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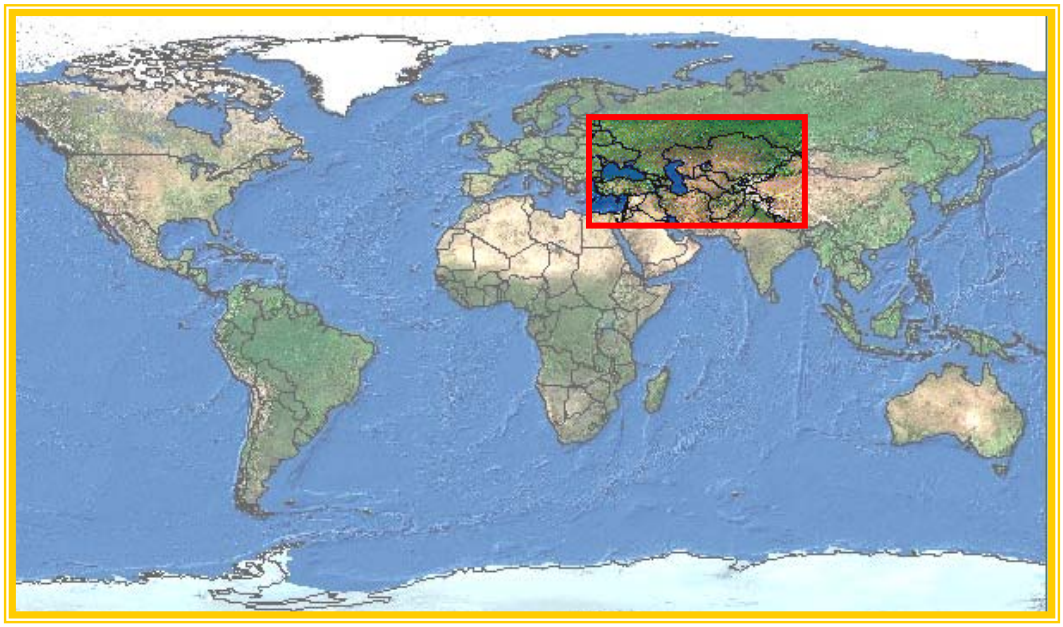
CROP MONITORING for FOOD SECURITY

Russia and Central Asian Countries

Situation at the End of June 2004
Agro-meteorological overview for May-June 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 May to the end of June 2004, and gives a qualitative assessment of the winter cereals status at the end of this period.

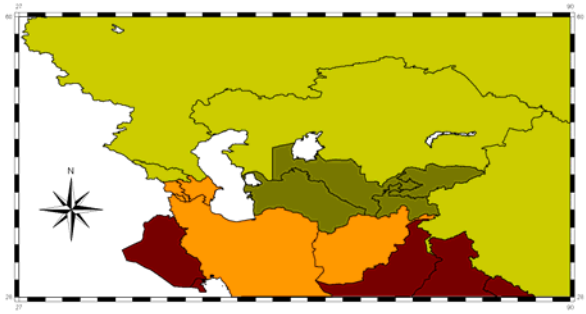
Crops. In most countries of the region, it is the last third of the season for winter crop development. Winter crops are harvesting in India, Pakistan, Nepal, Iraq, and Kuwait.

Wheat and barley are the main crops cultivated during the winter period in most countries. Additionally, sugar cane and rape seed are grown in Northern India, Northern Pakistan, Western China and Northern Nepal, as well as potatoes and fodder crops in Afghanistan, rice in Northern India, and rye in Russia and Kazakhstan. In many countries of the region more than 90% of wheat and barley are cultivated as winter crops. However more than 90% of wheat and barley in Kazakhstan, near 70% of wheat and more than 90% of barley in Russia are spring crops. Near 90% of barley in Armenia, and Kyrgyzstan, and near 40% of wheat in Kyrgyzstan, more than 60% of barley in Tajikistan, and near 40% of barley in Georgia is cultivated in summer too.

