Initiative on "Capacity Development to support National Drought Management Policy"
(WMO, UNCCD, FAO and UNW-DPC)

Country Report

Drought conditions and management strategies in Serbia

Background:
Serbia is situated in the Central-European, Balkan, Pannonian, and Danube region. It is relatively rich in agricultural land – about 58 % of the total area, forest – about 29 %, and landscape diversity, and has high levels of biodiversity. Under climate conditions of our region drought is an occasional phenomenon, which can be moderate or extremely severe. The evaporation intensity depends on temperature, effects of wind and geographic location of a certain region and increases from west to east or from north to south of our country. The highest intensity has been recorded in the south-eastern part of the country. Temperatures largely affect this phenomenon. Evaporation is a product of high temperatures and is most closely related with the direction of the precipitation decrease. This fact can be a reason why our eastern and southeastern regions often suffer more or less from effects of drought. The data of the Republic Hydrometeorological Institute of Serbia (precipitation and air-temperature, for the Belgrade territory for the 1991-2012 period were transformed in average in three summer months, vegetative period and total per year and the Statistical Office of the Republic of Serbia (Statistical Yearbooks: maize yields for central part of Serbia). The average annual air temperature for the regions with the altitude of up to 300 m amounted to 10.9^{o}C during the 1961-1990 period. The corresponding temperatures amounted to approximately 10.0^{o}C, i.e. 6.0^{o}C for the regions with the altitude of 300-500 m, i.e. over 1000 m, respectively. Temporal and spatial distribution of precipitation over the territory of Serbia is irregular. A larger part of Serbia is characterised with the continental precipitation regime with greater amounts during the warmer half of the year. The greatest precipitation sums are recorded during May and June. 12 to 13% of the total annual precipitation sums are detected in June. The lowest precipitation sums (5-6% of the total annual precipitation sum) are recorded in February or October. The higher altitude have the higher annual precipitation sum. The annual precipitation sum in lowland regions ranges from 540 to 820 mm. This amount seems to be sufficient to cultivate the majority of field and vegetable crops. Under conditions of our climate, the greatest precipitation sums are recorded in June.
If precipitation sums are well distributed over decades and if there are rainfalls during July, maize - our most important crop - rarely suffers from drought. Insufficiency of precipitation in July, and later on, a longer rainless period accompanied with high temperatures and heat waves cause the greatest problems. Under conditions of favourable precipitation distribution during the growing season it is not necessary that the annual precipitation sum is high. The analysis of weather conditions in the 1991-2000 period related to maize shows that 1992, 1993, 1998 and especially 2000 were extremely dry years. Out of 12 years of 21st century four were favourable and high yield years (2004, 2005, 2009 and 2010), while

the following three years were very dry: 2003, 2007 and 2012. The driest year was 2012, when very low amounts of rainfall were recorded, while maximum daily temperatures in the May August period were over 35^{o}C. Frequent heat waves have been observed during summer months of the growing season. In the beginning, heat waves were characteristic for September and they contributed to faster maize maturing, but during the last few years, heat waves have been occurring in August, while in 2012 they occurred in the second half of July. Heat waves contributed to accelerated maturation and they disturbed grain filling. Today, this is becoming a problem. The temperature increase in June, July and August by 0.7^{o}C, 1.2^{o}C and 1.1^{o}C, respectively, or on the average for these three months by 1.1oC had the highest effects on crops in certain extremely dry years, such as1992, 2000, 2007 and 2012. If the data of the first decade of the 21st century are compared with data of the reference period (1961-1990) the difference of exactly 2^{o}C can be considered alarming. This is especially dangerous because these increases and a few heat waves increase nocturnal temperatures during July and August up to tropical temperatures not lower than 20^{o}C.

According to the detailed analysis of temperature and precipitation regimes on the territory of Belgrade in the 1991-2010 period and the analysis of average maize yields in Serbia proper, the following can be concluded: General global climate changes also affect the Balkan Peninsula including Serbia. Two most important climate parameters in agronomy, temperatures and precipitations, have been changing faster during the past two decades. The extremely dry years were 1992, 1993, 1998 and particularly 2000, 2003 and 2007.

The average temperature for the three summer months increased by 2^{o}C in the 1991¬2010 period compared to period 1961-1990. Heat wave with extremely hot summer days and tropical nights contribute to the yield reduction. The temperature increase did not resulted in the precipitation reduction. Rainfalls were shifted more towards the first decade of June and the last decade of August and in such a way they simply masked the actual moisture insufficiency in the critical period for maize that lasts from the mid June to mid July under our climate conditions.

