

Knowledge transfer on drought issues due to climate change for Armenia

– Visegrad 4 project –

A webinar on

Drought management from legal and technical perspective in Hungary

27th June 2023

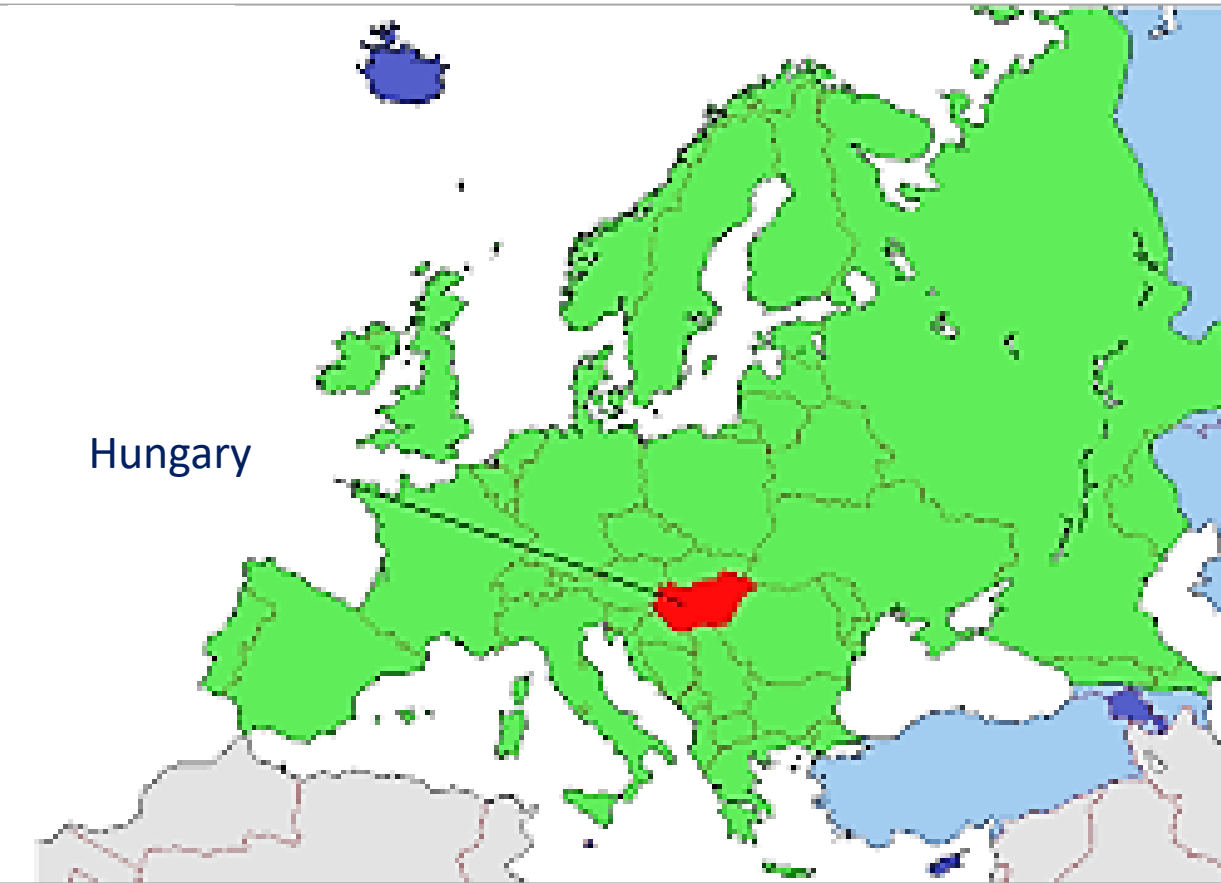
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Overview

- Water related challenges in Hungary
- The answers to complex water management challenges:
 - Integrated water resources management (IWRM)
 - Integrated Drought Management (IDM)
- Legal and technical regulations in Hungary using the IWRM and IDM principles



Hungary

Area: 93 070 km²

Population: 9 604 000

Danube River Basin

Major rivers:

Danube
Tisza
Dráva

Major lakes:

