Food and Agriculture Organization of the United Nations

3 February 2015

GIEWS Update

The Democratic People's Republic of Korea

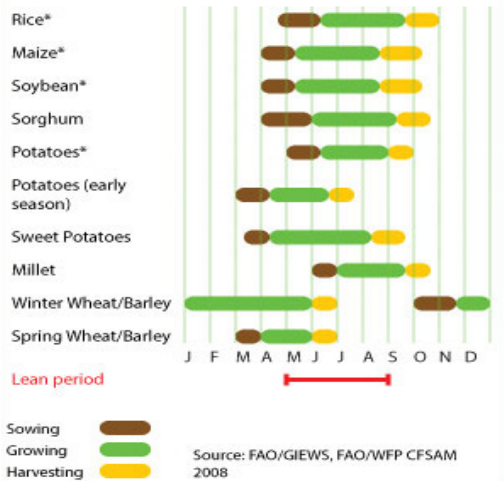
Outlook for Food Supply and Demand in 2014/15 (November/October)

This report has been prepared based on official production figures and FAO analysis, but not on information gathered from the field as an FAO/WFP Crop and Food Security Assessment Mission (CFSAM) did not take place in 2014.

Highlights:

- After increasing markedly for three consecutive years, food production remained stagnant in 2014 with the aggregate output put at 5.94 million tonnes (including cereals, soybeans and potatoes in cereal equivalent). This figure comprises the official estimate of the 2014 main harvest and forecast for the 2015 early crops from cooperative farms, as well as FAO projections of production from sloping land and household gardens.
- Paddy production dropped by about 10 percent due to reduced irrigation water availability, following low precipitation in the winter and dry spells during the 2014 main season. However, this decline was compensated by a significant increase in maize output, as a result of mass mobilization of people to water maize plants.
- Production of the 2014/15 early season potatoes and minor wheat and barley crops, to be harvested from next June, is forecast to fall considerably.
- The total utilization needs for the 2014/15 marketing year (November/October) are set by FAO at 5.49 million tonnes of cereal equivalent and the cereal import requirement is estimated at 407 000 tonnes. The Government is expected to import 300 000 tonnes of cereals, leaving an uncovered deficit of 107 000 tonnes for the current marketing year. This gap is larger than in 2013/14 partly as a result of revised post-harvest losses.
- With a stagnant harvest in 2014, the food security situation in 2014/15 is likely to remain similar to that of the previous marketing year, with most households estimated to have borderline and poor food consumption rates.

Figure 1: DPRK - Crop Calendar
**major foodcrop*



Climatic Conditions in 2014

The Democratic People's Republic of Korea (DPRK) has a continental climate with a relatively short cropping season. Winters are long and bitterly cold, particularly in the northern, mountainous regions. Summers tend to be short, hot, humid and rainy. On average, approximately 60 percent of all precipitation occurs between June and September. The distribution of the remaining 40 percent of precipitation is less reliable and droughts are common in the spring, winter and autumn.

Due to cold temperatures, a single cropping is practised in the north of the country. In the south, however, where winters are less severe and slightly shorter, double cropping is possible. The early season crops are winter wheat sown in October-November,

Report prepared in collaboration with the Joint Research Centre (JRC) of the European Commission (EC)