According to the detailed analysis of the form and the intensity of dependence of maize yields on meteorological conditions done by the method of multiple linear regression and correlation the following can be concluded:

The air temperature increase in all observed periods (summer, growing season and the full-year period for the region of Belgrade) resulted in the maize grain yield reduction. This reduction was statistically significant only for the summer period. On the other hand, the increase of the precipitation sums was regularly accompanied by the statistically significant maize grain yield increase. Of the two observed meteorological conditions, the greater effect on the maize grain yield was expressed by the precipitation sums, especially summer and annual ones. Maize grain yield variations over meteorological conditions (average air temperatures and total precipitation sums) ranged from 0.5377 (growing season), over 0.5591 (full-year period) to 0.6744 (summer period).

The changes in temperature and precipitation regimes show that the growing season starts earlier in this region. Based on these analyses it is necessary to consider the adaptation of many cropping practices that indirectly can reduce damages from drought starting from the adequate tillage systems, dates, depths, methods and densities of sowing, fertilising, cultivation methods during the growing season and selection of hybrids resistant to drought stress conditions. Certainly, irrigation, as a measure with the direct effect, can most efficiently eliminate effects of drought.

Tablet. Mean temperatures and precipitation sums during the maize growing season in the region of Central Serbia (1991-2010)

Year	Mean temperature (^oC)			Total precipitation sum (mm)			Maize grain yield t ha^{-1}
	vi-vm	IV-IX	Year	vI-vIII	Iv-IX	Year	
1991	18.5	16.1	10.7	163.0	334.8	628.5	4.9
1992	23.4	19.4	12.3	247.8	351.2	586.2	2.7
1993	22.5	19.7	12.2	131.8	224.8	541.1	2.3
1994	23.1	20.4	13.6	348.8	484.3	683.6	3.0
1995	22.3	18.8	12.4	167.6	404.8	701.2	4.0
1996	22.0	17.8	11.1	159.2	427.2	788.8	3.0
1997	21.5	17.9	11.8	275.0	444.0	754.6	4.7
1998	21.8	18.5	11.7	159.2	348.9	627.1	3.1
1999	20.7	18.5	11.8	418.4	611.5	1030.4	4.3
2000	24.1	21.0	14.2	56.2	203.3	367.7	1.9
Average	22.0	18.8	12.2	212.7	383.5	670.9	3.4
2001	22.0	18.7	12.6	262.4	651.0	893.1	4.1
2002	23.3	20.1	14.1	249.0	375.0	585.0	4.3
2003	24.7	21.1	13.1	154.0	273.0	556.0	2.9
2004	22.0	18.9	12.8	288.9	466.5	822.9	5.0
2005	21.5	19.0	12.2	329.0	486.0	791.0	5.0
2006	22.2	19.6	13.1	282.0	445.0	745.0	4.3
2007	25.5	21.1	14.4	198.0	316.0	774.0	2.2
2008	23.6	20.3	14.4	155.0	319.0	597.0	4.3
2009	23.2	21.1	14.0	277.0	321.0	807.0	5.0
2010	23.4	20.1	13.3	275.0	452.0	853.0	5.0
Average	23.1	20.0	13.4	247.0	410.4	742.4	4.2
Difference	1.1	1.2	1.2	34.3	26.9	71.5	0.8

In order to better understand the extent of damage in Serbia, it is necessary to identify the economic sectors dependent on weather and climate. These are the sectors whose activities depend on the weather and climate, and at the same time have a large contribution to the Gross Domestic Products (GDP).

In the study ("Study on Economic Benefits of RHMS of Serbia", The World Bank Study Group, 2005, Belgrade, Serbia) weather dependent economic sectors in Serbia and the share of these sectors in the GDP are identified. Also, the mean annual economic losses from hydro - meteorological hazards[1] and unfavorable[2] hydro - meteorological events are estimated.

