United States Department of Agriculture

Foreign Agricultural Service
Global Market Analysis
International Production Assessment Division
Web: https://ipad.fas.usda.gov

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Commodity Intelligence Report

North Korea MY 2023/24 Seasonal Crop Outlook

In North Korea, the marketing year (MY) 2023/24 summer crops have progressed well throughout the season. The rainy season typically starts in April and about 80 percent of the annual precipitation, on average, occurs between July and September. This year's growing season began with beneficial soil moisture conditions, and the rainfall outlook continued to be above average providing favorable conditions for planting, crop establishment, and reproduction during May to early August. The conditions have continued to raise yield expectations from average to above-average especially for the major, summer-grown food security crops of corn and rice. Rice, corn, and soybeans are at advanced maturity and approaching harvest stages (Figure 1). The main season (April to October) crops are rice and corn, accounting for almost 90 percent of the total crop output. Additionally, there are small quantities of soybeans, potatoes, millet, and sorghum (Figure 2). Rice is predominantly produced in the western provinces of South Hwanghae (28%, Hwanghae-namdo), North Pyongan (22%, P'yongan-bukto), South Pyongan (20%, P'yongan-namdo), and South Hamgyong (11%, Hamgyong-namdo). The southern, southwestern, and western provinces are considered the "cereal bowl regions" (Figure 3). In recent years, potatoes have emerged as a staple crop next to rice and corn, contributing about 8 percent to the annual output of food crops. Wheat and barley contribute approximately 2 percent to total annual food production; these are mainly winter crops with a small amount planted in early spring. In addition to the favorable, above-average crop outlook, particularly for rice and corn, production is expected to increase due to expansion in planted area. In recent years, according to North Korea's Ministry of Agriculture, new land has been brought under production through such projects as river improvements, straightening of waterways, land reclamation, and relocation of public buildings.

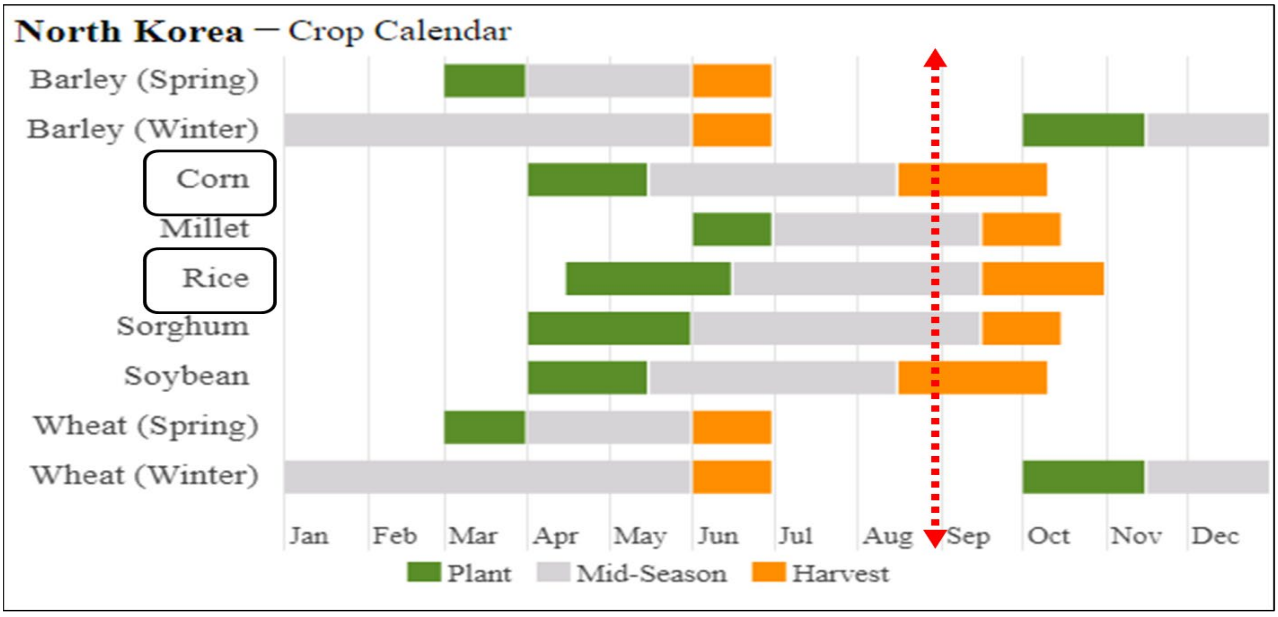
USDA forecasts MY 2023/24 North Korea rice production to be the same as last year's production at 2.1 million tons and rough rice yield to remain at last year's level of 4.18 tons per hectare (t/ha). The current rice yield forecast is almost 12 percent below the 5-year average of 4.76 t/ha (Figure 4). The lower yields are primarily due to expansion of rice planted area in marginal lands and poor capacity to import much-needed agricultural inputs, such as improved hybrid seeds and fertilizers. Input availability is impacted by economic sanctions and continued border crossing limitations due to COVID-19-related implications along the border with China. Rice planted area is up approximately 3 percent from the 5-year average.