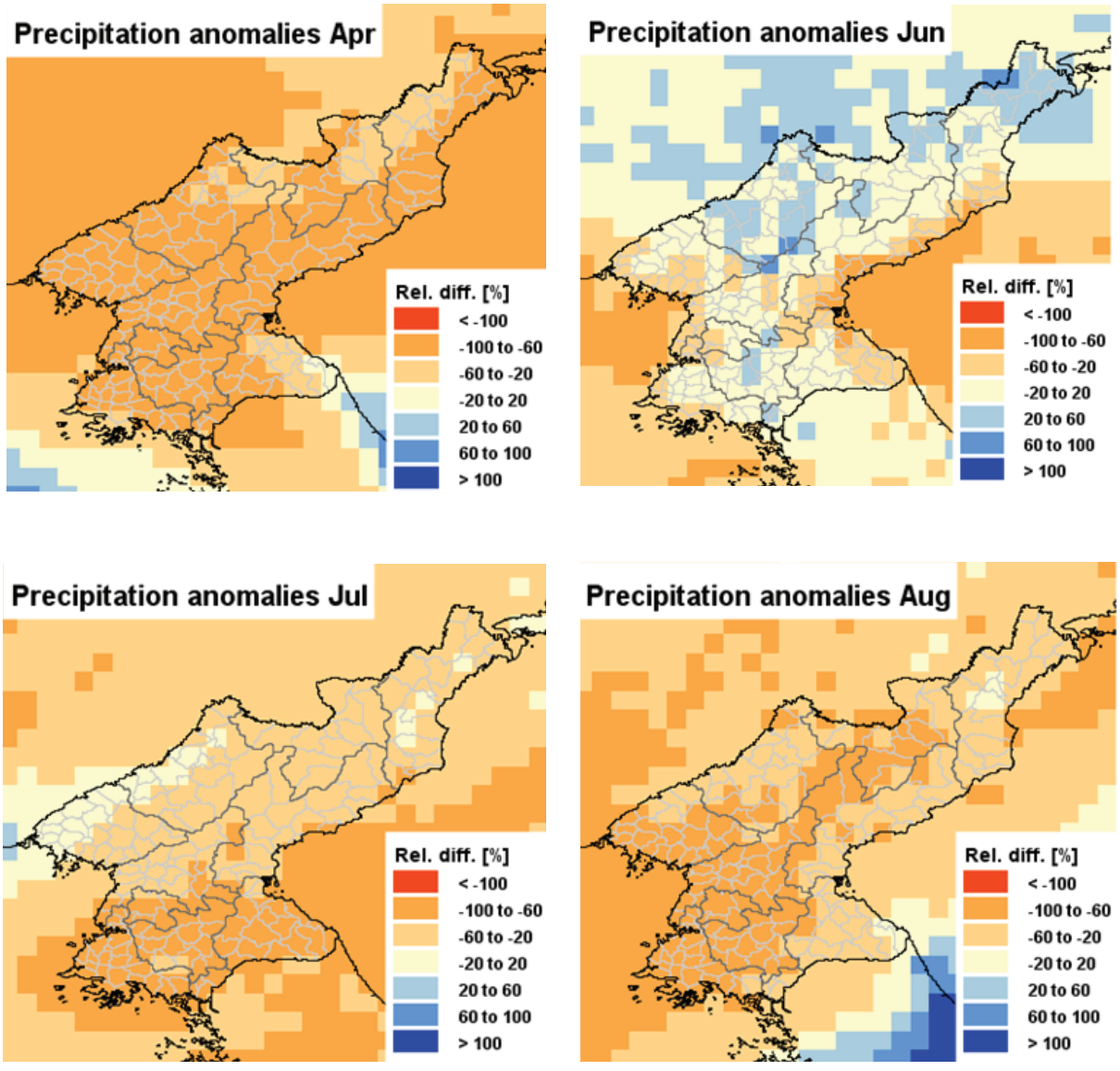
European Commission

MARS Monitoring Agricultural Resource

as well as spring wheat, barley and potatoes sown in March-April. Wheat and barley areas have been declining over time and being replaced by early potatoes. Low temperatures at the beginning of the main agricultural season emphasizes the need for plastic sheeting to ensure a timely start of the cereal crops.