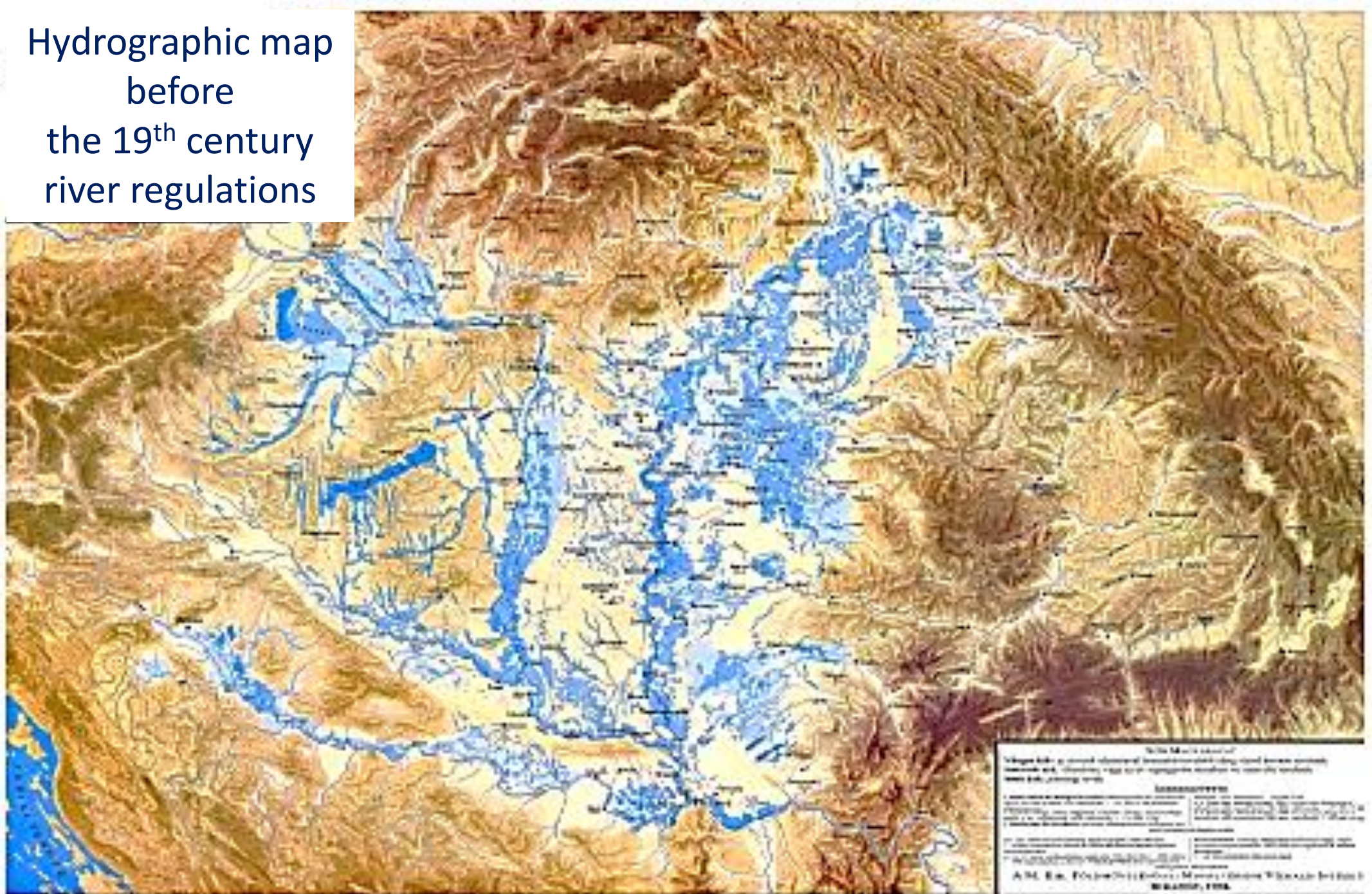
Lake Balaton
Lake Velencei
Lake Fertő

Water resources in Hungary:

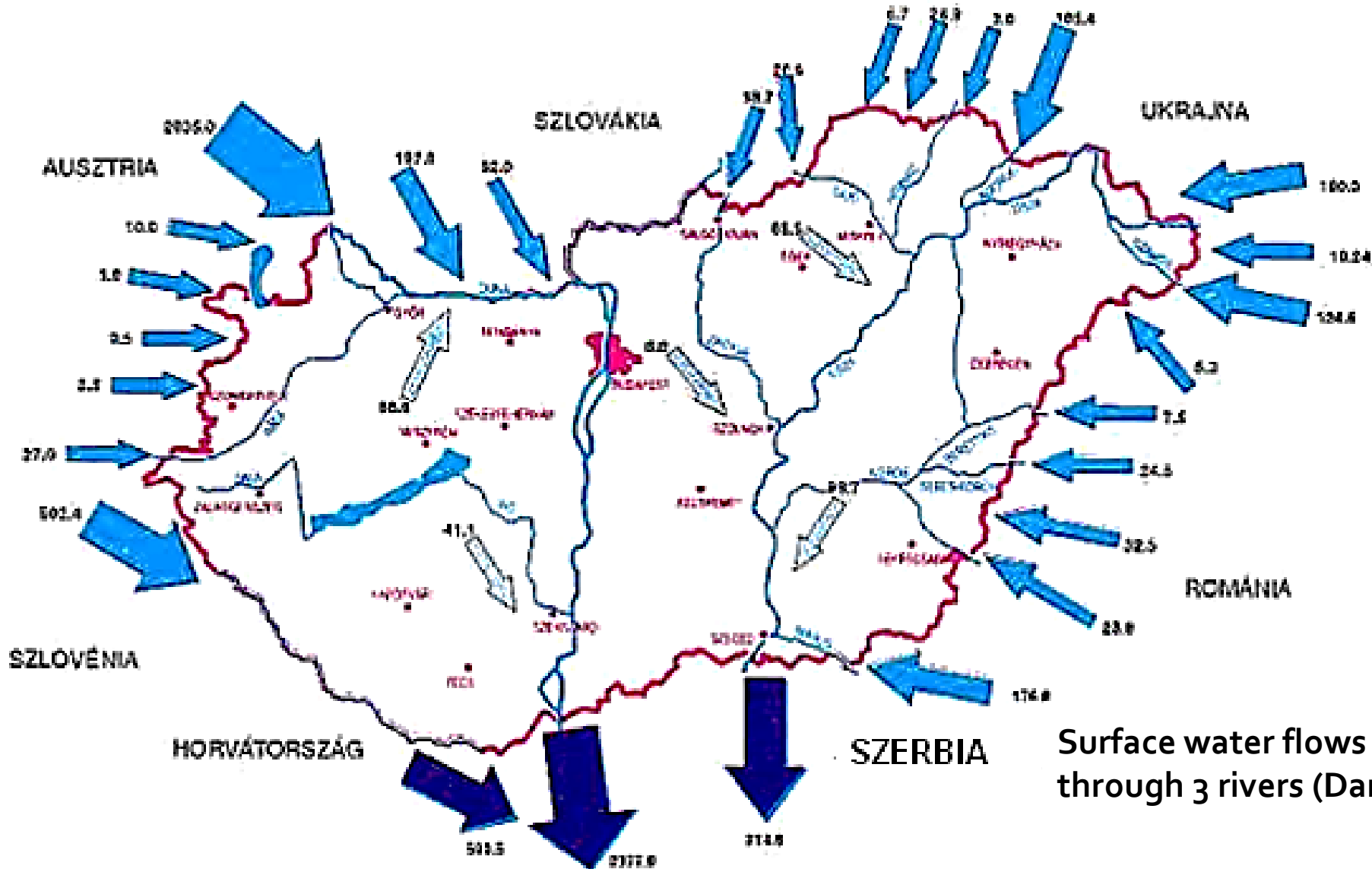
Surface: 120 km³
Subsurface: 3 000 km³



Hydrographic map
before
the 19th century
river regulations



Rivers entering and leaving Hungary



95% of surface water comes from upstream countries

In flow: 112 km³/y



+ Precipitation: 56 km³

- Evapotranspiration: 49 km³

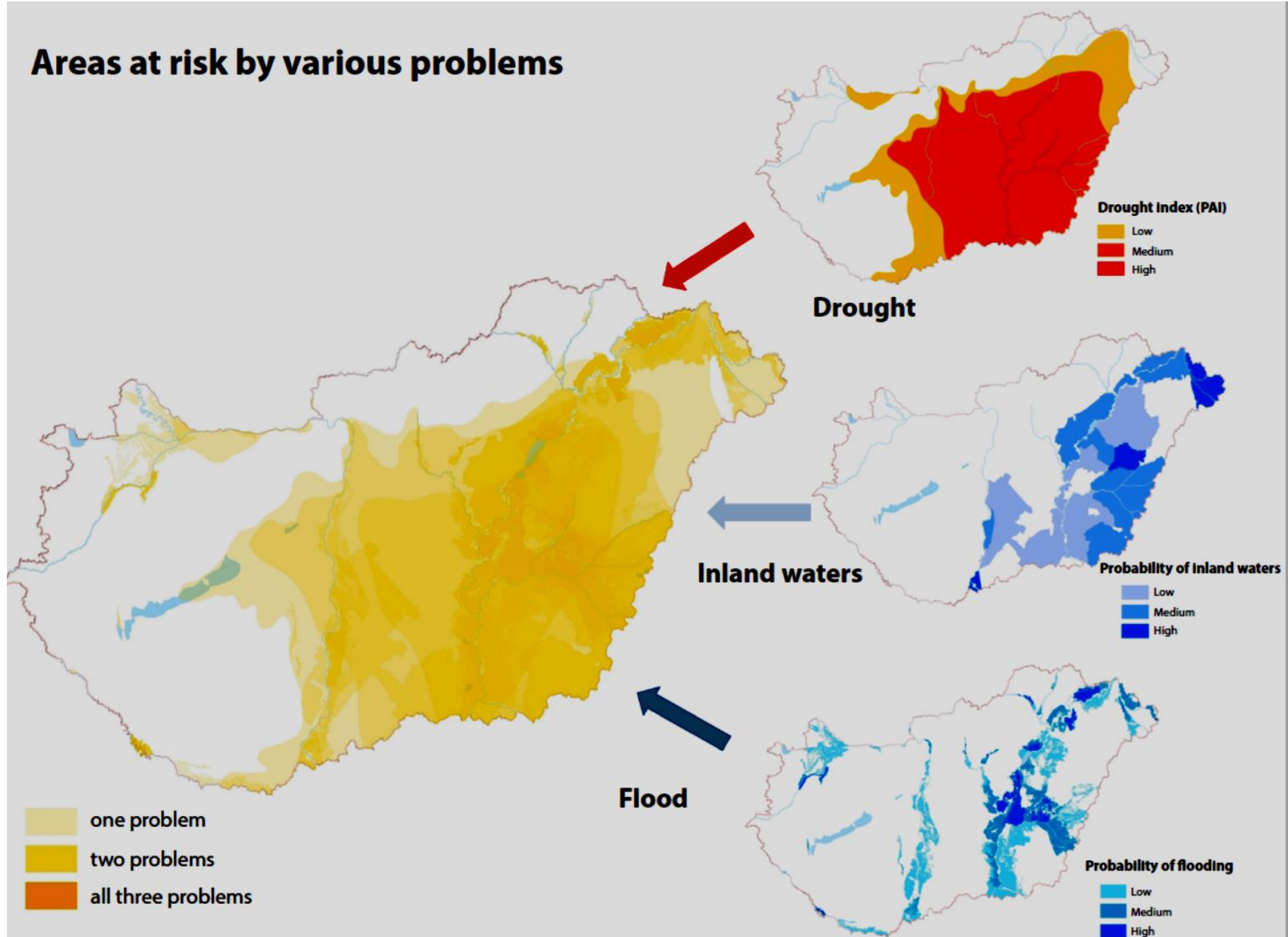
- Water usage: 2 km³

Out flow: 117 km³/y



Surface water flows out of the country only through 3 rivers (Danube, Tisza, Dráva)

