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SPECIAL MOBILITY STRAND

SPATIAL PLANNING IN VIEW OF FLOOD PROTECTION - METHODOLOGICAL APPROACHES FOR BALKAN COUNTRIES

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Novi Sad, 16/April/2019

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Floods in Balkan region

Floods in B&H, Serbia and Croatia, May 2014
Source: https://images.search.yahoo.com

City Doboj, B&H, May 2014
Source: https://images.search.yahoo.com

*2004, 2006, 2010, **2014**... **Climate changes…***

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Floods in Balkan region

Weaknesses in the sphere of spatial planning:

- Land use in urban and rural regions
- System of technical structures and measures for flood protection (dikes, water retenation, drenage system…)
- Infrastructure (sewage system in urban zones, transport, electrical engineering…)
- The rules of constructing in urban areas
- Spatial information basis

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Hypothesis

The improvement of spatial planning system is necessary for implementation of strategic and local measures for flood protection. It implies:

- Flood risk management plan as the part of spatial information base
- Harmonization between Spatial plan and Flood risk management plan
- Integrated approaches of spatial planning methodology

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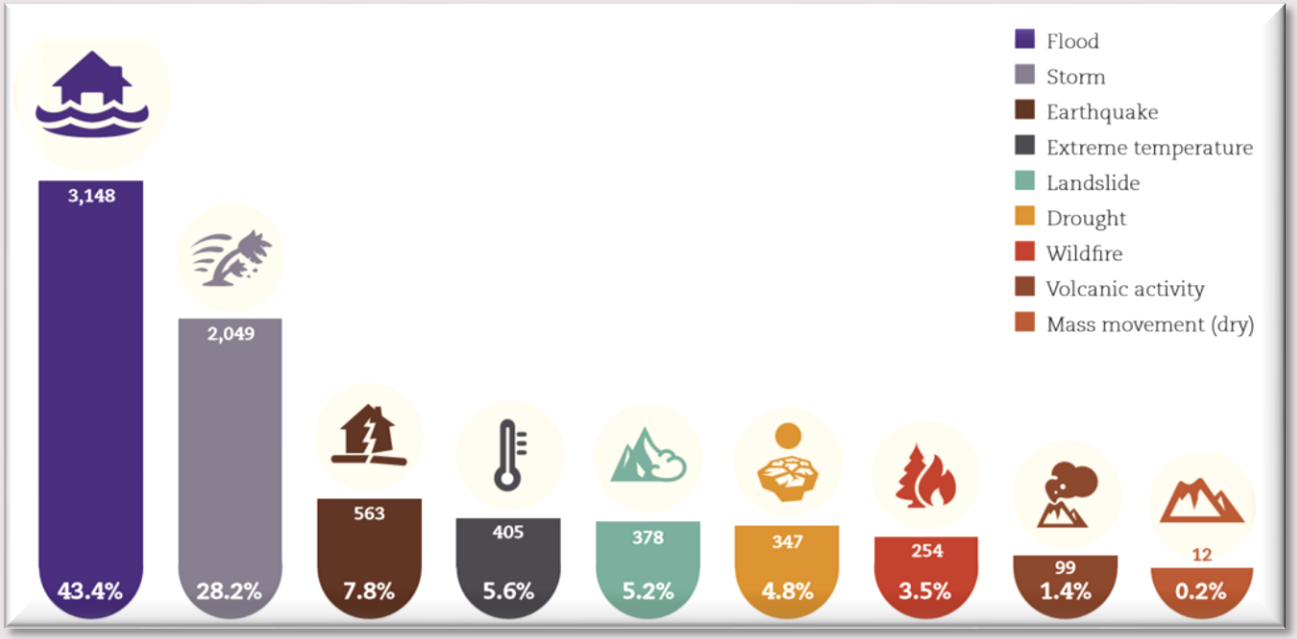
Climate changes and flood risk



Numbers of disasters per type 1998-2017

Source: EM-DAT- The OFDA/CRED International Disaster Database

Flood risk

43,4% (1998-2017)

37% (1993-2002)

WMO World Meteorological Organization

GWP Global Water Partnership

APFM Associated Program of Flood Management

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Table 1 – Factors contributing to flooding
(source:Water Management Organization, WMO 2006e.)

