GEOGLAM Crop Monitor*
September 2013

No. 1 (Expanded Version)

* Assessment based on Information as of August 28th

Prepared by members of the GEOGLAM Community of Practice

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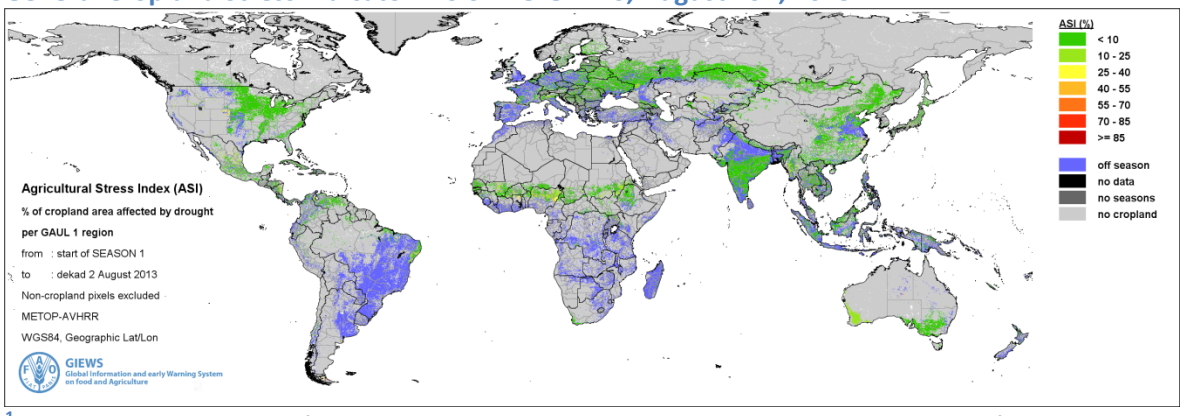
Comments

This is the first GEOGLAM crop outlook international consensus assessment developed for AMIS. It summarizes crop conditions for the 4 AMIS crops for the month of August, based on information as of August 28th, 2013. GEOGLAM Assessments are based on exchanges of expertise, analysis and relevant remotely sensed data, ground observations, and meteorological data between global, national and regional monitoring systems.

For each of the four crops, we provide a paragraph summarizing current conditions accompanied by a satellite-based vegetative index indicator map. Each map depicts crop vegetative growth anomalies from August 28th (relative to a 12 year average) based on the Normalized Difference Vegetation Index (NDVI), over the main crop growing regions within AMIS countries. We also provide a general cropland stress indicator (ASIS) map reflecting general conditions up to August 20th (FAO GIEWS).

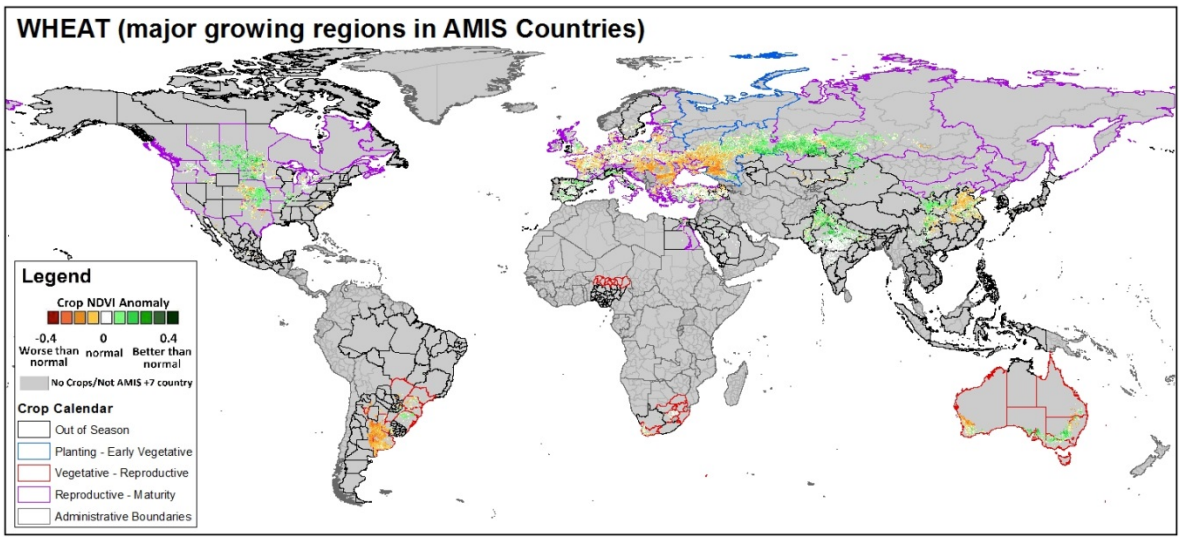
General Cropland Stress Indicator: ASIS FAO GIEWS, August 20th, 2013



[1] Green indicates areas of little or no stress – Blue indicates agricultural areas out of season

[*] GEOGLAM aims at strengthening global agricultural monitoring by improving the use of satellite tools for crop production forecasting. It is implemented within the framework of the inter-ministerial Group on Earth Observations (GEO). Both GEOGLAM and AMIS were endorsed by the G20 Heads of State Declaration (Cannes, November 2011) when GEOGLAM was tasked to "coordinate satellite monitoring observation systems in different regions of the world in order to enhance crop production projections and weather forecasting data." Within this framework, GEOGLAM is providing global crop outlook assessments in support of AMIS market monitoring activities. More detailed information on the GEOGLAM crop assessments is available on: www.geoglam-crop-monitor.org

Wheat

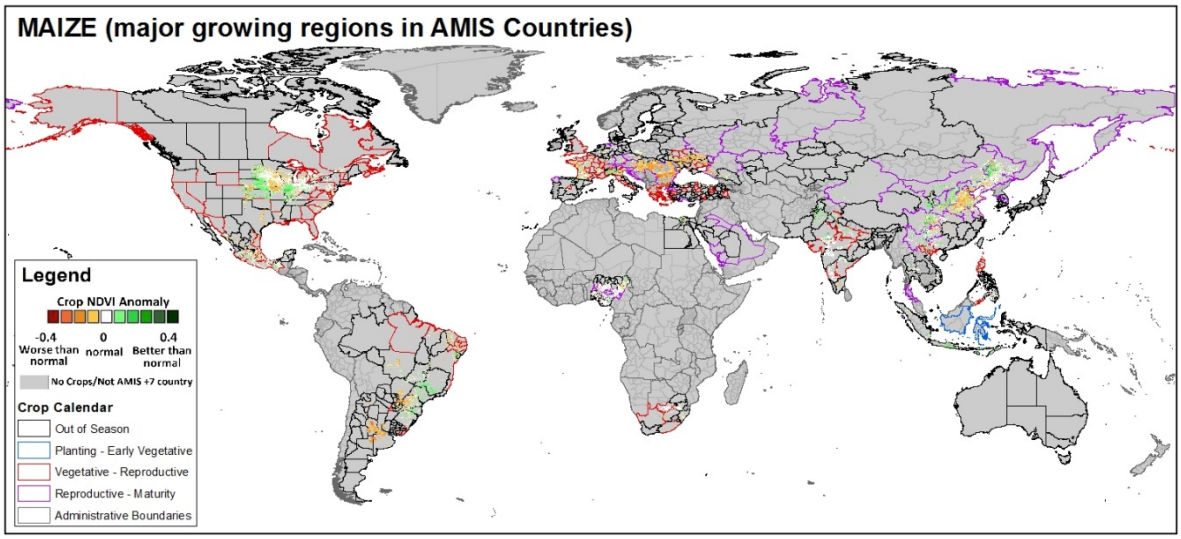


Satellite-Based Vegetative Growth Anomalies *based on the Normalized Difference Vegetation Index (NDVI):* NDVI is an indicator of photosynthesis often used for monitoring croplands. These anomaly images compare the NDVI for August 28th 2013 to the average NDVI for the same date from 2000-2012, over the main growing regions of the four AMIS crops. Orange to red indicates less green vegetation than average, green indicates higher than average vegetation. Administrative unit outline colours indicate crop growth stage: **Blue- planting to early vegetative, Red- Vegetative to Reproductive** (generally the most sensitive crop growth period), **Purple- Reproductive to Maturity, Black- areas out of season.** Note: only AMIS countries are highlighted.

Overall wheat prospects are favorable in the **Northern Hemisphere**. Winter wheat harvest is complete and spring wheat is in late maturity to harvest stages. In the **US approximately** two thirds of the spring wheat crop is reportedly in good condition. Harvest is in progress though is behind average due to the delayed planting and cool spring. In **Canada** spring wheat is overall in good condition, but development is still generally one week behind normal. Current yield estimates are expected to be average to above-average dependent on adequate heat between now and harvest. In **Russia** overall spring wheat conditions are good. Late planting and cool weather have delayed spring-wheat development in western Siberia. Although remotely sensed based NDVI indicate above-average potential yield, the late maturation of the crop will increase the risk of harvest losses in the event of unfavorable weather in September. In **Kazakhstan** overall spring wheat conditions are good, however excessive precipitation in August delayed the start of the wheat harvest in the north-central part of the country. As in Siberia, NDVI indicates high potential yield but late crop development and wet weather will increase the risk of harvest delays. In **Europe (EU 28)** winter wheat harvest has been completed and yield prospects are favorable. Despite an unusually prolonged winter, this crop has benefited from abundant rainfall during spring and favorable weather conditions during grain filling and maturing phases. In **the Southern Hemisphere**, winter wheat is in early vegetative to reproductive phases and conditions are mostly favorable. In **Australia** conditions are average to above-average. Adequate subsoil moisture availability across much of the wheat belt and mild winter temperatures have enabled good crop development, however widespread rainfall in the next month will be crucial for yield potential to be realized especially as temperature begin to increase. Rainfall across Western Australia during August 2013 has improved crop production prospects in central and southern regions, however this rainfall may have arrived too late to elevate yield losses in northern regions. There is some concern over dry conditions in parts of New South Wales, Queensland and Northern Western Australia. In **Argentina** winter wheat planting has been completed and wheat is in early growing stages. Current conditions are favorable, however additional moisture is needed in the near

future. In **Brazil** the wheat crop has been impacted by severe frosts causing significant crop loss in Parana State and there are some concerns over excessive wetness due to heavy rains in Rio Grande do Sul. In **South Africa** conditions for winter wheat production have improved since July following widespread precipitation.