USDA forecasts North Korea MY 2023/24 corn production at 2.3 million tons. The current corn crop outlook for North Korea indicates a forecast yield of 3.93 t/ha, which is almost the same as the long-term average expectation. Both rice and corn forecasts incorporate the season's satellite-based observations of soil moisture conditions and crop growth based on the NDVI (Normalized Difference Vegetation Index), as well as the seasonal rainfall outlook based on various agro-climatological sources. The NDVI time series graphs for the four major rice production provinces of Pyongan-bukto, Pyongan-namdo, Hwanghae-bukto, and Hwanghae-namdo indicate favorable crop performance for 2023 relative to the long-term average (Figures 5). These provinces account for roughly 80 percent of rice production. In addition, the NDVI images (maps) for June and July also show that crop conditions have been above average during the most critical period of plant growth and development. In general, the crop performance can be characterized as ideal and likely to result in relatively high production. In late June, vegetation conditions were improved, compared to last year (Figures 6, 7). In early July, vegetation conditions were also better than the previous year (Figures 8, 9). The observations and assessments revealed some variation within the country's cropping regions. However, based on favorable seasonal rainfall and above-average soil moisture, and the vegetation analysis in most parts of North Korea's major western cropping regions, this year's rice and corn crop should be near or at the long-term average. As an exception, some parts in the Central region and Northeast have an increased chance for a below-average crop. Nevertheless, the input problems, as mentioned earlier, present the strongest likelihood of problems which may negatively impact yields.

In June and July, the rainfall and soil moisture conditions were generally very favorable, predominantly above average, across the major crop growing regions (Figures 10, 11). The beneficial early-season growing conditions are projected to have encouraged further summer crop plantings across most parts of North Korea's cropping region.The soil moisture conditions continued to be adequate into August during advance reproductive crop stages, ensuring a good finish to the crop (Figures 12). All indications are that rainfall during June, July, and August was sufficient to fully recharge irrigation water reservoirs, coupled with significant carry over water levels from the 2022 season. Further evidence is also provided by the European Commission's Monitoring Agricultural Resources (MARS) system. MARS indicates that prospects are favourable for rice and corn, to be harvested in October and September, respectively. MARS data shows crop biomass ranging from average to above-average in all provinces. Throughout the 2023 season, MARS issued no anomaly hotspots of agricultural production (ASAP) (Figure 13). MARS states that with average to above-average rainfall, adequate soil moisture, and temperatures during the past three months, conditions have been favorable for corn and rice crops across the major production regions of Hamgyong-namdo, Hwanghae-bukto, Hwanghae-namdo, P'yongan-bukto, and P'yongan-namdo. This is important because approximately 80 percent of total cereal is produced in these regions, and this far into the season, none of the regions have been flagged with anomaly hotspots.

In summary, with the major food crops in advanced reproductive-to-maturity stages, the productivity prospects remain favorable barring no major weather disruptions. Widespread favorable conditions during the remainder of the season across all parts of

the country's cropping regions should induce favorable end-of-season crop results. It is also important to keep in mind that food production and food security in North Korea, beyond weather and agricultural conditions, is dependent on a wide range of changing political and social-economic factors. Objective assessments and projections of food production and food security always have a high degree of uncertainty since many of the factors are poorly understood, coupled with lack of on-the-ground validation and verification. This presents challenges in the timely and accurate evaluation and prediction of crop production. Over the years, it has generally been recognized that in North Korea the food security situation is, to a large extent, influenced by the dynamics at the border with China and by continued international economic sanctions. Since 2020, according to the World Food Program (WFP), borders were fully closed and in-country labor mobility was severely restricted to prevent the spread of the COVID-19 virus. This resulted in severe import restrictions of food, farm inputs such as fertilizers, improved seeds, farming equipment, machinery spare parts, as well as humanitarian aid. The circumstances make it difficult to predict, with certainty, how these variables may continue to impact final crop harvest results.



USDA

Source: FAO/GIEWS

Figure 1. Major food crops, corn and rice, at advanced maturity and approaching harvest stages as illustrated by the dotted redline