Analysis by the European Commission's Joint Research Center (JRC) indicates that the start of the 2014 main season in April was characterized by dry weather throughout the country delaying planting operations of the main season crops. The rains resumed in May and June with quantities close to the long-term average allowing completion of maize, rice and soybean plantings. The months of July and August are usually the wettest in DPRK and account for more than half of the total annual precipitation. The 2014 season was characterized by dry conditions in July and August (Figure 2), with the lowest rainfall recorded in the last five years in most parts of the country. In particular, the month of August recorded below-average rainfall in the main agricultural zones (Figure 3). The dry spell effect on crop and vegetation growth is captured by the vegetation index derived from satellite imagery (Figure 4). Negative anomalies of the vegetation index were particularly visible in August in the provinces of North and South Hamgyong, as well as in South Hwanghae and Pyongyang, indicating a reduction in vegetation vigor.

Figure 2: DPRK - Precipitation Anomalies in April, June, July and August 2014
Calculated from the Rainfall Estimates by the European Centre for Medium-Range Weather Forecasts (ECMWF)



While the dry spell in August negatively affected most crops, the impact on maize was limited by supplementary irrigation, that is not normally required. Mass mobilization of non-farm workers in the main growing areas to combat the dry conditions by digging wells and pumping, carrying and applying water to plants in the field was reported.

Figure 3: DPRK - Precipitation (mm) in selected important cereal producing provinces, 2013 and 2014 compared to long-term average
The 2013 and 2014 Data are from Weather Stations and the 2008-2014 Average was Estimated from ECMWF data