In the period from 2000 to 2004 share of the weather dependent sectors in national economy, without Kosovo and Metohija, (in % of GDP at 2002 constant prices excluding taxes, i.e. % of Gross Value Added, GVA) is from 42% to 43.8%. Already in 2005 share of the weather dependent sectors in the GDP was 47.18%. World Bank study included only

49% of weather dependent sector is not taken into account the damage caused by forest fires. However, 258 forest fires were registered during 2007. Fire is registered in the 33,000 hectares of overgrowth. Of the 16,000 hectares was under forests. Forest fires have caused damage of about 40 million Euros.Rehabilitation needs 24 million. Indirect damage is not evaluated. The selected sectors (agriculture, flood management, energy production – heating plants, road maintenance, and commercial air transport) make 49% of all weather-dependent
sectors. It was found that total annual economic losses from hydro - meteorological hazards and unfavourable conditions in selected sectors range from 200 to 600 million EUROS. In the study, human lives were treated as a moral norm, not as a statistical - economic category. Estimated damage in the weather dependent economic sectors, including human victims clearly shows that it is necessary to work on refining the weather warning system. In this way, RHMS of Serbia contributes to the strengthening of resilience* and capacity of the whole community in Serbia.

Drought monitoring and early warning systems:
In accordance with its tasks, Republic Hydrometeorological Service (RHMS) developed a system of monitoring and early warning that represents a basic component of national plan for protection and mitigation of effects of this natural disaster that endangers the whole region of southeast Europe. National network of principal meteorological stations with hourly meteorological observations and operative collection of hourly meteorological reports makes the basis of this system. On the basis of systematic monitoring and forecasting of weather, climate and agroclimatic conditions, the beginning, intensity and distribution of drought is timely defined as well as its potential influences on various economic and regional sectors.
For this purpose RHMS has developed and operatively used the following agroclimatic indices: Standardized precipitation index (SPI), Calculated values of moisture storage in the soil up to the depth of one meter; Palmer's Z index and Palmer's drought index (PDSI); Precipitation quantity expressed in the percentage of long-term average for month, season and vegetation period. Index value calculation is operatively carried out every day on the basis of hourly observations in national network of principal meteorological stations (30 stations on the territory of the Republic of Serbia that send collected coded SYNOP meteorological reports every hour). Calculation results of these and other agroclimatic indices are issued in regular and outstanding agrometeorological bulletins that are available together with other meteorological information and forecasts (short-range, medium-range, monthly, seasonal) and operative warnings via Internet and other communication means to farmers and manufacturing companies and Ministries for Agriculture, Water Management, Forestry, natural disasters protection, scientific institutions and other users.

Table 1: Meteorological data collected by RHMSS

Term measurements	**Periodical Daily measurements**	**Chronology of events**	**Agrometeorological data**
- Air pressure at the station - Air pressure on the station	- Maximum air temperature	- Identity, - intensity,	-Soil temperature (three terms)

- Dry thermometer temperature - Wet thermometer temperature - Relative humidity as per hygrometer - Wind direction - Wind speed - Sunshine duration - Precipitation quantity - Precipitation duration - Soil condition - Horizontal visibility - Quantity, description and amount of clouds -Phenomena in observation term	- Minimum air temperature - Minimum air temperature at 5 cm - Precipitation quantity - Precipitation type - Snow soil cover degree - Characteristics of snow cover surface - Total snow height - New snow height - Evaporation as per Piche	- intermissions - duration of phenomena	- Evaporation from water surfaces (two terms) - Evapotranspiration at the lysimetric station - Belgrade (automatic hourly observations) - Soil moisture at 6 depth levels up to 1 meter - Phenological observations

Table 2: Observation stations operated by RHMSS

Type of observation stations	Number		Connected to WMO GTS	Comments of 2010 network
	2007	2010		
Atmospheric domain				
Surface synoptic stations (> 8 obs./day)	31	60		
Manned stations	28	28	28	
AWS or AWOS	3	32	0	On-line stations
Cloud-height – automatic	0	0		
Agrometeorological stations	28	30		
Ordinary climate station (3 obs./d)	70	70		
Rainfall station (2 obs./d)	400	400		
Rainfall station – automatic	0	-		
Meteorological towers	0	0		
Upper air radio sond stations	1	1	1	LAN
Pilot balloon stations	1	0		
SODAR/RASS	0	0		
Wind profiler stations	0	0		
Lidar	0	0		
Access to AMDAR data	-	-		
Weather radars	3	3		
Hale radars	10	10		Occasionally available
Lightning detection stations	0	0		
Lightning detection hub station	0	0		