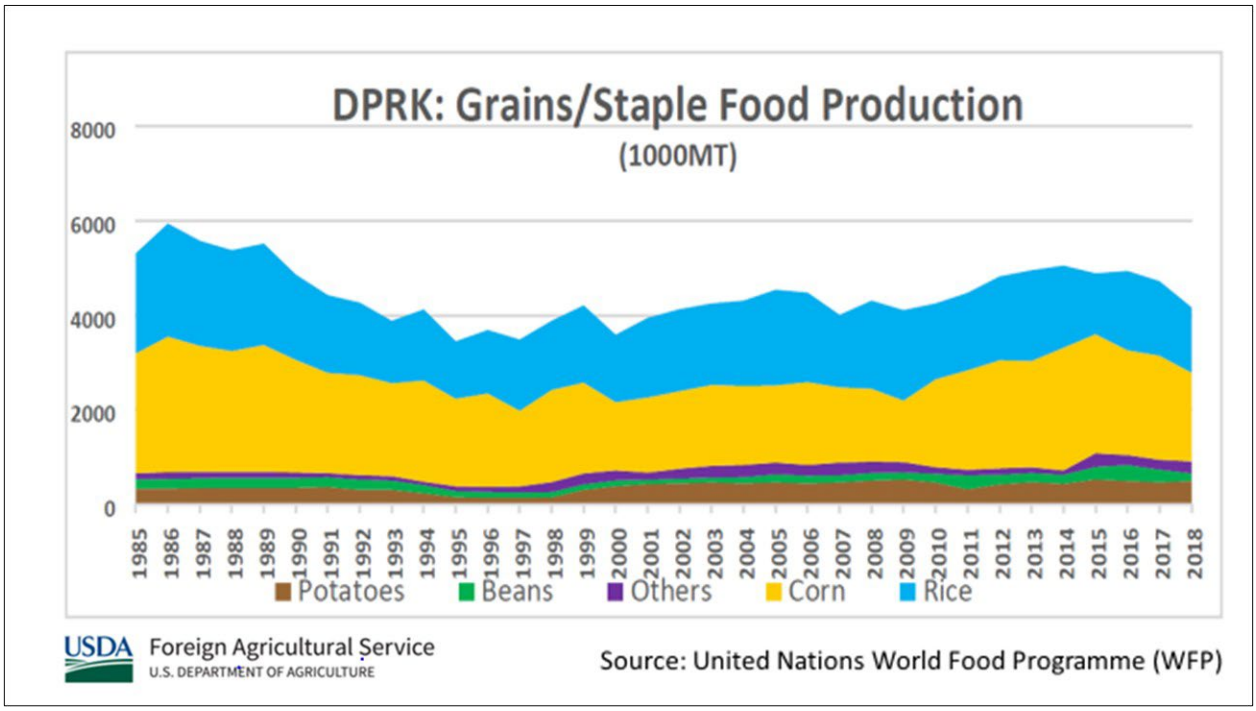


Figure 2. Corn and rice are the major staple food production crops for the DPRK (Democratic People's Republic of Korea, North Korea). Source: World Food Programme

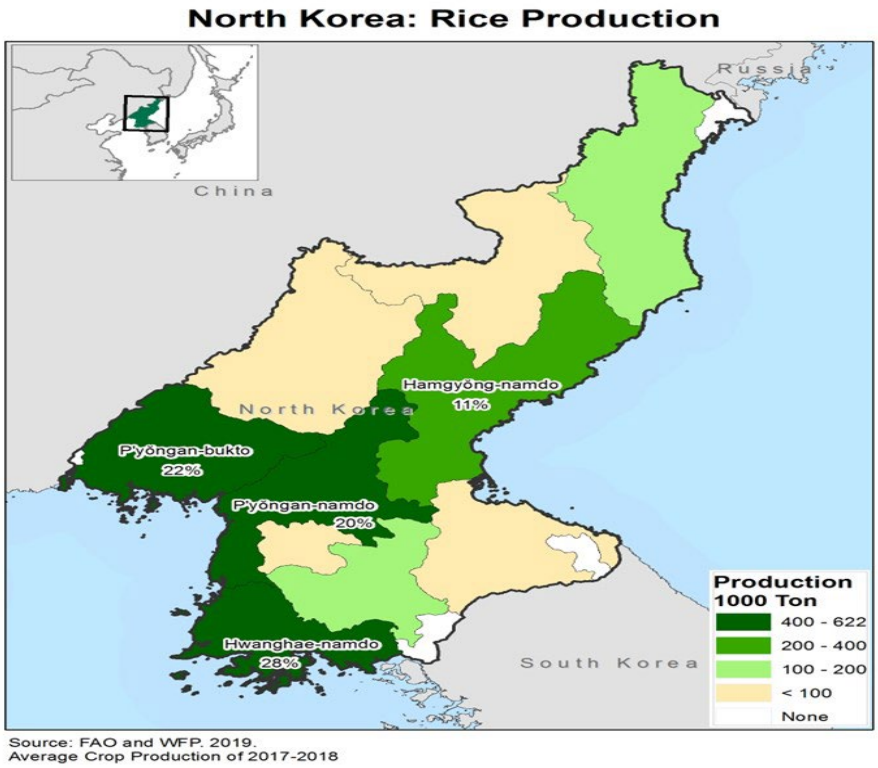


Figure 3. The western provinces are considered the "cereal bowl regions." The map shows the percent proportion of rice produced in the western provinces. Similar trends are true for corn and other major staple food production crops. Data source: FAO and WFP