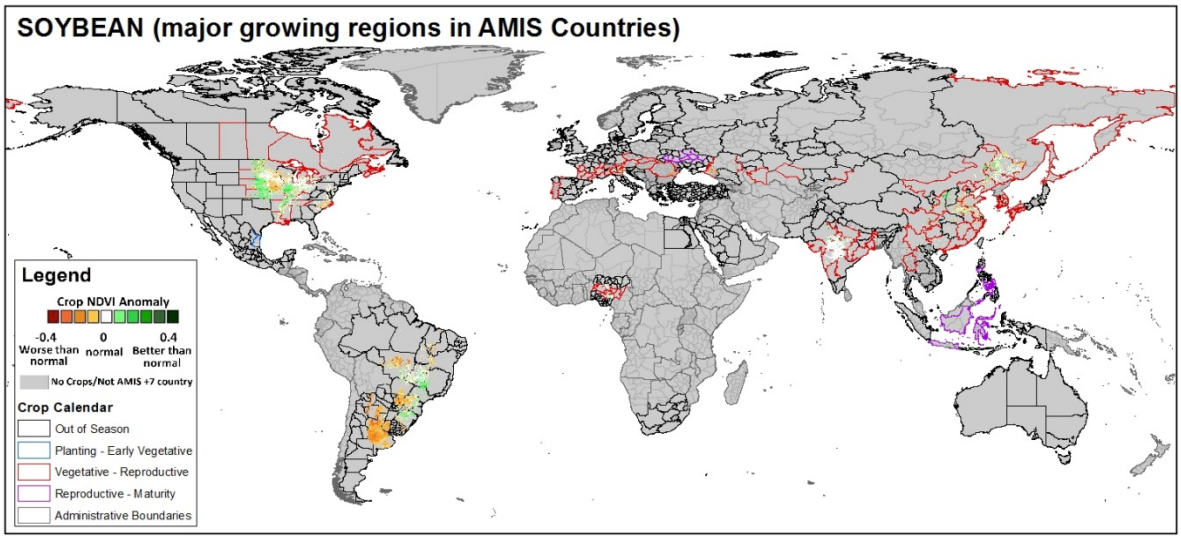
Maize/Corn



NDVI anomaly image (NASA MODIS) depicting vegetative growth anomalies on August 28th 2013 over the main corn growing areas. (The legend is as for wheat above).

Overall corn conditions are good. In the **US** approximately half of the crop is in good to excellent condition according to ground surveys and development is a couple of weeks delayed relative to average. Despite dry weather and rising temperatures in the Midwest in late August, a bumper production is expected largely due to increased planted area. In **Canada** crop conditions are favourable. Yields are expected to be average to above average, and will depend on adequate heat between now and harvest. **Europe** (EU 28) overall prospects are good except in northern Italy, Hungary, Austria, Slovenia and Croatia where there is concern due to late sowing which has shortened the critical reproductive and grain-filling phases and due to dry and hot conditions. In **Russia,** current yield prospects for corn are favourable despite persistent dryness, which is depleting subsurface moisture reserves in southern European Russia. In **Ukraine,** corn conditions are favorable particularly in the main corn regions. Hot temperatures in May and June caused the crop to mature 2-4 weeks earlier than average. In **China** good moisture conditions were maintained in the North China Plain and in the Northeast, benefiting the corn crop. In **India** corn conditions are good, as Monsoon rains have been well distributed in most parts of the country supporting crop development. In **Mexico** beneficial rain maintained favorable conditions across the southern corn producing regions. In **Brazil** the second corn crop harvest, concentrated in the center-western region, is almost complete and is expected to be favorable. Severe frosts in Parana State are expected to cause some loss (amount not yet estimated).

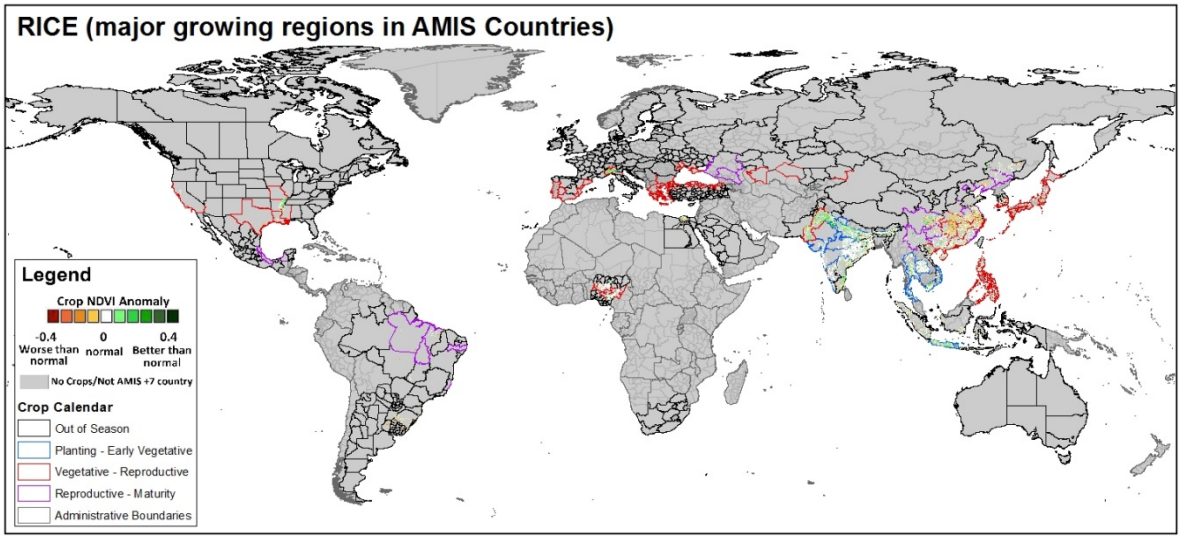
Soy



NDVI anomaly image depicting vegetative growth anomalies on August 28th over the main soy growing areas. (The legend is as for wheat above).

Overall soy growing conditions are favorable. In the **US** as of the end of August approximately half of the soybean crop was rated in good to excellent conditions according to ground surveys, however prolonged dry conditions in the Midwest are raising concerns as the crop matures. While soybeans are at increased risk for an early frost due to the delayed season, the crop will still likely be at least average assuming relatively normal conditions throughout the late summer and early fall. In **China** overall conditions are favourable for soy development in the North China Plain and in North East China. In **India** monsoon rains provided favourable moisture conditions for soy development, however there is some concern over excessive moisture in central India.

Rice



NDVI anomaly image depicting vegetative growth anomalies on August 28th over the main rice growing areas. (The legend is as for wheat above).

Overall, rice growing conditions are favorable. The monsoon season got off to an early start in **South** and **Southeast Asia**, and has maintained good moisture conditions across most of the region. In **India,** conditions are favourable as widespread monsoon showers have been well distributed and have maintained mostly abundant moisture for rice. In **Pakistan** and **Bangladesh** rainfall has maintained favorable moisture conditions for rice development. In **Thailand** precipitation has been widespread across most of the country although there is some concern over localized dryness. Mostly favourable conditions were maintained in **Vietnam** and the **Philippines** with some concern over excess moisture and flooding. In **China**, good moisture conditions were maintained in the North China Plain though there is some concern over flooding in the northeast and excess moisture in the southwest. However, south of the Yangtze Valley, dry conditions and above normal temperatures raise concern. In the **US** the rice crop is in good condition with no widespread concerns. In **Japan**, conditions are mostly favourable in the south for early developing rice.

Sources & disclaimer

The GEOGLAM assessment information has been elaborated by GEOGLAM with the inputs from the following partners (in alphabetical order): AAFC (Canada), ABARES/DAFF/CSIRO (Australia), ARC (South Africa), CAS CropWatch (China), CONAB/INPE (Brazil), GISTDA (Thailand), EC JRC-MARS, FAO, ISRO (India), JAXA (Japan), ASIA RiCE, IKI (Russia), INTA (Argentina), LAPAN/MOA (Indonesia), Mexico (SiAP), NASA, UMD, and USDA FAS/ USDA NASS (US), Ukraine Hydromet Center/NASU-NSAU (Ukraine), VAST/VIMHE (Vietnam).

The findings and conclusions found in this joint multiple-agency reporting are only consensual statements from the GEOGLAM expert group, and do not necessarily reflect those of the individual Agencies represented by these experts.

