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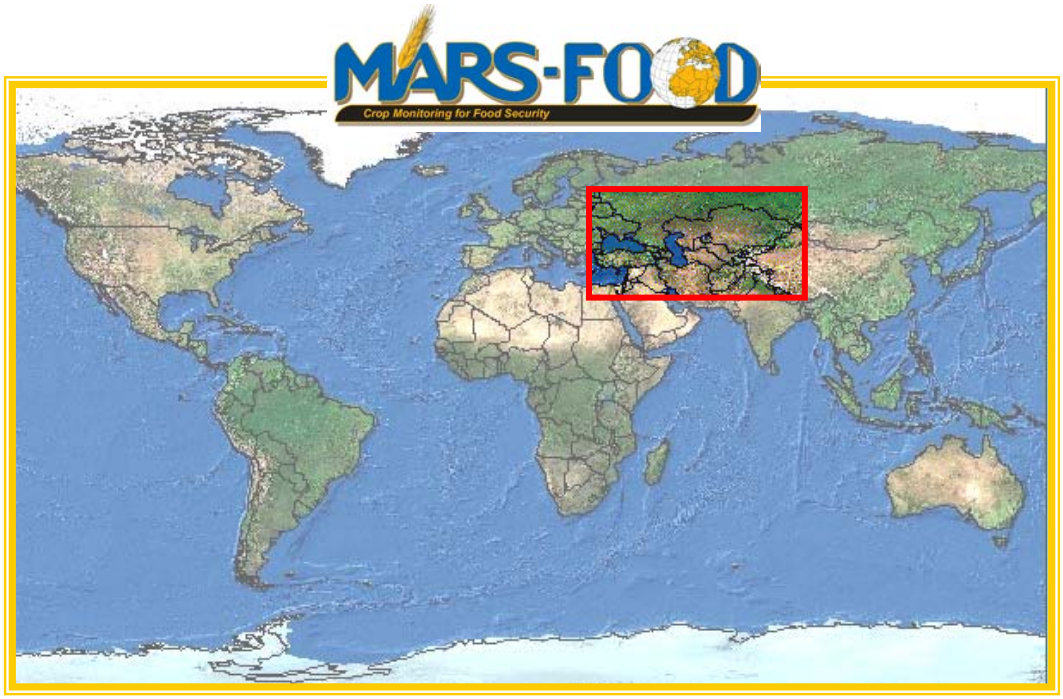
CROP MONITORING for FOOD SECURITY

Russia and Central Asian Countries

Situation at the End of August 2004
Agro-meteorological overview for July-August 2004



Introduction

The present Bulletin is dedicated to the analysis of the agro-meteorological situation in Russia and Central Asian countries during the period from the beginning of July to the end of August 2004, and to the qualitative assessment of crop status at the end of this period.

Crops. This is the time for summer crops development in most countries of the region. Winter cereals were harvested during the period of the analysis. In many countries of the region more than 90% of cereals are cultivated as winter crops. But in Russia near 70% of wheat and more than 90% of barley are spring crops. All barley and more than 90% of wheat in Kazakhstan are spring crops too. Near 90% of barley are spring crop in Armenia and Kyrgyzstan. Maize, rice and potato are other important crops which are cultivated in summer in the most countries of the region. Summer crops in Uzbekistan, Turkmenistan, Iraq, Kuwait, Iran, Afghanistan, Northern Pakistan, Northern India, Northern Nepal and Western China are cultivated under irrigation. Part of the field crops in Azerbaijan, Kyrgyzstan, Tajikistan, and southern regions of Kazakhstan is irrigated too. Only in Russia, Georgia, and Armenia summer crops are cultivated primarily in rain-fed conditions.

The agro-meteorological situation during the period of analysis is compared with the situation at the similar period of the previous season, and with long-term average data.