Areas at risk by various problems



Lake Balaton



Balatonfenyves - **10th August 2010** at 111 cm

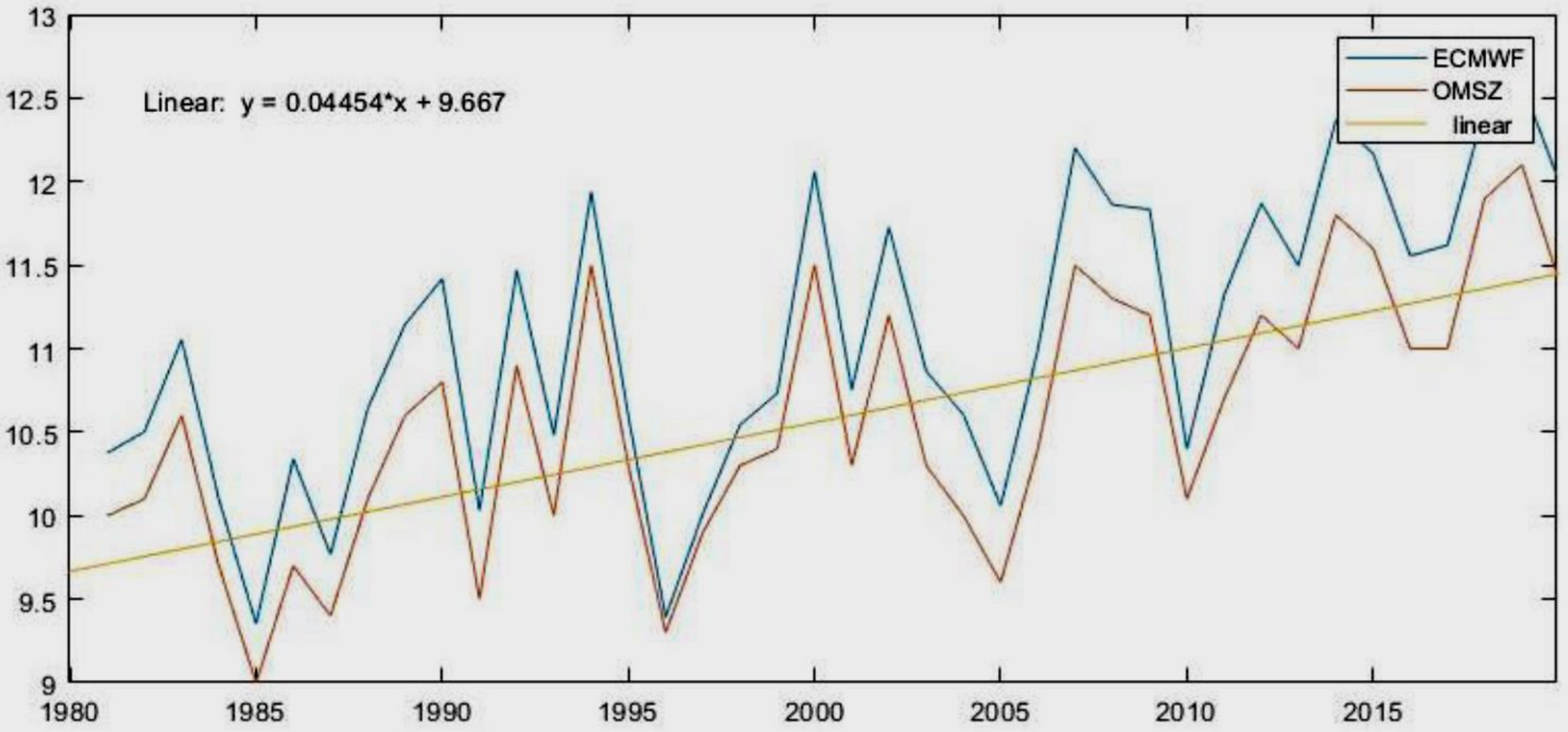


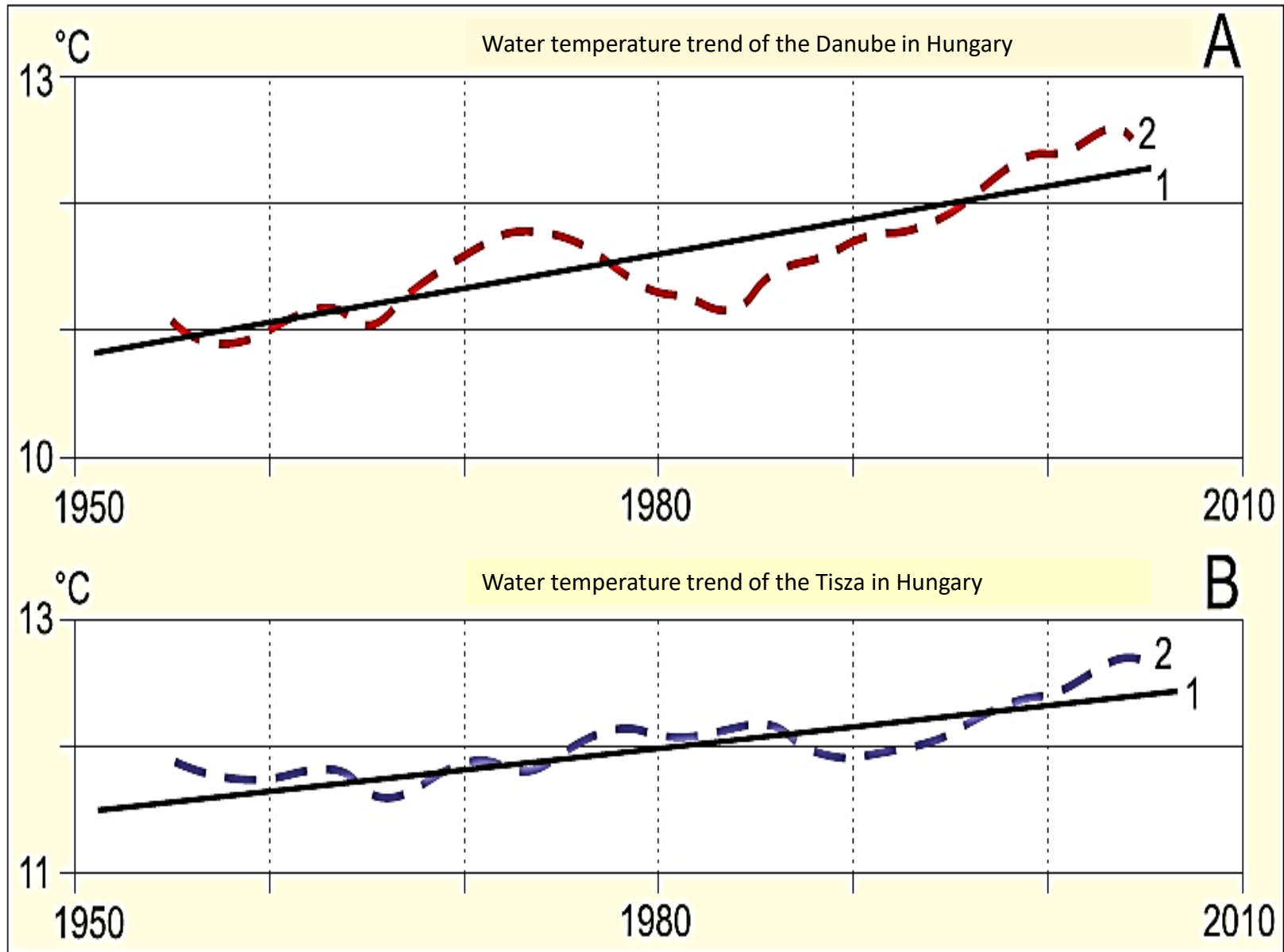
Balatonfenyves - **11th October 2012** at 39 cm