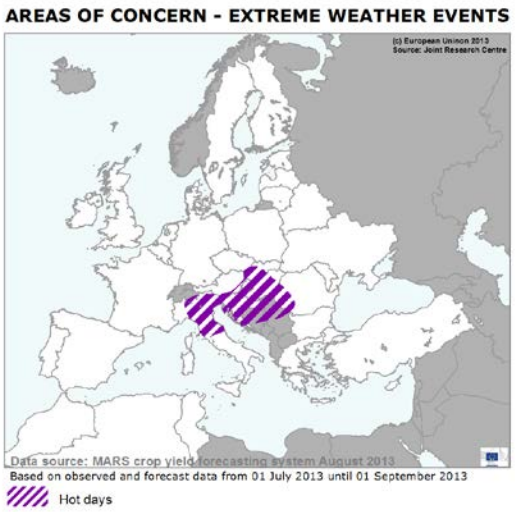
Map data sources: Main crop type areas based on the IFPRI SPAM 2005 beta release (2013). Crop calendars based on FAO and USDA crop calendars. NDVI anomaly data produced by NASA/USDA/UMD based on NASA MODIS data. Growing Degree Day anomaly data produced by EC JRC MARS. Water Satisfaction Index for Maize produced by EC JRC MARS.

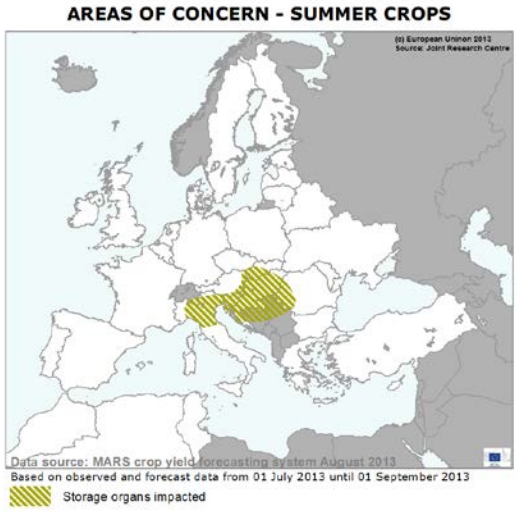
Annex: Supporting Evidence

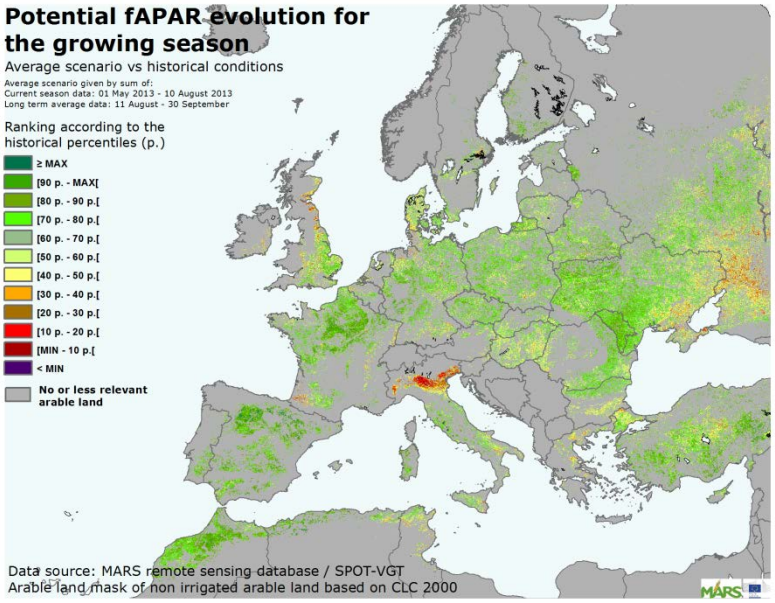
Examples of National and Regional Inputs for August Assessment

Europe (EC JRC)

(Source: MARS Bulletin)



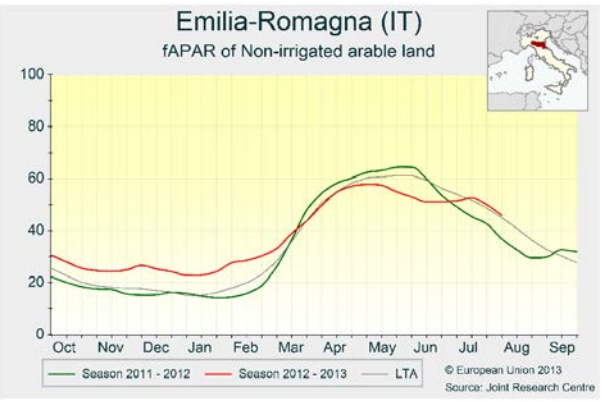


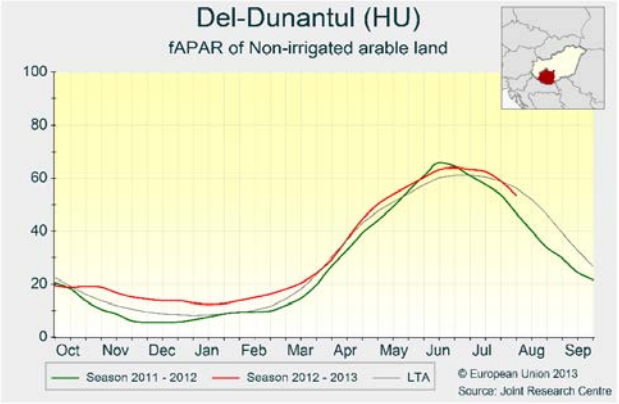


Areas of Concern in Europe as of end of August 2013:

Northern Italy experienced unusually hot conditions between mid-July and the beginning of August. The already suboptimal conditions for maize growth due to late sowing have thus worsened with an acceleration of phenological development that has shortened the grain-filling phase. Similar conditions are observed at the **borders between Hungary, Austria, Slovenia and Croatia**. In these countries, dry and hot conditions have affected crop growth and shortened the reproductive and grain-filling phases of

summer crops critical for yield formation.





Most recent SC MARS can be downloaded from:

http://mars.jrc.ec.europa.eu/mars/Bulletins-Publications

China (RADI, CAS)

In China good moisture conditions were maintained in the North China Plain and in the Northeast, benefiting maize and soybean development. However some farmlands in Northeast of China were flooded due to the excessive rainfall this recent month, which damaged rice fields and hampered rice development. Rice in Guangxi province, Southwest China was also affected by the continuous rain. Meanwhile, dry conditions and above normal temperatures are raising concern in main rice growing areas, south to Yangtze river, where precipitation is needed in coming weeks.

Australia (ABARES/DAFF/ CSIRO)

Adequate subsoil moisture availability across much of Queensland, New South Wales, Victoria and South Australia combined with mild winter temperatures has enabled good crop development. However, widespread rainfall in the next month will be crucial for yield potential to be realized, especially as temperatures begin to increase. Rainfall across Western Australia during August 2013 has improved crop production prospects in central and southern regions, however this rainfall may have arrived too late to elevate yield losses in northern regions.

Rainfall outlook indicates a wetter than normal spring for much of the Australian Wheat-sheep belt due to a negative Indian Ocean Dipole, a neutral-to-cool tropical Pacific, and warm sea surface temperatures surrounding much of western and southern Australia.

Australia Wheat Crop Condition Dashboard

	WA	SA	Vic	NSW	Qld
Forecast	I	I	I	S	S
29-Aug-13	rains	rains	rains	dry	dry
15-Aug-13	rains	rains	rains	dry	dry
01-Aug-13	dry	rains	rains	rains	rains
18-Jul-13	dry	rains	rains	rains	dry
04-Jul-13	dry	rains	rains	rains	rains
20-Jun-13	dry	rains	rains	rains	rains
06-Jun-13	rains	rains	rains	dry	dry
23-May-13	rains	rains	rains	rains	rains
09-May-13	rains	rains	dry	dry	dry
25-Apr-13	rains	rains	dry	dry	dry

Canada (AAFC)

Crop Condition 'National Dashboard' by Province

NATIONAL DASHBOARD

	BC	AB	SK	MB	ON	QC	ATL
2-week forecast	stable	stable	stable	stable	improving	improving	stable
Aug. 20, 2013	dry, hail				low temps		
Last Report Aug. 7, 2013	dry	disease, hail, frost	low temps, disease	low temps, disease		No Report	
July 23, 2013	dry	storms, hail, wind disease	storms, hail tornadoes disease	storms, hail, tornadoes		excess moisture	
July 9, 2013	heat	excess moisture, hail, disease	excess moisture	flooding	flooding disease	excess moisture disease	disease
June 25, 2013	No Report	flooding, disease	excess moisture	flooding, disease	flooding	excess moisture	disease
June 11, 2013	No Report			flooding		excess moisture	excess moisture; disease
May 28, 2013	flooding ; fire; insects		flooding, delayed seeding	flooding, delayed seeding	frost	winter kill; frost; flooding	disease
May. 14, 2013			flooding, delayed seeding	flooding, delayed seeding			
Apr. 30, 2013			flooding, delayed seeding	flooding, delayed seeding	flooding		
Apr. 16, 2013			flooding, delayed seeding	flooding, delayed seeding			disease
Apr. 3, 2013			flooding	flooding	dry		
Mar 12, 2013			flooding	flooding	drought		dry
Nov. 6, 2012		dry	dry	drought	rain, wind		rain, wind

