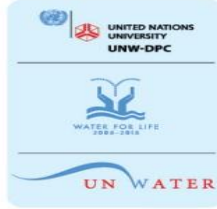




A UN-WATER INITIATIVE ORGANIZED BY:



Capacity Development to Support National Drought Management Policies

DROUGHT CONDITIONS AND MANAGEMENT STRATEGIES IN ROMANIA

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¹National Meteorological Administration

²Ministry of Environment and Climate Change

³Ministry of Agriculture and Rural Development

1st Regional Workshop for Eastern European countries

BUCHAREST

9 – 11 July 2013

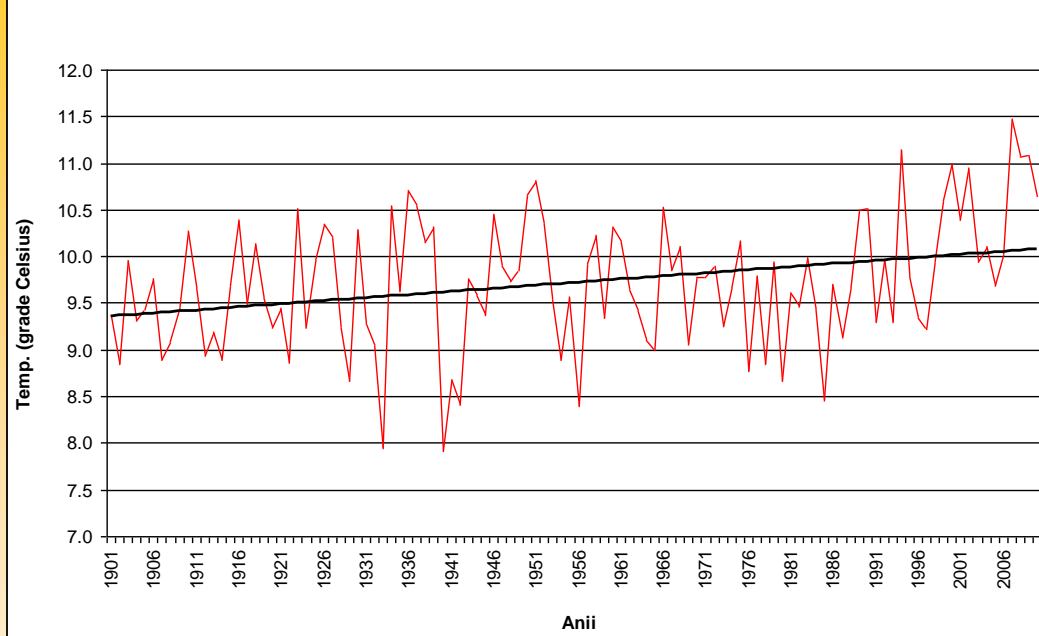


OUTLINE

- ▶ **AGROCLIMATIC CONDITION IN ROMANIA IN THE CONTEXT OF CLIMATE CHANGE**
- ▶ **DROUGHT MONITORING / meteorological profile of NMA and drought indicators**
- ▶ **NATIONAL DROUGHT MANAGEMENT POLICY**
- ▶ **FUTURE STEPS**

AGROCLIMATIC CONDITION IN ROMANIA IN THE CONTEXT OF CLIMATE CHANGE

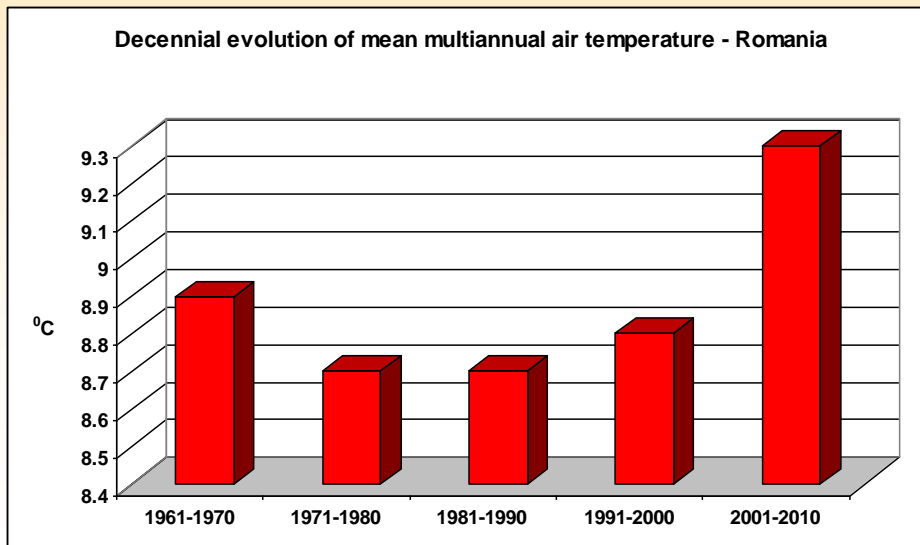
Mean annual air temperature trend in Romania, over 1901-2010 period



Annual air temperature trend in Romania, over 1901-2010 period

► In ROMANIA, the mean annual air temperature rose by 0,6°C in the last 100 years. The evolution by decades of the mean multiannual air temperature over the 1961-2010 period show that the air temperature rose by 0,4...0,6°C in the 2001-2010 interval in comparison with every decade. The increasing trend is obvious especially beginning with 1971.