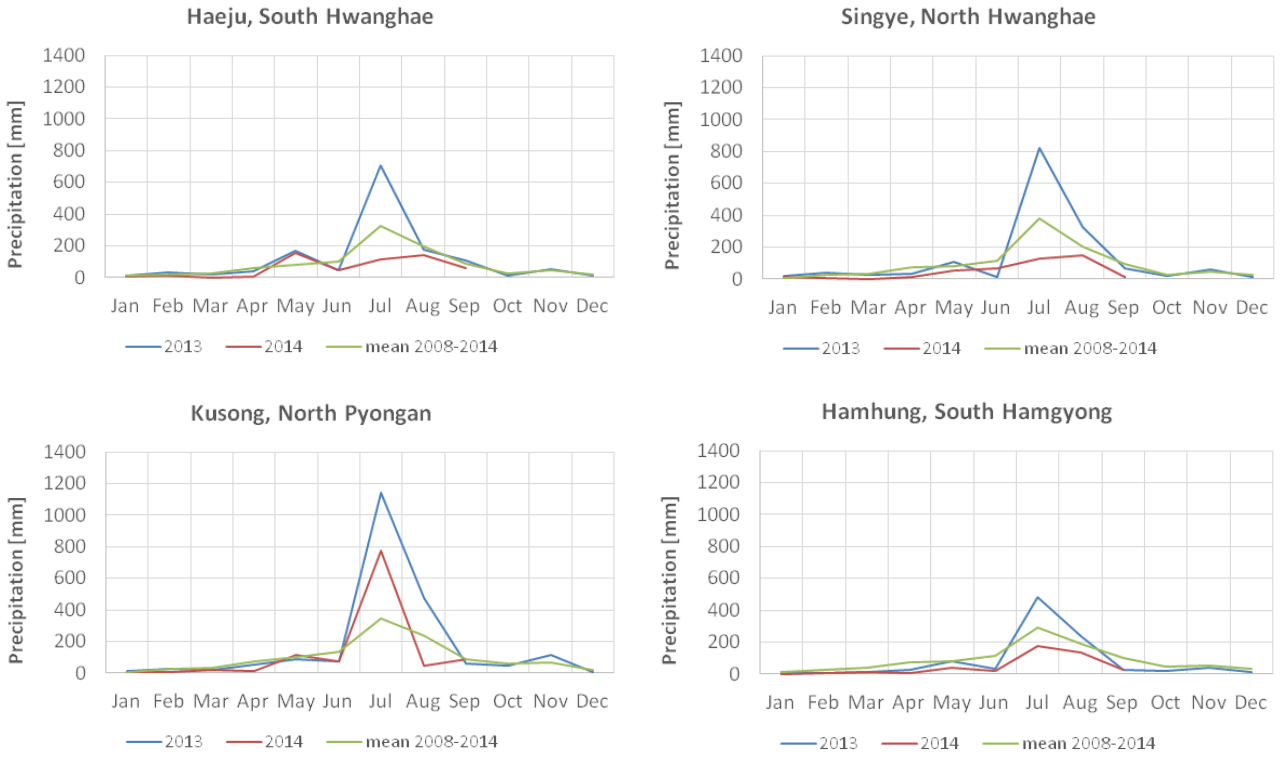


Figure 4: DPRK - Anomalies of the Normalized Difference Vegetation Index (NDVI) for July and August 2014
Calculated from Satellite Imagery (METOP-AVHRR)

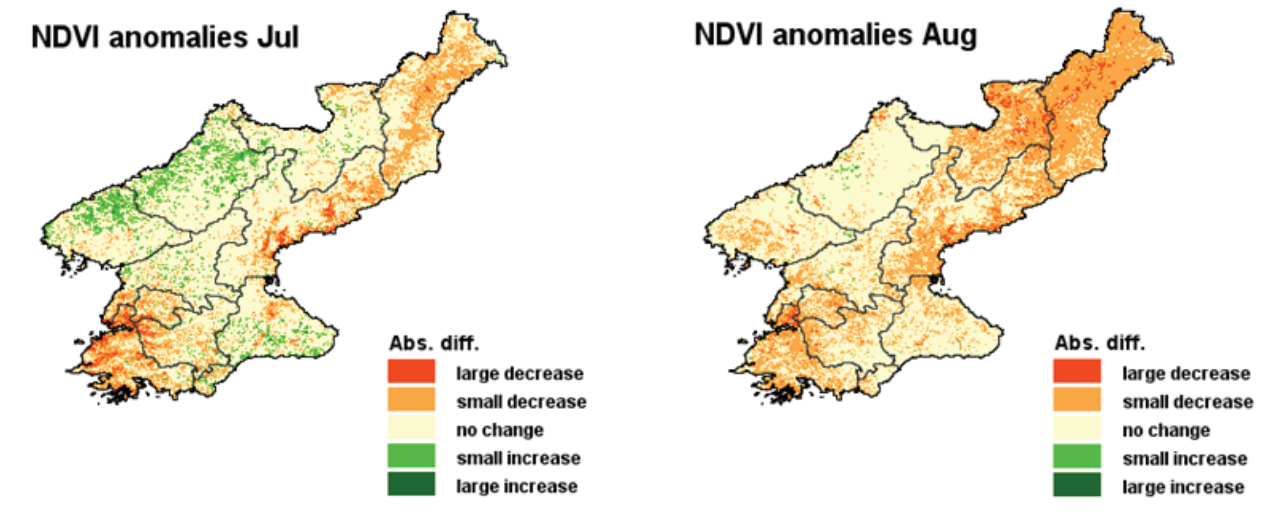


Table 1: DPRK - Fuel Consumption, 2013 and 2014

Fuel Type	2014	2013	% change, 2014 to 2013
Diesel	55 171	64 425	-14
Petrol	5 500	7 000	-21
Total	60 671	71 425	-15

Source: Ministry of Agriculture (MoA)

Table 2: DPRK - Volume of Water in Irrigation Reservoirs, 2013 and 2014 *(10 000 m³)*

Year	Target	Actual
2014	240.0	100.0
2013	357.4	364.4
2012	357.4	374.6

Source: Ministry of Agriculture (MoA)

Table 3: DPRK - Fertilizer Statistics for 2009-2014 *(tonnes)*

	N (ammonium sulphate equivalent, approx. 20.5 % N)	P (superphosphate equivalent, approx. 17% P2O5)	K (KCl-muriate of potash, 48-62% K2O)	Total
2014	727 993	18 977	2 700	749 670
2013	686 015	18 396	2 788	707 199
2012	686 517	21 460	18 650	726 627
2011	735 943	5 545	4 477	745 965
2010	475 100	11 402	12 314	498 816
2009	434 807	2 776	8 400	445 983

Source: Ministry of Agriculture (MoA).