Drought on rivers in 2022



Yearly average air temperature °C





Water related challenges in Hungary

- **Floods and droughts:** Hungary is intensively prone to both floods and droughts.
- **Water scarcity:** particularly during the summer months. This is primarily due to high agricultural water consumption, industrial activities. and public water supply.
- **Groundwater depletion:** Overexploitation of groundwater resources is a significant concern in Hungary.
- **Water pollution**

Water Management

Water damage prevention

Protection against destructive waters

1. Flood protection, high water river training
2. Low- and medium flow river training
3. Stream regulation
4. Gully improvement
5. Sediment retention

Drainage of harmful waters

1. Mountainous - and hilly drainage
2. Lowland drainage

Protection of water quality

1. Sewerage and waste water treatment
2. Protection of surface and groundwater quality

Activities serving both water utilization and damage prevention

Excess surface water management

Amelioration

- atmospherical,
- terrestrial
(land grading, soil protection, tile-draining, recultivation, remediation)
- hydro melioration
(water drainage, irrigation, water quality improvement)
- bio melioration

Mine water management

River training

Inter-basin water diversion

Water storage

Water utilization

Health, cultural, personal and housing services

1. Drinking and other water supply
2. Waterside recreation, bathing, water sports and nature protection

Transport

1. Low - and medium flow river training
2. Lake regulation
3. River canalization
4. Navigation canal construction

Industry

1. Industrial water supply
2. Water power utilization

Agriculture

1. Irrigation
2. Fishery

Water management activities can be divided based on the territorial principle

The activity according to location	Water damage prevention	Water utilization
water management along rivers	river, lake and stream regulation; river, oxbow and lake management, flood protection	natural and artificial water way, hydropower utilization, water environment recreation
municipal water management	municipal water management water course and land management channelling, sewerage disposal and cleaning	municipal water supply, bath, swimming pool water use, hot water and medicinal water utilization
regional / territorial water management	inland water management, inland water drainage and inland water protection, agronomic water management, drainage, erosion protection	reservoir, irrigation, lake management, agricultural wastewater utilization

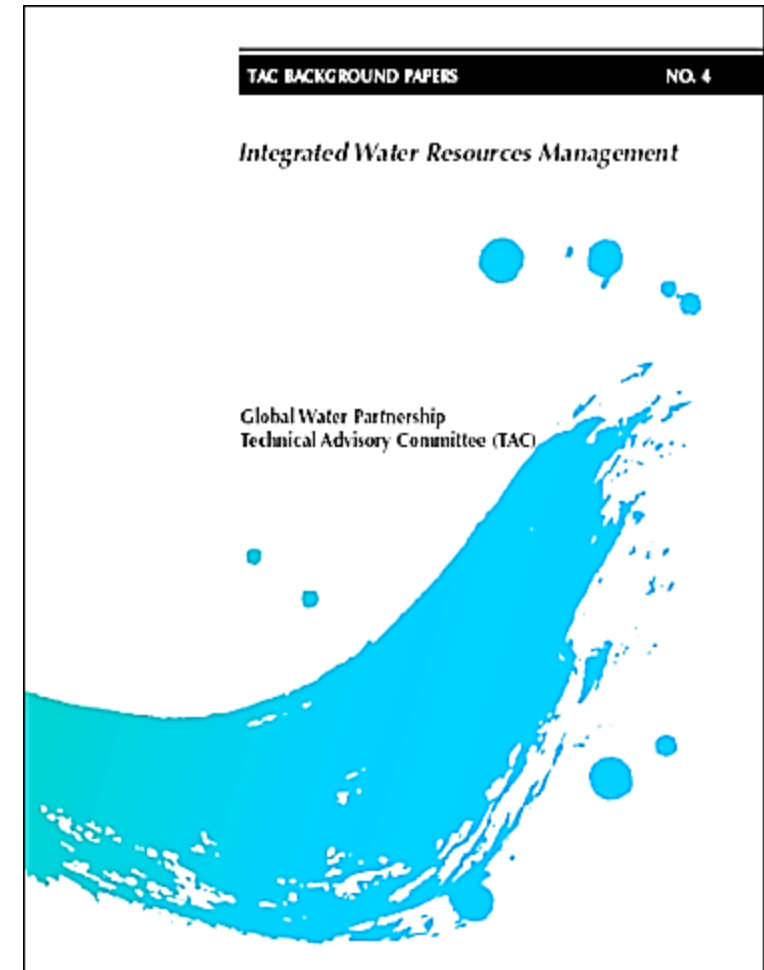
The management of drought and water shortage does not appear directly in the traditional water management classification system, but at the same time it affects most water management activities and tasks.

It is now obvious that modern drought and/or water shortage management must be based on similar principles and practices as the integrated water resources management (IWRM).

IWRM definition

IWRM is a **process**, which promotes the ***coordinated development*** and **management** of *water, land and related resources*, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

In: GWP, TEC Background Paper No. 4: Integrated Water Resources Management (2000)



The key principles of IWRM

1. Integrated approach

IWRM promotes the coordinated management of water resources across different sectors and administrative boundaries, recognizing the interdependencies between them.

2. Sustainability

It seeks to ensure the long-term availability of water resources by considering both present and future needs, as well as the preservation of ecosystems and the environment.

3. Stakeholder participation

IWRM emphasizes the involvement of all stakeholders, including communities, government agencies, NGOs, and private sector entities, in the decision-making process to achieve a more inclusive and equitable water management.

4. Demand management

IWRM focuses on efficient water use, conservation, and demand-side measures to optimize water allocation and reduce wastage.

5. Water governance

It highlights the importance of effective institutions, policies, and legal frameworks to enable transparent, accountable, and participatory water governance.

6. Ecosystem protection

IWRM recognizes the intrinsic value of ecosystems and aims to protect and restore them, considering the ecological functions and services provided by water resources.

The three main pillars of IWRM - a holistic approach

1. **Social Equity**: This pillar emphasizes the need for fair and equitable access to water resources and services for all stakeholders.

It recognizes the importance of involving marginalized and vulnerable groups in decision-making processes and ensuring that water allocation and management are not biased against any particular social group. Social equity also addresses issues such as gender equality, poverty alleviation, and the provision of basic water services to underserved populations.