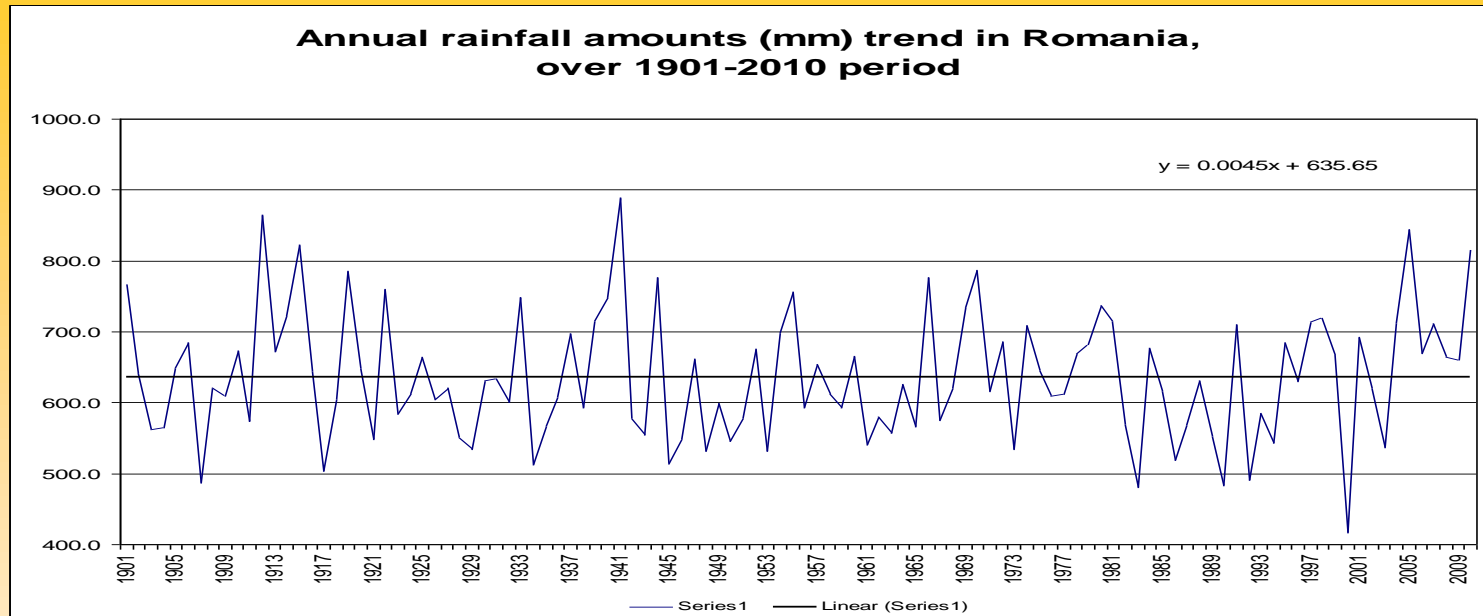
Decennial evolution of mean multiannual air temperature - Romania



	Mean air temperature (°C)
1961-1970	8.9 /+0.4°C
1971-1980	8.7 /+0.6°C
1981-1990	8.7 /+0.6°C
1991-2000	8.8 /+0.5°C
2001-2010	9.3

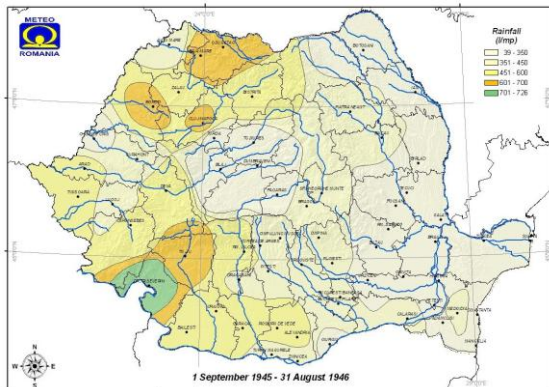
2001-2010 / + 0.4...+0.6°C

Annual rainfall trend in Romania, over 1901-2010 period

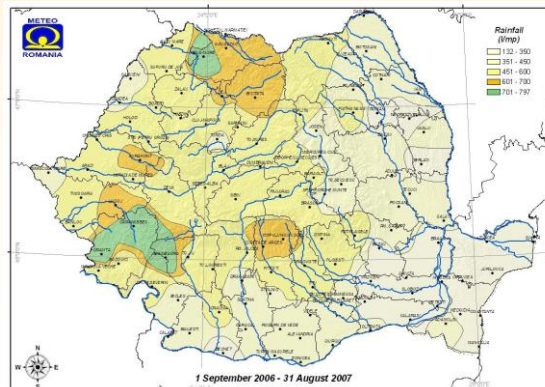


As regards precipitation, the 1901-2010 period highlighted a general decreasing trend in the annual precipitation amounts especially after 1961 year and a parallel enhance of the precipitation deficit in the South, South-East and East of the country.