The background information is given in the following table.

country	***Production and Yield of main crops, 2003 (source FAO)***				
	wheat	**barley**	**maize**	**rice**	**potatoes**
Russia	**34030 (1,6)**	**17946 (2,1)**	**2113 (3,3)**	**450 (3,2)**	**36747 (11,6)**
Armenia	**320 (2,6)**	**83 (1,3)**	**15 (4,6)**	**No crop**	**508 (15,7)**
Azerbaijan	**1575 (2,5)**	**275 (2,3)**	**143 (4,4)**	**16 (4,7)**	**769 (13,5)**
Georgia	**234 (1,8)**	**55 (1,3)**	**450 (2,4)**	**No crop**	**425 (11,6)**
Kazakhstan	**11800 (1,0)**	**2050 (1,2)**	**438 (4,4)**	**200 (2,5)**	**2319 (13,9)**
Kyrgyzstan	**1084 (2,3)**	**146 (2,0)**	**399 (6,1)**	**18 (3,0)**	**1300 (15,6)**
Tajikistan	**569 (1,9)**	**40 (2,0)**	**95 (11,4)**	**59 (5,2)**	**473 (18,2)**
Turkmenistan	**2534 (3,0)**	**31 (0,6)**	**13 (0,8)**	**110 (2,6)**	**30 (5,0)**
Uzbekistan	**4550 (3,7)**	**90 (1,8)**	**136 (4,0)**	**311 (2,6)**	**760 (14,9)**
Afghanistan	**No data**	**No data**	**No data**	**No data**	**No data**
Iraq	**No data**	**No data**	**No data**	**No data**	**No data**
Iran	**12900 (2,0)**	**2000 (1,4)**	**1800 (8,6)**	**3300 (5,9)**	**3550 (19,7)**
Kuwait	**0,5 (2,3)**	**2,0 (1,4)**	**800 (20,0)**	**No crop**	**33 (28,0)**
India	**69320 (2,8)**	**1280 (1,9)**	**14800 (2,1)**	**132013 (3,0)**	**23161 (17,3)**
Nepal	**1344 (2,0)**	**29 (1,1)**	**1441 (1,7)**	**4155 (2,7)**	**1480 (10,6)**
Pakistan	**19210 (2,4)**	**107 (1,0)**	**1275 (1,5)**	**6751 (3,1)**	**1946 (16,4)**
China	**86100 (3,9)**	**3115 (3,6)**	**114175 (4,9)**	**166417 (6,1)**	**66813 (14,8)**
First figure is a production (1000 tons), figure in brackets – yield (t/ha). Green colour indicates figures which are higher than normal and red colour indicates figures which are lower than normal.					

Methods. The agro-meteorological situation during the period of analysis is compared with the situation during the previous season, and with long-term average data. The monitoring of the agro-meteorological situation is based on the analysis of the following dekadal data: minimal, maximal and average air temperature, sums of precipitation and global radiation, dekadal values of the climatic water balance, and maps of the Normalized Difference Vegetation Indexes (NDVI). Meteorological data are derived from the outputs of the numerical meteorological model from ECMWF (UK), and were prepared for analysis by METEOCONSULT (NL). SPOT-VEGETATION data were used as a basis for calculation of the remote sensing indicators of crop growth. Data were preprocessed by VITO (BE). Dekadal maximal NDVI values were weighted for pixels, where crops are cultivated, for each country of the region. Weighted NDVI values were used as an indicator of crop status. Dry Matter Production maps were calculated by VITO based on SPOT-VEGETATION data and information about global radiation, applying the Monteith approach.

The Bulletin has the following structure. The next page contains the highlights and the main results of the analysis. The following pages are dedicated to the analysis of separate indicators of the crop growth during the period of analysis.

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Highlights Country by Country