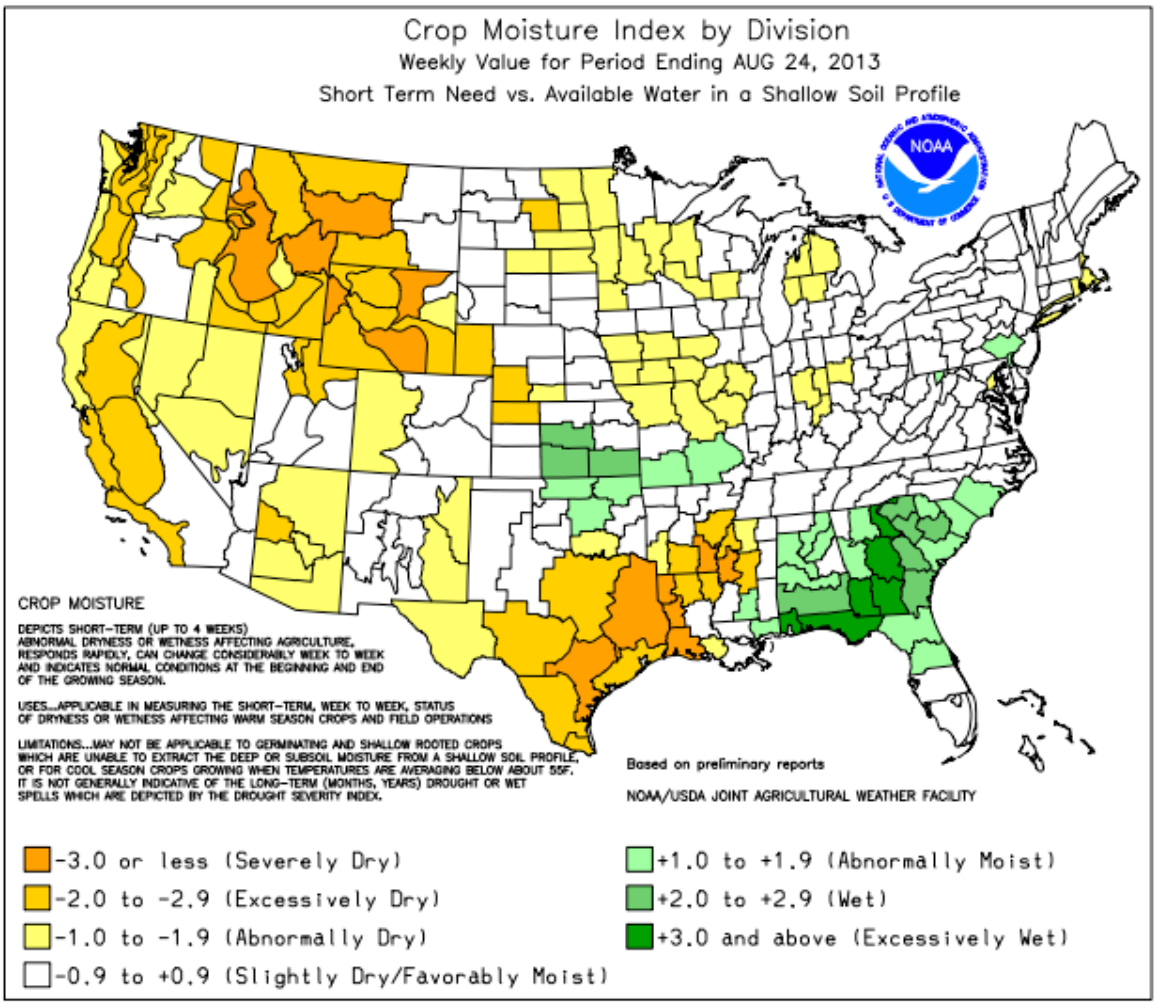
Green/Yellow/Orange/Red is a continuum of 'No significant risk' to 'Large or Urgent risk'.
Text in black indicates the event is currently occurring; gray text highlights risk.

NATIONAL PICTURE

- Approximately 30 per cent of Canada's agricultural area has experienced very high to record precipitation since April 1 as compared to historical distribution. This area includes approximately 29 000 farms and 3.8 million cattle, and the areas that have received the highest precipitation compared to normal are the BC interior, the foothills of southwestern Alberta, and southern Ontario.
- Over the past two weeks, the greatest accumulations of precipitation (50 to 100 mm) occurred in eastern Quebec and the Atlantic region. The majority of western Canada received very little precipitation with the exception of a few thunderstorms that occurred in the east-central region of Alberta.
- The driest parts of the country are currently in BC and southern Alberta. Despite high precipitation since April 1, very dry surface soil moisture conditions currently exist across the BC interior and a large area of southern Alberta.
- The AAFC Canadian Crop Yield Forecast product estimates that western Alberta and southern Ontario are expected to have the greatest spring wheat production yield within Canada this year, at approximately 50 to 60 bushels/acre. The southern Prairie region is expected to have the lowest yields, generally ranging from 20 to 40 bushels/acre.
- The AAFC Field Crop Outlook for 2013 (released August 13) estimates a 6 per cent increase in total production of grains, oilseeds, pulses, and special crops. This report indicated that the estimated increase could increase supply to 79 million tonnes.

Reference:
http://www.agr.gc.ca/pol/mad-dam/index_e.php?s1=pubs&s2=fco-ppc&s3=php&page=fco-ppc_2013-08-13

USA (USDA/NOAA)

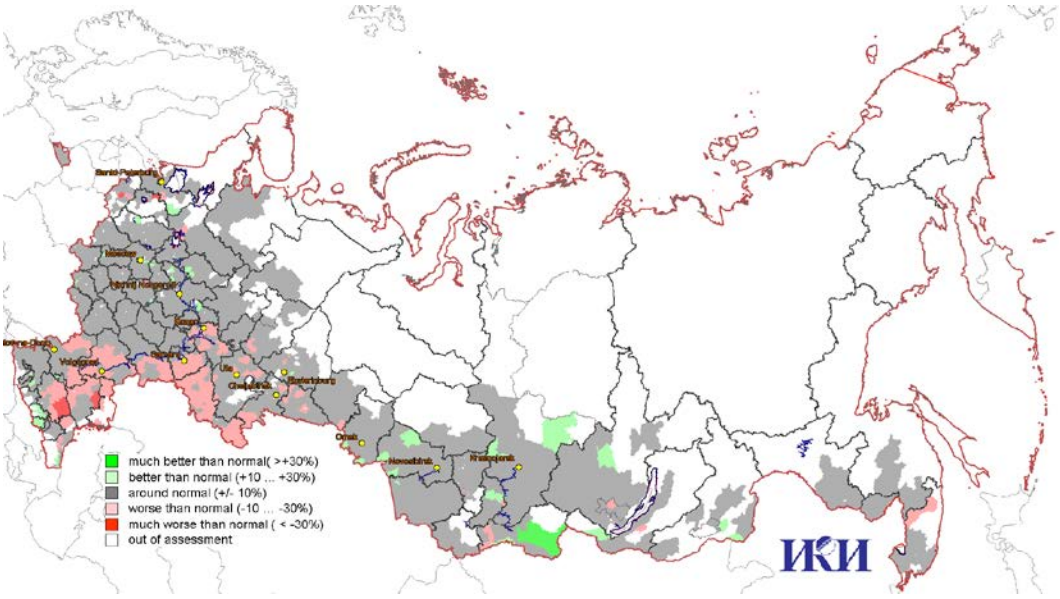


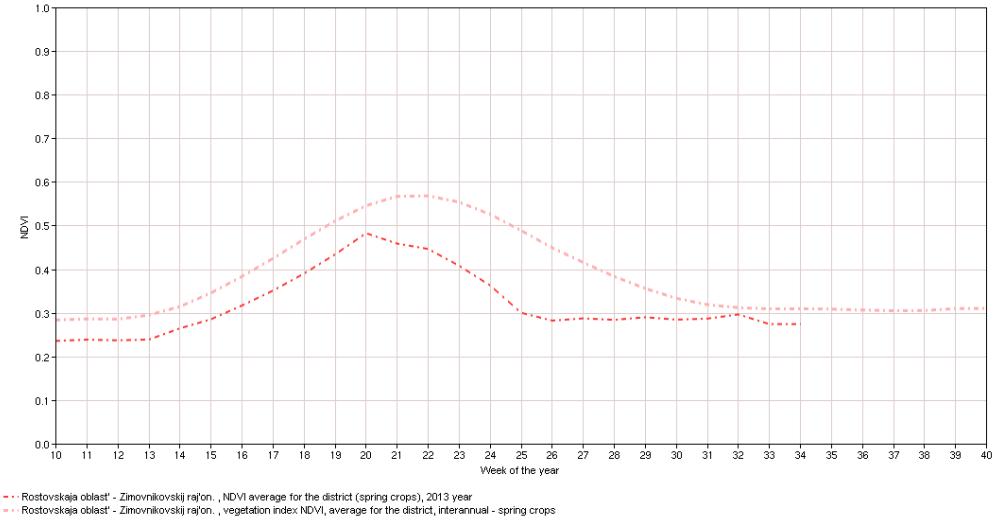
References:

Crop Progress and Condition (from USDA/NASS)
http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1048
http://www.nass.usda.gov/research/cpcs/index.htm
Drought Monitor
http://droughtmonitor.unl.edu/
Crop Production (USDA/NASS)
http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1046
Weekly Crop Bulletin (USDA OCE):
http://www.usda.gov/oce/weather/pubs/Weekly/Wwcb/index.htm

Russia (IKI)

Spring and summer crops Max NDVI Departure from multi-annual mean
Status for August 23, 2013