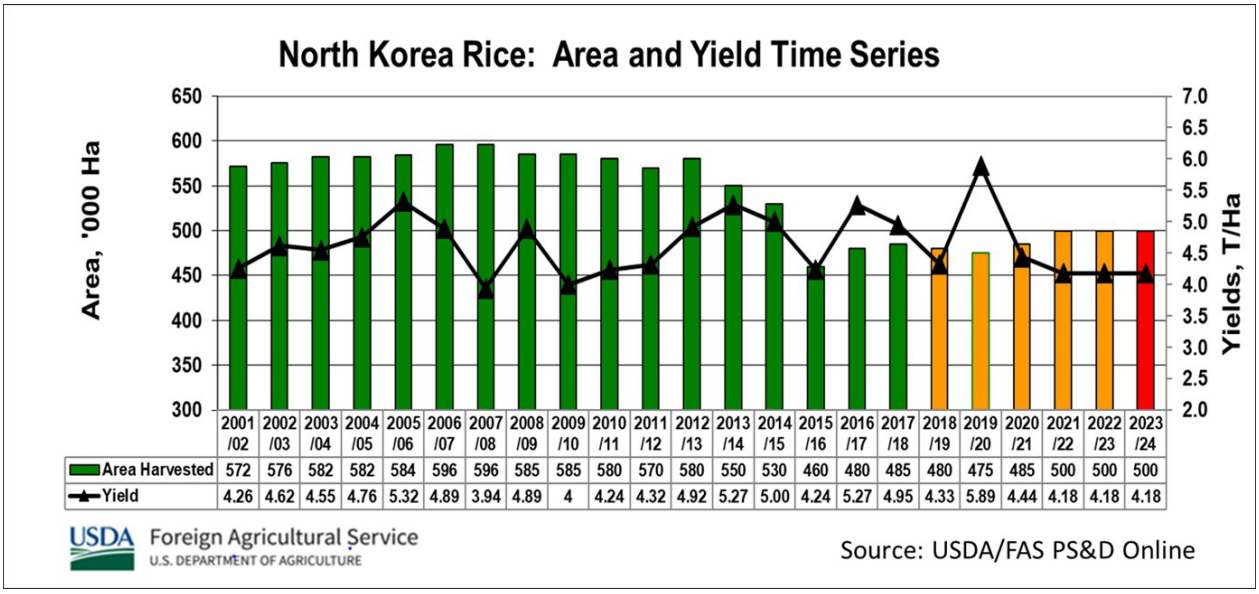


Figure 4. The current rice yield forecast is almost 12 percent below the 5-year average of 4.76 t/ha. In recent years, the declining yield trend is primarily due to expansion of rice planted area in marginal lands and poor capacity to import much-needed agricultural inputs such as improved hybrid seeds and fertilizers due to economic sanctions and COVID-19 related border closing restrictions with China. Source: USDA Foreign Agricultural Service

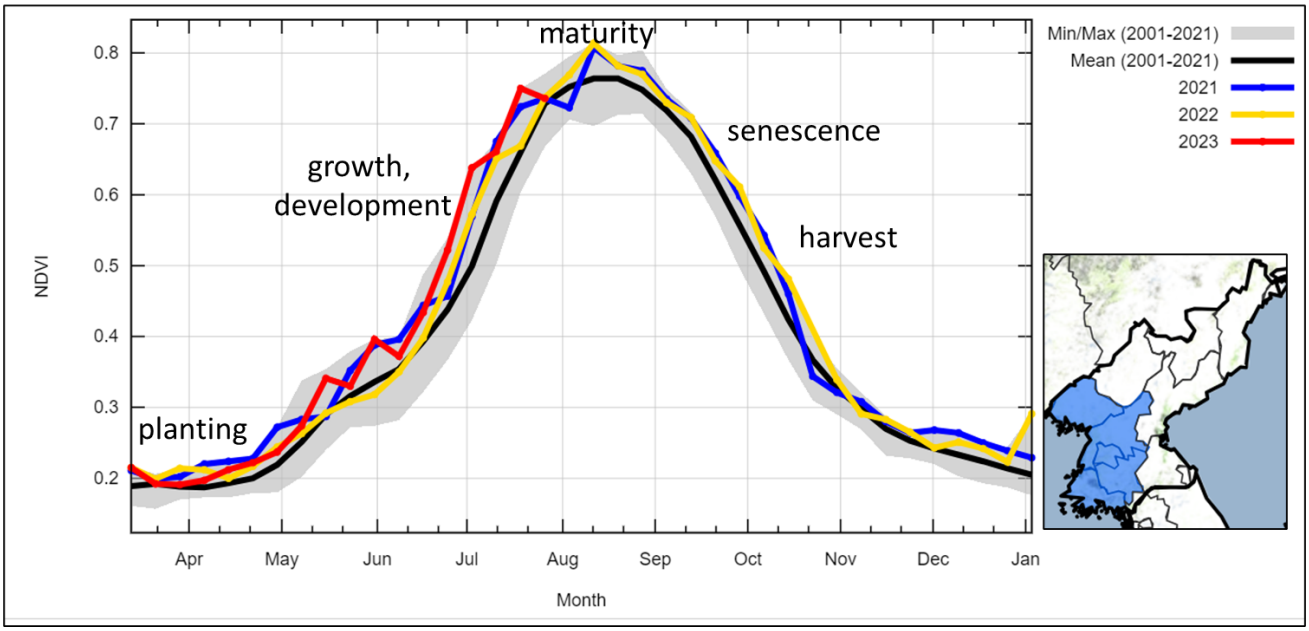


Figure 5. NDVI (Normalized Difference Vegetation Index) time series for Pyongan-bukto, Pyongan-namdo, Hwanghae-bukto, and Hwanghae-namdo provinces. The NDVI graphs indicate favorable crop performance for 2023 relative to the long-term average. Source: USDA/NASA GLAM, MODIS 8-day NDVI