2. **Economic Efficiency**: This pillar focuses on optimizing the economic benefits derived from water resources and promoting efficient water use.

It involves assessing the economic value of water, implementing cost-effective measures for water allocation and management, promoting water pricing mechanisms that reflect its true value, and encouraging water-saving technologies and practices. By maximizing economic efficiency, IWRM aims to achieve sustainable economic development while minimizing wastage and negative impacts on the environment.

3. **Environmental Sustainability**: This pillar recognizes the critical importance of maintaining the health and integrity of ecosystems in water management.

It involves protecting water resources from pollution, safeguarding aquatic habitats, preserving biodiversity, and ensuring the sustainable use of water for ecological purposes. Environmental sustainability also includes measures to mitigate the impacts of climate change on water resources, such as adaptation strategies and the integration of climate considerations into water management plans.

Main pillars

**Economic
Efficiency**

Equity

**Environmental
Sustainability**

Implementation tools

**Management
Instruments**

- Assessment
- Information
- Allocation
Instruments

**Enabling
Environment**

- Policies
- Legislation

**Institutional
Framework**

- Central -
Local
- River Basin
- Public -
Private

Concept of integrated drought management – the key components 1/2

1. Drought Monitoring and Early Warning Systems

This component involves the collection and analysis of data related to weather patterns, precipitation, hydrological conditions, soil moisture levels, and other relevant indicators. Early warning systems are developed to detect and forecast drought conditions, enabling proactive responses.

2. Risk and Impact Assessment

This component focuses on assessing the vulnerability and potential impacts of drought on different sectors and regions. It involves evaluating the socio-economic, environmental, and agricultural consequences of drought to identify high-risk areas and populations.

3. Planning and Preparedness

IDM emphasizes the development of drought management plans and preparedness measures before drought events occur. These plans outline strategies and actions to mitigate the impacts of drought, including water conservation measures, water allocation mechanisms, and agricultural practices that enhance drought resilience.

4. Water Allocation and Demand Management

This component emphasizes the efficient allocation and management of water resources during drought conditions. It involves prioritizing water use, implementing water-saving measures, promoting water-efficient technologies, and managing water demands across different sectors.

Concept of integrated drought management – the key components 2/2

5. Stakeholder Engagement and Participation

IDM recognizes the importance of involving all relevant stakeholders in the decision-making process. This includes government agencies, local communities, water users, non-governmental organizations, and other entities. Stakeholder engagement ensures that diverse perspectives are considered, and collaborative approaches are adopted in drought management strategies.

6. Information and Knowledge Sharing

This component focuses on the dissemination of information and knowledge related to drought management. It involves raising awareness about drought risks, sharing best practices, promoting capacity building, and facilitating the exchange of experiences and lessons learned among stakeholders.

7. Monitoring, Evaluation, and Learning

IDM emphasizes the continuous monitoring and evaluation of drought management measures to assess their effectiveness. This component enables the identification of successful strategies and areas for improvement. Lessons learned from previous drought events inform future response and adaptation strategies.

Drought policy framework and regulations in Hungary

I. Drought management framework regulation (Enabling environment)

The Act LVII of 1995 on Water Management (<https://njt.hu/jogszabaly/1995-57-00-00>)

This Water Act, is a key legislation in Hungary which governs the management, use, protection, and conservation of water resources. The main features of the Act:

- 1. Water Management Authorities:** The Act establishes water management authorities responsible for the administration and implementation of water management policies and regulations. These authorities are responsible for issuing permits, monitoring water resources, and enforcing compliance with water-related laws.
- 2. Water Use Permit System:** The Act sets up a water use permit system to regulate the use of water resources. Users who intend to abstract or discharge water in significant amounts are required to obtain a permit. The permits specify the conditions and limitations for water use, including the quantity, quality, and purpose of water use.
- 3. Water Conservation and Protection:** The Act emphasizes the protection and conservation of water resources. It prohibits activities that may contaminate or degrade water quality and establishes regulations for preventing and controlling pollution. It also promotes the sustainable use of water resources and encourages water-saving practices.
- 4. Water Planning and Management:** The Act requires the development of water management plans at different scales, including river basin and regional plans. These plans identify water management objectives, assess water resources, and propose measures for sustainable water use, flood prevention, and environmental protection.

I. Drought management framework regulation (Enabling environment)

The Act LVII of 1995 on Water Management

This Water Act, is a key legislation in Hungary, which governs the management, use, protection, and conservation of water resources. The main features of the Act:

5. **Water Charges and Fees:** The Act establishes a system of water charges and fees to ensure the sustainable financing of water management activities. Water users are required to pay fees based on the quantity and quality of water used. The revenues generated from these charges are used to support water management and conservation efforts.
6. **Flood Protection and Management:** The Act addresses flood protection and management by outlining measures for flood prevention, forecasting, and emergency response. It establishes flood zones, defines responsibilities of authorities and landowners, and regulates activities within flood-prone areas.
7. **International Water Management:** The Act recognizes the importance of international cooperation in water management, especially in shared river basins. It provides provisions for transboundary water management and encourages collaboration with neighboring countries.
8. **Public Participation and Information:** The Act promotes public participation in water management decision-making processes. It ensures access to information related to water resources, their management, and associated projects. It also encourages public involvement in water-related consultations and environmental impact assessments.
9. **Penalties and Enforcement:** The Act establishes penalties and enforcement mechanisms for violations of water-related regulations. It outlines fines, sanctions, and other measures to ensure compliance with the law, deter illegal activities, and protect water resources.

I. Drought management framework regulation (Enabling environment)

The 232/1996. (XII. 26.) Governmental Decree on the rules of protection against water damage

(<https://njt.hu/jogszabaly/1996-232-20-22>)

The main chapters of 232/1996. (XII. 26.) Governmental Decree are:

- Organizations of the national defense management
- The responsibility of the minister responsible for the management of the water administration bodies
- The Government's task during flood and inland water protection
- Local control of the technical tasks of defense
- The Defense Committee
- Preparation for defense
- Obligation of District Water Directorates to provide technical and organizational data
- Resource organization cooperation obligation
- Information on defense preparation
- Ordering defense readiness
- Information on ordering defense readiness
- Duties of the defense manager
- The management system
- Defense duty
- Reports, information
- Evacuation, evacuation
- Measures following the termination of protection
- Final provisions.