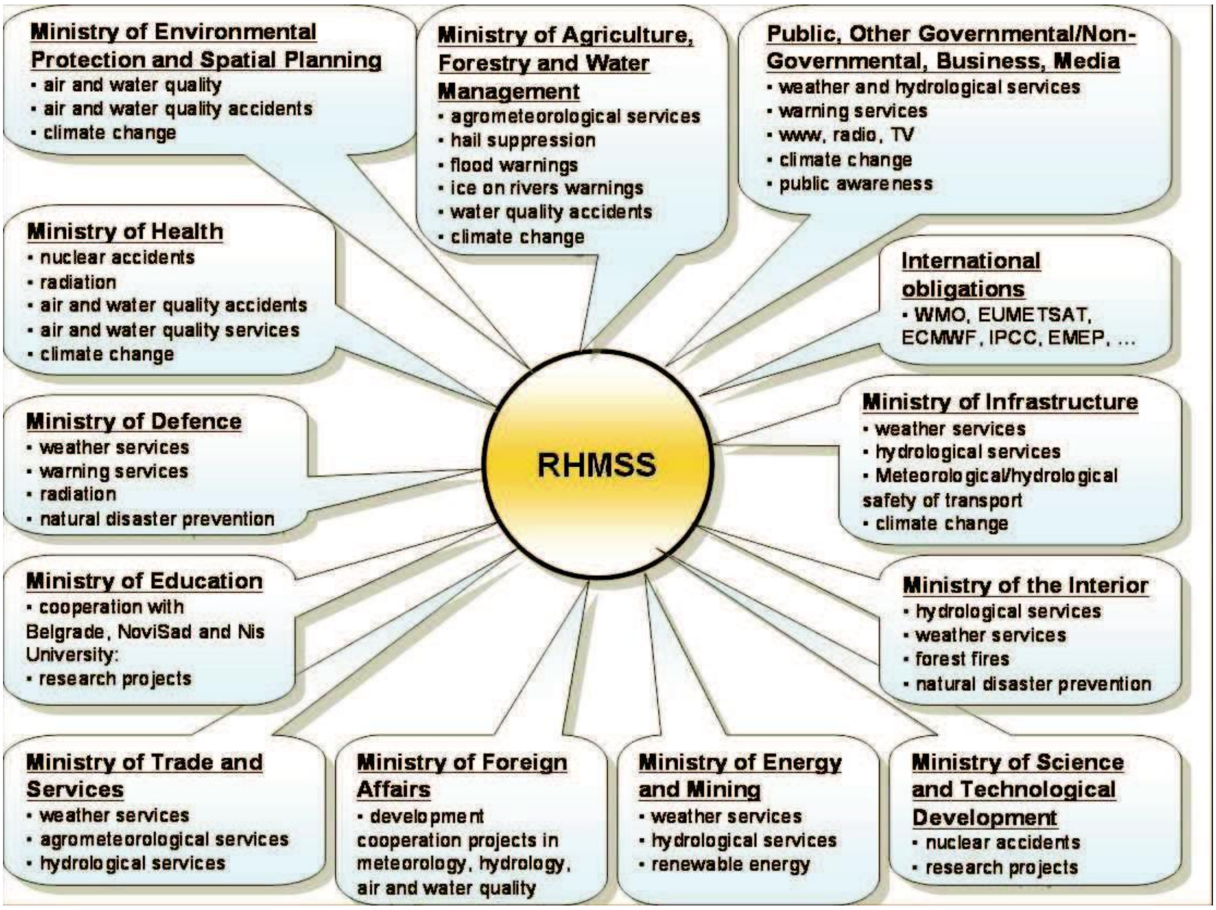
Satellite MSG ground station	1	1		
Hydrological domain				
Hydrometric station	185	200	21	60 sends data on-line
Stream gauge station – manual				
Stream gauge station – automatic				
Water level post – manual				
Water level station – automatic				
Environmental domain				
Air quality	24	24		
Water quality – surface water	149	149		12 real-time stations
Water quality likes and accumulation	33	33		
Ground water quality	68	68		
Nuclear radiation/deposition	NA	9		RHMSS only collects data
Ozone – near surface	1	1		In experimental phase
Ozone – upper air	0	0		
UV radiation	0	0		
GAW station	1	1		

The available data are used in the process of detection and monitoring of hydrometeorological hazards. Also, these data in combination with radar data are used in order to alert the warning.
The hydrological network consists of 5 regional station centers, which operate 119 surface water stations of the first order, 191 stations of the second order and 438 ground water stations. New technology is adopted during the latest years for discharge and water level measurements. In the network 66 stations located in main rivers monitor and send data in real-time and data from 41 of these are collected by automatic GSM system. Hydrological data observed by RHMSS are water level, water temperature, ice phenomena for surface water, and water level and water temperature for underground water: Hydrological data calculated by RHMSS are water discharge using rating curves.

