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Action Plan on Flood Prevention for Tisza River

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Action Plan on Flood Prevention and Protection for the Tisza River

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The paper reports on the planning of flood prevention and protection for the Tisza River. The basic principles of the planning, the strategies and the selection of structural and non-structural measures for the flood management Action Plan will be discussed.

Hungary ranks high on the world list of countries exposed to flooding. Of the 93 000 km² large territory of the country 21 248 km² (22.8%) are flood plains, levees protecting 97% thereof against inundation by river floods. The level of flood exposure in terms of the ratio of flood plains is the highest in Hungary of all European countries and is comparable with the situation in the Netherlands alone. 2.5 million people in close to 700 communities are exposed to flood hazard, the flood plains contain 32 % of the railway lines and 15 % of the roads, and about 25 % of the gross domestic product is produced on the reclaimed flood plains. The flood plains are also ecologically valuable parts of the country. The existing flood defences built since the middle of the 19th century comprise the main-line levees of 4003 km total length (3973 km earth embankment, 30 km flood wall) along the rivers and other flood defence structures.

Flood control in Hungary with regard to the human life has been successful in recent years: the last flood causing the loss of human life has occurred in 1956. This is attributable to carefully planned development of flood defence systems and organisational efforts. However floodings and flood damages remain present-day problems in the Tisza river basin. Large areas were flooded during the recent flood and during the flooding, many settlements along the river were flooded.

It is well-known that human activities has increased the risk of river floodings due to hydraulic interventions, intensive building activities and the use of all areas in the vicinity of rivers. Today's knowledge on the effects of climatic changes points out that there will probably be a general rise of risks from floodings in this century, thus including the Tisza basin. Improved flood prevention and protection remain indispensable and will in future be more in demand than ever. There is demand to give considerably more expanse to the Tisza in case of floodings.

Floods pose the greatest natural hazard in Hungary. Flood control is an issue of safety to human life and property, is the part of the national disaster control policy. An issue of strategic importance is whether the flood levels will continue to rise and what are the causes and the potential control measures? New strategies, approaches and action plans should be developed for flood prevention.

According to the Hungarian Government decision, an Action Plan on Flood Prevention and Protection for the Tisza River is under development. The action plan aims at improving the protection of people and goods against floodings while integrating ecological improvements of the Tisza and its floodplains.

. Considerable activities on flood defence and flood prevention have been started or carried on in other European countries. The conclusions of those are used as a basis for the Tisza flood action plan. However these international initiatives are being completed by numerous Hungarian national activities.

The EU Water Framework Directive, the EU Water Directors' Common Strategy on the Implementation of the Water Framework Directive, is the general basis for the Action Plan. The improvement of the ecological situation will equally be integrated into the Action Plan in order to compensate for the ecological deficits of the past. Contributions of water management, spatial planning, nature protection, agriculture and forestry is required.

The programme and action plan will aim at prevention of all flood situations, not only of extreme events. The targets will be ambitious but realistic. They will demand considerable efforts, financial efforts as well as efforts of political implementation in order to change present ways of thinking and of use.

The action plan will aim at mobilising all social forces for the implementation of the demanded measures. In a first step, non-governmental organisations participate in the drafting of the action plan. The implementation of the measures of the action plan aimed at improving flood protection require large scale information and exchange of information with those locally affected. Therefore, offensive and informative public relations are brought on the way.

The implementation of the Action Plan is supported by a three years R&D project on the engineering and scientific bases of flood risk assessment, development of new methods of flood frequency and risk estimation and modelling. The changes in the societal and environmental attitudes to flood control are analysed and assessed, and the relations between flood plain development and reasonable risk will be cleared, with special regard to the importance of the floodplains from the ecological and quality of life points of view. The studies envisaged under the project would thus explore the statistical regularities of flood occurrence, predict on this basis their expected behaviour and support by more reliable parameters revised design-flood specifications, improving thus the cost-effectiveness of flood control.

