SECOND NATIONAL CONSULTATION DIALOUGE in Lithuania

1. General Data

Country:	Lithuania
Organizer:	GWP-Lithuania/Public Establishment "Vandens namai"
Date & Place:	20 November 2014 Radisson Blu Hotel Lietuva, Konstitucijos ave. 20, Vilnius, LT-09308
Participants:	Attached separately (Annex 2)
Attachments:	Agenda (Annex 1), List of participants (Annex 2)

2. Agenda

Objective : Presentation and discussion draft Guidelines for Drought Management Plans with the aim to contribute to its completion – elaboration of comments to the Guidelines and provide national experience according to the templates in Annexes I – VI

Special objectives:

to present first results of IDMP, discuss draft drought management guidelines

Agenda:

See annex 1

Main points of discussion:

- general issues of climate change;
- impact of climate change on water resources of Nemunas River Basin District (Lithuania and Belarus);
- impact of climate change on groundwater resources of Klaipeda area, west Lithuania;
- flood risk management in Lithuania;
- presentation of first results of GWPCEE IDMP;
- presentation and discussion of draft guidelines for drought management;
- demonstration of videos on small retention measures and IDMP CEE.

3. Report (max 3000 characters)

29 participants from various institutions (NGO, academia, governmental) attended the 2nd dialogue on drought management. Six presentations were made (see in Annex 1), and videos on small retention measures and IDMP CEE were demonstrated.
GWPCEE "Guidelines for Drought Management Plans" have also been discussed.
It was agreed that drought management is far beyond the responsibilities of one institution, e.g. Ministry of Environment, as drought impacts various social and economic sectors (environment, agriculture, forestry, hydropower, some water consuming industries, etc.). Therefore drought management should be carried out by the inter-institutional body (committee).

4. Conclusions

Outcome of the public consultation:

Participants agreed to contact the Lithuanian Environmental Protection Agency, responsible institution for preparation and implementation of the river basin management plans, asking if they will agree to include chapter on drought management into the second river basin management plans for 2015-2021 which are under preparation at the moment. In case of positive response from EPA, drought expert team will compile a chapter on the importance of drought management for river basin planning.

Brief information about actual status of production of DMP:

Chapter on drought management will be compiled and included into the river basin management plans for 2015-2021

Proposals for further steps focused on elaboration of (comments to the draft of the Guidelines and national experience according to the templates in Annexes I – VI):

Templates for elaboration of the national experiences included into Annexes of the Guidelines

Annex I: Examples of the national methodologies for assessment of historical drought
STEP 4 (section 3.4.2 of the Guidelines)