I. Drought management framework regulation (Enabling environment)

The Act CLXVIII of 2011 on the management of weather and other natural risks affecting agricultural production

(<https://njt.hu/jogszabaly/2011-168-00-00>)

By this act the National Assembly (Parliament) developed

- risk community to mitigate the effects of weather and other natural events affecting agricultural production,
- strengthened the responsibility of farmers based on self-sufficiency,
- made state aid more effective,
- ensured proportionate responsibility for those affected, and
- facilitated the uniform treatment of the effects caused by an unavoidable external weather and other natural damages (force majeure).

II. Governance system of drought policy, planning and management (Institutional framework)

The lead organizations on drought policy in Hungary are

- **Ministry of the Interior**, which develops nationwide general drought policy through its background institution OVF (General Directorate of Water Management).
- **Ministry of Agriculture (MoA)**, which is responsible for a specific task in connection with drought policy.
MoA defines the period of drought for agricultural plants in a given year, and determines the level of compensation for farmers following drought events.
- In case of drought protection planning the **Ministry of the Interior** is responsible for developing drought plans through its background institution **OVF** (General Directorate of Water Management).

III. Drought management strategy (Enabling environment)

There are several strategy documents that deal with drought issues. The most important ones are:

The 5th National Environmental Protection Program 2021-2026 (<http://www.hermanottointezet.hu/nkp5skv>)

The Program is a comprehensive domestic strategic planning document of the environment, which provides a framework for all environmental strategies, programs and plans, integrates their main objectives and formulates guidelines for their development. The Program is closely linked to the National Framework Strategy for Sustainable Development as a long-term concept.

The task of the Program is to define the country's environmental goals and the tasks and means – including the drought issues - necessary to achieve them, taking into account the country's capabilities, society's long-term interests and future development goals, as well as the obligations arising from global responsibilities, international cooperation and EU membership.

Second National Climate Change Strategy (2018-2030, with a view to 2050) (http://doc.hjegy.mhk.hu/20184130000023_1.PDF)

The document contains a review of the first National Climate Change Strategy and a second National Climate Change Strategy in line with new legal requirements, changed socio-economic conditions and the latest scientific findings.

The overarching goals of the climate strategy are:

- 1) Survival and sustainable development in a changing world.
- 2) Getting to know the endowments, opportunities and limitations of the country.

Specific objectives are:

- i) Decarbonisation,
- ii) GIS foundation for the territorial study of climate vulnerability,
- iii) Adaptation and preparation – including the drought issues,
- iv) Ensuring a climate partnership.

III. Drought management strategy (Enabling environment)

There are several strategy documents that deal with drought issues. The most important ones are:

National Water Strategy (The Jenő Kvassay Plan)

(<https://www.vizugy.hu/vizstrategia/documents/997966DE-9F6F-4624-91C5-3336153778D9/Nemzeti-Vizstrategia.pdf>)

The National Water Strategy (NWS) is the Hungarian water management strategy until 2030.

Its tasks are

- to setting objectives for water management and for
- creating the conditions for implementing the measures needed to solve these tasks, creating opportunities for irrigation management, and preventing or mitigating drought damage.

The NWS defines the following 4 priority and 3 institutional focus tasks:

1. Water retention and water distribution for better utilization of our waters for supportive water management.
2. Preventive water damage prevention – **including drought issues.**
3. Gradual improvement of water status to achieve sustainable good status.
4. Quality water utility service and quality rainwater management are tolerable with consumer burden bearing.
5. Improving the relationship between society and water.
6. Renewal of planning and management.
7. Reorganization of the economic regulatory system of water management.

IV. Definition of drought and water scarcity (Management instruments)

There are 2 different regulations in place to determine a drought situation.

One is used by the water management, which is based on a drought index developed by the sector.

The other was introduced by the agricultural sector, which is used to compensate for drought damage.

IV. Definition of drought and water scarcity (Management instruments)

In water management:

10/1997. (VII. 17.) KHVM (Ministry of Transport, Communications and Water) Decree on flood and inland water protection (<https://njt.hu/jogszabaly/1997-10-20-6B>)

If the degree of drought according to HDIs (Hungarian Drought Index) justifies it, drought protection alert should be ordered. The degree level depends on the value of HDI's as well as other conditions (e.g.: water quality problem, lack of water supply for authorized water users, etc...)

The Annex 4 of this Decree gives the level of droughts and protections as a function of HDI:

HDIo – The baseline drought index, calculated using daily precipitation (P) and daily mean temperature (T).

HDIs – Heat stress adjusted drought index.

Basic parameters are in line with the HDIo. It is assumed that during a heat wave the potential evapotranspiration (PET) is independent of water availability, and losses are realised entirely.

The degree of drought according to the value of the index:

0 – no drought	if		HDIs	< 1,33	-
1 - mild drought	if	1,33 <	HDIs	< 1,50	degree
2 - moderate drought	if	1,50 <	HDIs	< 2,00	degree
3 - intense drought	if	2,00 <	HDIs	< 3,00	degree
4 – extreme drought	if	3,00 <	HDIs		

IV. Definition of drought and water scarcity (Management instruments)

In agriculture:

Act CLXVIII of 2011 on the management of weather induced and other natural risks affecting agricultural production

<https://njt.hu/jogszabaly/2011-168-00-00>

According to Act CLXVIII of 2011 drought is defined as a natural phenomenon.

In the growing season a given crop is exposed to drought, when in case of 30 consecutive days

- (a) the total amount of precipitation does not exceed 10 mm, or
- (b) the total amount of precipitation does not exceed 25 mm and the daily maximum temperature exceeds 31 °C for at least 15 days.

V. Relief and response measures (Management instruments)

During occurrence of drought, depending on the level and prolongation of it, Hungary applies:

- (i) operational demand measures,
- (ii) operational supply measures,
- (iii) economic impact compensation measures and
- (iv) operational measures for the environment.