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Action Plan on Flood Prevention and Protection for the Tisza River in Hungary

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1. Floods in Hungary – facts and figures

Territory of the country: 93 000 km²

Floodplains: 21 300 km² (23 %)

Protected floodplains: 97 %

Facts and figures on the protected floodplains:

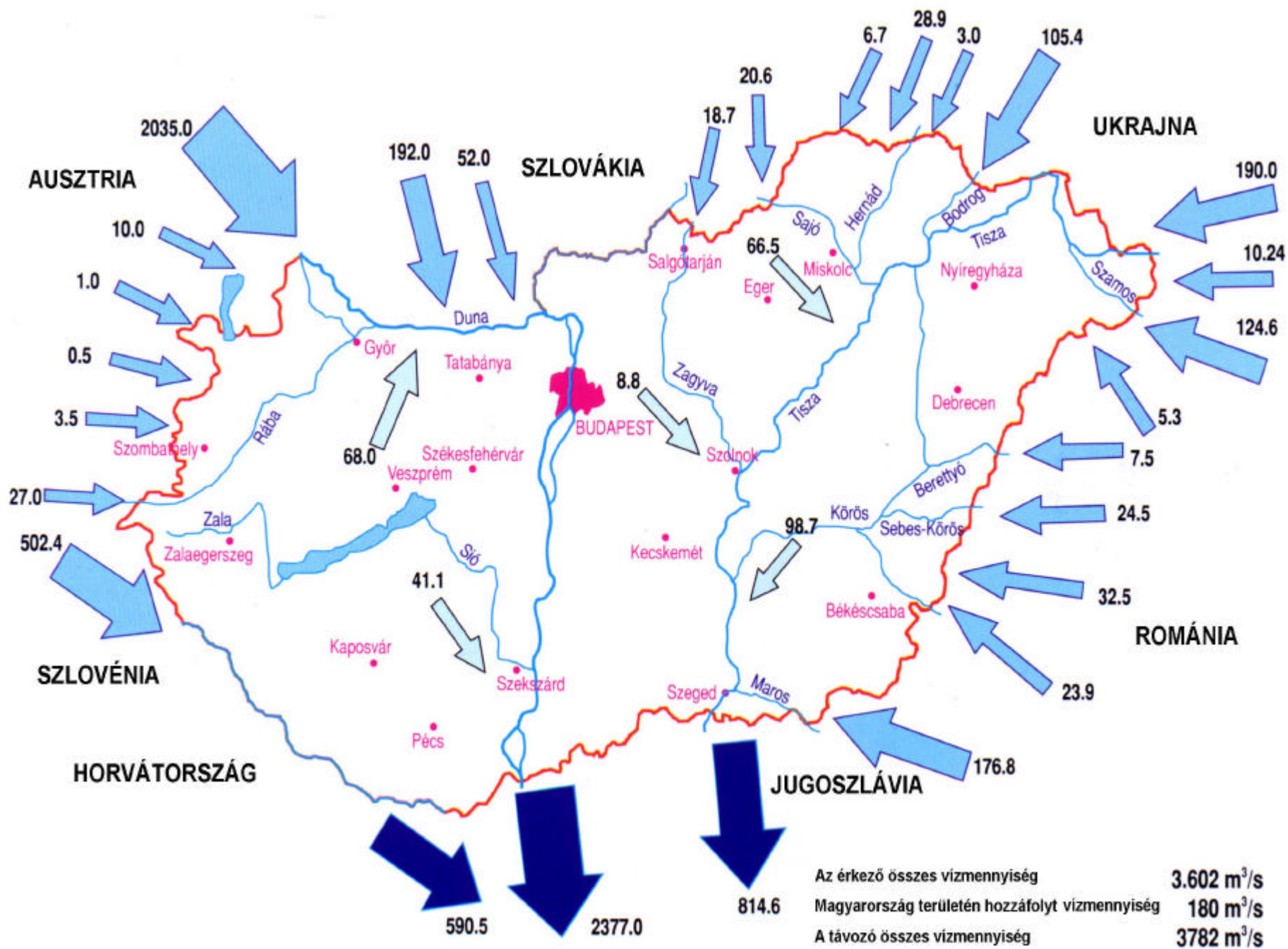
- **2,5 million people (¼ of the population)**
- **700 communities**
- **one-third of arable lands: 18000 km²**
- **32% of the railway lines, 15% of the roads**
- **2000 industries**
- **25% of the gross domestic product**

2. The hydrology of river floods

Two large rivers: Danube and Tisza

runoff from **290 000 km²**

(an area three times larger than the territory of Hungary).