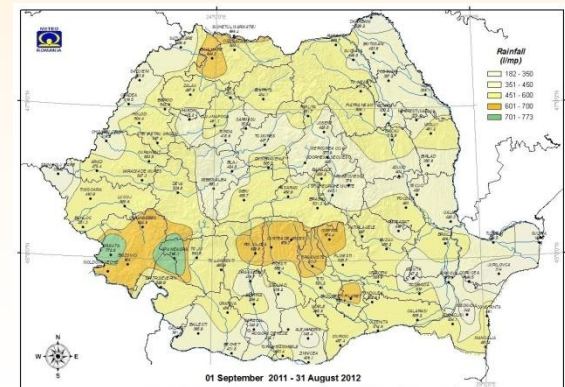
1945-1946



2006-2007



2011-2012



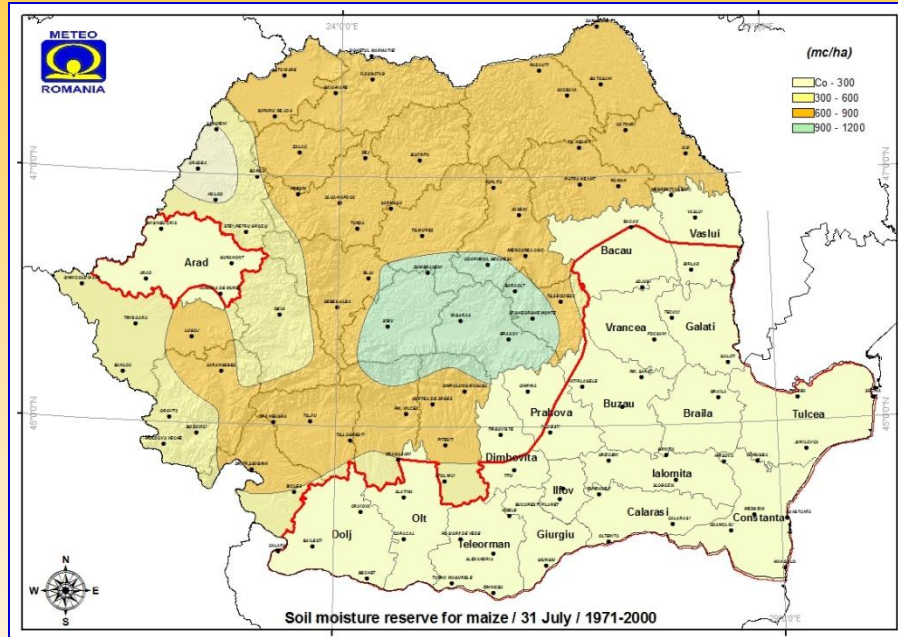
Droughty/rainy years in Romania (1901-2010)

DECADE	XX-TH CENTURY	
	EXTREMELY DROUGHTY YEARS	EXTREMELY RAINY YEARS
1901-1910	1907-1908	1910
1911-1920	1917-1918	1911, 1912, 1915, 1919
1921-1930	1923-1924, 1927-1928	1929
1931-1940	1934-1935	1937, 1939, 1940
1941-1950	1945-1946, 1947-1948, 1949-1950	1941, 1944, 1947
1951-1960	1952-1953	1954, 1955, 1957, 1960
1961-1970	1962-1963, 1964-1965	1969, 1970
1971-1980	1973-1974, 1975-1976	1972, 1974, 1975, 1976
1981-1990	1982-1983, 1985-1986, 1987-1988	1981, 1990
1991-2000	1992-1993, 1997-1998, 1999-2000	1991, 1997
	XXI-ST CENTURY	
2001-2010	2000-2001, 2001-2002, 2002-2003, 2006-2007, 2008-2009	2005, 2006, 2008, 2010
2011-2020	2011-2012	

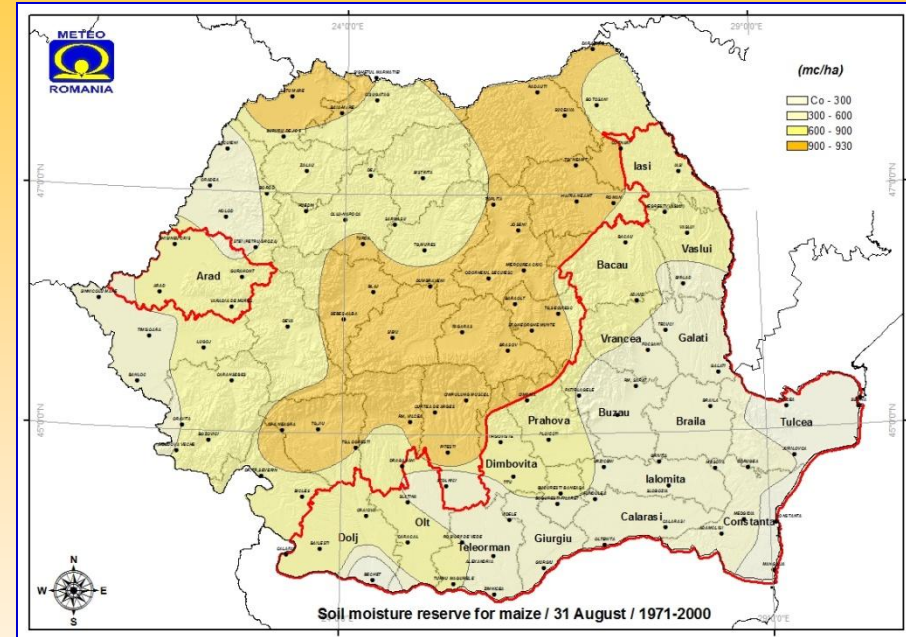
Since 1901 until now, Romania has seen in every decade one to four extremely droughty/rainy years, an increasing number of droughts being more and more apparent after 1981

Soil moisture reserve in Romania (1971-2000)

