April and harvested in June. Main season summer crop is sown in June–July and harvested in August–September. Early season potato is grown in the lowland parts of North and South Pyongan, North and South Hwanghae, Pyongyang, Nampo and Kaesong. As main season summer crop, it is grown in the cooler northern highlands (Chagang and Ryanggang provinces), where the growing season is short.

Between 2012 and 2018, production of potato increased from 380,000 tonnes (in cereal eq.) to 570,807.3 tonnes (Fig. 4). Unlike other crops, output of potato in 2018 instead of declining recorded significant growth surpassing 2017 production by 34.3 percent. In 2019, DPRK harvested a record production of 684,586.8 tonnes of potato. In 2020, total potato production in DPR Korea has been reported at 661,092 tonnes, a 3.4 percent decrease from the previous year’s record level; however it exceeds the 7-year average (2012-2018) by 41.5 percent.

Of the total potato production in 2020, 283,990.6 tonnes were produced in the early season harvested from an area of 112,899.6 ha. The share of early-season potato in 2020 stands at 43.0 percent for production and 76.5 percent for harvested area; and the average yield obtained was 2.515 tonnes/ha (in cereal eq.). The major early-potato growing areas were located in the provinces of North Pyongan (22.46 percent), South Hwanghae (20.06 percent), South Hamgyong (15.34 percent) and south Pyongan (13.46 percent).

Average national yield of potato in 2020 was reported at 4.505 t/ha (cereal eq.), which exceeds the 2011-2019 average (3.10 tonne/ha) by 45.3 percent. The yield of main-season potato in Ryanggang
province was 8.028 tonnes/ha (cereal eq.), where the production was recorded at 138 714.6 tonnes (21.0 percent of total national production) from an harvested area of 17 278.3 ha (11.8 percent of total potato cropped area).

Harvesting of potato in Ryanggang province, 19 September 2020

Recently the Government of DPRK has adopted a comprehensive approach toward improving agricultural productivity and boosting aggregate agricultural output in the northern uplands of the country through introducing locally adapted suitable crops, fruits, breeds, and technologies. As part of this strategy, the Government has emphasized further development of potato cultivation and potato processing in Ryanggang province as the key element of improving food security and livelihoods of the people.

To support government’s effort, FAO is currently implementing a project, titled “Seed potato multiplication to improve food security of the people of Paekam County, Ryanggang Province TCP/DRK/3701”. This project will support capacity building for local production of disease free potato seed working with relevant stakeholders in the seed multiplication chain – AAS Highland Potato Research Institute at Taehongdan (tissue culture/micro-tuber production) and cooperative farms (mini-tuber and seed potato for commercial planting).

5.4. Soybean

Soybean is widely cultivated in DPRK. The major production areas soybean are located in North Hwanghae, South Hwanghae, South Pyongan, North Pyongan, North Hamgyon, S. Hamgyon and Kangwon provinces.

During the period 2012–2019, soybean cultivation in DPRK experienced significant expansion; area under the crop increased from 115 000 hectares (ha) in 2012 to 175 000 ha; production rose from 168 000 tonnes to 281 910 tonnes in 2016. Most of the growth in production was due to increase in cropped area rather than increase in yield (Figure 5). Average yield decreased from 1.46 tonne/ha in 2012 to the lowest 1.13 tonne/ha in 2014 and bounced back to a new high of 1.61 tonne/ha in 2016. Two consecutive years of drought in 2017 and 2018 saw soybean area in DPRK decreased to the lowest 107 000 ha and production contracted to 135 300 tonnes in 2018.

In 2019, DPRK farmers harvested 263 919.5 tonnes of soybean which marked a dramatic recovery from two consecutive years of steep decline closely approaching the highest level of production achieved in
2016. Harvested area under soybean in 2019 was 154,868.9 ha, 44.7 percent above the lowest 2018 level but below the highest level achieved in 2016 (175,359.7 ha). In 2020, soybean production was reported at 229,892.30 tonnes, a 12.9 percent decrease from the level of 2019; although harvested area 163,713.60 ha represented 5.7 percent increase from 2019 level. Yield declined to 1.40 tonnes/ha, below the yield averaged over 2012-2019 at 1.43 tonne/ha. Province wise, highest soybean yield in 2020 was obtained in North Pyongan province (1.829 tonnes/ha) and the lowest in Kangwon province.