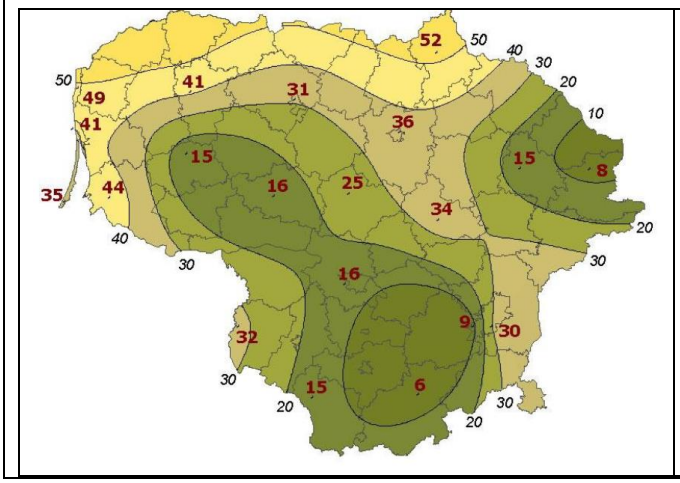
Country: Lithuania

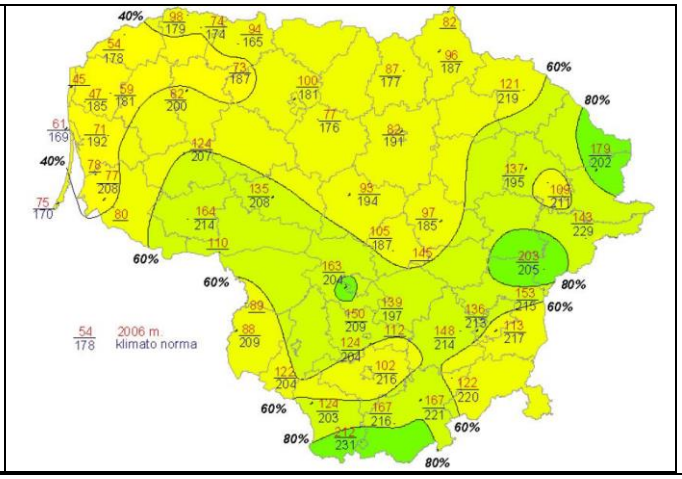
Indicators used for the historical data assessment:

The main diagnostic tool for identification severity of drought in Lithuania was the hydrothermal coefficient (HTC) of Selyaninov (Table 1). Supporting index is the length (persistency) of period without precipitation. Both indices described in table 1.

Table1. Characteristics of drought (dryness) indices used for official drought recognition in Lithuania

No.	Index (indicator) name	Index construction technique	Advantages	Disadvantages	Application area
1.	***Hydrothermal coefficient (HTC)***	Based on the sum of precipitation and the temperature for particular period Input data: - precipitation; - temperature.	- easy to use - enough accurate - applicable to the droughts or wet spell of different duration	- no soil data included - not applicable for comparison of two or more different regions	In use for the official drought warning Involved in many regional climate diagnostics applications
2.	***Persistency of dry spell (PDS)***	Period without precipitation ≥30 days with exception of daily precipitation rate not exceeding 0.5 mm	- very simple - comparable between different sites and areas - easy interpretable	- not always has links with real droughts - contains no information about preconditions as well as about precipitation climatology	In use for the official drought warning Serves as simple drought diagnostic tool in many environmental applications





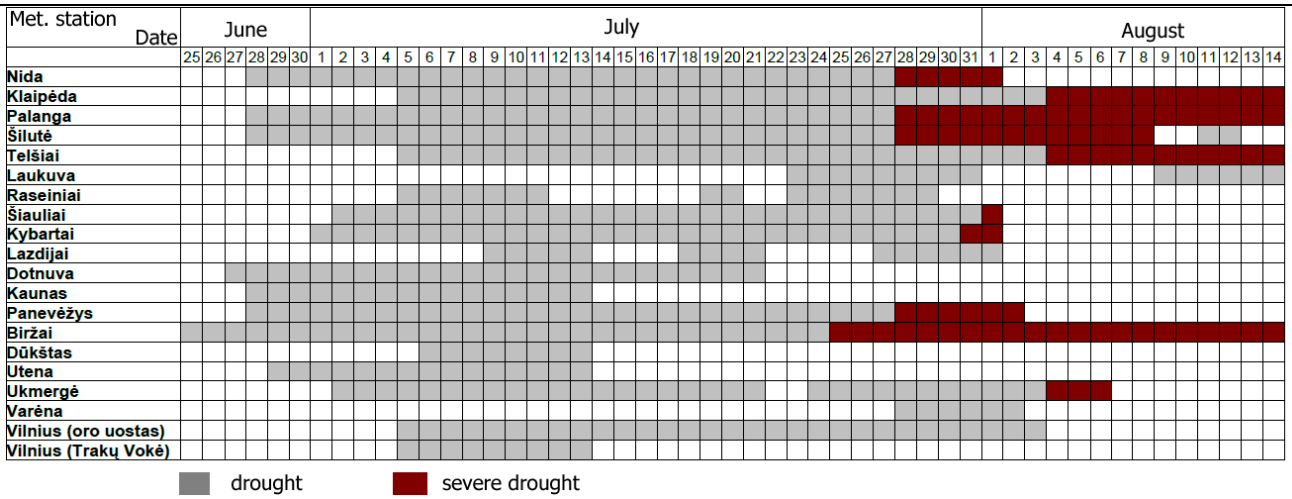


Fig.1. Drought visualisation for summer 2006 in Lithuania. Drought duration, in days (upper left), seasonal precipitation amount for MJJ 2006, in mm, the climate norm for the same season and deviation from the norm, in percent (upper right) and length of drought and severe drought during summer months. (Source: archive of LHMS).