Practically all winter crops in Russia and Kazakhstan are cultivated in rain-fed conditions. In Tajikistan, Uzbekistan, Georgia and Armenia near 30% of winter crops are irrigated. In Kyrgyzstan, Azerbaijan, Iran, Iraq and Afghanistan near 40-70% of winter crops are cultivated in irrigated conditions. Practically all winter crops are irrigated in Turkmenistan, Kuwait, Northern India, Northern Pakistan, Western China and Northern Nepal.

country	*Production and Yield, 2003 (source FAO)*	
	wheat	**barley**
Russia	**34030 (1,6)**	**17946 (2,1)**
Armenia	**320 (2,6)**	**83 (1,3)**
Azerbaijan	**1575 (2,5)**	**275 (2,3)**
Georgia	**234 (1,8)**	**55 (1,3)**
Kazakhstan	**11800 (1,0)**	**2050 (1,2)**
Kyrgyzstan	**1084 (2,3)**	**146 (2,0)**
Tajikistan	**569 (1,9)**	**40 (2,0)**
Turkmenistan	**2534 (3,0)**	**31 (0,6)**
Uzbekistan	**4550 (3,7)**	**90 (1,8)**
Afghanistan	**No data**	**No data**
Iraq	**No data**	**No data**
Iran	**12900 (2,0)**	**2000 (1,4)**
Kuwait	**0,5 (2,3)**	**2,0 (1,4)**
India	**69320 (2,8)**	**1280 (1,9)**
Nepal	**1344 (2,0)**	**29 (1,1)**
Pakistan	**19210 (2,4)**	**107 (1,0)**
China	**86100 (3,9)**	**3115 (3,6)**

First figure is a production (1000 tons), figure in brackets – yield (t/ha). Green color indicates figures which are higher than normal and red color indicates figures which are lower than normal.



Winter crops status in May-June: olive green – **flowering-maturing**; *dark olive green –* **maturing-harvesting**; *orange –* **maturing** *; brown –* **harvesting** *(based on long-term average data, source FAO).*

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.

Area cultivated and other factors (fertilizers, pesticide inputs, pests, diseases) which may be predominant in some cases are not taking into account.

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.

Acknowledgements. *The following organizations were involved in data supply: VITO (BE), METEOCONSULT (NL), ECMWF (UK).*

Disclaimer. *The geographical borders are purely a graphical representation and are only intended to be indicative. These boundaries do not necessarily reflect the official EC position.*

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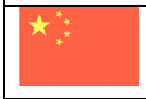
Highlights Country by Country

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

Results of the analysis

The meteorological conditions during May-June 2004 were favourable or close to optimal for winter crop growth in the most countries of the region. Insufficient amount of precipitation in Northern India and Northern Pakistan couldn't affect winter crops, which were close to harvesting and grown primarily in irrigation conditions. Heavy rains which took place during the period of analysis in some regions of Russia and Georgia should affect winter crop growth, but in general such areas were scarce. Extremely high air temperature and moisture deficit could damage winter crops in Siberian Russia, and northern Kazakhstan, but winter crop areas in these regions are small.

In general the meteorological situation for winter crops during May-June 2004 was better than in previous year only in Russia, Georgia, Armenia, and northern Iran, and was worse in other former USSR republics, in Afghanistan, Northern India, and Western China.

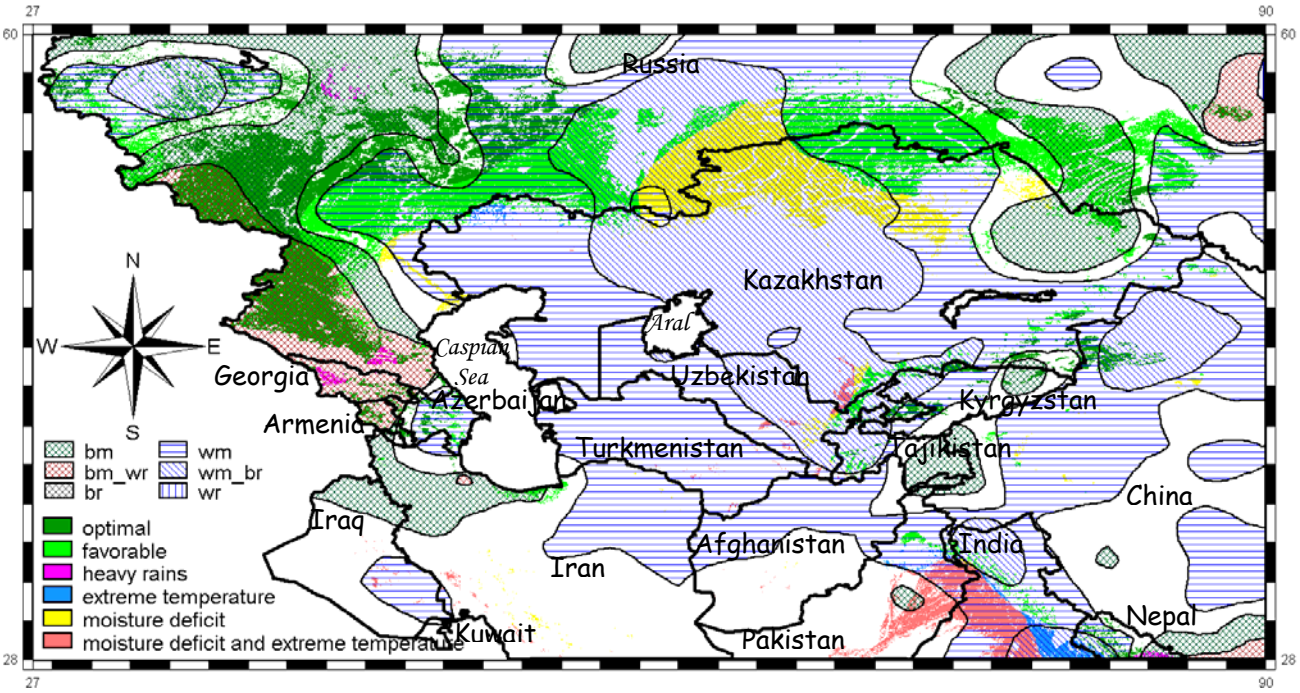
The winter crop status at the end of June 2004 is likely to be better than last year in Russia, Armenia, and Georgia and worse in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and Afghanistan.