31 July / Maize



31 August / Maize

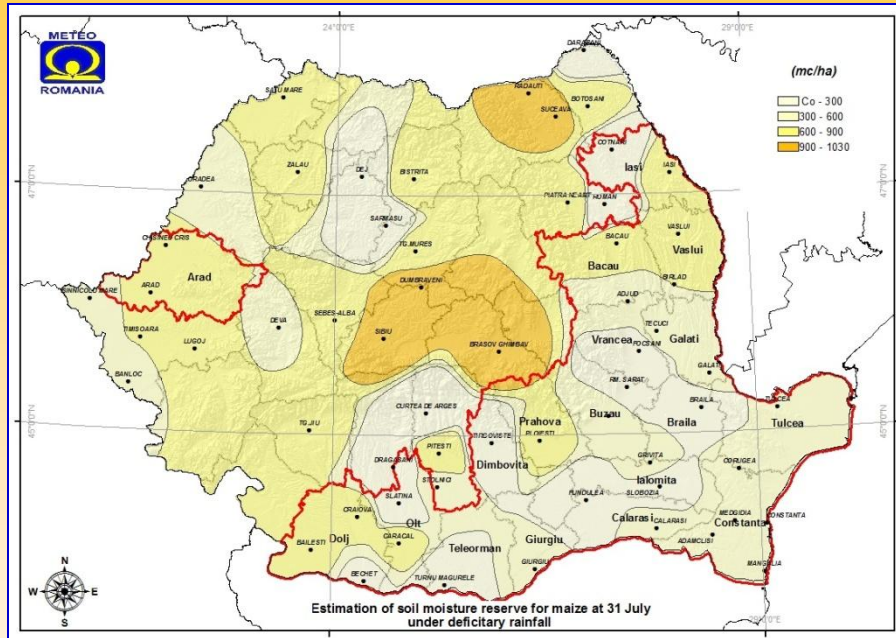


Soil moisture classes	
<300 mc/ha	Extreme pedological drought
300 – 600 mc/ha	Severe pedological drought
600 – 900 mc/ha	Moderate pedological drought
900 – 1200 mc/ha	Satisfactory supply

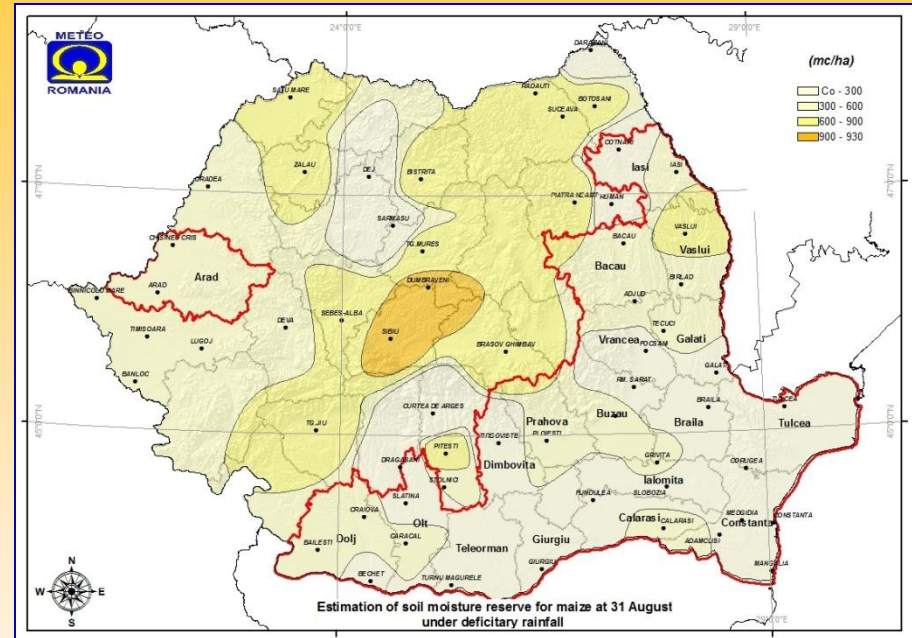
The southern, south-eastern and eastern part of Romania are the most vulnerable areas to extreme and severe pedological drought.

Estimations of the soil moisture reserve in Romania, in the context of predictable climate change

31 July / Maize



31 August / Maize



In the conditions in which the climatic scenarios estimate a decrease of the annual precipitation amounts (10-20%), it is expected that the intensity of pedological drought phenomena increased in the most vulnerable areas already known today, respectively the south, south-east and east of Romania. In the areas limited by the red line, the pedological drought will reach the highest intensity values (extreme/Co-300 m^3/ha and severe/600-900 m^3/ha).

NATIONAL METEOROLOGICAL ADMINISTRATION

<http://www.meteoromania.ro>

⇒ **NMA is the national authority in the meteorological field in Romania, with a continuous service since 1884 and operates under the authority of the Ministry of Environment and Climate Change (MECC).**

⇒ **The National Meteorological Observation Network within the NMA is made up of 7 Regional Meteorological Centres / RMC.**