Meteorological factors	Hydrological factors	Human factors
– Rainfall – Cyclonic storms – Small-scale storms – Temperature – Snowfall and snowmelt – Cyclones	– Soil moisture level – Groundwater level prior to storm – Surface infiltration rate affected by vegetation, soil texture, density, structure and soil moisture – Presence of impervious cover such as snow and ice – Channel cross-sectorial shape and roughness – Presence or absence of overbank flow, channel network – Synchronization of runoff from various parts of watershed	– Land-use activities such as urbanization increase runoff volume and rate – Occupation of the floodplain obstructing flows – Structural flood-control measures such as embankments upstream – Greenhouse-gas emissions which may affect climate change and frequency and magnitude of precipitation events. – Decrease in conveyance of the river channels owing to build-up of river debris, restriction of waterways, dumping of minerals, rubbish and other waste – Mining and other industries alter water regimes, pollute water channels and affect ecosystems; can also alter water courses.

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Protection of floods

- played an impotrant role in protecting people and socio-economic development from flooding in the past.
- lagerly relied on structural solutions, such as embankments, bypass channels, dams and reservoirs…
- sometimes were folowed with non-structural measures such as flood forecasting and land use regulations but it was partial and non comprihencive.

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Flood controle and protection measures

- implie making development decisions on the basis of information about current and potential future risks of extreme hydro-meteorological events
- each community or country will be ready for risks that it can cope with

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Flood menagement

GWP, WMO, 2009

Flood management is recognized as the higest model of comprihensive, sustainable, resilient and responsible human answer to the challenges of floods in condition of climate change. It above:

- Spatial measures
- Technical measures
- Organization measures

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Integrated Flood menagement

GWP, WMO, 2016

Process promoting an integrated – rather than a fragmented – approach to flood management within the framework of Integrated Water Resources Management (IWRM).

As opposed to traditional flood-management options, IFM is a proactive approach with systematic actions in a cycle of preparedness (to ensure effective response), response (to reduce adverse impacts during flooding) and recovery (to increase the resilience of affected communities). Figure 1

Sustainability and resilience of urban and rural areas to flooding

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Integrated Flood menagement

GWP, WMO, 2009

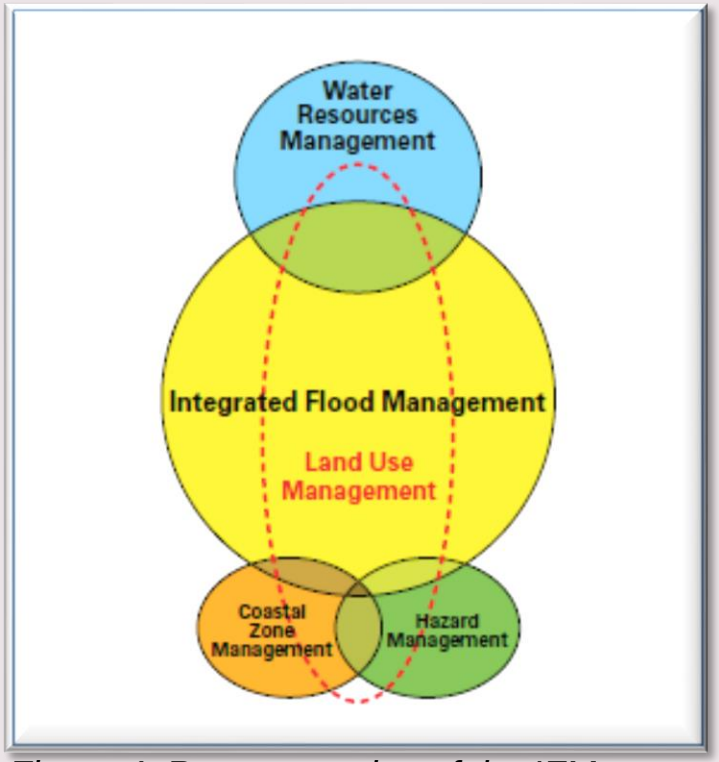

Figure 4, Representation of the IFM approach (WMO, 2009)

The aims

- Reducing loss of life as a result of flooding
- Maximizing the net benefits from flood plains
- Reducing flood vulnerability and risks
- Preserving ecosystem and their associated biodiversity.