Over the past five years, FAO supported soybean production in DPRK with assistance provided by the UN’s Central Emergency Response Fund (CERF). Selected cooperative farms were provided with quality seeds, plastic sheets, fertilizers, irrigation water pumps and two-wheel power tillers. The average yield of soybean harvested in project-supported farms was 1.98 t/ha in 2015, 1.813 t/ha in 2016, and 2.27 t/ha in 2017 compared with average country-level yields of 1.40 t/ha in 2015, 1.607 t/ha in 2016, and 1.512 t/ha in 2017.

In 2020, FAO implemented a project “Supporting production of vegetables and soybean to improve nutrition of children, women and patients at pre-school nurseries, hospitals and household level - OSRO/DRK/001/CHA” funded by CERF. Under the project cooperative farms were provided with inputs such as hybrid seeds, water supply pipes, mulch covering, pre-fabricated greenhouses and plastic sheets for growing of vegetables and soybean under protected environment. A total of 13,500 households including 54,000 people in 20 cooperatives in Kangwon, North Hwanghae, and South Hwanghae provinces and Samjiyon city in Ryanggang province benefitted from the project. Currently FAO is implementing a project “Technical support to soybean production for improving nutritional status of urban and rural populations TCP/DRK/3801 (2020-2022)” to enhance capacity of farmers and farm technicians in five selected cooperative farms to increase the productivity of soybean by using improved production practices and technology.

5.5. Wheat and Barley
Wheat and barley are minor cereals which contribute only 1.8 percent to total annual food production (in cereal equivalent) in DPR Korea. Most of these crops are grown as winter crop; a small area is planted to spring wheat and barley. Winter wheat and barley are sown from end September to mid-October, immediately after the harvesting of the main-season crops. A number of factors influence the status of winter cultivation. These include the amount of rainfall in autumn, availability of seed, farm power and farm labour. Particularly availability of farm labour is a significant constraint, when the demand remains high for other important farm operations, especially the harvesting of paddy. Other factors are winter kill in the event of a cold winter without snow cover; spring rainfall; and finally (and not least) the availability of workers and/or machinery at the short harvest window of seven to ten days in mid-June. Spring wheat and barley are sown in March and harvested in July.

The major production areas of wheat and barley crops are located in the provinces of South Hwanghae, South Pyongan, North Hwanghae, North Pyongan and Ryangang. Total production of wheat and barley in 2020 was 143,970.60 tonnes, the highest over 2013-2019 period. It exceeded the production of 2019 by 0.4 percent. Both area and production of wheat and barley declined since 2012, when the emphasis was shifted to expansion of potato double cropping. In 2016 cultivation of these minor cereals rebounded, followed by two consecutive years of decline and recovered again in 2019 surpassing the level of 2016 (Fig. 6). Harvested area under wheat and barley in 2020 was recorded at 73,884.10 ha, a 14.7 percent decrease from the level of 2019.

The average yield of wheat and barley in 2020 was recorded at 1.949 tonne/ha, 17.4 percent above the level of 2019 (1.656 tonne/ha). It also exceeds the 5-year (2015-2019) average yield by 28.4 percent.
A key constraint to increasing production of wheat and barley in DPRK is unavailability of high-yielding varieties with broad tolerance to drought, pests, and diseases. It calls for strengthening national wheat breeding programme; because it has been shown that half of the yield potential is due to superior cultivars and seeds and the remaining half is due to appropriate crop production and management practices involving timely sowing, supply of adequate nutrient and other agro-inputs. Further, it is worthwhile to mention that in case, good quality seed of potentially high performing cultivars is not used, then the expenditure on the agro-inputs fails to give the desired result and the cost benefit ratio decreases.