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

country	*comparing with previous year*		*Winter Wheat Yield 2004 expectation (t/ha)*
	Meteorological conditions during May-June	*Winter crop status at the end of June*	
Russia	+	+	**2,2-2,5**
Armenia	+	+	**2,3-2,7**
Azerbaijan	-	=	**2,2-2,5**
Georgia	+	+	**2,0-2,3**
Kazakhstan	-	-	**0,8-1,2**
Kyrgyzstan	-	-	**2,1-2,3**
Tajikistan	-	-	**1,5-1,8**
Turkmenistan	-	-	**2,6-2,8**
Uzbekistan	-	-	**2,7-3,0**
Afghanistan	-	-	**n/d**
Iraq	=	=	**0,7-0,9**
Iran	+	=	**1,8-2,0**
Kuwait	=	=	**2,3-2,5**
Northern India	-	=	**n/d**
Northern Nepal	=	=	**n/d**
Northern Pakistan	=	=	**n/d**
Western China	-	=	**n/d**

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

Favourability of meteorological conditions during May-June 2004 for winter 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*



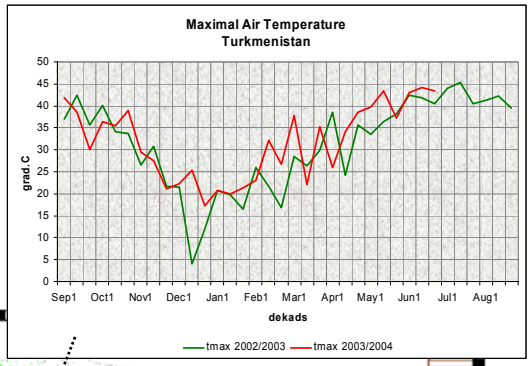
Global Radiation and Temperature Conditions