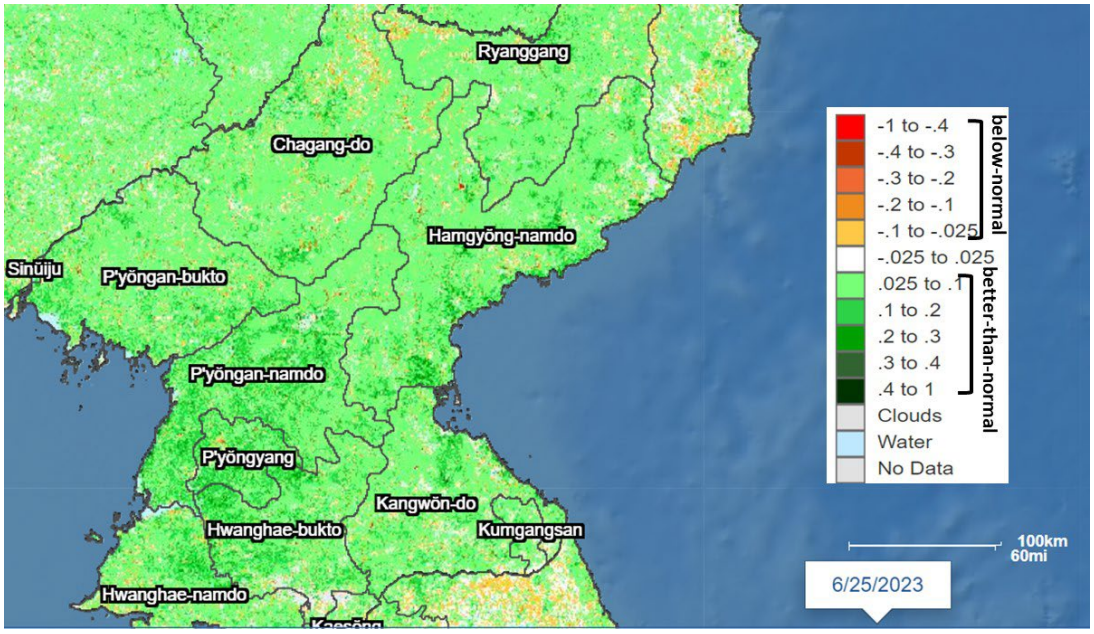


Figure 6. North Korea MODIS NDVI (Normalized Difference Vegetation Index) anomaly map for June 25, 2023, early-season during early plant growth and establishment stages. The vegetation index is an important indicator of plant health and crop performance. This early-season map indicates favorable crop status, vegetation conditions, and productivity relative to the long-term average. Source: USDA - Foreign Agricultural Service, Global Agricultural & Disaster Assessment System (GADAS)

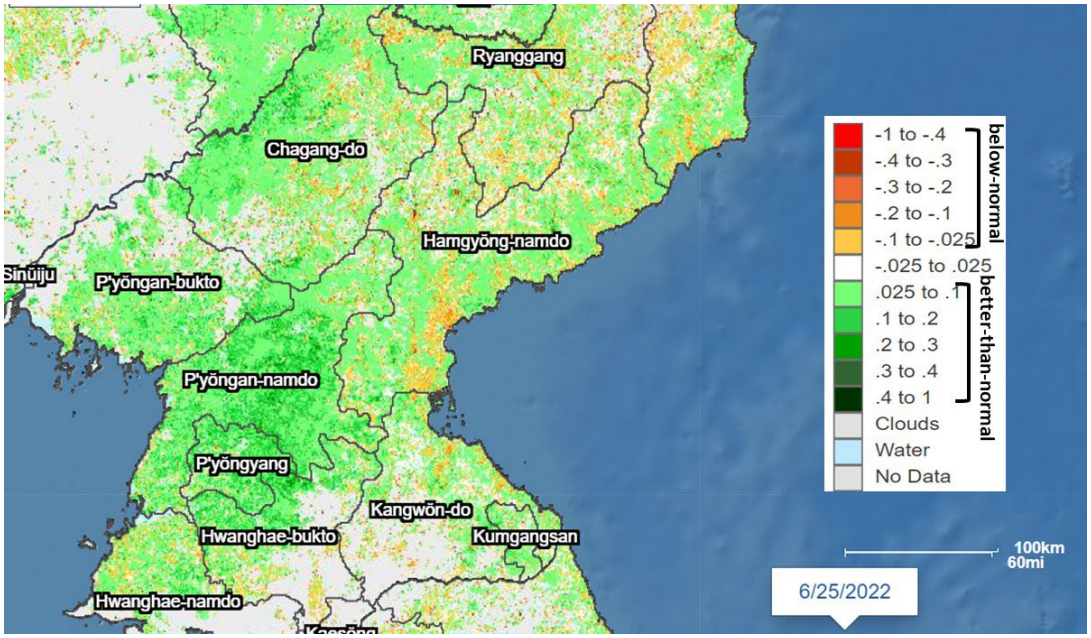


Figure 7. North Korea MODIS NDVI (Normalized Difference Vegetation Index) anomaly map for June 25, 2022, early-season during early plant growth and establishment stages. The vegetation index is an important indicator of plant health and crop performance. This early-season map indicates favorable crop status, vegetation conditions, and productivity relative to the long-term average. Source: USDA - Foreign Agricultural Service, Global Agricultural & Disaster Assessment System (GADAS)