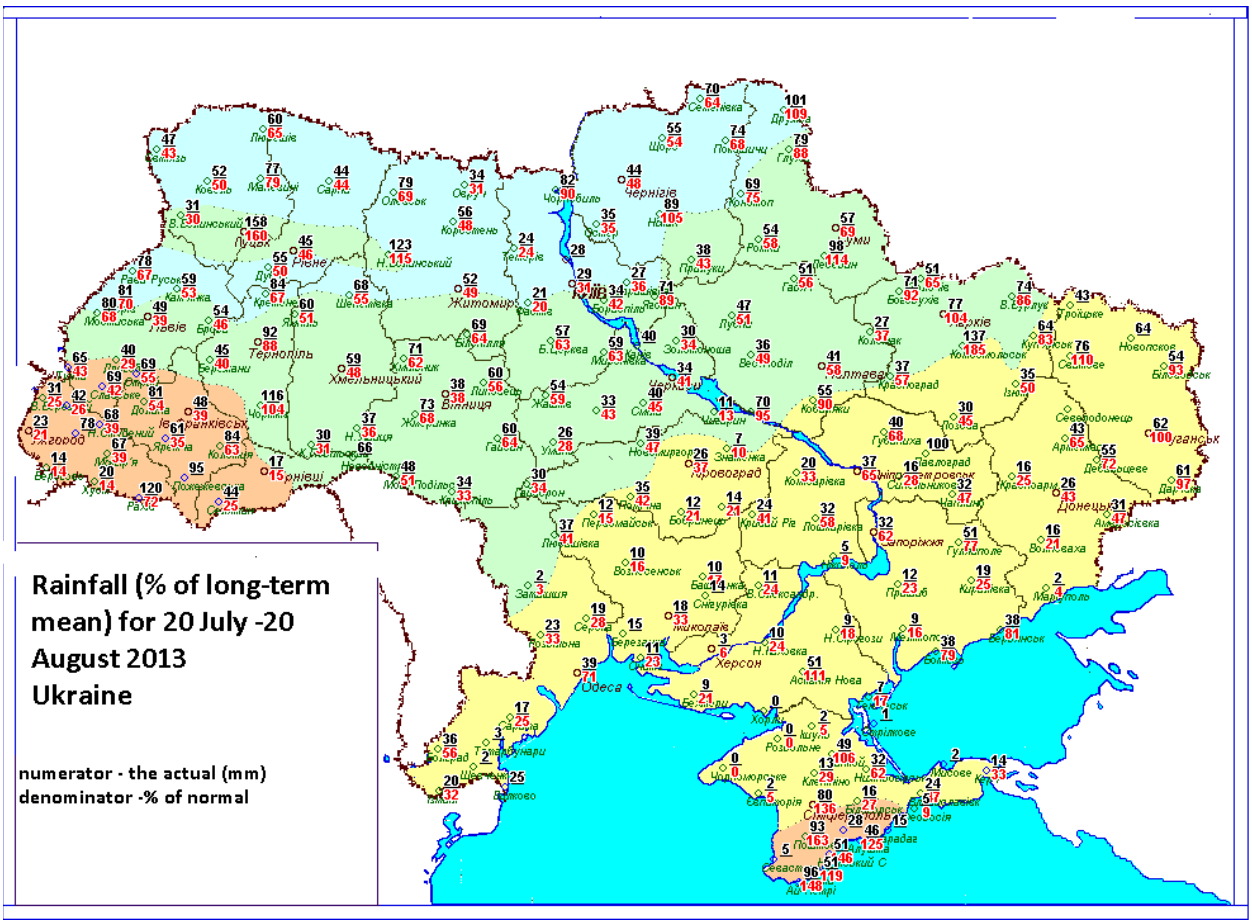




The NDVI seasonal profile departure from multi-annual mean is demonstrating strong anomalies whish are caused by drought in several regions in the south of European part of Russia, such as Rostov (the NDVI profiles are presented on the graph above), Stavropol, Volgograd, Samara, Saratov, Tatarstan, Bashkortostan and Orenburg.

The information is prepared using the VEGA web-based service (http://vega.smislab.ru/eng/), developed by the Space Research Institute (IKI) of the Russian Academy of Sciences.

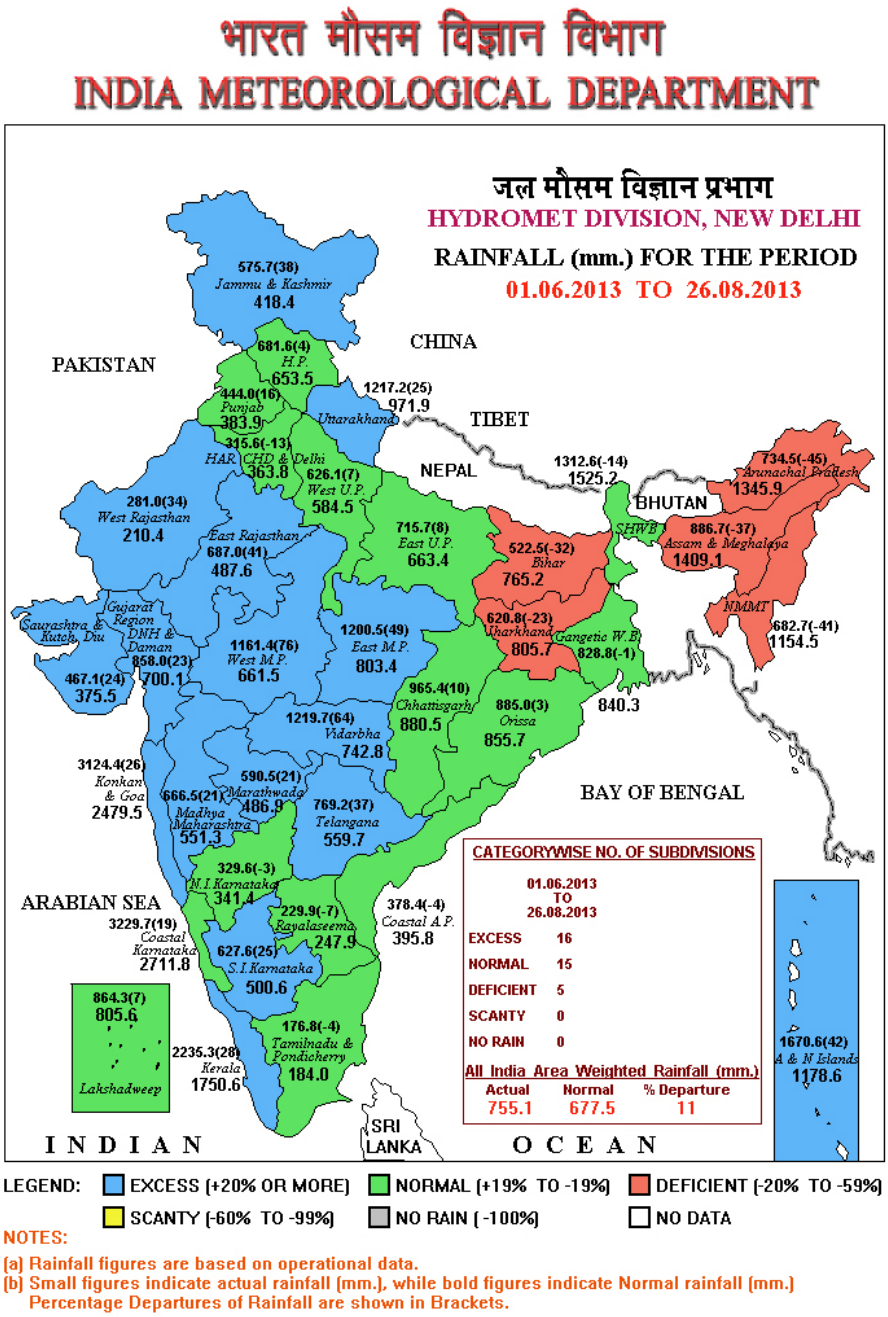
Ukraine (Hydromet Center)



In Ukraine, there were periods of very dry weather during the growing season, but in general the conditions are close to the average or better. In the primary corn production areas conditions fared better than average (Cherkassy, Dnepropetrovsk, Vinnitsa, Odessa, Poltava, Kirovohrad region). Here the moisture content of the growing season (May-August) is close to the long-term average. Classic drought with a substantial loss of harvest cereals (winter wheat, spring barley) in the current year has only been observed in the Kherson region and the Crimea. In these regions, corn is a minor crop or is irrigated. So the outlook remains very optimistic for corn. Estimate - 25 million tons, the average yield -5, 2 t / ha. Sown area - 4803, 3 thousand hectares (10 June 2013).