	Russia	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, and crops status at the end of August 2004 was better comparing with the previous year.
	Armenia	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, and crops status at the end of August 2004 was better comparing with the previous year.
	Azerbaijan	Agro-meteorological conditions during July-August 2004 were favorable for summer crops, but worse than in previous year. Status of maize and potatoes at the end of August 2004 was close to the previous year, and status of rice was worse.
	Georgia	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, but worse than in previous year. Status of summer crops at the end of August 2004 was worse comparing with the previous year.
	Kazakhstan	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, but worse than in previous year. Status of maize and rice at the end of August 2004 was worse comparing with the previous year.
	Kyrgyzstan	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, but worse than in previous year. Status of summer crops at the end of August 2004 was worse comparing with the previous year.
	Tajikistan	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, but worse than in previous year. Status of summer crops at the end of August 2004 was worse comparing with the previous year.
	Turkmenistan	Agro-meteorological conditions during July-August 2004 were unfavourable for summer crops due to low precipitation. Summer crops status at the end of August 2004 was worse comparing with the previous year.
	Uzbekistan	Agro-meteorological conditions during July-August 2004 were unfavourable for summer crops due to low precipitation. Status of potatoes and maize at the end of August 2004 was worse comparing with the previous year.
	Afghanistan	Agro-meteorological conditions during July-August 2004 were unfavourable for summer crops due to low precipitation. Summer crops status at the end of August 2004 was worse comparing with the previous year.
	Iran	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, and crops status at the end of August 2004 was better comparing with the previous year.
	Iraq	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, and crops status at the end of August 2004 was better comparing with the previous year.
	Kuwait	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, and crops status at the end of August 2004 was better comparing with the previous year.
	Northern India	Agro-meteorological conditions during July-August 2004 were favourable for summer crops. Status of maize and rice at the end of August 2004 was close to the previous year, and status of potatoes was better.
	Northern Nepal	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, and crops status at the end of August 2004 was close to the previous year.
	Northern Pakistan	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, but crops status at the end of August 2004 was slightly worse comparing with the previous year.
	Western China	Agro-meteorological conditions during July-August 2004 were favourable for summer crops, but crops status at the end of August 2004 was slightly worse comparing with the previous year.

Results of the analysis

The meteorological conditions during July-August 2004 were favourable or close to optimal for summer crop growth in most countries of the region. Insufficient amount of precipitation were received in some regions of Kazakhstan, southern Iraq, and southern Iran, but it couldn't affect summer crops in Iraq and Iran, where they were close to harvesting and grown primarily in irrigation conditions. Heavy rains which took place during the period of analysis in some regions of Georgia, Nepal and India should negatively affect summer crop growth. Extremely high air temperature and moisture deficit could damage summer crops in southern Iraq and southern Iran.

In general the meteorological situation for summer crops during July-August 2004 was better than in the previous year in Russia, northern Iran, and western Iraq, and was worse in the other countries of the region.

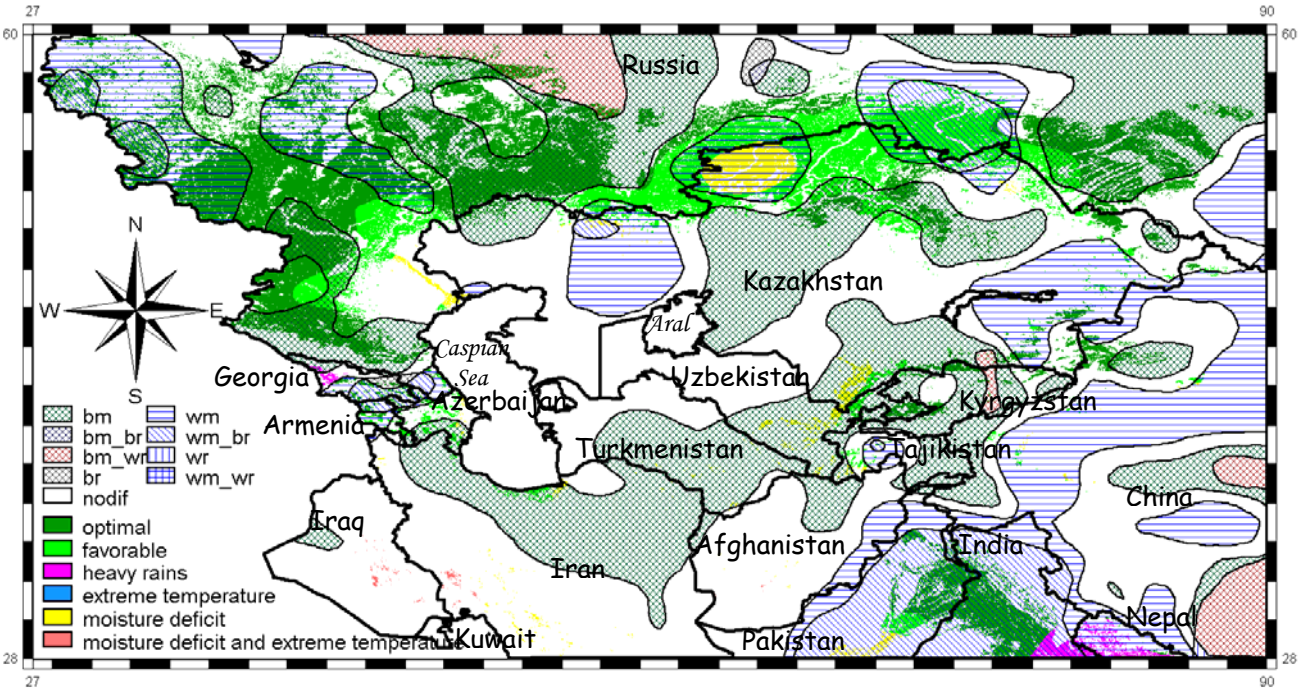
The summer crop status at the end of August 2004 is likely to be better than last year in Russia, Armenia, Iran, Iraq, and Kuwait, and worse in Georgia, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan, Afghanistan, and Northern Pakistan.