RHMSS is connected to WMO-GTS via RMDCN network has been established with ECMWF, DWD Germany, Austrocontrol Wienna and Hungarian Met Service. RHMSS sends bulletins and messages of different types according to the WMO and ICAO manuals. The data-sharing protocols meet WMO, EU, EUMETSAT and EUMETNET protocols.

With regard to DRR activities, Republic Hydrometeorological Service of Serbia is responsible for the establishment and functioning of basic components of hydrometeorological early warning system as a part of National Protection and Rescue system coordinated by the Ministry of Interior-Sector for Emergency Management which, in disaster risk or disaster occurrence, activates, through the headquarters for emergencies, the proceeding pursuant to the adoption of the decision to declare emergency situation. The basic duty of RHMSS is to provide timely and reliable information necessary for the life and goods protection. For its operative work there are available products of global

numerical models and own operational regional weather and climate models.
In accordance with the Law on emergencies and Law on meteorological and hydrological activities, RHMSS, as a competent organization for operative functioning of the hydrometeorological early warning system, is responsible to make the vulnerability assessments within the scope of its work and to make risk maps for particular meteorological hazard and send them to the Ministry of Interior which is coordinator for the preparation of protection and rescue plans.
RHMS of Serbia is responsible for monitoring, detection, forecasting and issuing of warnings for the following hydro-meteorological hazards: Rotational high winds, Flash floods, Strong winds, Hailstorm, Thunderstorm or lightning, Heavy snow, Freezing rain, Dense fog, Heat waves, Cold waves, Drought, River flooding.



Operational linkages of RHMSS with other institutions in DRR

In the course of 2008, experimental development and operative implementation have been completed for the installation of early warning and alarm system against atmospheric and hydrological disasters and catastrophes for the territory of the Republic of Serbia, so-called “MeteoAlarm” and “HydroAlarm”. Serbian “MeteoAlarm” system has been included in the European Meteoalarm that represents one especially important EUMETNET program. Also, Serbia became a member of European Flood Alert System (EFAS).

RHMS is the host of sub regional South East European Virtual Climate Change Centre

(SEEVCCC) which was included in 2009, in accordance with the Resolution of WMO RA VI, in the Pilot program of European network of WMO Regional Climate Centers. One of the key functions of the Center relates to climate monitoring, seasonal forecasting and warnings (Climate Watch) on the occurrence of climate extremes and disasters as well as development of scenarios of regional climate change and research of climate change effects, vulnerability and adaptation options. The Center and RHMSS have signed agreements on expert-technical cooperation with majority of NMHSs in the region. Strengthening of regional cooperation in the field of climate change will certainly contribute to more efficient functioning of national meteorological, hydrological and climate early warning system.

Vulnerability assessment:

Droughts are most prevalent in the eastern portion of the country and the Pannonian Basin in the north; catastrophic droughts struck Serbia three times in the last 20 years. Mean damages, mainly to agricultural production, are estimated to reach 500 million € per year. A severe drought, coupled with the longest registered wave of extremely high air temperatures (10-17 days with temperatures from 35 to 45 degrees centigrade) occurred in July and August 2007.

Mainly triggered by droughts, wildfires are equally frequent and widespread during the dry summer season, threatening the 28% of Serbian territory covered by forests. Between 1998 and 2008, 853 forest fires burned an area of 16,357 ha. 258 forest fires were counted in 2007 alone, causing damages of approximately 40 million € burning more than 5200 ha.

Weather-dependent sectors are those sectors that are most dependent of the weather conditions and, at the same time, are critical to the national economy (high GDP share). GDP structure by sector in 2009 was: services 63.8%, industry 23.5%, agriculture 12.7%. Serbia's primary industries include processing of base metals, furniture, food processing, machinery, chemicals, sugar, tires, clothes and pharmaceuticals. The main Serbian agriculture products are wheat, maize, sugar beets, sunflower, raspberries, beef, pork and milk.