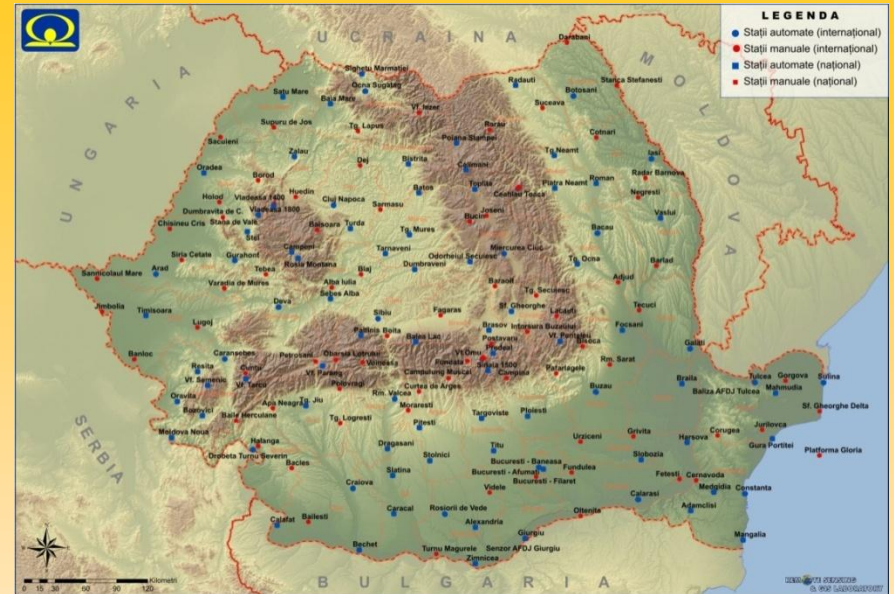
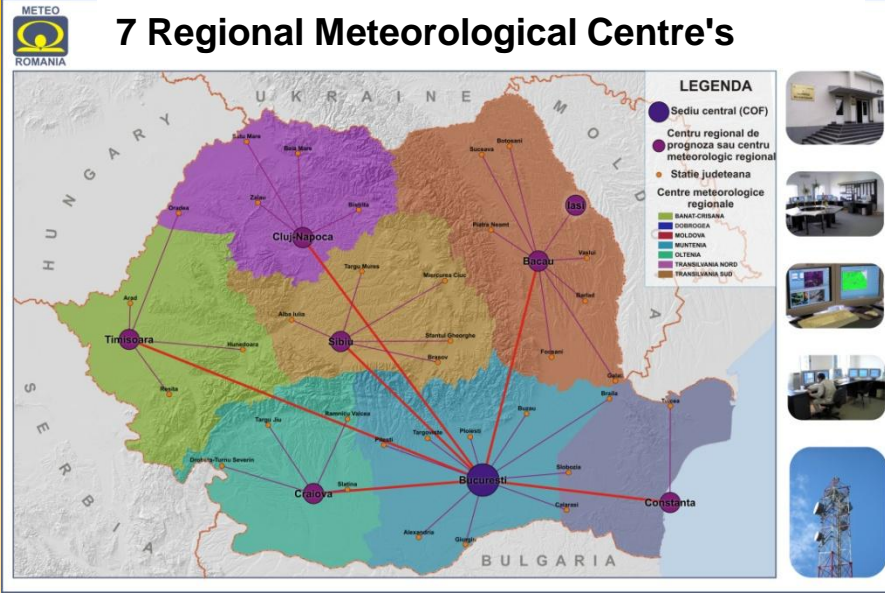
⇒ **Meteorological profile:**

- Synoptic and climatological observations and measurements: 159 stations
- Number of automatic weather stations (MAWS): 126
- Agrometeorological observations and measurements stations: 55
- Radar network: 8 radars (5 C-band and 3 S-band Doppler radars)
- Pluviometric observations and measurements: 67 stations.

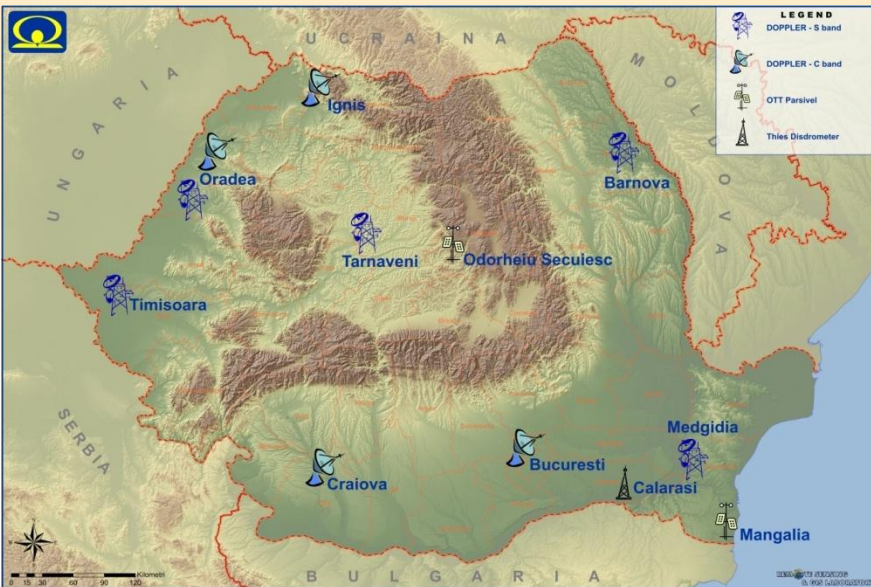
⇒ **NMA participates to the international meteorological data exchange with:**

- 23 stations in RBSN (Regional Basic Synoptic Network), and
- 14 stations in RBCN (Regional Basic Climatological Network).

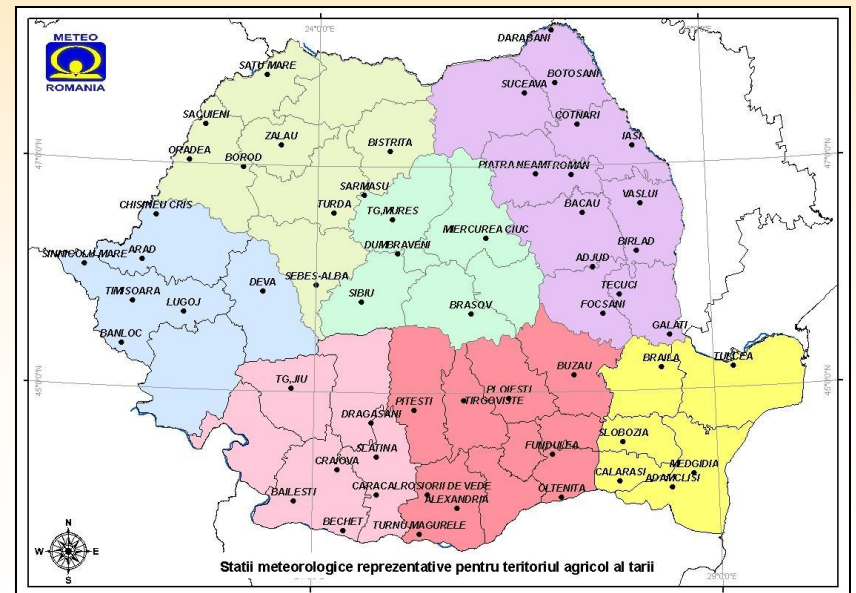
Meteorological stations network



Radar network



Agrometeorological measurements network



DISSEMINATION OF INFORMATION

<http://www.meteoromania.ro>

Ministerul Mediului și Schimbărilor Climatice
ADMINISTRAȚIA NAȚIONALĂ DE METEOROLOGIE