Analysis of the similarity of agro-meteorological indicators of current season and other seasons with statistical data leads to the summer crops yield expectations presented in the table.

Yield Expectation for 2004 (t/ha)	**crop**		
	maize	**rice**	**potato**
Russia	3,2-3,5	3,1-3,3	No data
Armenia	4,6-4,9	No crop	14,0-16,0
Azerbaijan	4,0-4,3	4,3-4,6	11,5-12,5
Georgia	2,4-2,7	No crop	11,0-12,0
Kazakhstan	3,3-3,6	2,6-2,9	10,0-11,0
Kyrgyzstan	5,3-5,6	2,6-2,9	14,0-15,0
Tajikistan	5,7-6,0	4,7-5,0	15,0-16,0
Turkmenistan	0,6-0,8	1,4-1,7	4,5-4,8
Uzbekistan	3,7-4,0	2,2-2,5	13,5-14,5
Afghanistan	No data	No data	No data
Iraq	No data	No data	No data
Iran	8,4-8,7	5,8-6,1	21,0-22,0
Kuwait	20,0-20,5	No crop	28,0-29,0
Northern India	No data	No data	No data
Northern Nepal	No data	No data	No data
Northern Pakistan	No data	No data	No data
Western China	No data	No data	No data

Green colour indicates figures which are higher than normal, red colour indicates figures which are lower than normal, and black – close to normal.

Favourability of meteorological conditions during July-August 2004 for summer crops (in color):
color on the map shows favorability and main limitations (see legend on the left)
Comparison with the conditions of previous year:
hatchings show units, where: **br** *– better radiation regime;* **bm** *– better moisture regime;* **wr** *– worse radiation regime;* **wm** *– worse moisture regime*