Maximum floods:

Danube – 10-12.000 m³/s, Tisza 4.000 m³/s

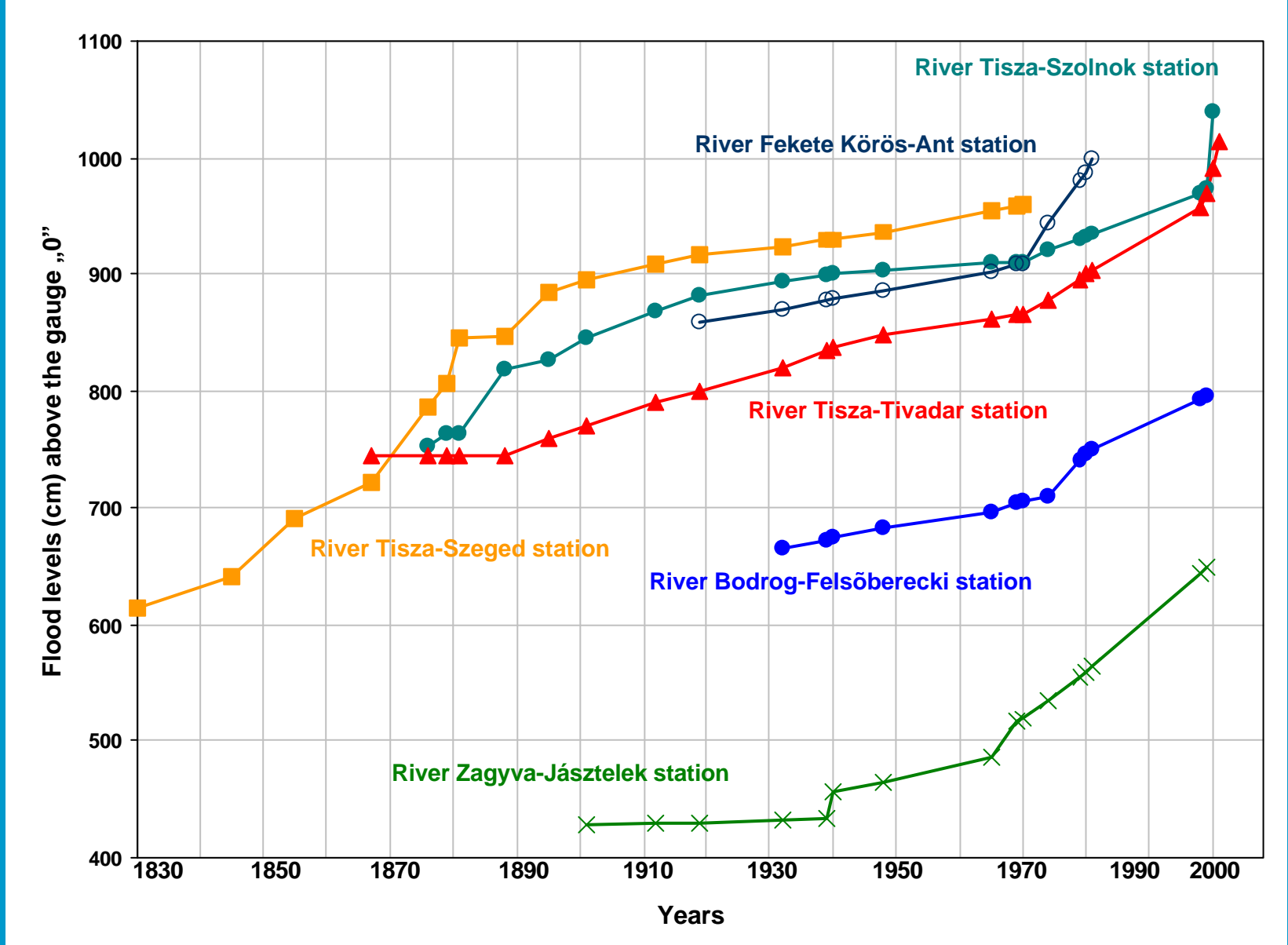
Recurrence period of floods:

**2-3 years minor and medium, 5-6 years major and
10-12 years abnormal floods**

Duration of major floods:

5-10 days on upstream river sections

50-120 days along the flat middle and lower sections



Rising flood peaks on the Tisza and her tributaries

Rising flood peaks on the Tisza and her tributaries

**cutting of meanders and reducing the width of the flood plains
by levees - higher flood levels,**

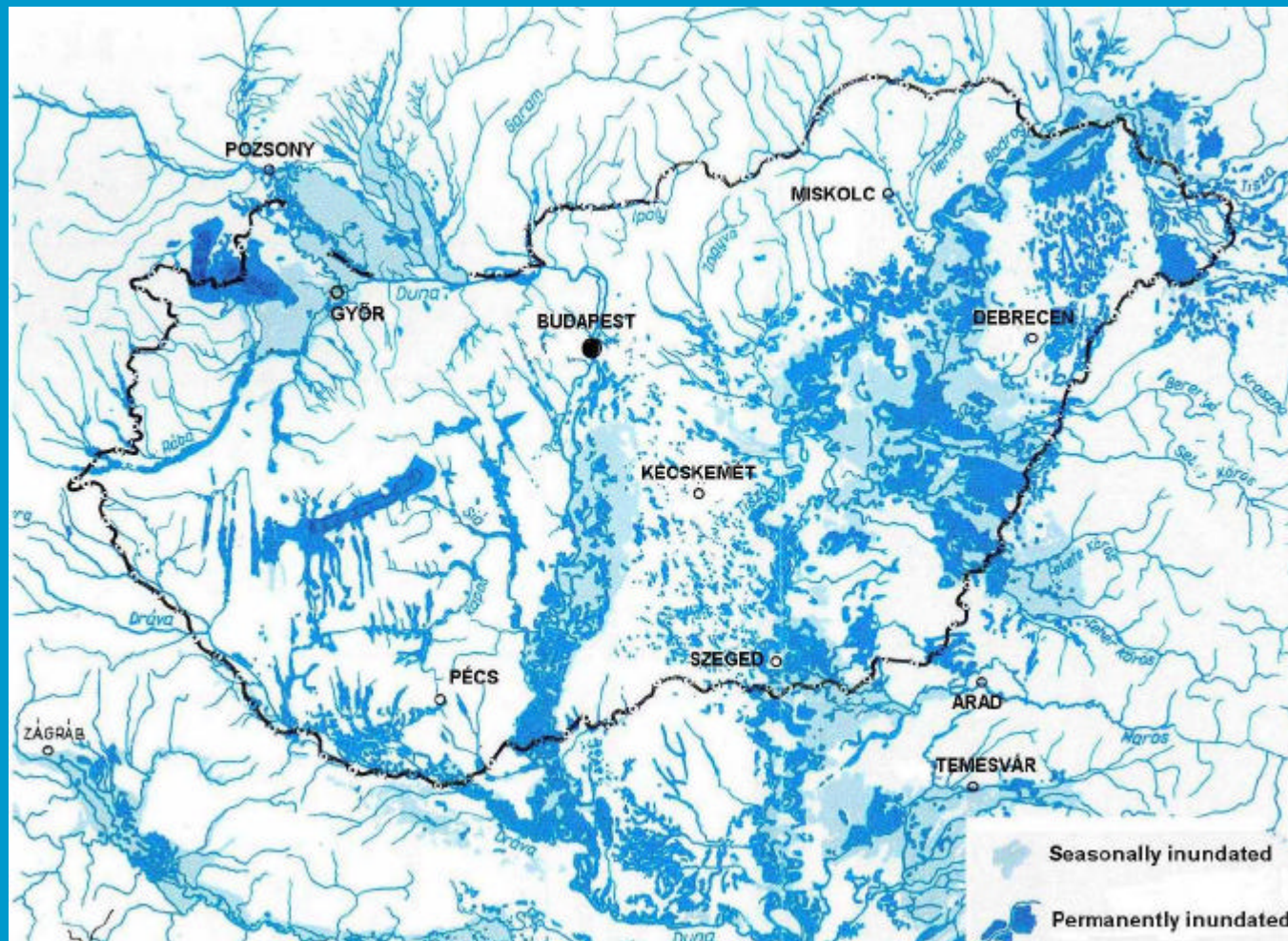
changes in runoff conditions,

human activities in the mountain and lowland sub-catchments,

potential impacts of global climate change.