Means of Production and Inputs in 2014

Farm power: Reports from previous CFSAMs indicate that farm power, in the form of machinery and fuel, has been the most frequently-cited constraint to increase crop production in DPRK, with the numbers of tractors inadequate. The 2013 CFSAM estimated that mechanized land preparation could only be carried out on about 60 percent of arable area, with the remaining land being prepared by oxen. According to official information, in 2014 the number of tractors and the operational rate nationally in DPRK remained close to the previous year's level. However, the amount of diesel and petrol supplies decreased by 14 percent and 21 percent, respectively, from 2013 limiting productivity (Table 1).

Irrigation: Data from the Ministry of Agriculture (MoA) shows that water availability in irrigation reservoirs during the 2014 main season was sharply reduced compared with the previous seasons, holding less than half of the target level of 2.4 billion m^3 of water and only one-quarter of the 2013 actual levels (Table 2).

Fertilizers: During 2014, the total supply of nitrogenous fertilizer, phosphate and potash is reported to have increased by 6 percent compared to the 2013 level of 749 670 tonnes (Table 3).

CEREAL PRODUCTION IN 2014

Area Planted

The aggregate 2014/15 cropped area is set at 1.97 million hectares, marginally lower (1.16 percent) than the 2013/14 level (Table 4). This includes estimates from MoA for the 2014 main season from cooperative farms, and FAO's estimates of the 2015 early season crops. Based on estimates from previous CFSAMs, an area of 550 000 hectares of sloping land, and 25 000 hectares of household gardens, have been added. Much of DPRK's sloping land has been cultivated for decades by individuals, groups and also by cooperative farms. Home gardens, though limited in size, can be highly productive, carrying both crops and livestock contributing significantly to household nutrition and income.

The MoA data for the 2014 main season indicates that 1.25 million hectares from cooperative farms were planted to cereals, potatoes and soybeans, which shows a marginal increase of about 8 000 hectares, or 0.6 percent, on last year's level. The area under mostly irrigated paddy was reported at 525 037 hectares, a contraction of 4 percent from 2013. Much of this reduction was attributed to the limited availability of irrigation water at sowing time. It is assumed that paddy fields, which were difficult to irrigate, were put under alternative crops. The area planted to soybeans in 2014 was estimated to have increased by 23 percent to 142 543 hectares. The expansion was mainly the result of the Government's efforts to increase the area under legume break crops. Soybeans play an important role in crop rotation by helping to improve nitrogen levels in the soil. Despite delays in the start of the rainy season, the area planted to maize in 2014 remained close to last year's good level. The area under minor crops, namely potatoes and others cereals (including sorghum, millet, buckwheat) decreased slightly compared with 2013.

Taking into account production forecasts by MoA, the forthcoming 2015 winter wheat and barley crop areas are estimated by FAO to have declined by some 18 percent to 44 000 hectares, most likely due to shortages of seed following the poor harvests in 2014. Similarly, the planted area under early season potatoes in 2015 is anticipated to decrease by 18 percent compared to the previous year to 100 000 hectares.

Crop Yields and Production

The aggregate 2014/15 food production is expected to reach 5.94 million tonnes (in cereal equivalent and paddy terms), virtually unchanged from 2013/14 (Table 4). This includes the MoA estimates for the 2014 main season and forecast for the forthcoming 2015 early season crops from cooperative farms, as well as FAO's estimates for production from sloping land and households gardens. The marginal increase (0.3 percent) in the 2014/15 food production follows three consecutive years of strong growth at 4.4 percent in 2011/12, 8.7 percent in 2012/13 and 3.5 percent in 2013/14. However, at the forecast level, production remains above the past five-years average.