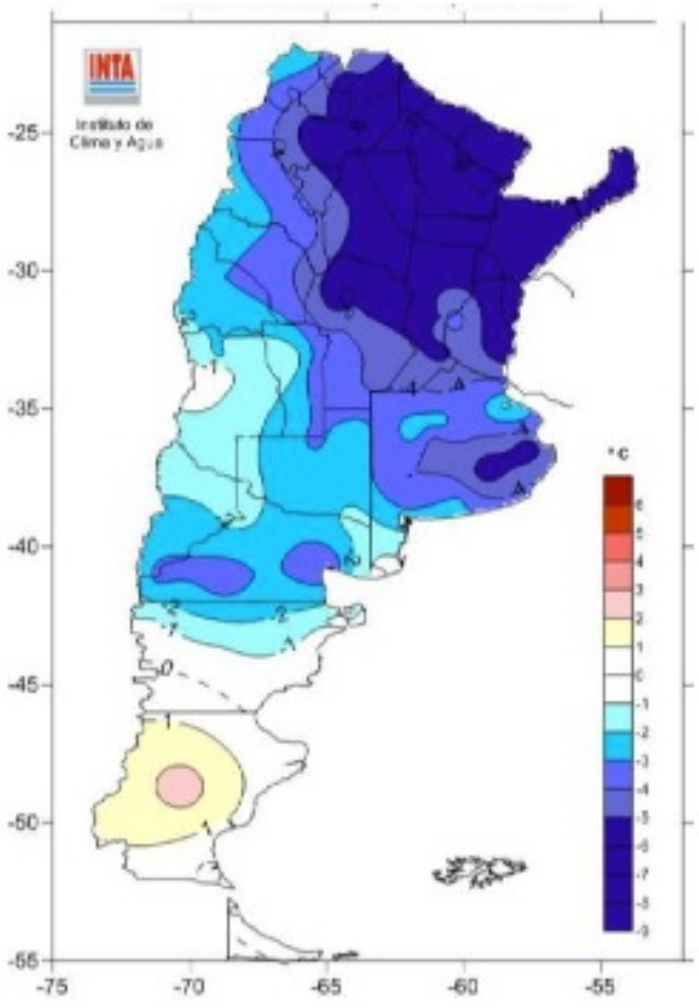
India (ISRO/Meteorological Department)

The Monsoon rains have been very well distributed in most parts of the country supporting summer crop development. Crop conditions for rice, corn, and soy are very good and production prospects are favorable.



Argentina (INTA)

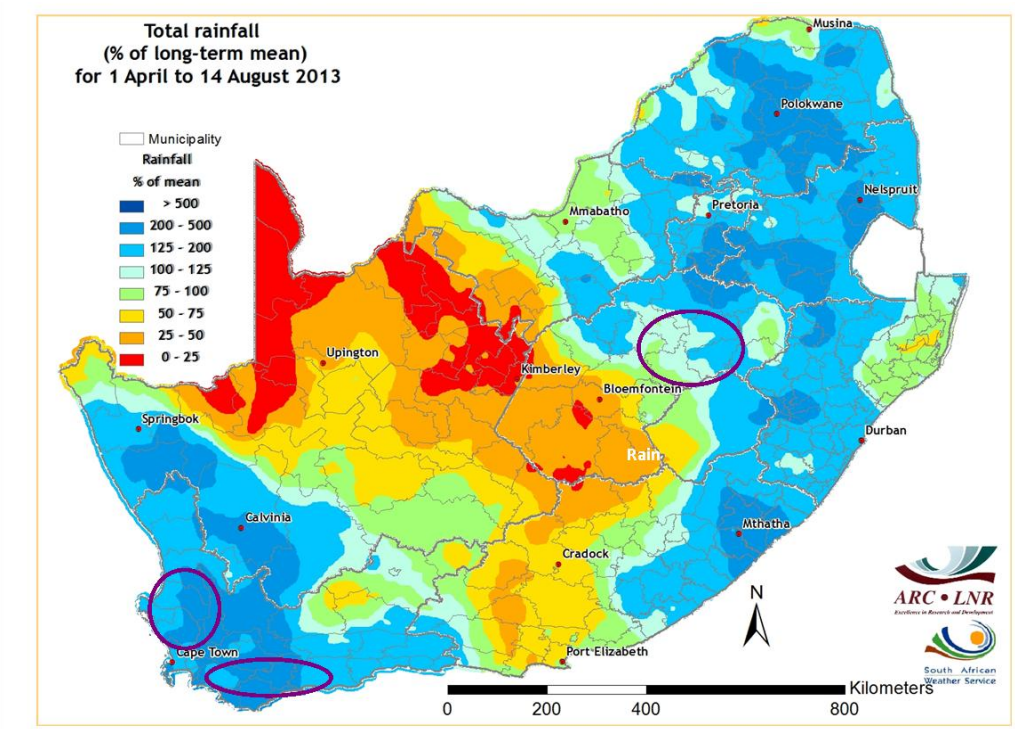
Unseasonably Cool Temperatures in Argentina, August 11th through 17th , 2013



Winter crops, barley and wheat, are 99% planted. In the case of wheat, the estimated planted area is about 3,900,000 hectares. All crops have emerged and in some parts of the country soil moisture is the main limiting factor for optimal growing conditions. Negative thermal anomalies were observed in most part of the territory (see temperature anomaly figure above)

Reference: http://old.siia.gov.ar/ (Ministry of Agriculture)

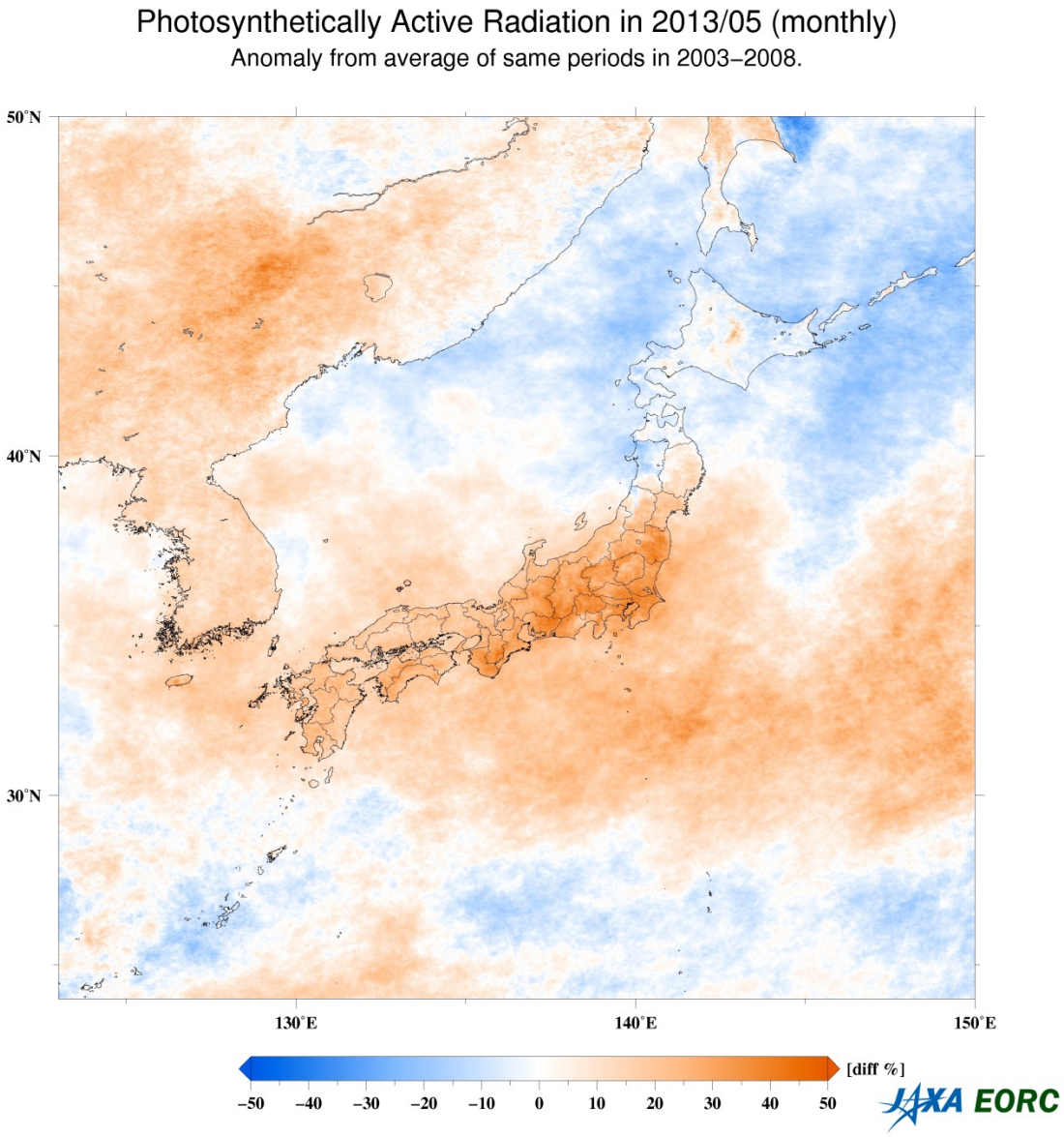
South Africa (ARC)



Total Precipitation Anomaly (January to June 2013) highlighting main wheat areas Percentage of Average Seasonal Greenness, April 1 – August 14th, 2013.