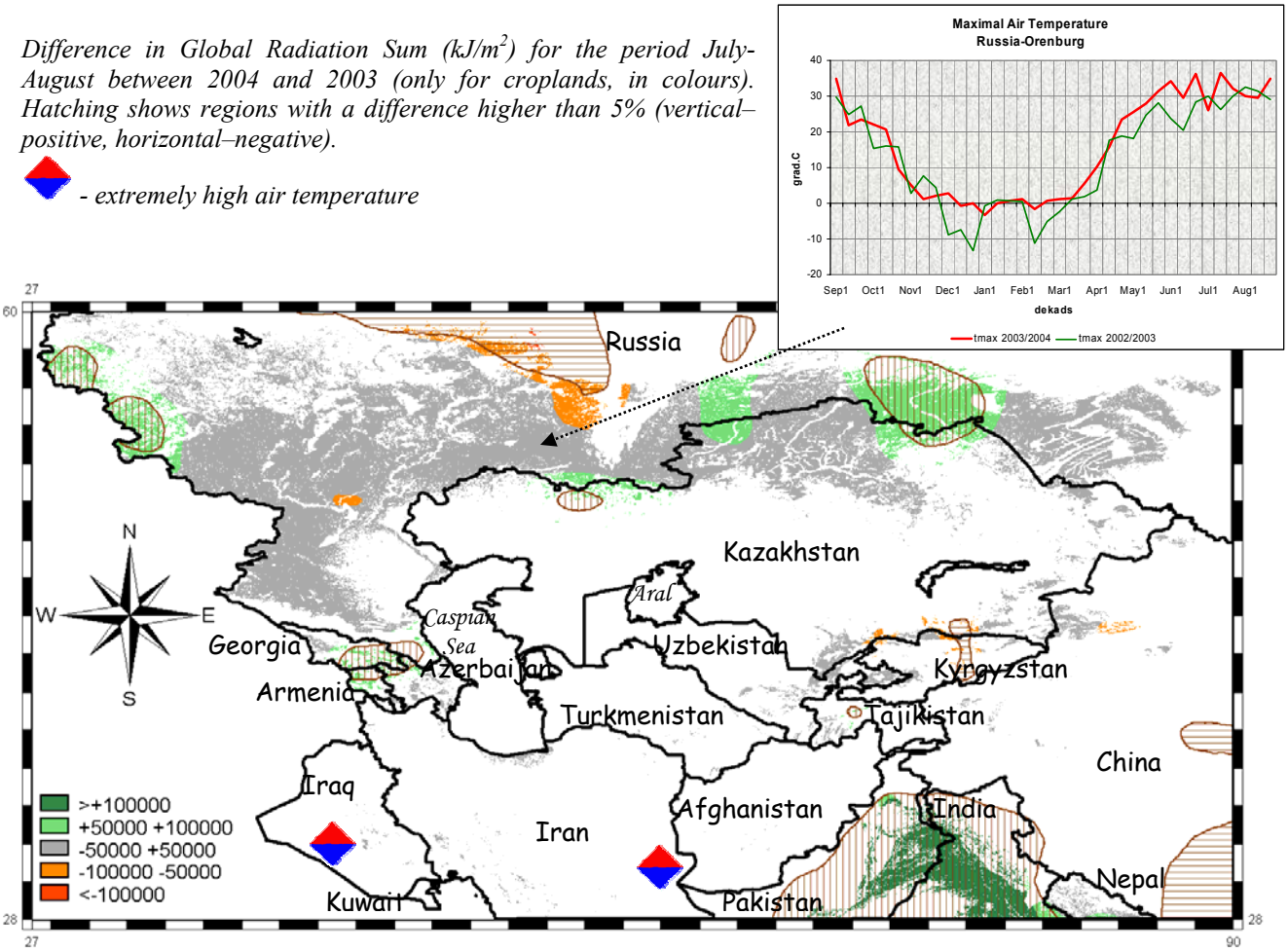
Global Radiation and Temperature Conditions

The amount of radiation in general was close to optimal for winter crop development in all countries of the region.
The radiation sum during July-August was lower than **normal** in all countries of the region. A slightly more than normal amount of radiation was received by croplands in the Northern Nepal.
Comparison with the **previous year** shows that less radiation during July-August 2004 was received only by croplands in Kyrgyzstan. More radiation was received in Armenia, Georgia, Northern India, and Northern Pakistan. The radiation sum was close to the previous year in other countries of the region.
The **air temperature** during July-August was slightly lower than normal practically in all countries of the region. But "cold" days (with minimal air temperature below -4^{0}C) were observed during July-August only in the mountain regions of China, India, Afghanistan, and Kyrgyzstan. Days with the maximal air temperature above + 40^{0}C were dominant in July-August in many countries of the region excluding Russia, Caucasus countries, and Kyrgyzstan. Extremely high air temperature was observed only in Iraq, and eastern Iran.

Global radiation (July-August)	comparing with previous year
Russia	=
Armenia	+
Azerbaijan	=
Georgia	+
Kazakhstan	=
Kyrgyzstan	-
Tajikistan	=
Turkmenistan	=
Uzbekistan	=
Afghanistan	=
Iraq	=
Iran	=
Kuwait	=
Northern India	+
Northern Nepal	=
Northern Pakistan	+
Western China	=

Difference in Global Radiation Sum (kJ/m^2) for the period July-August between 2004 and 2003 (only for croplands, in colours). Hatching shows regions with a difference higher than 5% (vertical–positive, horizontal–negative).