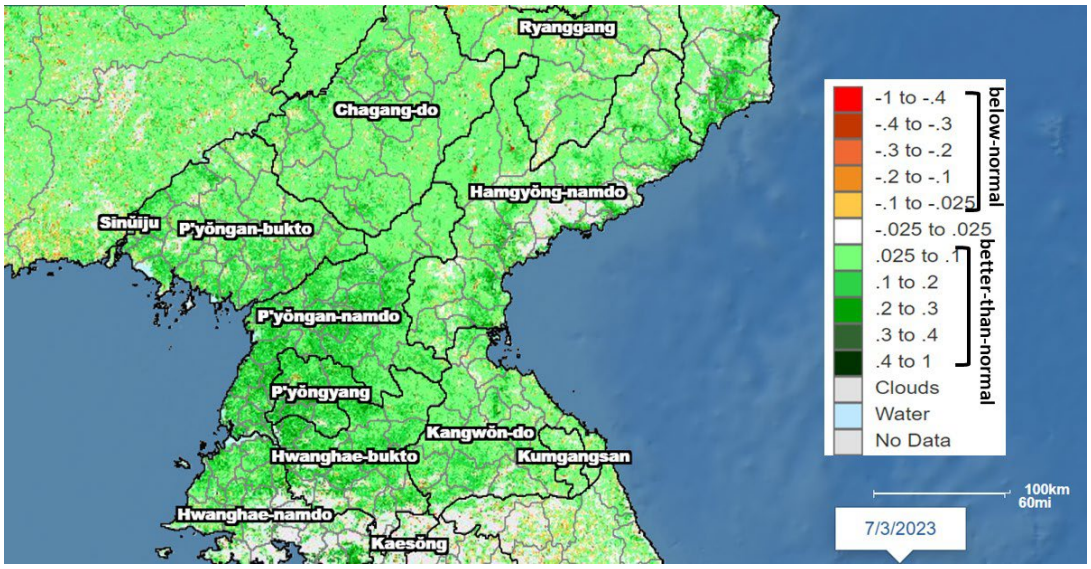


Figure 8. North Korea MODIS NDVI (Normalized Difference Vegetation Index) anomaly map for July 3, 2023, mid-season during advanced crop growth and development stages. The vegetation index is an important indicator of plant health and crop performance. This mid-season map indicates favorable crop status, vegetation conditions, and productivity relative to the long-term average. Source: USDA - Foreign Agricultural Service, Global Agricultural & Disaster Assessment System (GADAS)

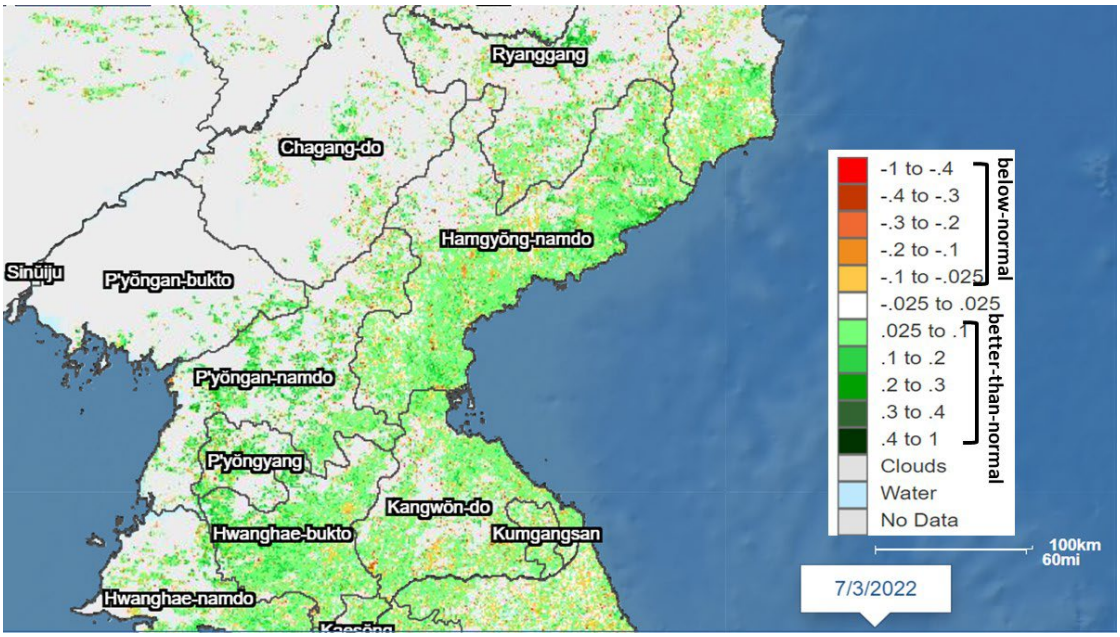


Figure 9. North Korea MODIS NDVI (Normalized Difference Vegetation Index) anomaly map for July 3, 2022, mid-season during advanced crop growth and development stages. The vegetation index is an important indicator of plant health and crop performance. This 2022 mid-season map indicates favorable, average-to-above-average crop status, vegetation conditions, and productivity relative to the long-term average and last year. Source: USDA - Foreign Agricultural Service, Global Agricultural & Disaster Assessment System (GADAS)