3. Historical review of flood control

- in the last ten centuries 75 major floods on the Danube,
- the first recorded Danube flood in 1012,
- flood fighting efforts from the 11th century



Areas inundated permanently and periodically (1830)

- flood protection projects in the Tisza basin from 1846,
- completed by the end of the 19th century
- significant floods in Hungary after the construction of river dikes:

Danube: 1876, 1926, 1941 (ice-jamps), 1954, 1956 (ice-jamps), 1965, **2002**

Tisza: 1895, 1913, 1932, 1940-42, 1947-48, 1964, 1970, 1974, 1979, 1985 (ice-jamps), 1993, **1998, 1999, 2000, 2001**

-flood control has been succesful in recent years, the last flood causing the loss of human life: **1956**

4. Existing flood defences

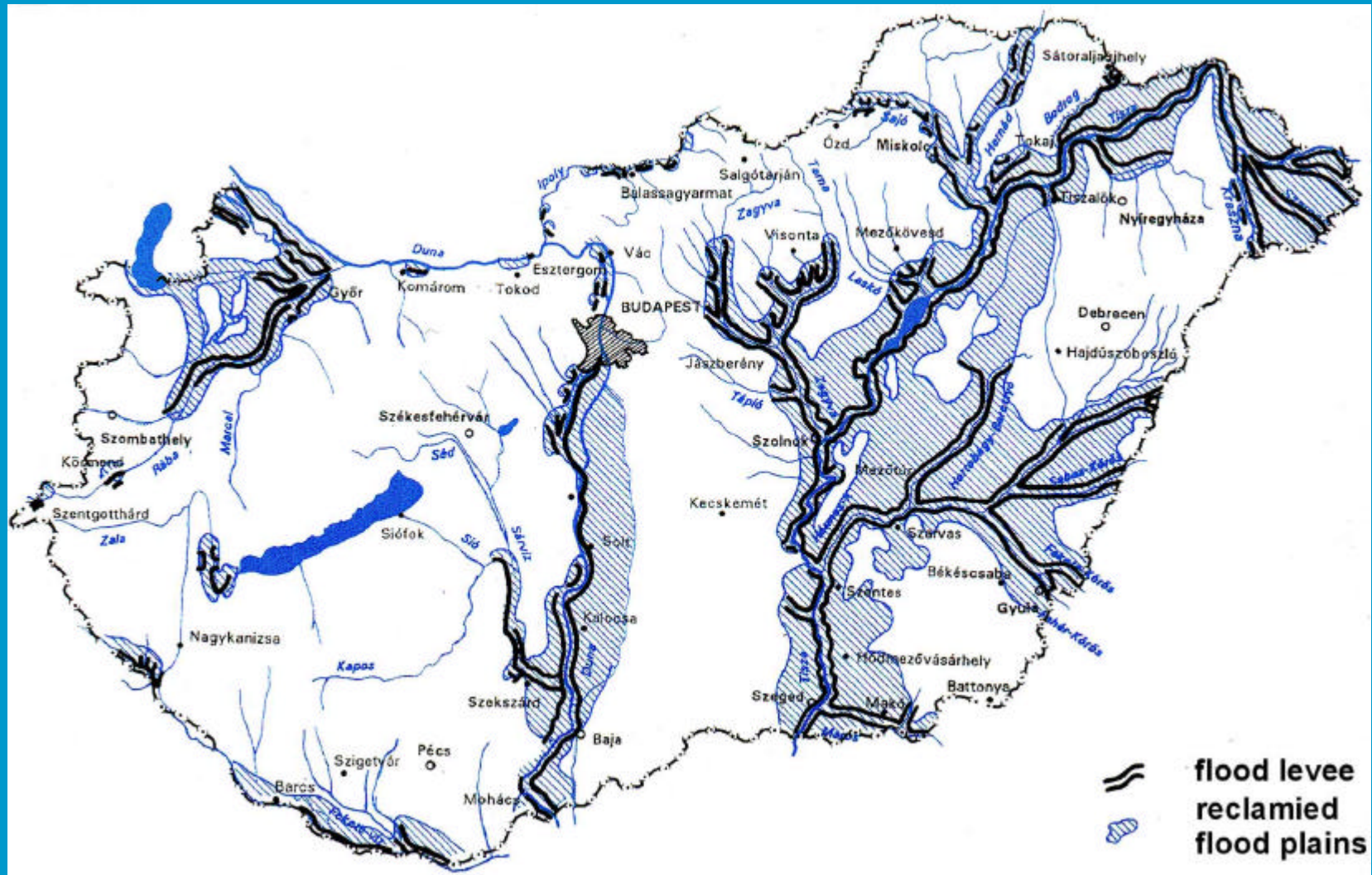
Flood protection has a long tradition and a well developed infrastructure