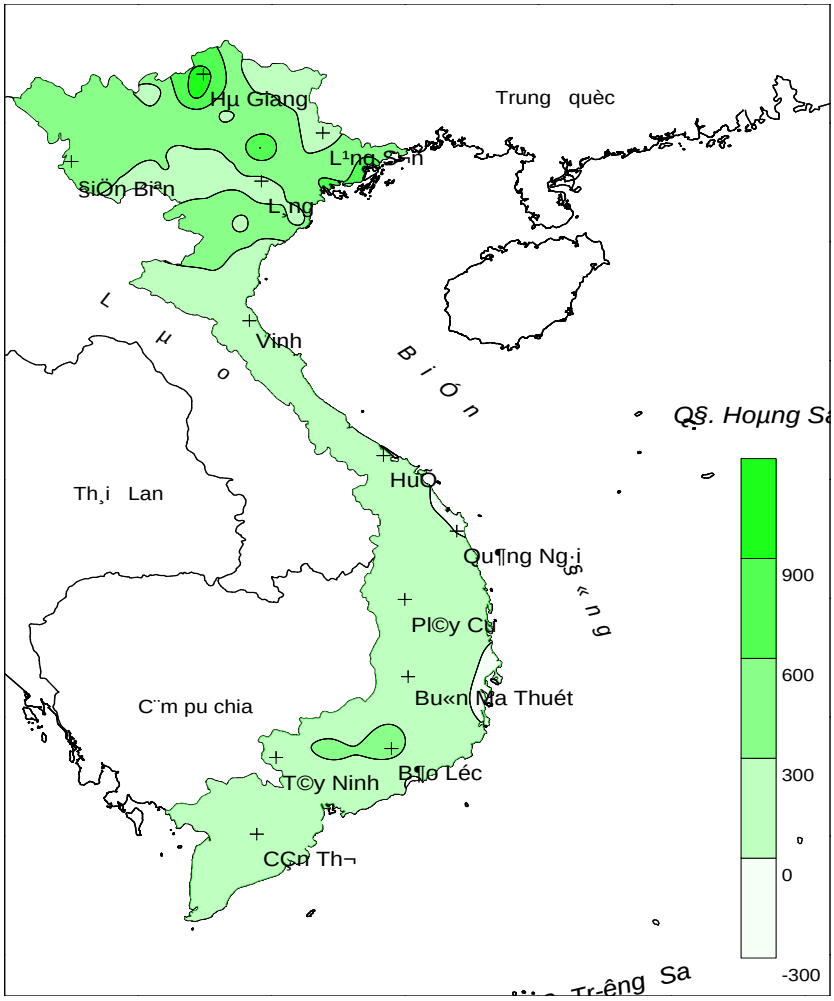
Conditions for winter wheat production have improved since last month because of widespread rain over the winter rainfall area of the country from the end of July to mid-August. Thus, rainfall totals for the entire winter rainfall area are above normal. The two main production areas over the southwestern parts of the country, which receive winter rainfall, have both received above-normal rainfall. Therefore, the alert for drier than average conditions is no longer needed. However, conditions in the summer wheat area must be monitored closely due to a lack of significant rainfall since middle April.

Japan (JAXA)



Early rice crop growth in southern region (Khushu and Shikou) is good under the current weather condition. But, Okinawa is poor because of shortage of solar radiation and low temperatures during the growing season (late March - May).

Vietnam (VAST, VIMHE)



Deviation of precipitation minus evaporation July 2013 compared with an average year (%).

In July 2013, adequate moisture availability and temperature created a relatively favorable rice cultivation season in the North. Temperature and moisture availability were also favourable for the summer rice harvest, and autumn/winter wheat sowing in the south.

By mid-July, most northern localities ended crop cultivation. The total cultivated area is 1049.2 thousand ha, which was 15.1% more than the same period last year. The southern provinces have also planted more than 2425.5 thousand ha of summer rice, up 12% compared to the same period last year.

Rice Paddy summer, autumn and winter:

As of mid-May, the total sown area of summer rice is estimated at 2588 thousand ha, an increase of 19.8% over the same period last year. Summer rice is mainly planted in the southern provinces. At planting time, the southern provinces have been delaying harvest of 890.8 thousand ha of summer rice,

which accounts for 38.9% of the area sown. Summer rice harvest in the Mekong Delta reached 869.8 thousand ha, which was more than the same period last year by 34%. Yield averages were estimated to be 560 kg / ha. Some local reports place yield as high as: Vinh Long 580 kg / ha, Dong Thap 580 kg / ha, Kien Giang 570 kg / ha.

Rice summer:

As of mid-July 2013, 1245.6 thousand ha of paddy area have been cultivated, an increase of 15.1% over the same period last year. Currently, most of the Northern provinces have completed the rice sowing season. The Southern provinces have sown 196.4 thousand hectares—mainly in the Highlands provinces—compared to 98% within the same period last year.

Thailand (GISTDA)

The monsoon trough lay across the upper northern and upper northeastern parts. These conditions caused abundant rainfall over upper Thailand and flash flood in some areas. The affected areas are located in 5 provinces which are Chiang Rai, korat, Chainat, Trad, and Satun. Even with some heavy rain in Thailand, there is no effect to the rice growth.

Indonesia (LAPAN, MOA)

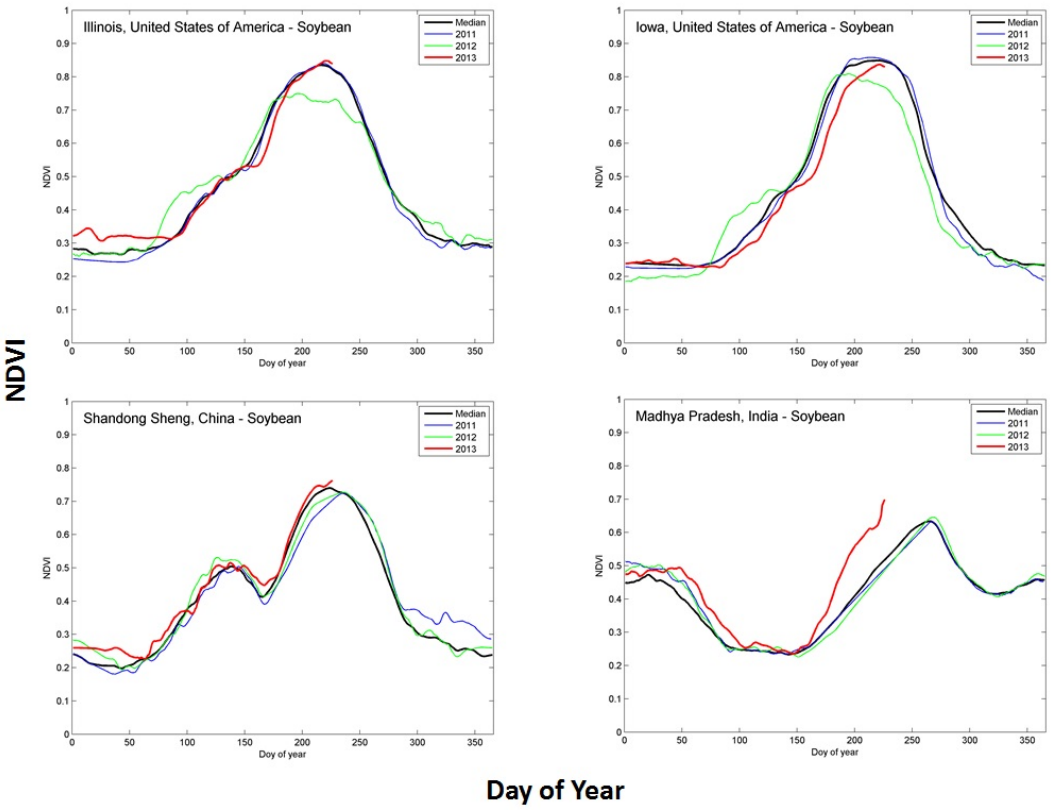
Several locations in the northern part of Aceh, Central Java, East Java, Bali, NTB and NTT have had drought or no rain for 60 days consecutively since July. Java, Bali, and Nusa Tenggara by September will have no rain for approximately 90 consecutive days. Therefore there is some concern over drought conditions until the end of September at the above mentioned location. During the rainy season, most of the rain properties are above normal to normal, and the rainy season starts from October 2013 in around 120 zones. Most areas are in Sumatra and Java. Potential planted area is about 7.7 million ha.

Vegetation Index Time Series: Indicators of crop development

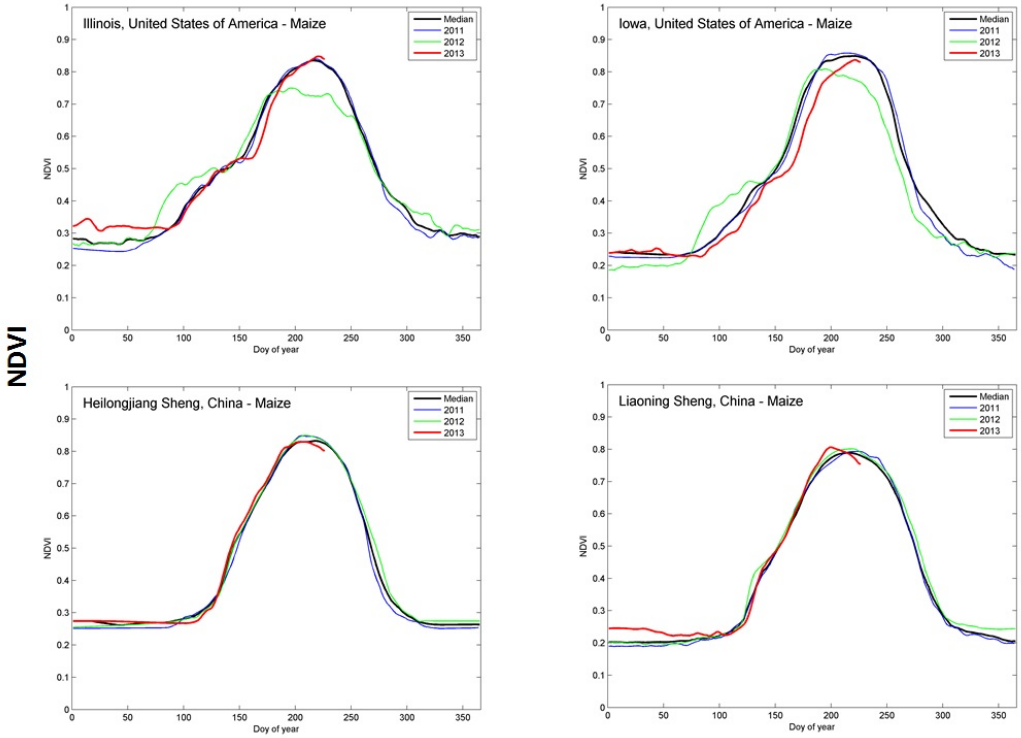
Vegetation Index (MODIS) Time Series for selected soy regions

red- 2013 up to July 26th; Black- Average (2000-2012); green- 2012; blue 2011

(NASA/UMD/USDA)