Sectors exposed to hydrometeorological hazards in Serbia

Sectors	Hazards affecting these sectors	Sensitivity
Agriculture	Hail, Strong wind, Flood, Late/Early frost, Drought	High
Production transmission & distribution of electricity and heating energy	Extreme low & high air temperature, Heavy precipitation especially wet snow, Thundering and lighting struck, Drought	Relatively high
Transport (road, rail, river and air)	Fog, Heavy rain, Snow, Slippery conditions (glaze, freezing, ice), River froze	Medium, But air High
Civil engineering (road	Strong wind and gust of wind, Heavy	Relatively low

construction and bridges, water engineering, building construction…)	precipitation, Frost, Thundering and lighting struck	
Water resources	Drought and Flood	Relatively high
Tourism and trade	Every deviation of normal climatologically and weather seasons	Medium

The agriculture sector is one of the most important sectors in the Serbian economy. Primary production from agriculture accounted for approx. 12.7% of GDP in 2009. Over two thirds of the total land area of Serbia is agricultural land and two thirds of the population in rural areas are involved in agriculture. Characterized by rich land resources and favorable climate, agriculture represents a vital sector of the Serbian economy.

A variety of different favorable natural conditions result in a high diversity of agricultural production. There are three broad agricultural regions that can be distinguished in Serbia on the basis of geography and climate, land quality, farm production systems, and socio-economic development, namely: Vojvodina, Central Serbia and Southern Serbia. Serbian terrain ranges from the flat and

Drought is a real threat for Serbian agriculture. For example, according to the evaluation of drought impacts on the crop yield in east Serbia in the period 1989–2000, the average drop in yield was 40.9% in comparison to the average annual yield in the years without drought. Bearing in mind the projected increase in air temperature and decrease in precipitation, it was concluded that agricultural production will be very vulnerable to climate change in the future. The assessment of potential climate change impacts on agriculture in Vojvodina generally indicate a high level of vulnerability of agricultural production to extreme weather conditions and systemically modified weather conditions, as well as of the damage that could cost millions. Also, the results of the crop production model SIRIUS showed that, in case of the climate change scenario A2, the yield of winter wheat in Vojvodina in 2040 and in 2080 will have dropped by 5–8% and 4–10%, respectively, relative to the average yield in the period 1981–2005.

Estimated losses in Serbia caused by unfavourable hydrometeorological events

Sectors and Hazards	**Evaluated losses**	
	Mean annul economic losses (million €)	**Human losses**
Agriculture - Flood	From 38.75 to 106.25	Few, up to 10
Water Resource Management - Flood	About 24.5	---
Agriculture – Hail, Heavy rain and strong winds	About 91.45	Few, up to 10, thunderstruck
Agriculture – Drought	About 500	No losses
Energy Production (heating plants) – Extreme low air temperatures	About 8.95	Few, up to 10

Road maintenance – Snow, slippery conditions (glaze, freezing, ice)	About 43.75	-------
Human losses on highway, regional roads and local roads due to bad weather: from 105 to 131		
Commercial air transport	From 0.675 to 0.9	----
TOTAL	From 208.1 to 607.15	From few to 160

Regarding the water sector, the territory of Serbia covers two main river basins: From the territory of Serbia, the waters gravitate towards the Black Sea (the rivers of the Danube basin), the Adriatic Sea (the Drim and the Plavska Rivers) and towards the Aegean Sea (the Pcinja, the Dragovistica and the Lepenac Rivers). Southern, south–western and western parts of the country are richer in water than the northern, central and eastern regions. Flood protection is the most important aspect of defense against the harmful effects of water, due to the fact that in the flood–prone areas, about 1.6 million hectares, are situated over 500 larger settlements, more than 500 large commercial building, around the 1,200 km of railway and more than 4,000 km of roads. In order to protect from flooding, over 3,400 km of dams were built and river regulation of about 420 km was realised. However, long–term/multiannual investment reduction in the maintenance of facilities and of riverbeds has led to a reduction in the security and level of protection from the destructive effects of water. Due to lack of maintenance of riverbeds, embankments of waterways under a torrential hydrological regime are threatened.Climate change is expected to affect water resources in many different ways. A preliminary assessment of climate change effects on the water resources indicate that a decrease of water flow on the national level is to be expected in the forthcoming period caused by decrease in annual precipitation. It should also be taken into consideration that the above projections show that climate change might cause more intense flood and drought episodes, greater both in scope and-duration.