- **main-line levees: 4.000 km**
- **75 % in the Tisza Valley**

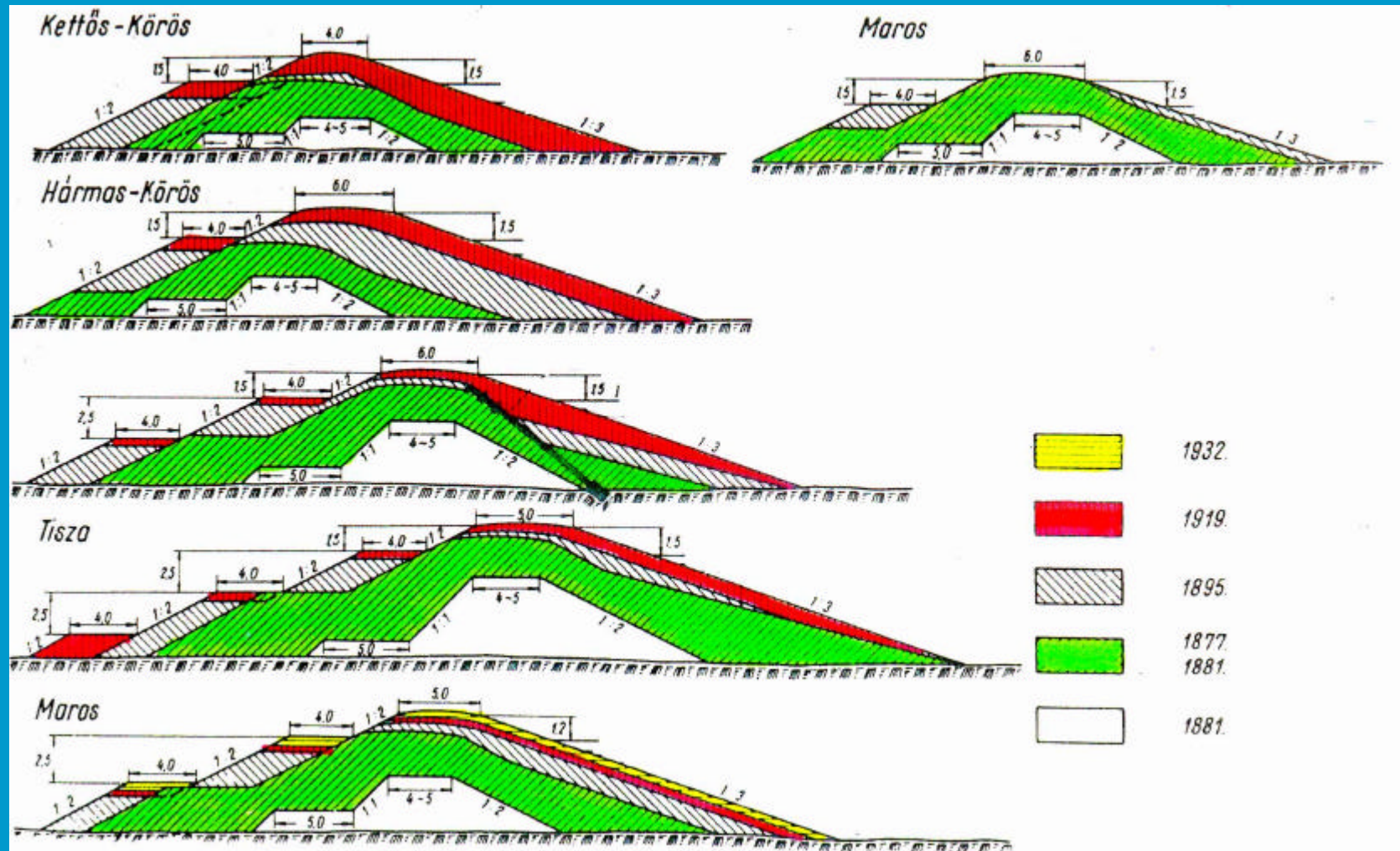
- **low-land emergency storage reservoirs: 223 km²**
- **storage capacity: 389 million m³**

- **secondary defences: 1.050 km**

- **the total length of levees covered by international agreements: 1.055 km (one-fourth of the defences)**



Flood defences and protected floodplains in Hungary



Successive embankment strengthening along the Tisza and her tributaries

5. The Action Plan for the Tisza River

WHY ?