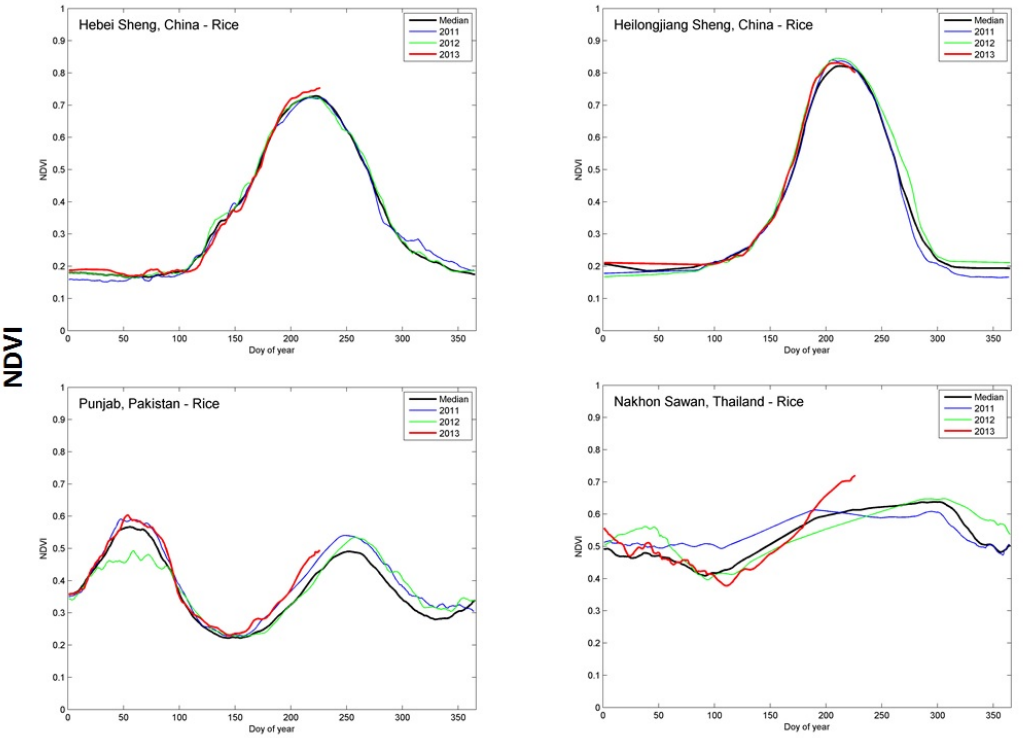
Vegetation Index Time Series for selected corn regions



NDVI

Day of Year

Vegetation Index Time Series for selected rice regions

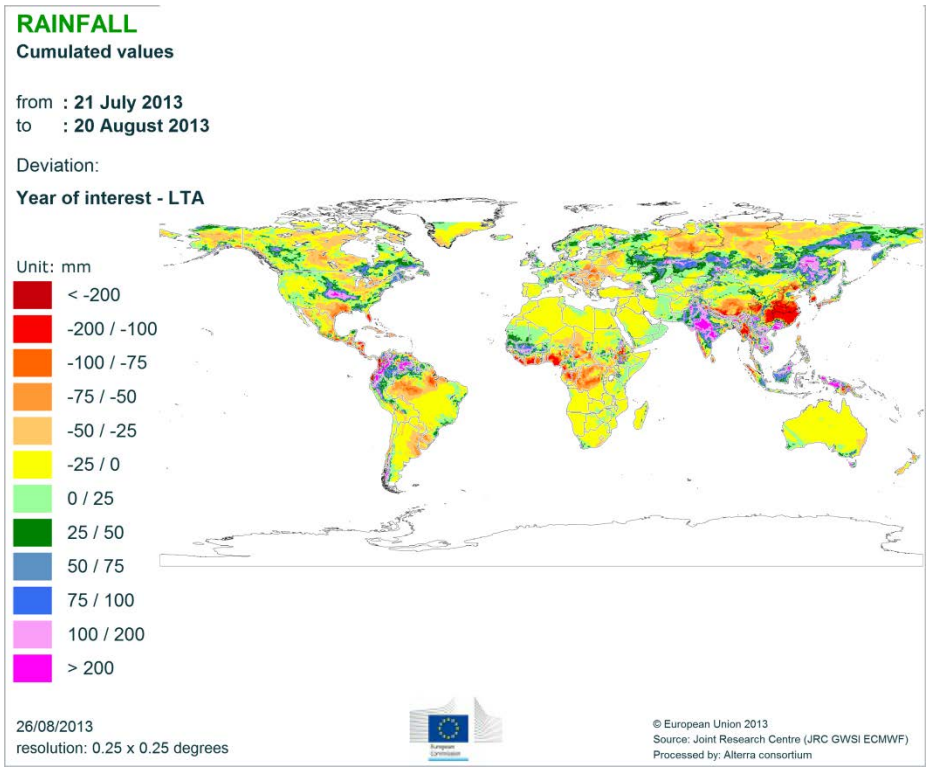


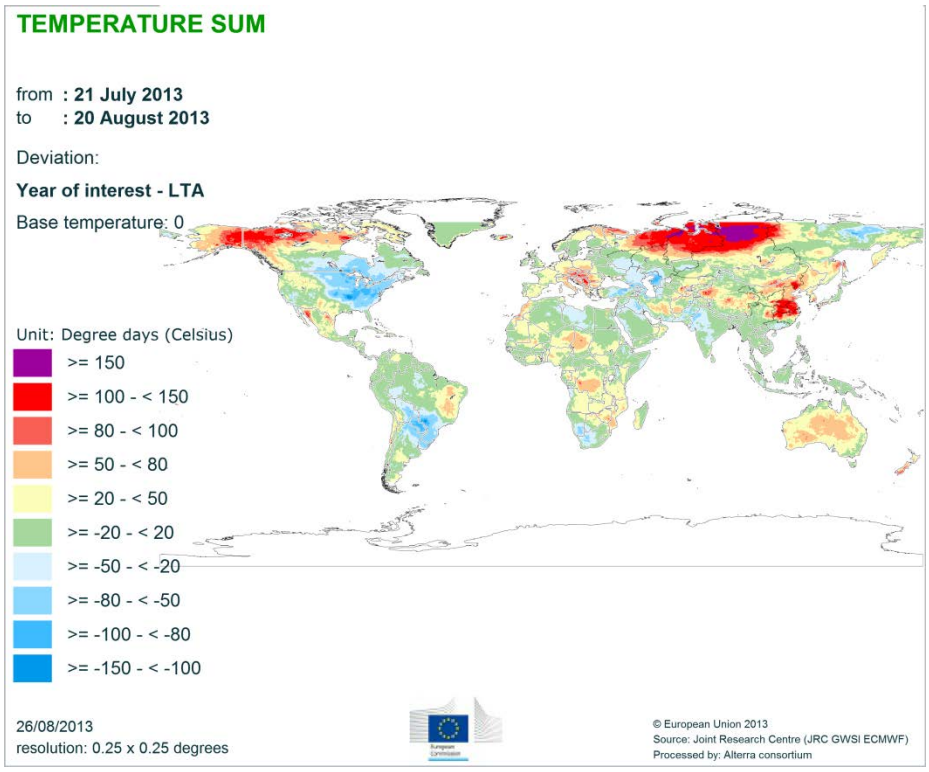
NDVI

Day of Year

Global Temperature and Precipitation Anomalies: July 21st -August 20th

JRC- MARS





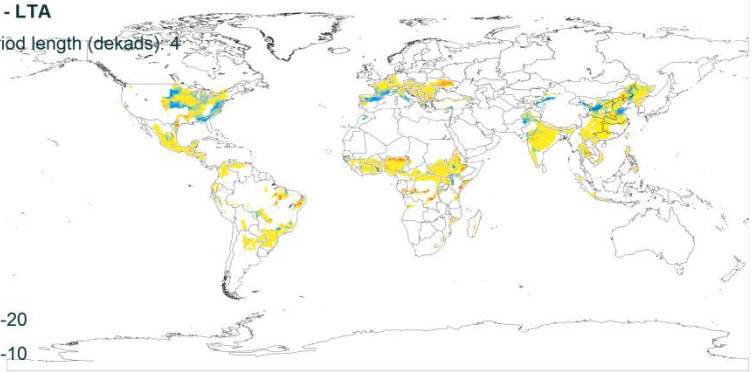
WATER SATISFACTION INDEX - NORMAL
GRAIN MAIZE

from : **11 August 2013**
to : **20 August 2013**

Deviation:

Year of interest - LTA

After-season period length (dekads): 4



Unit: %

- <= -30
- > -30 - <= -20
- > -20 - <= -10
- > -10 - <= 10
- > 10 - <= 20
- > 20 - <= 30
- > 30

23/08/2013
resolution: 0.125 x 0.125 degrees