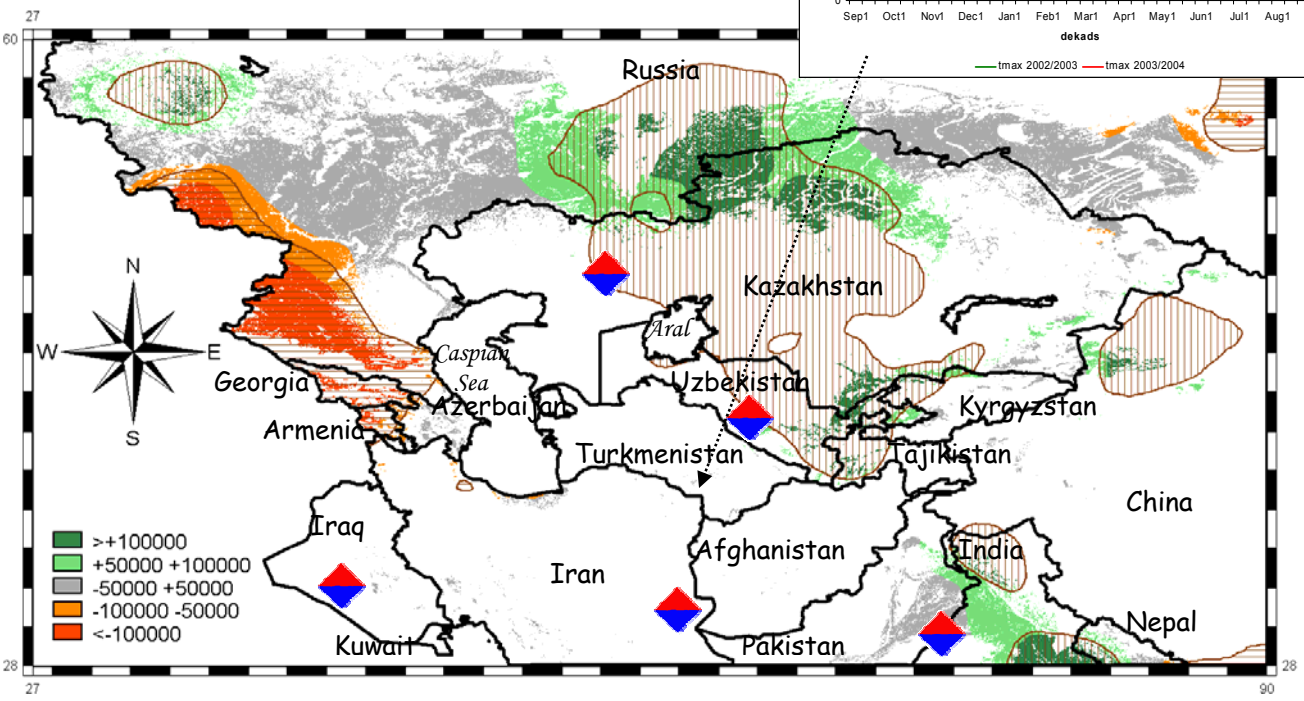
The amount of radiation in general was close to optimal for winter crop development in all countries of the region.
The radiation sum during May-June was higher than **normal** in all countries of the region. A slightly less than normal amount of radiation was received by croplands in the European Russia, and Caucasus countries.
Comparison with the **previous year** shows that less radiation during May-June was received only by croplands in Russia, Armenia, Georgia, and Iran. More radiation was received in Kazakhstan, Tajikistan, Uzbekistan, Afghanistan, Northern India, Northern Nepal, and Western China.
The **air temperature** during May-June was slightly higher than normal practically in all countries of the region. "Cold" days (with minimal air temperature below -4^{0}C) were observed during May-June only in east Siberian regions of Russia, and in some mountainous regions. Days with the maximal air temperature above + 40^{0}C were dominant in May-June in many countries of the region excluding European Russia, Armenia, and Georgia. Extremely high air temperature was observed in Iraq, Iran, Northern Pakistan, Northern India, Uzbekistan, and in central Kazakhstan. But winter crops in these countries were close to harvesting, and should not be significantly affected by high air temperatures.

Global radiation (May-June)	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 May-June 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 May-June 2004 was extremely limited in Iraq, Kuwait, southern Iran, and southern Afghanistan. Oppositely, a number of dekads with amount of precipitation more than 100 mm per dekad was observed in some regions of Russia, and in Georgia.