REZERVA DE UMIDITATE

La data de 08 Iulie 2013, rezerva de umiditate accesibilă plantelor pe adâncimea de sol 0-100 cm în cultura de porumb, prezintă valori satisfăcătoare (AS), apropiate de optim (ApO) și optime (AO), pe aproape întreg teritoriul agricol, cu excepția unor suprafețe restrânse din jumătatea de sud a Dobrogei, estul Munteniei, vestul Banatului și al Crișanei, unde se semnalează seceta pedologică moderată (SM), figura 1.

Figura 1.

Meteo Romania | Site-ul Ad...

55°

meteoromania.ro

meteoalarm
alerting europe for extreme weather

Vremea acum
- alege statia meteo -

Informații - Meteo Romania

- Estimarea evoluției valorilor termice și a precipitațiilor în intervalul 11 - 24 martie 2013
Proгноза este realizată folosind produsele numerice ale Centrului european pentru prognoze pe scară globală (ECMWF) ...
- Estimări meteorologice pentru intervalul martie - mai 2013
Proгноза distribuției temperaturilor medii și cantităților de precipitații lunare ...
- Proгноза agrometeorologică
Informații privind evoluția prognostică a condițiilor agrometeorologice și recomandări de specialitate ...
- Rezerva de umiditate
Vizualizează rezerva de umiditate în stratul de sol 0 - 100 cm ...
- Buletinul nivometeorologic
Informare nivometeorologică valabilă pentru masivele Bucegi și Făgăraș ...

INFORMARE
privind intensitatea fenomenului de secetă în România - 2012

➤ La data de 29 Octombrie 2012, pe adâncimea de sol 0-20 cm (ogor), se înregistrează valori scăzute și deosebit de scăzute, seceta pedologică fiind moderată (SM) și izolat puternică (SP) și extremă (SE), în majoritatea regiunilor agricole. În Banat, cea mai mare parte a Crișanei, Transilvaniei, estul Maramureșului, nordul Olteniei, nord-vestul Munteniei, aprovizionarea cu apă a solului se situează în limite satisfăcătoare (AS) și local apropiate de optim (ApO), figura 1.

Figura 1.

IULIE 2013
TEMPERATURA MEDIE LUNARĂ A AERULUI

ESTIMĂRI ECMWF / IULIE 2013 VALORI MEDII MULTIANUALE LUNARE /1961-1990

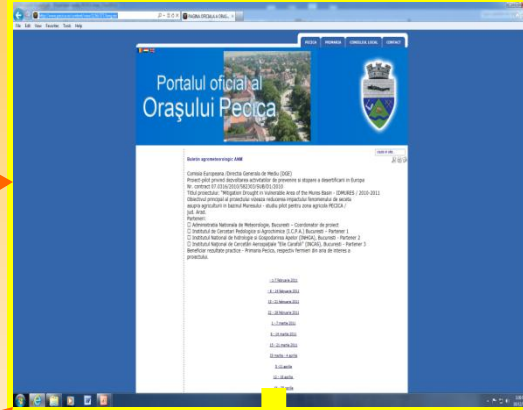
ROMANIA
Media multianuală la Turnu
(1961-1990)

Temperatura (°C)
19.2

- Notes on the evolution of drought
- Agrometeorological forecasts
- Soil moisture information
- Seasonal forecasts

Design a specialized agro-meteorological bulletin / regional and local level

RESULTS: Agrometeorological information and warnings disseminated on mobile phone



DROUGHT INDICATORS / agrometeorological operational and research activities

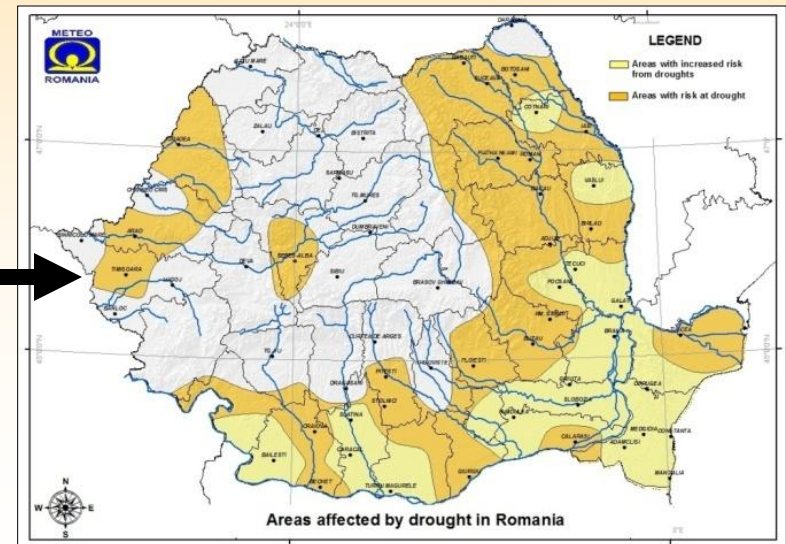
- **climatic indicators:** SPI, Aridity index, etc
 - **agrometeorological indicators:** Soil moisture, heat waves, etc
 - **satellite-derived products:** Normalized Difference Water Index (NDWI), Leaf area Index (LAI); Fraction of Absorbed Photosynthetic Solar Radiation (fAPAR)