- extremely high air temperature



Precipitation Sum

The amount of precipitation during July-August 2004 was extremely limited in Iraq, Kuwait, Turkmenistan, western Uzbekistan, southern Iran, and western Afghanistan. Oppositely, a number of dekads with amount of precipitation more than 100 mm per dekad was observed in some regions of Georgia, and Northern Nepal.

In general the amount of precipitation was higher than **normal** during this period in Russia, Georgia, and northern Iran, and was lower than normal in northern Kazakhstan, and Northern India, and Northern Pakistan.

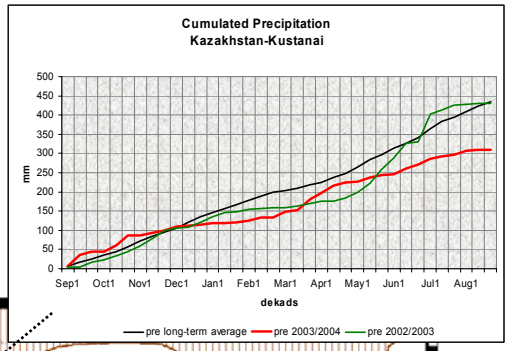
More precipitation than in **previous year** was observed during the period under analysis in the eastern part of the European Russia, in Azerbaijan, Kyrgyzstan, Tajikistan, Uzbekistan, and Iran, and less was observed in Armenia,, Northern India, Northern Nepal, and Northern Pakistan. The biggest negative difference was observed for Northern India, Northern Pakistan, and in some regions of Western Siberia.

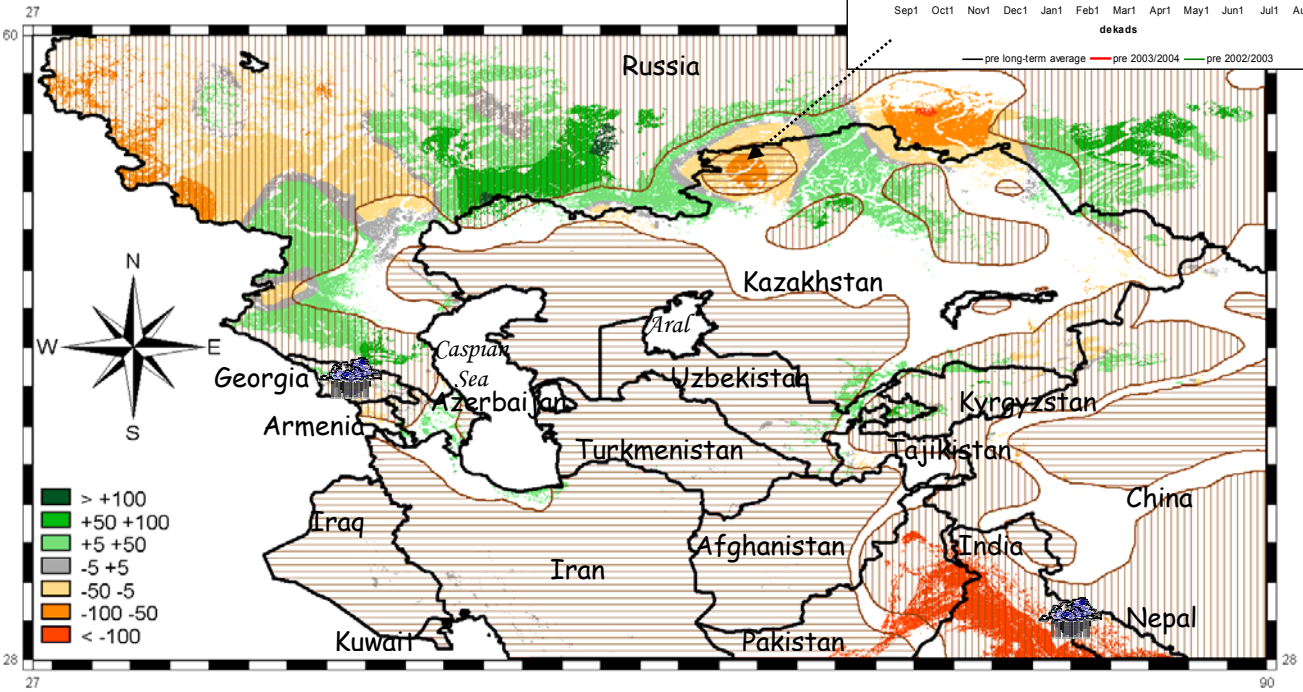
The comparison of the amount of precipitation cumulated for the current **vegetative season** with the similar period of the previous season shows that current season is more favourable in terms of precipitation for summer crops in Russia (excluding near Urals region), Georgia, Armenia, Iraq, Iran, Western China, and worse in Kazakhstan, Urals region of Russia, Azerbaijan, Afghanistan, and Northern Pakistan.