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

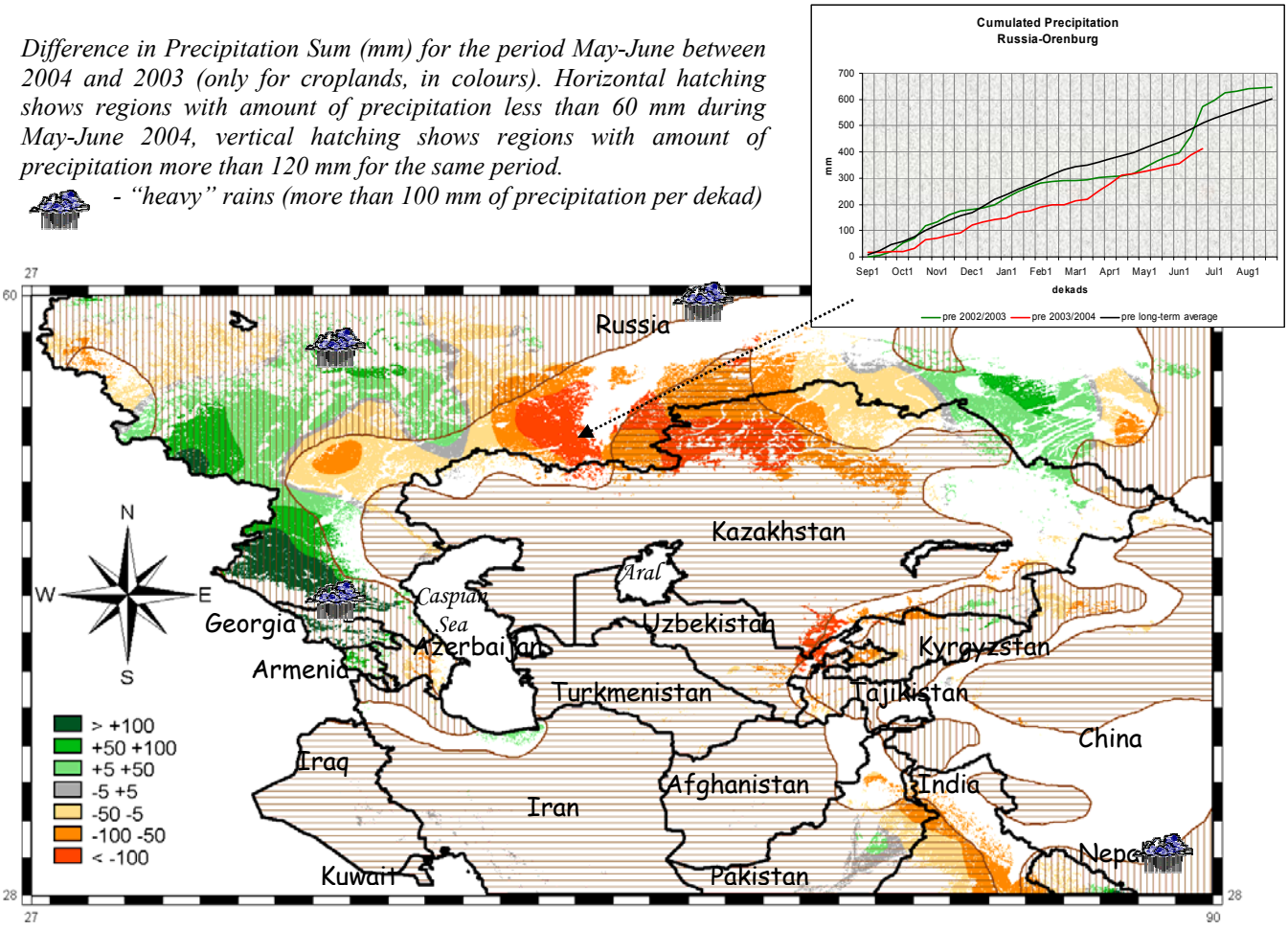
More precipitation than in **previous year** was observed during the period under analysis in the European Russia, Armenia, Georgia, and Iran, and less was observed in Azerbaijan, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, Northern India, and in Western China. The biggest negative difference was observed for Kazakhstan, and Urals's region of Russia.

The comparison of the amount of precipitation cumulated for the current **vegetative season** (November-June) with the similar period of previous season shows that current season more favourable in terms of precipitation for winter crops in the European Russia, Georgia, Armenia, Iraq, and Iran and worse in Kazakhstan, Urals region of Russia, Azerbaijan, Tajikistan, Kyrgyzstan, Afghanistan, and Northern Pakistan.

Precipitation (May-June)	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

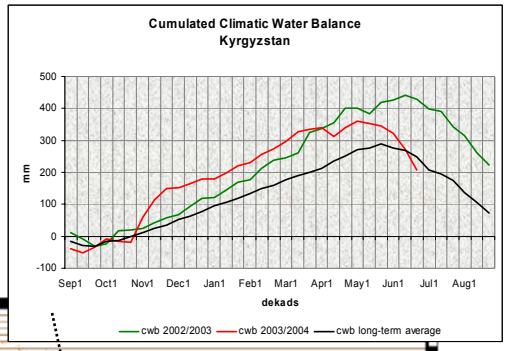
The dekads with positive climatic water balance were dominant during May-June 2004 only in some regions of Russia, in Georgia, and Armenia, and in eastern Kyrgyzstan. The climatic water balance was negative in other countries of the region.