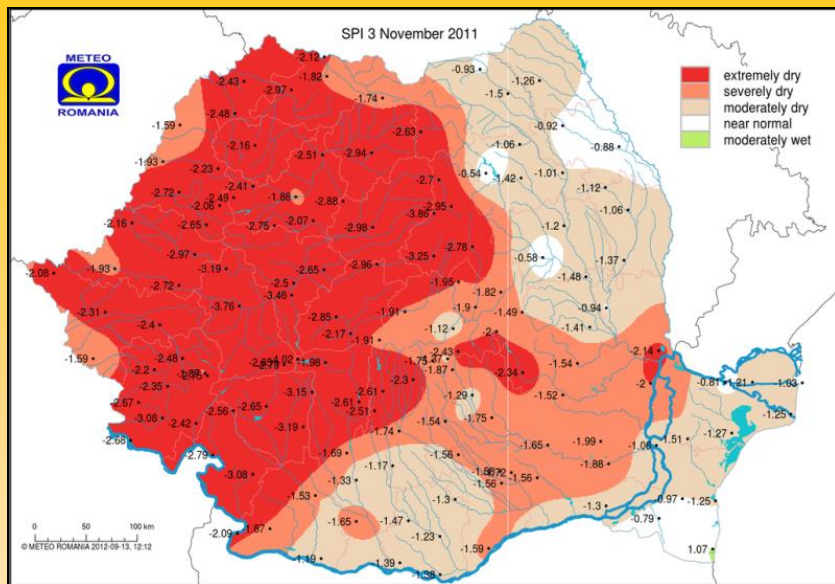
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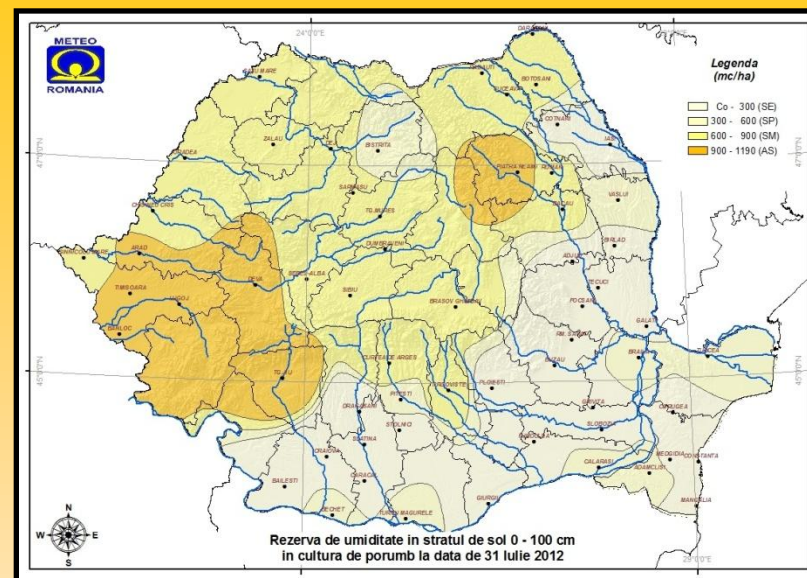
THE SOUTH, SOUTH-EAST AND EAST OF ROMANIA ARE THE REGIONS WITH RISK OF WATER SCARCITY AND DROUGHT



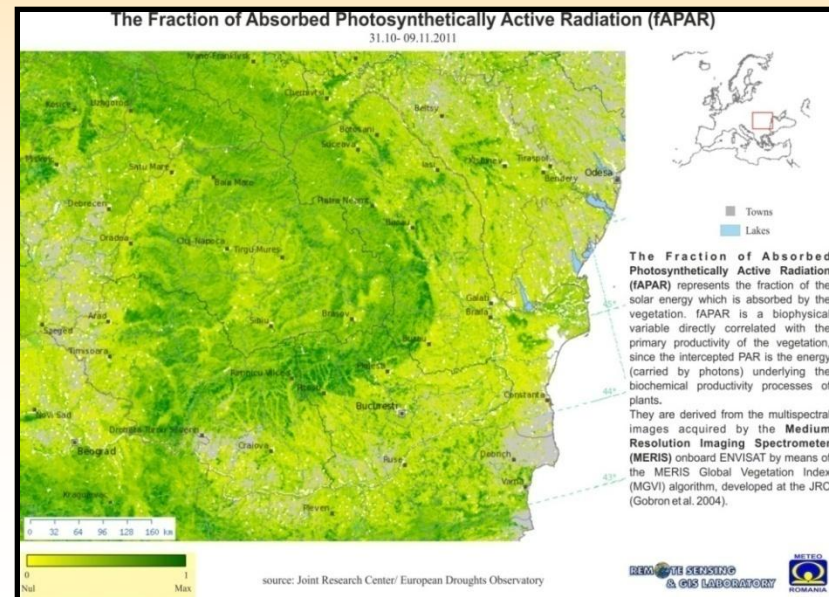
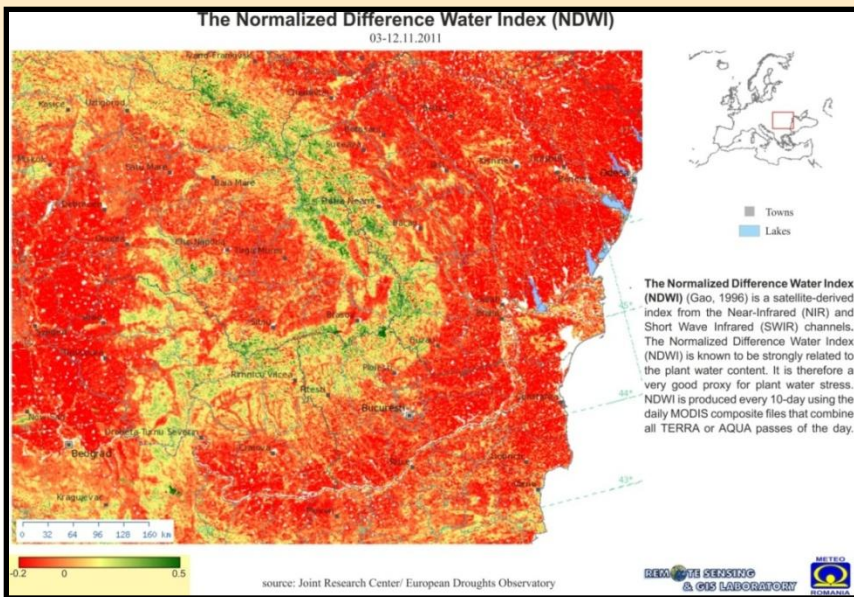
SPI / November 2011