Precipitation (July-August)	comparing with previous year
Russia	=
Armenia	-
Azerbaijan	+
Georgia	=
Kazakhstan	=
Kyrgyzstan	+
Tajikistan	+
Turkmenistan	=
Uzbekistan	+
Afghanistan	=
Iraq	=
Iran	+
Kuwait	=
Northern India	-
Northern Nepal	-
Northern Pakistan	-
Western China	=

Difference in Precipitation Sum (mm) for the period May-June between 2004 and 2003 (only for croplands, in colours). Horizontal hatching shows regions with amount of precipitation less than 60 mm during May-June 2004, vertical hatching shows regions with amount of precipitation more than 120 mm for the same period.

- "heavy" rains (more than 100 mm of precipitation per dekad)





Climatic Water Balance

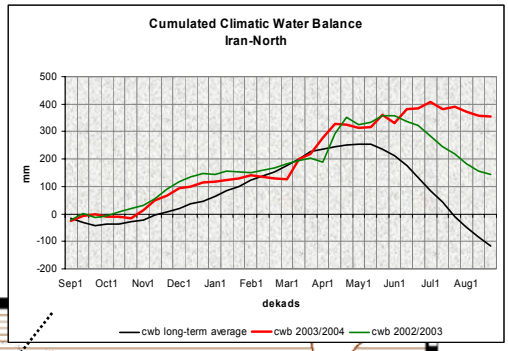
The dekads with positive climatic water balance were dominant during July-August 2004 only in the northern part of European Russia, in Georgia, Kyrgyzstan, and Northern Nepal. The climatic water balance was negative in other countries of the region.

The climatic water balance was worse than **long-term average data** in Northern Nepal, and Northern Pakistan. It was better during July-August comparing with long-term average values for this period of the year in Kazakhstan, Georgia, Armenia, Uzbekistan, and especially in Russia, Kyrgyzstan, Iraq, Iran, and Western China.

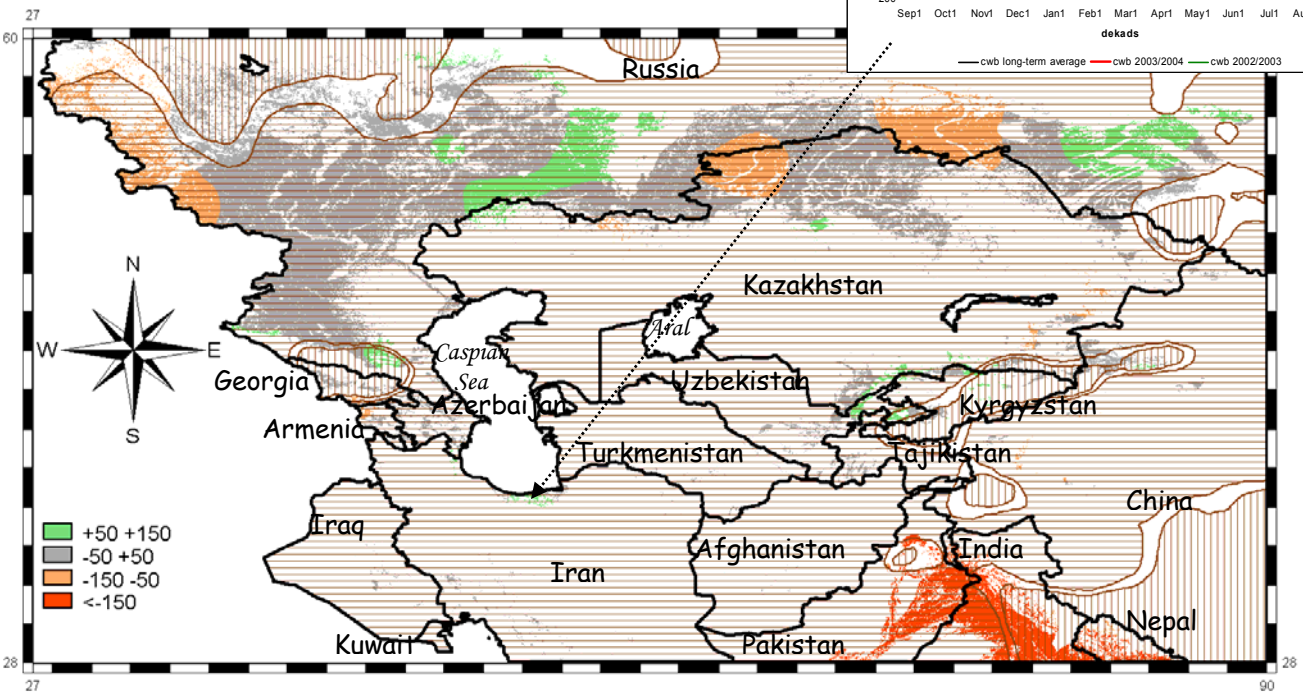
Situation is better for the period July-August in the current year than in the **previous year** only in Iran, and in some regions of Russia, and worse in Armenia, Kazakhstan, Northern India, Northern Nepal, and Northern Pakistan. The situation in other countries was close to the previous year.