5.6. Vegetables

Data on production of vegetables and fruits in national farm production in DPRK is not officially reported. Using field-level data on a sample of cooperative farms that received FAO emergency assistance to restore production in the wake of 2016 flood and 2017 drought, it is estimated that about 128 700 ha of cropped area are under vegetables. With an average yield of 18 tonnes/ha, vegetables production in DPR Korea is estimated at 2.3 million tonnes annually. This production is equivalent to 252 g/capita/day which is well below FAO recommended intake of vegetables at 400 g/capita/day. Average fruit harvests range from 50 to 100 tonnes/ha. In order to increase supply of vegetables, the DPRK Government had undertaken measures including investment in infrastructure to expand cultivation of vegetables in greenhouses.

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8 High-yielding Fruit Strains Bred in DPRK ,KCNA, 31 May 2019, 10 June 2019
FAO’s support to greenhouse vegetable cultivation is typically delivered through CERF-funded humanitarian assistance projects and TCP-funded projects to assist cooperative farms in rehabilitating food production in the aftermath of natural disasters and limited capacity building support deliverable through the narrative of humanitarian assistance.

In 2020, FAO supported 20 cooperative farms in Kangwon, North Hwanghae, and South Hwanghae provinces and Samjiyon city in Ryanggang province under the project “Supporting production of vegetables and soybean to improve nutrition of children, women and patients at pre-school nurseries, hospitals and household level (OSRO/DRK/001/CHA, March – December 2020)” with 53 units of prefabricated greenhouses, and 1 200 rolls of plastic sheets to construct plastic tunnels to enable cultivation of vegetables and soybean under protected environment.

Under the project “Post-disaster assistance to reduce post-harvest loss and replant vegetable crops in typhoon-affected areas of DPR Korea (OSRO/DRK/901/CHA, October 2019 – September 2020)”, FAO supported 100 cooperative farms in Typhoon-affected North and South Hwanghae and South Hamgyong provinces with inputs which include 146 100 sq. meter of greenhouse cover film, 5 517 units of plastic rolls and 250 kg hybrid seeds of Chinese cabbage, pepper, and tomato. Three cooperative farms were provided with 50 000 sq. meters of greenhouse film under the project “Promotion of capacity in biocontrol for sustainable greenhouse vegetable production (TCP/DRK/3703, October 2018 – May 2020). Through this project FAO provided assistance in greenhouse mass rearing of biological control agents parasitizing common vegetable pests (greenhouse whitefly, aphid and red spider mite) under the climatic conditions of DPRK and development of their application techniques.

FAO supported greenhouse vegetable cultivation through emergency assistance projects in the wake of 2016 floods – Emergency assistance to support food and nutrition security in flood affected areas (TCP/DRK/3605, October 2016 – September 2017); Emergency support to increase vegetable, soybean, and small livestock production to improve Nutrition Security (OSRO/DRK/701/CHA, March 2017 – December 2017). Under these two projects, a total of 58 greenhouses were constructed for cultivation of vegetables. Under the project TCP/DRK/3603 – Vegetable seed production (September 2016–August. 2018) eight units of greenhouses were constructed in four cooperative farms.

6. Input use

**Fertilizers**

According to the data provided by the MoA, the amounts of chemical fertilizers available to cooperative farms in 2020 were 931 328 tonnes of nitrogenous, 42 018 tonnes of phosphatic, 3 138 tonnes of potash, and 24 319 tonnes of silicon fertilizers. The 2020 supply of nitrogenous fertilizer was higher than in 2019 by 0.01 percent for nitrogenous (N); and 23.0 percent for potash (K₂O) fertilizers. The supply of phosphatic (P₂O₅) fertilizer was 6.5 times, and that of silicon 4.8 times as much as in 2019.

Despite these increases, the use of chemical fertilizers is unbalance and inadequate to maintain soil fertility. To make up the shortages in supply of chemical fertilizer, cooperative farms in DPRK use large quantities of organic manure composting locally available sources such as dunghill, peat, green manure
and muck. Some farms make organic fertilizers by blending microbial and hukposan fertilizers, humus, sullage and subsoil.