The climatic water balance was worse than **long-term average data** in Turkmenistan, Iraq, Kuwait, Northern Pakistan, Northern India, southern Iran, and Afghanistan and especially in the northern Kazakhstan, and Urals region of Russia. It was better during May-June comparing with long-term average values for this period of the year in other regions of Russia, in northern Iran, and Caucasus countries.

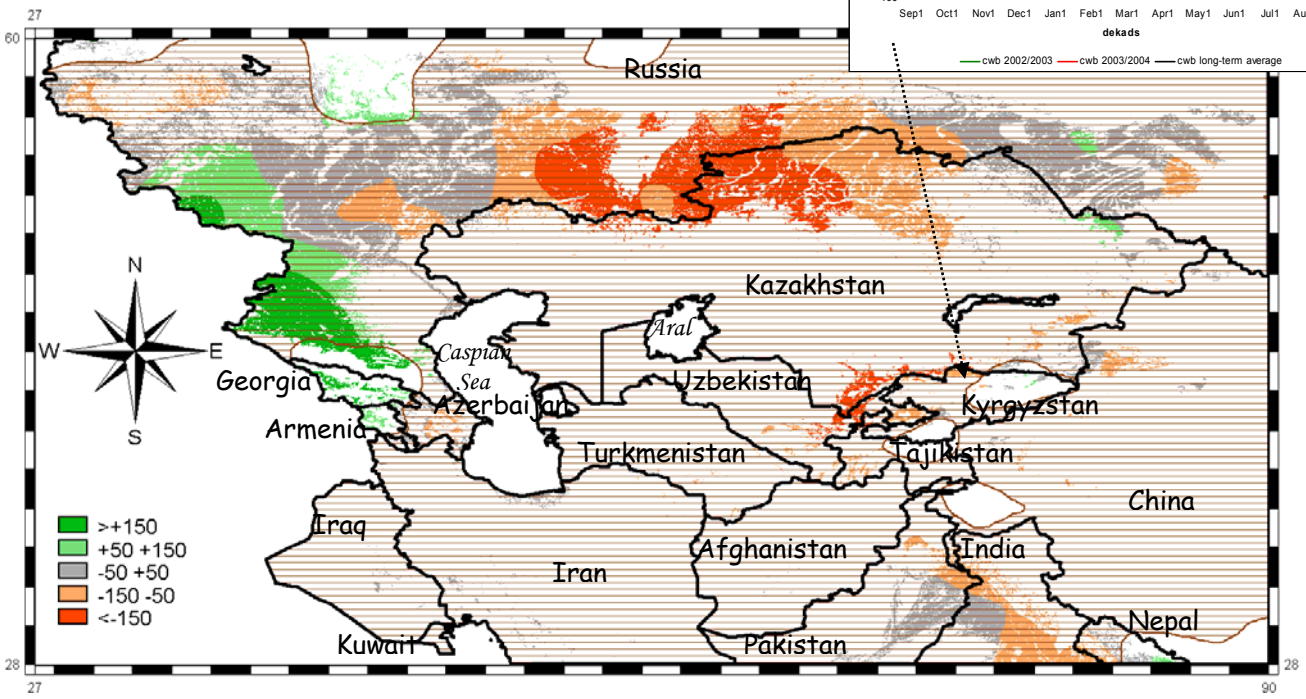
Situation is better for the period May-June in the current year than in the **previous year** in Armenia, and Georgia and worse in Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, Northern India, and Western China. The situation in other countries was close to the previous year.

The comparison of the climatic water balance cumulated for the current **vegetative season** (November-June) with the similar period of previous season shows that the current season is more favourable in terms of climatic water balance for winter crops in Russia, Georgia, Armenia, Iraq, and northern Iran and worse in Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, Northern Pakistan, and Western China.

Climatic Water Balance (May-June)	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 May-June between 2004 and 2003 (only for croplands, in colours). Horizontal hatching shows regions with negative water balance during May-June 2004.



Remote Sensing Indicators

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

The NDVI curves behaviour in the current vegetative season is close to the 2001/2002 situation in the most countries of the region. It is close to the 2000/2001 situation in some regions of Kazakhstan, and to the 2002/2003 situation in Central regions of Russia.

The analysis of the Dry Matter Production modelling results shows that less dry matter than in previous year was (potentially) produced in May-June in Uzbekistan, southern and northern Kazakhstan, Azerbaijan, Turkmenistan, and in Siberian part of Russia and more dry matter was produced in Armenia, European part of Russia, in Northern India, Northern Nepal, Northern Pakistan, and Western China.

NDVI indicator of winter crop status	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	=