- 150 years-old main-levees of 4000 km total length
- flood events in 1998-2001
- higher maximum floods
- new water policy – focus on ecosystems
- changing interests, re-assessment of the role of flood prevention and protection

HOW ?

Change from traditional flood prevention/protection/management approaches to flood plain reactivation (ecosystem based flood management)

Structural and non-structural measures:

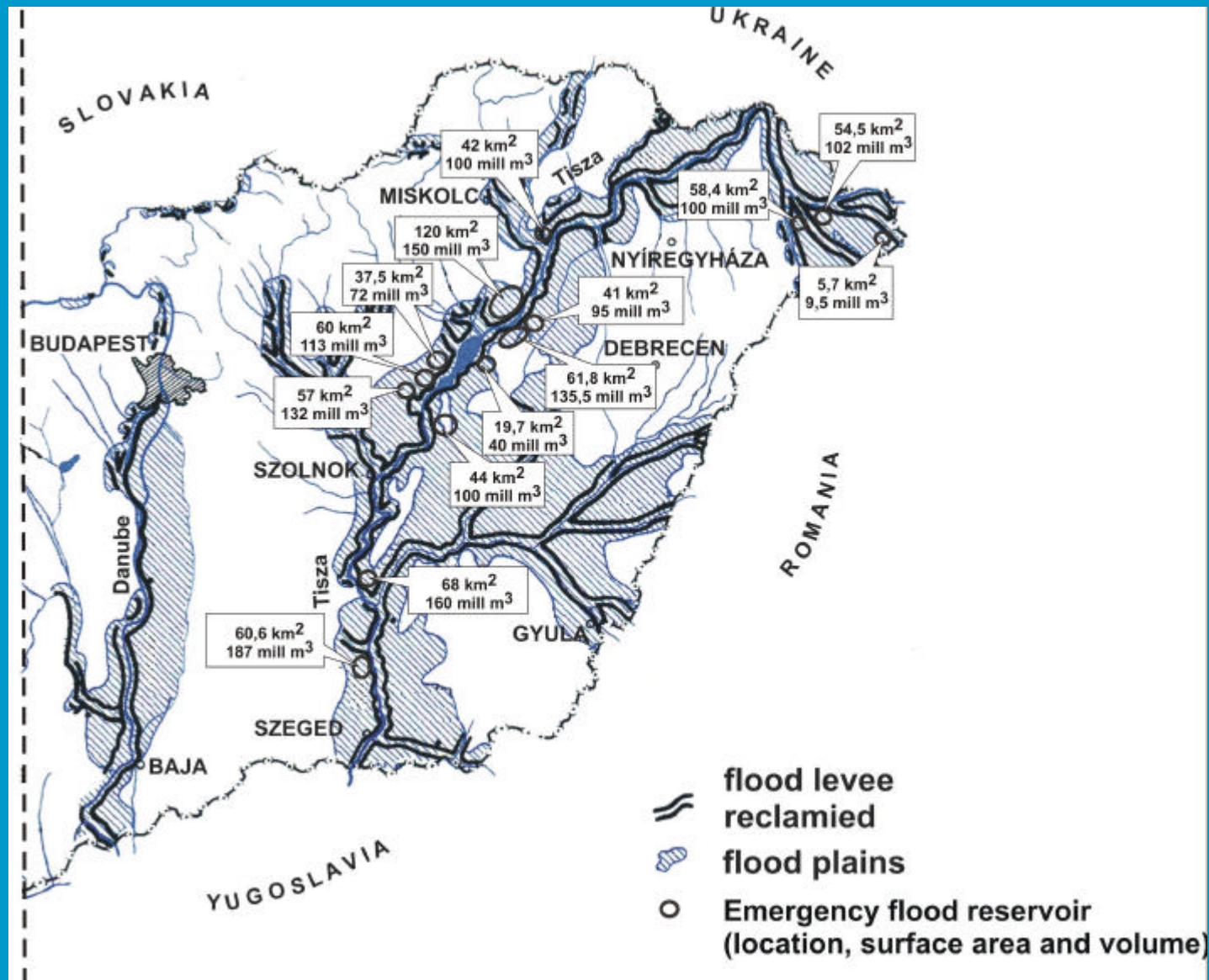
- storage in the upstream part of the catchment
- increase conveyance capacity of flood bed
- low-land storage (flood plain reactivation)
- strengthening of existing levees