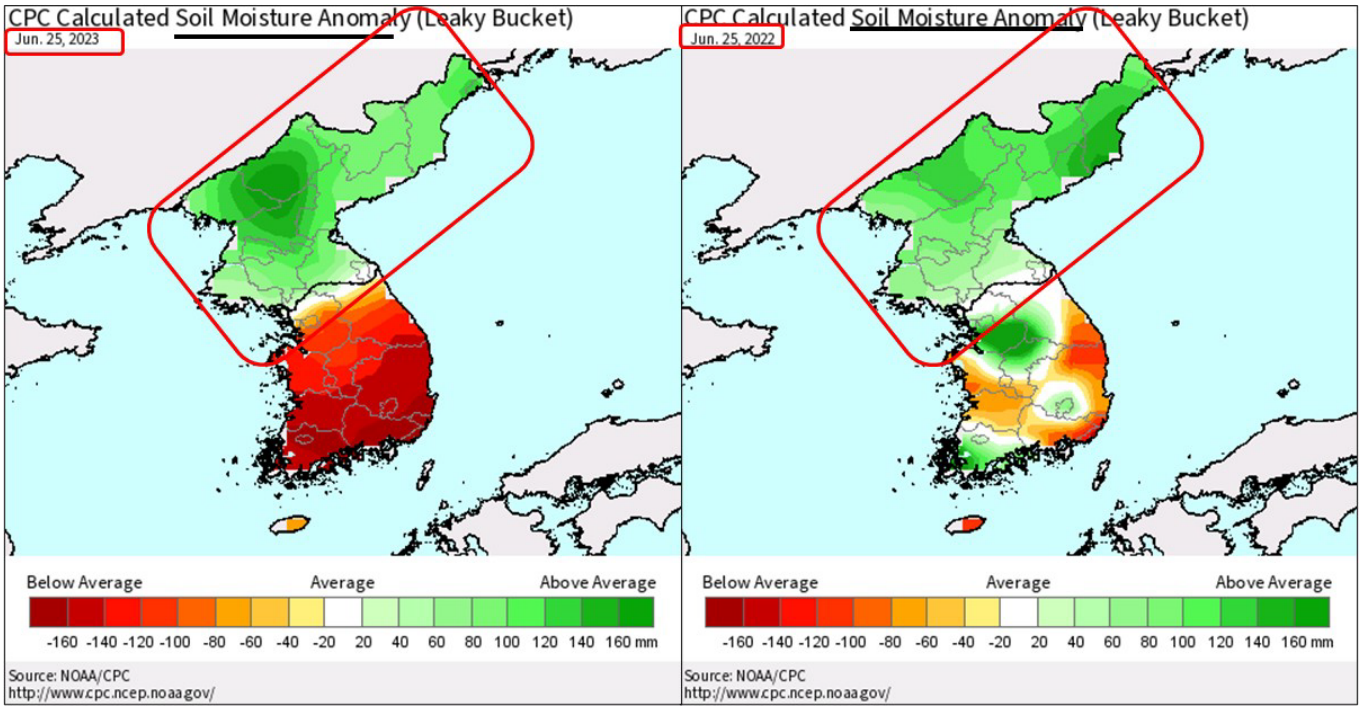


Figure 10. June soil moisture measurements and observations (map 2023 left, 2022 right) show favorable conditions across the major cropping regions in North Korea. Source: NOAA Climate Prediction Center (CPC)

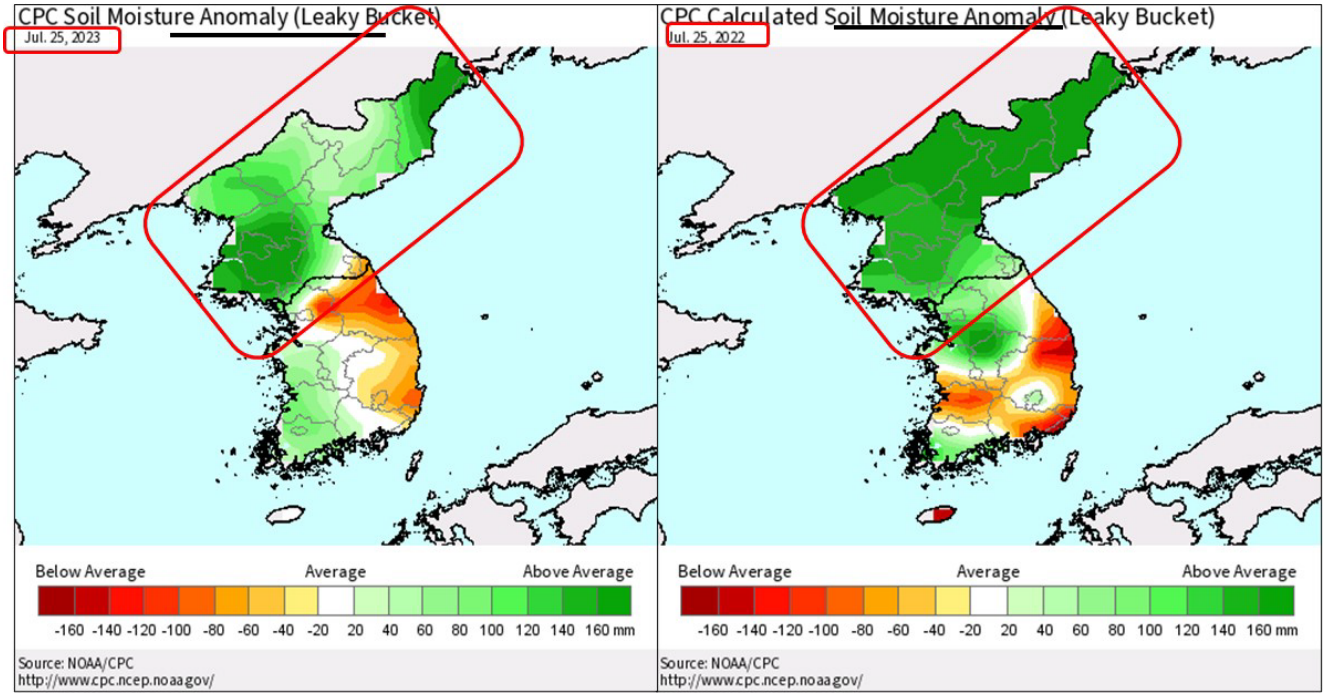


Figure 11. July soil moisture measurements and observations (map 2023 left, 2022 right) show favorable conditions across the major cropping regions in North Korea. Source: NOAA Climate Prediction Center (CPC)