Annex II: Examples of the national drought indicator systems
STEP 4 (section 3.4.3 of the Draft Guidelines)

Country: Lithuania

Parameter/indicators included or proposed into the national drought indicator system:

According special meeting (8-11 December 2009) organised by WMO fifty four experts from all regions agreed on the use of a universal meteorological drought index for more effective drought monitoring and climate risk management. They decided, that the Standardized Precipitation Index (SPI) should be used to characterize meteorological droughts by all National Meteorological and Hydrological Services around the world. Therefore, Lithuanian Hydrometeorological Service (LHMS) is going to change an existing oficial methodology for the drought onset and length inditification: according WMO recomendations as well as of findings of researchers fromVilnius university and Aleksandras Stulginskis University (former agricultural university) they intend to replace HTC index with SPI. There were also proposed an Effective Drought Index (EDI) for meteorological drought detection, intensity and duration analysis as well as for its temporal variability and hazard assessment. Drought, particularly meteorological drought, also could be monitored using well known conventional climatological tools – indices. One of them is percent of normal (defined precipitation climatology) and other reflects precipitation series ranges (Table 2).
Other problems related to droughts in Lithuania are: forest fires and the low run-off conditions. For the forest fires risk monitoring LHMS uses Forest Fire Risk Index . At present time, during warm season the forest fire risk is assessed and published daily by LHMS for different administrative regions and/ or different forest enterprise activity areas. The threshold measure for the rivers low run-off is the environmental water flow (EWF) volume defined for different streams (rivers) at the different cross-sections. Additional two indices proposed for hydrological drought: the Standardized Runoff Index (SRI) and the Flow Duration Curve (FDC). The first is designed for hydrological drought mapping, while later – for hydrological drought detection, intensity and duration analysis, also for detection of its temporal variability and hazard assessment.

Methodologies used for evaluation of the chosen parameters/indicators:

Standardized runo-off index (SRI) as the unit standard normal deviate associated with the percentile of hydrologic runo-off. Calculation of SRI follows the general approach employed to SPI. Like the SPI, the SRI can be calculated for runo-off totals accumulated over different durations (e.g., 1-month, 3-month), and for different spatial

aggregations depending on source runo-off data resolution and desired application. The flow duration curve is a plot that shows the percentage of time that flow in a river is likely to exceed some specified value of interest. For example, it can show the discharge of the river that occurs or is exceeded some percent of the time (e.g., 10% of the time). Forest Fire Risk Index is very universal, however additional information is required - natural flammability class factor, which depend on prevailing forest type (also on soil structure, stands bonitet etc). The characteristics of other proposed drought indices are presented in table 2.

Table 2. Characteristics of proposed drought (dryness) indices to be introduced into the national drought indicator system in Lithuania

No.	Index (indicator) name	Index construction technique	Advantages	Disadvantages	Application area
1.	Percent of Normal (PN)	Based on precipitation climatology Input data: - precipitation.	- one of the simplest measurements of dryness - very effective when used for a single region or a single season	- the mean precipitation is often not the same as the median precipitation - non comparable between different areas	Widely used in operational work as well as in academic research in defining wetness or dryness anomalies
2.	Deciles (PD)	Arrangement of monthly precipitation data into deciles Input data: - precipitation	- provides an accurate statistical measurement of dryness - good for extreme wet and dry periods	- accurate assessment requires a long climatic data record	Well known in scientific papers and academic research, however negligible usage in operational service
3.	Standardized Precipitation Index (SPI)	Based on the probability of precipitation for any time scale Input data: - precipitation	- can be computed for different time scales - can provide early warning of drought and drought severity - accurate but less complex than PDSI - allows comparing drought severity in regions with very different climates	- values computed on preliminary data may change	Advised by EC. Widely used in operational analyses as well as in scientific research however no applications in the national early warning systems
4.	Effective Drought index (EDI)	Based on precipitation amount needed to recover from the accumulated deficit since the beginning of a drought	- can be computed for different time scales - can provide early warning of drought and drought severity - easy to use - enough for identification of short-term drought	Uncertainties in climates with long periods with solid precipitation	Increase of usage during last 10 years however for research purposes only
5.	Streamflow Drought Index (SDI)	Based on calculations of the total	- can be computed for different time scales - can provide early	Unable to represent long term dryness	Comparatively new index, recently applied in various

		monthly discharge starting from the beginning of the hydrological year	warning for low flow conditions - good correlation with SPI	dynamics	environmental research Currently the index is adapted for Lithuanian conditions