Table 4: DPRK - Comparison between 2014/15 and 2013/14 National Aggregate Production of Food Crops in Cereal equivalent

	2014/15			2013/14 1/			Change 2014/15 from 2013/14		
	Area	Yield	Prodn.	Area	Yield	Prodn.	Area	Yield	Prodn.
	'000 ha	t/ha	'000 t	'000 ha	t/ha	'000 t	%	%	%
MAIN SEASON, Farm (Total)	**1 253.2**	**4.3**	**5 347.1**	**1 245.1**	**4.2**	**5 267.1**	**0.6**	**0.9**	**1.5**
Paddy	525.0	5.0	2 626.4	546.7	5.3	2 900.9	-4.0	-5.7	-9.5
Maize	531.8	4.4	2 349.1	527.3	3.8	2 002.0	0.8	16.4	17.3
Other cereals	25.6	2.1	53.7	26.1	2.5	65.8	-1.6	-16.9	-18.3
Potatoes	28.2	5.6	157.5	29.1	4.6	135.1	-3.3	20.7	16.6
Soybeans	142.5	1.1	160.4	115.9	1.4	163.4	23.0	-20.2	-1.8
EARLY SEASON (winter and spring), Farm (Total)	**144.0**	**2.1**	**301.0**	**175.3**	**2.1**	**366.2**	**-17.8**	**0.1**	**-17.8**
Wheat and barley 2/	44.0	1.4	60.0	53.5	1.4	76.6	-17.8	-4.7	-21.7
Potatoes	100.0	2.4	241.0	121.8	2.4	289.6	-17.9	1.3	-16.8
NATIONAL, Farm Total	**1 397.2**	**4.0**	**5 648.1**	**1 420.4**	**4.0**	**5 633.3**	**-1.6**	**1.9**	**0.3**
Sloping land	550.0	0.4	220.0	550.0	0.4	220.0	0.0	0.0	0.0
Household gardens	25.0	3.0	75.0	25.0	3.0	75.0	0.0	0.0	0.0
TOTAL including sloping land and gardens	**1 972.2**	**3.0**	**5 943.1**	**1 995.4**	**3.0**	**5 928.3**	**-1.2**	**1.4**	**0.3**

[1] Revised 2013/14 figures based on the actual officail estimates for the early season crops.

[2] Includes a small amount of main crop wheat and barley grown mainly in Nortn and South Hamgyong, and Ryanggang.

The 2014 main season food production is estimated at 5.35 million tonnes, which is 1.5 percent higher than that of 2013, with an increase in maize output compensating for a decline in most of the other crops. A shortage of water for irrigation due to low winter precipitation and dry spells during the 2014 main rainy season resulted in a 9.5 percent drop to 2.6 million tonnes in paddy rice production, one of the country's most important cereal crops.

However, unlike paddy, maize production from cooperative farms is estimated to have grown by some 17 percent from the 2013 good level, to some 2.35 million tonnes. Despite the dry spells during the cropping season, the Government's efforts to provide supplementary irrigation to the maize crop reportedly resulted in higher yields. Irrigation was facilitated by the digging and drilling of new wells, the use of tractors to run portable pumps, construction of sprinkler irrigation, and the mass mobilization of people to water maize plants with buckets.

Despite the significant expansion in area planted to soybeans, the most important source of protein in the country, the 2014 production is estimated to have decreased slightly to 160 000 tonnes, due to the long dry spell and poor quality of seeds. Similarly, the output of other cereals is set at 54 000 tonnes, an 18 percent drop compared to the 2013 level. By contrast, the output of potatoes is reported by MoA to have increased sharply due to a significant increase in yields for the second consecutive year. Improved fertilizers supplies in 2014 are likely to have supported the higher productivity.

Official information from MoA forecasts the 2015 main early season potatoes, to be planted in March, and wheat and barley crops at 301 000 tonnes (cereal equivalent), 18 percent lower than in 2014. Shortages of seeds, following the reduced harvest of the previous year, is the main factor behind the expected decrease in output. Early season potato production in 2014/15, is put by FAO at 241 000 tonnes, or 17 percent down from the previous year's level, while the winter wheat and barley harvest is expected at 60 000 tonnes, a decrease of 22 percent.