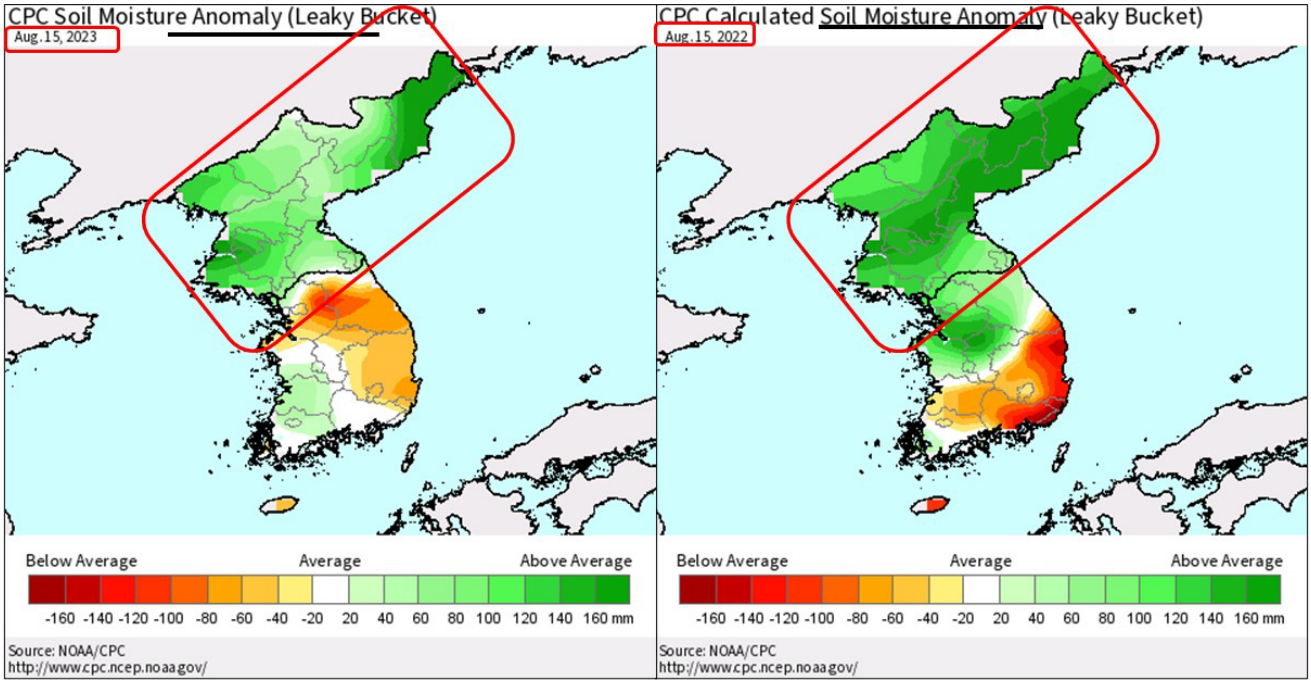


Figure 12. August soil moisture measurements and observations (map 2023 left, 2022 right) show favorable conditions across the major cropping regions in North Korea. Source: NOAA Climate Prediction Center (CPC)

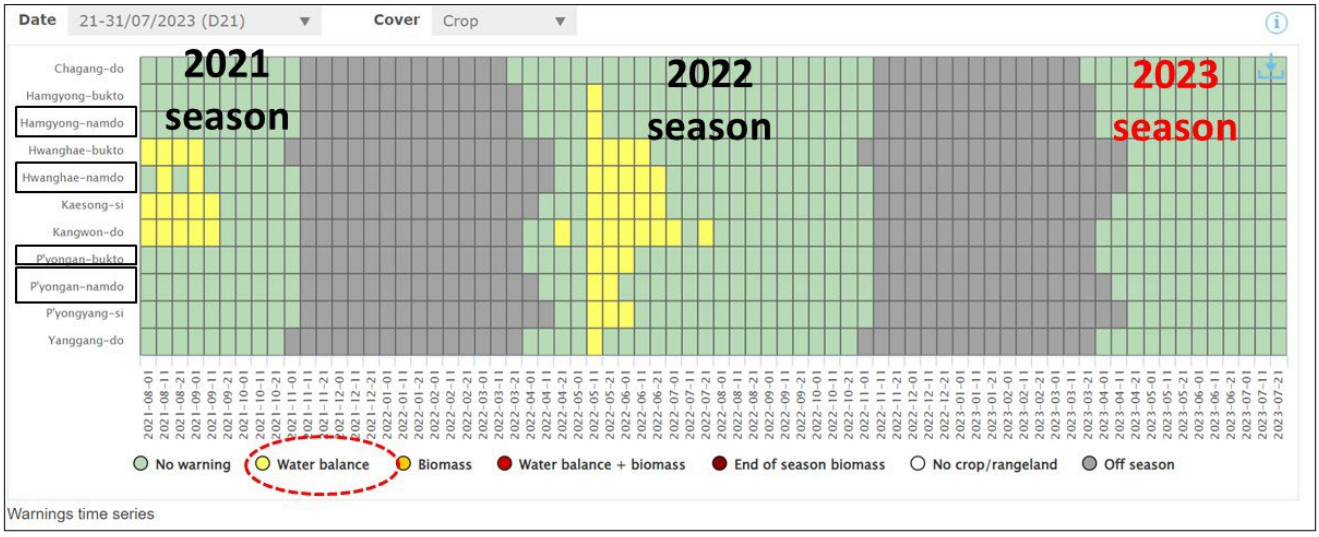


Figure 13. North Korea Anomaly Hotspots of Agricultural Production (ASAP) warnings time series. The matrix shows a table view of the relative history of the warnings in 2021, 2022, and 2023 seasons through July for each of the subnational units in North Korea. The table columns are the 10-day periods, the table rows are the subnational levels. The color of each cell corresponds to the warning levels:

-Water balance: water deficit possibly evolving in poor growth
-Biomass: evidence of poor growth
-Water balance + biomass: poor growth and negative prospects
-End of the season biomass: poor season growth: described at the bottom of the matrix.
Source: European Commission, EU Science Hub ASAP Country Assessment

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