Several farms also produce fermented compost from blue-green algae using Sinyang No. 2 bacteria.

In addition, nearby urban centres also support cooperative farms with organic manures. Government, party officials and industrial enterprises are tasked with supporting cooperative farms with procurement of soil amendments and their transportation to crop fields. Starting in February, organic manures are transported to crop fields for spreading into soil. According to cooperative farm managers and technicians, organic manures improve soil fertility and contribute to high yields. About 600-800 kilograms of organic matters are removed from soil with a paddy yield of over 10 tonnes/ha in a year, and therefore 20 tonnes of good quality organic fertilizers should be applied per hectare.

Among the chemical pest control products, the supply of herbicides was 350 tonnes of herbicide, 144 tonnes of insecticide and 85 tonnes of germicide. Farmers overcome shortages of chemical pesticides by making bio-pesticides using locally available plant materials.

**Farm power and fuel**

The amount of fuel available to cooperative farms in 2020 included 57 950 tonnes of diesel and 4 500 tonnes of petrol. The 2020 supply of diesel was 21.1 percent higher than in 2019, but the supply of petrol was 17.9 percent less than in 2019. However, the total supply of fuel was below the last five-years average.

**Irrigation water**

The planned amount of irrigation water to be held in reservoirs (rivers, canals, streams) for 2020 cropping season was estimated at 260 000 (x10 000 m³). Because of record rainfall available water was adequate to fully meet irrigation requirements.

**7. Food supply/demand balance in 2020/2021**

The DPRK Government hasn’t yet provided data on food balance for the Marketing Year November 2020 – October 2021. This chapter will be updated when relevant data are available. Still, it is possible to provide an outlook on DPRK’s food security in 2020-2021. Total food production in 2021 amounts to 5.523 million tonnes (in cereal equivalent) which is almost equal to the seven-year (2012-2018) average. Thus, the shortfall in domestic production of foodgrain doesn’t deviate from the long-term trend which is about 0.5 to 1.0 million tonne. In this context, humanitarian food assistance increasingly plays an important role in providing support to food-insecure population through targeted
interventions. According to a food security assessment conducted jointly by FAO and WFP in 2019, 10.1 million people (40 percent of the population) are food insecure and in urgent need of food assistance.

According to an assessment in GEOGLAM special report issued on 9 September 2020, considering the recent impacts of COVID-19 and extensive flood damage, this estimate is likely to have increased in 2020, posing additional concerns to the state of food insecurity in the country. However, the assessment of hunger and malnutrition performed on the basis of Global Hunger Index (GHI) shows there has not been any significant change in DPRK’s status in 2020 compared with 2019. The GHI score of DPRK in 2020 is 27.5 compared with 27.7 in 2019 and on GHI severity scale, the country’s food insecurity as measured by hunger and malnutrition continues to remain as serious.

In 2020, the Russian Government provided food aid consisting of a shipment of 25,000 tonnes of wheat arrived in DPR Korea on 14 May 2020. UN’s Central Emergency Response Fund (CERF) provided US$700,000 to support FAO’s proposed project titled “Supporting production of vegetables and soybean to improve nutrition of children, women and patients”. Some 581,577 beneficiaries, including 306,365 females, may not receive timely agricultural inputs and technical support from FAO. Additional 560,000 people receiving food assistance, including 211,800 women, may not receive timely fortified foods, and other inputs and technical support from WFP. According to an announcement made on 13 August 2020 by the Ministry of Unification, the South Korean Government has decided to donate US$10 million to DPR Korea via a World Food Programme (WFP) aid project, under which it will provide essential food and nutrition for hundreds of thousands of young children.