The implementation of these measures is determined by legislation.

Operational demand measures

- Act LVII of 1995 on Water Management in 15 / C. § (1) ... the water user does not have to pay a water supply contribution fee (m) ... after the amount of water used for irrigation, fisheries and rice production during the period of permanent water shortage ...
- 12 general water scarcity / drought management plans
- 84 detailed plans for each water scarcity / drought districts

These detailed plans describe the specific circumstances of the water directorates and water scarcity/drought district areas from geographical, meteorological, hydrological, water management, infrastructure etc. point of view. It contains also information about the available water resources, agricultural water supply systems, needs (demands) and possibilities, and a series of measures that can be implemented to prevent or mitigate drought effects.

V. Relief and response measures (Management instruments)

Operational supply measures

- **Act CXIII of 2019 on irrigation management** (<https://njt.hu/jogszabaly/2019-113-00-00>) regulates:
 - the rules for the establishment, modification and termination of the right to water irrigation,
 - issues related to the preparation of irrigation development plans,
 - general rules on compensation for restrictions.
- **302/2020. (VI. 29.) Government Decree** on the implementation of the Irrigation Management Act (<https://njt.hu/jogszabaly/2020-302-20-22>) determines:
 - the provision for the establishment of an irrigation service
 - issues of one-off compensation
 - indemnity compensation.

V. Relief and response measures (Management instruments)

Economic impact compensation measures

Act CXIII of 2019 on irrigation management

<https://net.jogtar.hu/jogszabaly?docid=a1900113.tv>

The Parliament created the law in order to protect natural resources, strengthen the adaptability of agriculture, spread irrigation farming, and create irrigation communities.

The law consists of 17 paragraphs. The law entered into force on 1st January 2020.

302/2020. (VI. 29.) Government Decree on the implementation of the Irrigation Management Act

<https://net.jogtar.hu/jogszabaly?docid=a2000302.kor>

The main chapters

1. Provisions regarding the establishment of the irrigation easement
2. One-time compensation
3. Compensation based on demand income
4. Procedure for the recognition of the irrigation community
5. Final provisions

The government decree has 3 annexes.

Annex 1: Calculation of the compensation related to the establishment of the irrigation easement.

Annex 2: Data required for the application for the recognition of irrigation communities

Annex 3: Data required for an environmental district plan.

V. Relief and response measures (Management instruments)

Operational measures for the environment

- Hungary's river basin management plan second review - II. Discussion material – 17 May 2021

The 3rd RBMP addresses the issues of climate change and related drought issues. The Background document No. 8-4 of the 3rd RBMP deals with elaboration of possible methods for the prevention and reduction of damage caused by water scarcity (drought), development of action plans.

A detailed table is given in the discussion paper, which summarizes the measures that are already in place or planned to be adapted in Hungary in accordance with the drought and scarcity. Here are the first three lines only:

	Status			Source(s)				Additional information
	applied	planned	Not considered	Drought Mgt Plan	River Basin Mgt Plan	Adaptation Plan/Strategy	Other	
Afforestation and reforestation as adaptation opportunity	X				X			Afforestation is subsidized by Common Agricultural Policy (CAP), but it is not an adaptation tool today. The planting of invasive species (eg. robinia pseudoacacia) is subsidized too. Ecological and adaptation considerations play a marginal role in the allocation of grants.
Use of adapted crops and varieties	X			X	X			CAP (mostly pillar II) includes several measures for that, but their role is marginal.
Conservation agriculture	X			X	X			CAP (mostly pillar II) includes several measures for that, but their role is marginal.

VI. Order of priority established for the allocation of water to users in case of drought (Management instruments)

Act LVII of 1995 on Water Management defines the allocation of water to different users in case of drought.

The provisions of the act:

- 1) Groundwater may only be used to the extent that the balance of water extraction and water supply is maintained without quality damage, and the requirements for achieving the objectives of the good condition of the waters according to the separate legislation are met.
- 2) With regard to the quantitative and qualitative protection of usable water resources, water needs can be met primarily from water resources that have not yet been tied up for the purpose of water use.
- 3) For the use of mineral, medicinal and thermal waters, priority should be given to medicinal and spa use.

VI. Order of priority established for the allocation of water to users in case of drought (Management instruments)

Act LVII of 1995 on Water Management (<https://njt.hu/jogszabaly/1995-57-00-00>) defines the allocation of water to different users in case of drought.

The 15. § (4) of the Act determines the priority order for allocation of water among different users according to the following:

- a) drinking and public health, disaster relief,
- b) activities of production and services for medical and residential purposes,
- c) animal husbandry, fish production,
- d) nature conservation,
- e) irrigation,
- f) economic,
- g) other (e.g. for sports, recreation, leisure, swimming, tourism)
water use.

If a restriction on the use of water becomes necessary, the order of the restriction shall be reversed in the order of allocation specified above, as defined by Act LVII of 1995 on Water Management in section 15 (5).

Concise summary of drought policy and regulations in Hungary

- The issue of drought is regulated at national level by law and for the implementation of which several government decrees and ministerial decrees are in force.
- The implementing regulations cover the definitions related to drought management, the *indicator* used and its monitoring, the definition of *the responsible organizations*, and the *manner and extent of compensation* for the damage caused by drought.
- Several drought strategy documents have been prepared at national level, taking into account the priorities of environmental protection, climate change and river basin management.
- Based on various drought strategy documents, drought management plans have been developed, such as river basin management plans (national and 4 regional), and water scarcity management plans produced in two levels:
 - (a) the 12 general water scarcity / drought management plans, covering the territories of the District Water Directorates, and
 - (b) the 84 detailed plans for each water scarcity / drought districts.
- The so-called Hungarian Drought Index is used to assess the severity of the drought.
- Hungary operates a financial compensation procedure to alleviate the drought damage of farmers.
- The 3rd cycle RBMP provides a detailed analysis of the drought situation throughout Hungary and lists the planned measures to mitigate damages caused by drought.



**Thank you
for your attention!**