Soil Moisture Reserve / 31 July 2012



Drought indicators based on satellite-derived products



NATIONAL DROUGHT MANAGEMENT POLICY

- Ministry of Agriculture and Rural Development

1. National Committee to Combat Drought, Land Degradation and Desertification, which is a consultative body (approved in 2004 and updated in 2013) .

- Ministry of Environment and Climate Change

1. Working Group on Adaptation to Climate Change (2008)

Ministry of Agriculture and Rural Development

<http://www.madr.ro>

⇒ The Romanian Government is assisted in taking decisions on drought, land degradation and desertification issues by the interdisciplinary National Committee to Combat Drought, Land Degradation and Desertification, which is a consultative body. This Committee is coordinated by The Ministry of Agriculture and Rural Development.

⇒ Strategy of the Ministry of Agriculture and Rural Development in irrigation sector has the following main objectives:

1. Rehabilitation of irrigation infrastructure belonging to the public domain of the State on the area of approx. 823 thousands hectares, economically viable
2. Changing power solution for 3 irrigation systems with the surface of approx. 56 thousands ha, which are currently fueling from Siret and Prut powered from magistral channel Siret – Bărăgan
3. Fitting of the area of approximately 425 thousands ha, to be arranged with irrigation works in areas adjacent of the magistral channel Siret – Bărăgan, powered from the magistral channel Siret - Bărăgan.

National Strategy to Combat Drought, Land Degradation and Desertification (elaborated in 2008) must be updated and approved by Romanian Government.



Ministry of Environment and Climate Change

<http://www.mmediu.ro>

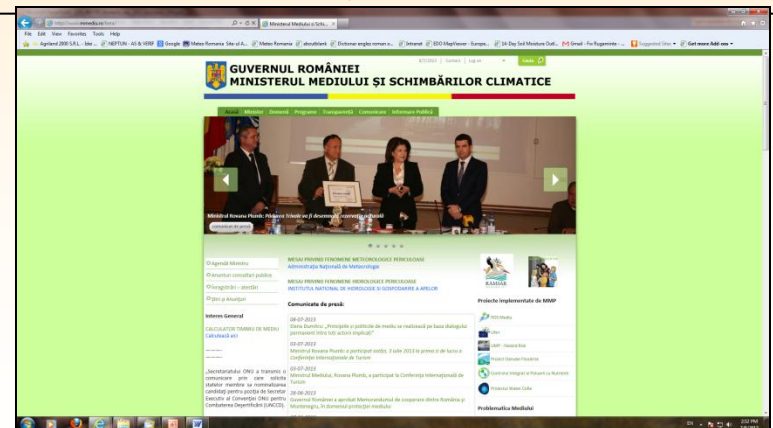
⇒ **The National Climate Change Strategy (2013-2020)** addresses two main components: the reduction in the concentration of greenhouse gases (Mitigation) and the adaptation to climate change (Adaptation), which is under approval by Romanian Government.

- On the Adaptation component were identified 13 sectors vulnerable to climate change: Food, Agriculture and Fisheries, Tourism, Public Health, Construction and Infrastructure, Transportation, Water Resources, Forestry, Energy, Biodiversity, Insurance, Recreation, Education.

- In this context, the integration of the adaptation in the sectorial strategies will help to have a comprehensive approach and select appropriate measures for the direct and indirect effects of climate change (including drought and floods).

⇒ **MECC and the National Meteorological Administration** work together tightly to consolidate the technical and institutional capacity of NMA and also to facilitate the access to the structural funds of the European Union during the next accounting interval, over the years 2014 to 2020.

<http://climate-adapt.eea.europa.eu/countries/romania>



FUTURE STEPS /drought monitoring and early warning system

⇒ The need to improve national drought monitoring and management policies with the goal of improving preparedness and reducing drought impacts will be based on two main topics:

- 1) Monitoring and prediction which should contribute to a broad early warning system;
- 2) Mapping and assessing the impact of droughts, promote adaptation of best practices, and develop infrastructure for irrigation based on scientific knowledge (climatic data, soil and crops data).

Thematic drought maps will illustrate the most vulnerable areas to drought and water deficit at different spatial and temporal scales, including also the impacts on agriculture, forest, water supply and energy and environment. In order to choose the best decision it is needed a more detailed description of current situation regarding the current conditions and forecast of limitative conditions (water deficit and drought) in order to elaborate the disaster management plan in timely manner. In this way the farmer and not only may get benefit by the complex analyses and advisories to mitigate the effects of limitative conditions.

⇒ By continuing the modernization and development of national meteorological system components is essential to ensure permanent interoperability with the European and international systems and other specialized institutions in this field.

Thank you!

Email: elena.mateescu@meteoromania.ro