However, how much of external food assistance has actually reached target beneficiaries remains unclear given the delays and backlogs in clearing aid shipments due to strict enforcement of anti-epidemic measures at border crossings. Also the capability of international aid agencies and diplomatic community to procure and deliver food aid has greatly diminished due to continued exit from DPRK of expatriates. With their exit, there is virtually no presence of the international community in DPRK to monitor evolving food security situation in the country; procure and coordinate delivery of food assistance. Pandemic-related restrictions that are still in place in DPRK are likely to continue until further notice. Therefore, food insecurity of the most vulnerable groups – pregnant women, malnourished children, infants, tuberculosis patients and senior citizens – recipients of food aid is likely to be enhanced.

8. Prospects for the 2021 cropping season

DPRK received record rainfall in 2020 which led to flooding in August inundating agricultural heartlands of the country, the provinces of South Hwanghae, North Hwanghae, South Pyongan, and North Pyongan. Agro-climatological indicators for the 2020 main cropping season over these areas show

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10 GEOGLAM Special Report, 9 September 2020, www.cropmonitor.org

cumulative seasonal rainfall to be above the five-year average with surface soil moisture at or slightly above the ten-year maximum (GEOGLAM Special Report). Following harvesting of the main season crops, the intensity of rainfall decreased. In October, dry conditions prevailed over most of the country with rainfall recorded at 20 to 80 percent below the LTA. Provinces along the west coast and parts of the central areas received above average rainfall. In November, most of the country received above-average rainfall.

DPRK witnessed first snowfall of over 5 cm in most of south-central part of DPRK on 13 December 2020. According to weather experts, this snowfall in some local areas including Nampo and Wonsan cities was the latest of start since the meteorological observation. In particular, the first snowfall in Pyongyang was 29 days later than that of the normal year (November 14), and 13 days later than last year (November 30). Overall in December 2020, dry weather prevailed over most of DPRK with precipitation less than 20 to 80 percent of LTA. In January 2021, majority areas including the west coast and the south-central parts of DPRK received plenty of rainfall exceeding the LTA by 20 to 80 percent. In February, rainfall over agriculturally important South-western and South-central parts of DPRK was close to LTA. In the second dekad of March, DPRK received abundant rainfall as evident from the map below. Therefore, there is no indication of drought-like conditions as the spring planting begins.

According to KCNA report circulated on 15 March 2021, sowing of spring wheat and barley began in Pyongyang, North Pyongan, South Pyongan, North Hwanghae, Nampo, North and South Hamgyong provinces under the guidance of the Ministry of Agriculture and the provincial rural economy committees. Starting in mid-March, cooperative farms in Sinchon county, Yonbaek, Jaeryong, and other plains of South Hwanghae province, have started sowing seeds in rice beds.

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12 First Snowfall Witnessed in DPRK, KCNA, 13 December 2020

13 Sowing of Wheat and Barley Seeds Brisk in Rural Areas of DPRK, 15 March 2021

14 Sowing Rice in Seed Plots Begins, Rodong Sinmun, 23 March 2021
7. Conclusion

Although it was not possible for humanitarian agencies to verify by field visits the progress of farming activities during the 2020 cropping season, both early season spring planting (wheat, barley) and main season (rice, maize, potato, soybean) planting were completed by and large within the optimum period according to reports published in official media. Unlike the previous three years, weather conditions remained mostly favourable through most of the crop growing period. Toward the end of the cropping season, DPRK witnessed record rainfall resulting in flooding of a large area of the country’s agricultural heartland followed by three tropical storms that hit the regions that escaped the impact of flooding causing substantial losses to standing paddy and maize crops. Notwithstanding these losses, a large part of the “Cereal Bowl” area including South Hwanghae, North Hwanghae, and Pyongyang benefitted from above-average rainfall, and surface soil moisture that reversed the impact of three years’ of consecutive droughts. As a result, production of major food crops in DPR Korea in 2020 decreased, but the reduction fitted the trend over 2012-2018 period and the shortfall in domestic food production is expected to be within the existing range of 0.5 to 1.0 million tonne.

No time to relax:
- We MUST do better towards the SDGs – Leave No One Behind,
- We CAN do better, and
- We can’t afford not to do better.