The comparison of the climatic water balance cumulated for the current **vegetative season** with the similar period of previous season shows that the current season is more favourable in terms of climatic water balance for summer crops in Iran, Georgia, Armenia, Iraq, Kuwait, and in the main part of Russia and worse in Kyrgyzstan, Azerbaijan, Uzbekistan, Tajikistan, Turkmenistan, Afghanistan, Northern India, and especially in Kazakhstan, and Northern Pakistan.

Climatic Water Balance (July-August)	comparing with previous year
Russia	=
Armenia	-
Azerbaijan	=
Georgia	=
Kazakhstan	-
Kyrgyzstan	=
Tajikistan	=
Turkmenistan	=
Uzbekistan	=
Afghanistan	=
Iraq	=
Iran	+
Kuwait	=
Northern India	-
Northern Nepal	-
Northern Pakistan	-
Western China	=



Difference in Climatic Water Balance (mm) for the period July-August between 2004 and 2003 (only for croplands, in colours). Horizontal hatching shows regions with negative water balance during July-August 2004.



Remote Sensing Indicators

The NDVI curves shows that at the end of August the summer crops status in general was better comparing with last year in Russia, Armenia, Iran, Kuwait, and especially in Iraq, and worse in Georgia, Kazakhstan, Kyrgyzstan, Turkmenistan, Afghanistan, Northern Pakistan, Western China, and Uzbekistan. The situation with summer crops in Azerbaijan, Tajikistan, Northern India, and Northern Nepal appears close to the previous year.

The NDVI curves behaviour in the current vegetative season is close to the 2002 situation in most countries of the region. It is close to the 2003 situation in Northern Pakistan, Northern India, and some regions of Kazakhstan and Russia.

The analysis of the Dry Matter Production modelling results shows that less dry matter than in previous year was (potentially) produced in July-August in northern Kazakhstan, Azerbaijan, Tajikistan, Turkmenistan, and in Afghanistan and more dry matter was produced in the European part of Russia, in Northern India, Northern Pakistan, Western China, Iran, Kuwait, and especially in Iraq.

Remote sensing indicators	comparing with previous season			
	NDVI for:			**Dry Matter** July-August
	potato	maize	rice	
Russia	=	+	+	=
Armenia	+	+		=
Azerbaijan	=	=	-	-
Georgia	-	-		=
Kazakhstan	=	-	-	=
Kyrgyzstan	-	-	-	=
Tajikistan	=	=	=	-
Turkmenistan	-	-	-	-
Uzbekistan	-	-	=	=
Afghanistan	-	-	-	-
Iraq	+	+	+	+
Iran	+	+	+	+
Kuwait	+	+		=
Northern India	+	=	=	+
Northern Nepal	=	=	=	=
Northern Pakistan	=	-	-	+
Western China	+	-	-	+