Crop production from sloping land and household gardens is assumed to have remained similar to the 2013 levels of 220 000 tonnes and 75 000 tonnes (cereal equivalent), respectively, as estimated by the 2013 CFSAM.

FOOD SUPPLY/DEMAND BALANCE 2014/15

The 2014/15 marketing year (November/October) food supply/demand balance sheet, including cereals and cereal equivalent of potatoes and soybeans, is summarized in Table 5. MoA production estimates for the 2014 main season crop and preliminary forecasts of the 2015 early season crops from cooperative farms,

Table 5: DPRK - Food Balance Sheet for Marketing Year, November 2014-October 2015
('000 tonnes)

	Rice (milled) 1/	Maize	Wheat and Barley	Other cereals	Potatoes 2/	Soybeans 3/	Total
DOMESTIC AVAILABILITY	**1 733**	**2 594**	**60**	**54**	**449**	**192**	**5 082**
Main-season farm production	1 733	2 349		54	158	192	4 486
Winter/spring production			60		241		301
Production on slopes		220					220
Production from gardens		25			50		75
TOTAL UTILIZATION	**1 825**	**2 658**	**182**	**54**	**502**	**267**	**5 489**
Food use	1 497	2 049	156	46	344	249	4 341
Feed use		100			20		120
Seed requirement	58	68	17	3	70	8	225
Post harvest losses	270	441	10	5	67	10	803
Stock build-up	0	0	0	0	0	0	0
IMPORT REQUIREMENTS	**92**	**64**	**122**	**0**	**53**	**75**	**407**
Anticipated commercial Import							300
Uncovered deficit							107

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.

as well as FAO's estimates for production from plots on sloping land and household gardens, have been used. For the calculation of food consumption, FAO/GIEWS cereal balance methodology has been applied. Specifically, the following assumptions were made in preparing the balance sheet:

- **Population:** The total national population at the end of December 2013 was officially estimated at 24.88 million (including 700 000 special entity personnel). Applying an average annual population growth rate of 0.55 percent, the population for November 2014 to October 2015 is projected at 24.95 million.
- **Food Use:** An annual per capita consumption of 174 kg of basic food commodities, covering cereals, potatoes and soybeans, is used. This rate is based on the apparent average consumption of the previous three years using historical data from FAO/GIEWS cereal balances. The individual items are adjusted somewhat to match with the estimated availability during the current marketing year and to maintain zero balance of non-traded commodities such as potatoes and other cereals. Specific food requirements used are: 150.2 kg of cereals (including 60 kg of milled rice, 82.1 kg of maize, 6.25 kg of wheat and barley and 1.84 kg of other cereals), as well as 13.8 kg of potatoes and 10 kg of soybeans in cereal equivalent. More maize and less rice and wheat/barley are included in the anticipated diet to reflect changes in crop production in 2014 compared to 2013. Cereals, potatoes and soybeans remain the main source of nutrition for the population. The estimated per capita food consumption of 174 kg represents about 1 640 kcal per person daily. The remaining energy and other nutrients required are assumed to be derived from the limited quantities of available fish, poultry, meat, sweet potatoes, vegetables, fruits and wild foods. However, it should be noted, that the Government's target weighted average consumption rate is considerably higher at 207 kg per person per year. This leads to a significant higher estimate of the cereal import requirements by the Government.
- **Feed Use:** As the number of livestock in 2014 remained unchanged from the previous year's level, the feed requirement in 2014/15 is assumed to remain similar to the 2013 CFSAM estimate of 120 000 tonnes of feed grain and feed grain-equivalent (100 000 tonnes of maize and 20 000 tonnes of potatoes).
- **Seeds:** A seed requirement of 225 000 tonnes is estimated, based on the seed rates used in DPRK and the average area sown in the past three years, allowing for some multiple planting/sowing.
- **Crop Losses:** Post-harvest losses rates have been updated from previous reports, to take into account the results of a 2014 study on post-harvest losses of rice, maize, wheat and barley carried out by the Pyongyang Agricultural Campus and Kim Il Sung University, in collaboration with FAO and UNDP. Accordingly, post-harvest losses have been adjusted to: 15.56 percent for rice, 17 percent for maize and 16.35 percent for wheat and barley. As this study did not consider other cereals, potatoes and soybeans, the rates of post-harvest losses used in the past CFSAM reports of 10 percent, 15 percent and 5 percent, respectively, have been applied.
- **Paddy-to-rice:** A milling ratio of 66 percent is used. This is consistent with rates in other countries of the region. No other grains are converted to milled form as the food and non-food requirements are expressed in whole-grain form.
- **Cereal Import Requirement:** The total cereal import requirement in 2014/15 (November/October) is estimated at 407 000 tonnes. With 300 000 tonnes expected to be imported commercially by the Government, there is an uncovered deficit of 107 000 tonnes for the current marketing year. The estimated food gap is larger than the 2013/14 level of 40 000 tonnes reported by the 2013 CFSAM, partly due to higher post-harvest losses following changes in the methodology for their estimation.