Annex III: Examples of the national drought classification and early warning systems
STEP 4 (section 3.4.4 of the Draft Guidelines)

Country: Lithuania

Indicators included into drought warning system; thresholds for chosen indicators for four drought stages (normal, pre-alert, alert, emergency):

National drought warning system still based on two indices: HTC and PDS (table 1). Drought as extreme weather event is recognised only for vegetation season (from April to October). Official drought is identified (officially announced) when HTC fall below 0.5 and soil moisture reserve (SMR) is less than or equal to 10 mm and 60 mm at the upper soil layer (0- 10 cm) and 1 meter thick layer (0-100 cm) respectively. When such hydrothermal conditions persist at least for one month LHMS announces drought at a particular area; when such conditions expand for more than 1/3 of Republic territory – this is named as severe drought (some sort of natural disaster). Threshold values of HTC for drought alert are presented in table 3.

Table 3. Interpretations of HTC index values for drought warning in Lithuania.

HTC index	Interpretation
0.6 – 0.7	Dry conditions
0.4 – 0.5	Drought
< 0.4	Severe drought

Answer on questions:

- *Is monitoring system sufficient for running of early warning system or requires upgrading ?*

System requires upgrading involving more drought indicators as well as more complex decision making algorithms

- *Are there technical means available for timely dissemination of warnings?*

More or less they available in operational use

- *How often should be actual data updated – daily or weekly?*

Data have to be updated daily.

Annex IV: Examples of national organizational structures to deal with drought
STEP 1 (section 3.1 of the Draft Guidelines)

Country: Lithuania

Competent authority:

Proposed composition of Drought Committee indicating involvement of all actors on three levels:

- *governing level*
- *professional level*

- *affected stakeholders*

Scheme of organizational structure for drought management is recommended:

Annex V: Examples of national program of measures for preventing and mitigating drought
STEP 4 (section 3.4.5 of the Draft of the Guidelines)

Country: Lithuania

List of the measures identified on the base of the national situation in drought management structured at least into three groups:

- *organizational*

As an example of the national organizational measure for drought preventing and mitigation is an existing (since 2009) "The early warning system of natural disasters". The system was developed within Lithuanian Hydrometeorological Service under the Ministry of Environment of the Republic of Lithuania (LHMS) and includes warnings for agrometeorological phenomena, very high temperature (t ≥ 30°C), and risk of forest fire that can be directly linked to the drought. This system gives alerts for 72 hours ahead. The system is very similar to the existing pan-European Eumetnet system called "Meteoalarm" (http://www.meteoalarm.eu/) however have structural differences.

- *operational*

no

- *preventive*

Determination of adequate ecological flows for problematic river ranges and upstream (water quality, blooming) and downstream (too low water levels and water discharges) from the run-off regulation facilities (dams, HPS ect).

Management of wetlands: limited agricultural use of wetlands and restoration of degrading wetlands. Example – completed WETLIFE project "The project aims at reducing "environmental debt" by restoring hydrology in Amalvas and Žuvintas wetland complexes affected by peatland drainage and water level regulation in the lakes; and promoting sustainable farming in Natura 2000 site - Žuvintas biosphere reserve".

A state re-insurance mechanism to encourage the insurance undertakings to offer drought insurance and the agricultural entities to insure their crops against drought. This re-insurance mechanism should reduce the demand for funds from the State budget (reduce the need for state compensation granted to farmers for losses caused by adverse weather conditions) and promote competition among insurance undertakings. All description of guidelines for insurance payments for losses caused by drought is presented in "Decision for state aid Partial compensation for costs of insurance undertakings resulting from
the payment of insurance payments for losses caused by drought. EC State aid/ Lithuania Aid no N 682/2007"

The example how to develop program of measures is provided in Annex V of the Guidelines (Slovak proposal)

Annex VI: Examples of the national research programme supporting drought management
STEP 6 (section 3.6 of the Draft Guidelines)

Country: Lithuania

List of suggested actions for the national research program supporting drought management (eventually supplemented by short description of the action):

- development of methodology for drought risk analysis, determination of association between drought indices and impacts, identification of drought hazard risk areas;
- climatic change assessment methodology with regard to drought occurrence and its severity;
- determination of environmental (ecological) flow thresholds for national water bodies according WFD Common Implementation Strategy guidelines;
- promote modeling studies for the coupled atmospheric, soil (vegetation) and hydrological processes.