Emergency relief and drought response:

The Indemnity Fund (IF) is an implementing agency of the Ministry of Agriculture. IF deals mainly with insurance and compensation in case of disasters. Drought, hail and strong precipitations are the priority hazard for insurance. The Ministry of Agriculture covers the 40% of insurance costs for the farmer. A pilot insurance project in Serbia is developed with Delta Generali and Swiss Re. RHMSS participate in this project, by providing meteorological data and analysis. Insurance companies collect data on damages in agriculture and as stated by the agreement they should provide them to RHMSS. The IF in collaboration with the Institute for statistics and the Institute for Science in Agriculture are developing the project for the “Establishment of the Serbian Farm Accountancy Data Network (FADN)” in the framework of IPA 2010 programme. The system of agricultural accountancy data to be developed aims to monitor the level of income and expenses of the registered farms and family farms, assess the efficiency of agricultural production and analyze the agricultural policy measures. The interesting aspect, concerning drought risk assessment is the establishment of a general database containing useful information for drought vulnerability assessment. The current phase doesn’t foresee the development of a GIS, but only a statistical database organized geographically by Region and thematically per value of output and type of farm.

Emergency relief and drought response:

Currently, there are few other organizations archiving drought or flood related information: Republic Committee for Disasters; Ministry of Interior, Sector for Emergency Management; “Srbija Šume”, Republic Directorate for Forestry; Ministry for Agriculture, Forestry and Water Resources, Directorate for Water, Flood Protection Sector.

Practices to alleviate drought impacts:

RHMSS used drought impact data on agriculture as feedback for validation/calibration of the drought monitoring system. RHMSS has analyzed drought/flood impact data also within the Program of adaptation measures of the First national report for UN Framework Convention on Climate Change and the spatial plan of the Republic of Serbia. In the framework of the Delta Generali insurance project, the data on damages collected by the insurance company will be shared with RHMSS.

RHMSS provides and disseminates drought and flood information on regular basis. After all, some drought and flood information (relevant data sets, studies etc.) are delivered upon the request of various users. Most of drought and flood information, which are prepared on regular basis, are free. Users cover expenses of arrangement of the response to special requirements.
utputs of RHMSS drought monitoring and analyses (indices and other relevant parameters, assessment of drought consequences, studies, etc.) are utilized by various users. There is a whole spectrum of usages for this information: from planning of field operations and plant protection activities to medium-term and long-term planning of agricultural production and economic ambient and policy. Almost there is no formalized feedback mechanism. Nevertheless, RHMSS takes into account feedbacks received on occasion of contacts with users any time when content of information is discussed. Demands received by feedback are incorporated into the further hydrological information and forecasts (specific forecasting locations, extended forecasting period, etc…). Increased demand for more specific and challenging products is noticeable, e.g. detailed spatial analyses, high resolution maps, outputs from crop yield and plant disease/pest models, long-range drought forecasts, as well as assessment of the effects of expected climate changes on the various aspects of agricultural production. In case of flood information, estimation is that information fully meets the users’ expectation in almost any case.

The need for knowledge and skills on drought management:

1. Coordinated DRR research should be undertaken to improve methods for predictive multi-risk assessments and socioeconomic cost–benefit analysis of risk reduction actions at all levels. These methods should be incorporated into decision-making processes at regional, national and local levels. Strengthen the technical and scientific capacity to develop and apply those methodologies, studies and models, including the improvement of regional monitoring capacities and assessments.

2. To encourage mainstreaming of disaster risk reduction into national educational curriculum by establishing Curriculum Revision Working Group composed of the representatives from the Ministry of Education, from the Sector for Emergency Management of the Ministry of Interior, the Republic Hydrometeorological Service of Serbia, the Republic Seismological Institute of Serbia, other respective line Ministries, the Serbian Red Cross, NGOs, international organisations, expert organizations and individuals as well as research and education institutions.

3. To further strengthen operational cooperation of the Sector for Emergency Management of the Ministry of Interior and the Republic Hydro-meteorological Institute of Serbia through joint training and improvements to the standard operating procedures across agencies linked to the different threat levels and lessons learnt from each disaster event.
To develop national capacities for climate services to support medium and long-term sectoral planning through strong collaboration and cooperation across line ministries and with the Republic Hydro-meteorological Service of Serbia, and through enhanced regional cooperation with other South Eastern European and EU countries and Centres.