According to official data, in the previous 2013/14 marketing year, the country imported 313 755 tonnes of cereals, about 8 percent less than projected by the 2013 CFSAM. Commercial cereal imports reached 248 603 tonnes, consisting mainly of wheat flour from China. This was some 16 percent below the level of 2012/13. Total food aid, including both bi-lateral and multi-lateral, declined significantly to about 65 152 tonnes of cereals. The major bi-lateral source of food assistance was the Russian Federation, which provided 28 700 tonnes of wheat, followed by China with 8 300 tonnes of maize. By contrast, multi-lateral cereal food assistance (mostly through WFP) rose by almost 10 percent to 36 385 tonnes in 2013/14. Over the past two decades, total cereal imports have ranged from about 1 million tonnes during the mid-2000's to

around 300 000 tonnes in 2008/09 and 2013/14. The decline over the past two decades mainly reflects a reduction in food assistance (see Figure 5).

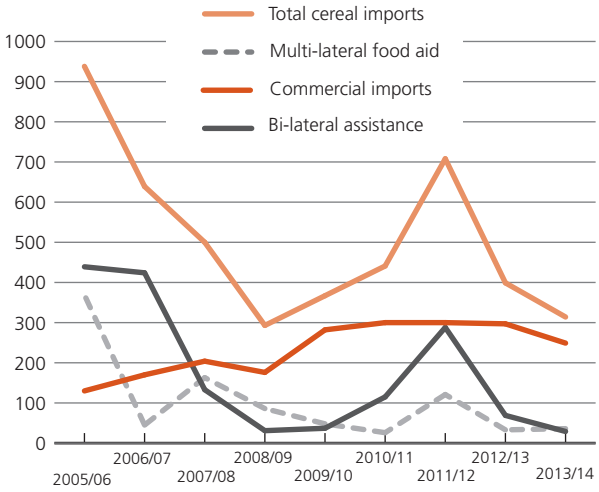
FAO ASSISTANCE

FAO supports the rehabilitation and development of the agricultural sector in DPRK through eight ongoing projects with a total budget of USD 4.27 million as follows:

Three emergency and rehabilitation projects valued at USD 2.25 million, including conservation agriculture and double cropping funded by the EU and Food Security coordination funded by Sweden and the EU.

Five Technical Cooperation Programme (TCP) projects with a total budget of USD 2.02 million, covering pasture seed multiplication; system of rice intensification; seed and post-harvest handling; foot and mouth disease; and avian influenza.

Figure 5: DPRK - Cereal imports, 2005/06 to 2013/14 marketing years
('000 tonnes)



Source: National Coordination Committee, Government of DPRK.

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