Annex 1

Global Water Partnership
Central and Eastern Europe
Lithuania Water Partnership

NACIONAL CONSULTATION DIALOGUE: IMPACT OF CLIMATE CHANGE ON WATER RESOURCES OF LITHUANIA

Date: 20 November 2014

Venue: Radisson Blu Hotel Lietuva, Konstitucijos avenue 20, Vilnius, LT-09308

PROGRAMME

14:00-14:10 Introduction. Dr. Bernardas Paukštys, GWP- Lithuania
14:10 – 14:30 Do we really need to mend up the sky? Global climate change impacts. Professor Arūnas Bukantis, Vilnius University, Department of Hydrology and Climatology.
14:30 – 14:50. Impact of climate change on water resources of Nemunas River Basin District in Lithuania and Belarus. Associated Professor Edvinas Stonevičius. Vilnius University, Department of Hydrology and Climatology.
14:50-15: 10. Impact of climate change on groundwater resources of Klaipeda area, West Lithuania. Dr. Marius Gregorauskas, Vilnius University, Department of Hydrogeology.
15:10 – 15:30. Flood risk management in Lithuania. Dr. Simonas Valatka. Center for Environmental Policy.
15:30-16:00 Coffee Break
16:00 – 16:30 First results of GWP CEE International Drought Management Programme. Associated Professsor Gintautas Stankūnavičius. Vilnius University, Department of Hydrology and Climatology.
16:30- 17:30 Demonstration of videos on small retention ponds and IDMP. Presentation of GWP CEE „Guidelines for Drought Management“. Dr. Bernardas Paukštys. GWP-Lithuania.
17:30- 18:00 Discussion

Annex 2. List of Participants

No	Name, surname	Institution
1	Gintautas Stankūnavičius	VU GF Hidrologijos ir klimatologijos katedra
2	Arūnas Bukantis	VU GF Hidrologijos ir klimatologijos katedra
3	Edvinas Stonevičius	VU GF Hidrologijos ir klimatologijos katedra
4	Marius Gregorauskas	Vilnius universitetas/ UAB Vilniaus hidrogeologija
5	Simonas Valatka	Aplinkos apsaugos politikos centras
6	Andrius Litvinaitis	Vilnius Gedimino technikos universitetas
7	Vaidotas Kisielius	Aplinkos ministerija
8	Julius Taminskas	Gamtos tyrimų centras
9	Bernardas Paukštys	VšĮ Vandens namai
10	Lina Bagdžiūnaitė-Litvinaitienė	Vilnius Gedimino technikos universitetas
11	Audronė Pumputytė	Aplinkos apsaugos agentūra
12	Jurgita Stankevičienė	Aplinkos apsaugos agentūra
13	Jolanta Krasovskienė	Aplinkos apsaugos agentūra
14	Vahanas Grigorianas	Aplinkos apsaugos agentūra
15	Simona Daugintienė	Aplinkos apsaugos politikos centras
16	Donatas Valiukas	Lietuvos hidrometeorologijos tarnyba
17	Jurga Arustienė	Lietuvos geologijos tarnyba
18	Rasa Radienė	Lietuvos geologijos tarnyba
19	Jurgita Kriukaitė	Lietuvos geologijos tarnyba
20	Vytautas Belickas	UAB Sweco
21	Aleksandras Kajutis	Lietuvos hidrometeorologijos tarnyba
22	Justinas Klipys	Lietuvos hidrometeorologijos tarnyba
23	Indrė Venciuvienė	Lietuvos hidrometeorologijos tarnyba
24	Rima Sajienė	Lietuvos hidrometeorologijos tarnyba
25	Janina Brastovickytė	Lietuvos hidrometeorologijos tarnyba
26	Aistė Krinickaitė	Vilniaus Gedimino Technikos Universitetas
27	Kazimieras Dilys	Gamtos tyrimų centras
28	Anicetas Štuopis	UAB Grota
29	Laimonas Januška	VU GF Hidrologijos ir klimatologijos katedra