Additional measures:

flood insurance, public awareness, land use changes, implementation of the improved Common Agriculture Policy, Rural Development Planning, River Basin Management Planning, implementation of the WFD

Key measures:

- 30 potential sites for storage (flood plain reactivation) - 730 km²
- 5 % of the floodplain in the Tisza Valley
- to retain temporarily up to 1,5 billion m³ water



Potential sites for storage (flood plain reactivation)

Relevant Plans:

Water Resources Management Plan for the Tisza Basin (1976)

Rehabilitation Programme for the Tisza Valley Oxbows (1994)

Tisza Plan (1995)

Alföld (The Great Hungarian Plan) Programme (1996)

**Examination of flood drainage and storage possibilities
considering the Tisza Green Corridor programme (1996, 1998)**

**Transboundary cooperation in nature conservation
and wetland management for the Danube River Basin
Phare Project, Component 2: Floodplain restoration
and protection in the Tisza River Basin, 2000**

Background documents:

Rhine Action Plan

**EC CIS guidance documents, issue papers,
WG HMWB – 34 case studies**

ECE documents

New US manuals for flood risk management

National RTD projects:

**New approaches for flood prevention/protection/management
17 institutes, 3 years**

**Modelling approaches for flood management
8 institutes, 3 years**

Relevant international activities:

**CEE WFE Dialogue on the implementation of the WFD
in Rural Water Management – GWP/WFE/ICID ERWG**

ICID ERWG

WT on WFD, WT on Flood Management, WT on Drought

ICID WG on Flood Management

Manual on Non-Structural Aspects of Flood Management

HARMONICOP

ICPDR RBM EG

**CIRCA INFO – info on CIS guidance documents for
Hungarian professionals dealing with the implementation of WFD**

6. The Tisza action plan and the WFD

RBMP under the WFD

- *Identification of environmental objectives (HMWBs)*
- *Identification of programmes of measures*

Not covered by the WFD:

Identification of flood relevant economic and social objectives

Identification of programmes of measures to achieve these objectives

Relationship between RBMP and flood management planning:

WFD Article 13 - River Basin Management Plans

„5. River basin management plans may be supplemented by the production of more detailed *programmes and management plans for sub-basin, sector, issue, or water type, to deal with particular aspects of water management*”.

Need for national/international RBMP guidance documents

for identification of the flood relevant economic and social objectives and

for planning the programmes of measures to achieve these objectives

Importance of the WFD

WFD: environmental and economic limitations for the planning of flood prevention, protection and management

- **Environmental limitations: Analysis of pressures and impacts – need for flood specific guidance documents**
- **Economic limitations: Economic analysis - (full) cost recovery - cost-efficient approaches – need for flood specific guidance documents**

7. Key issues - questions

Key questions for discussion during the Session

1.1 Who is responsible

Precautionary flood protection

Protection of population/goods

National Planning/Decision Making

Government

Except: large towns - local governments

Coordination – interministerial commission

1.2 What precautionary and mitigation measures are needed ?

The main measures:

Low land storage - flood plain reactivation

Land use changes

Improved maintenance of the levee systems

1.3 What are the costs and who pays ?

EURO 400 million

Government

Local governments

Stakeholders ?

Insurance agencies ?

International sources ?

1.4 What are major conflicts or constraints in setting up flood management plans ?

Selection of the sites for low land storage - reactivation of flood plains

Key actors: ecologists/NGOs – farmers – population – government – local government

Need for PP approaches - HARMONICOP

Key issues:

Need for

new approaches (WFD)

**common understanding (terms
and approaches)**

international R&D cooperation

international planning (large

**international river basins as Danube
and Tisza)**

coordinated River Basin Management

Planning and Rural Development Planning

Final note:

The action plan for flood prevention and protection of the Tisza River in Hungary is still under development

Discussions, negotiations, public involvement are going on

International activities are also important

I am optimistic !

Thanks

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