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Integrated Flood menagement

GWP, WMO, 2009

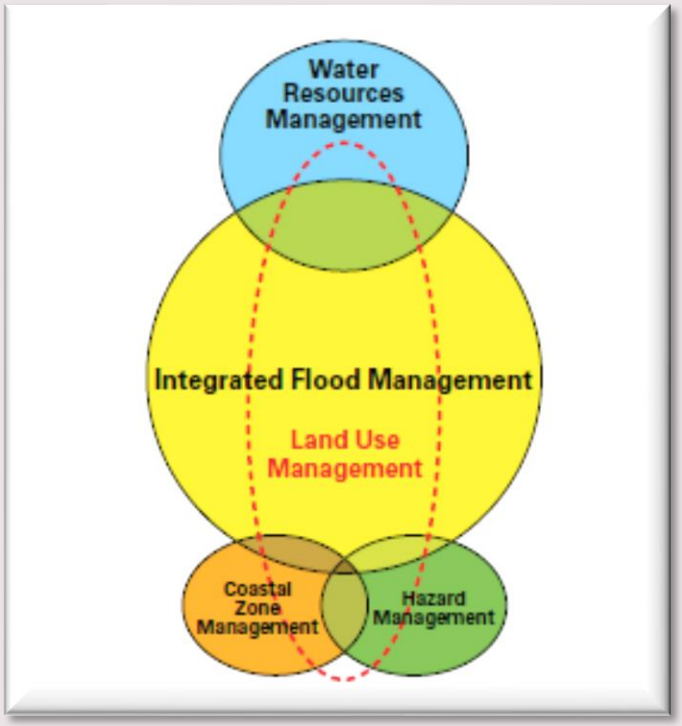

Figure 4, Representation of the IFM approach (WMO, 2009)

Key elements

- Adopting a basin approach to flood management
- Bringing a multi-disciplinary approach to the flood managemant
- Reducing flood vulnerability and risks
- Enabeling community participation

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Integrated Flood menagement

GWP, WMO, 2016

IFM requires planning process which should involve all organizations, institutions or communities that could affect or be affected by the hydrological processes of the river basin. Also, they are developed at different administrative levels as part of sectoral planning. These include:

- Basin or Catchment Flood Strategy
- Basin or Catchment Flood Management

} wider areas and time horizons up to several decades

- Local Flood Management Plan
- Project Plan

} small spatial scales and timescales of months or a few years

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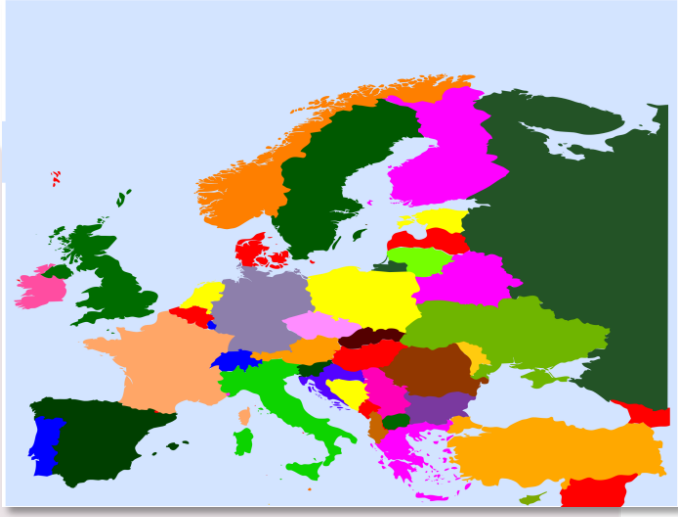
Spatial planning and Flood protection



Spatial planning is multidisciplinary socio-political and professional process aimed at:

- the welfare of the people,
- control of land use,
- the arrangement of the urban environment
- the protection and improvement of the natural environment.

CENTRAL LAVEL

REGIONAL LEVEL

LOCAL LEVEL

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division of the activities in the planning system and design and hierarchy of spatial plans in relation to the physical level (B&H)

Division of the activities
Hierarchy of plans

Spatial planning (state, region/district, municipality)

- spatial strategies of republic
- spatial plan of republic
- spatial plan of region
- spatial plan of specific area
- spatial plan of municipality

Urban planning (town, settlement, urban block, street buildings)

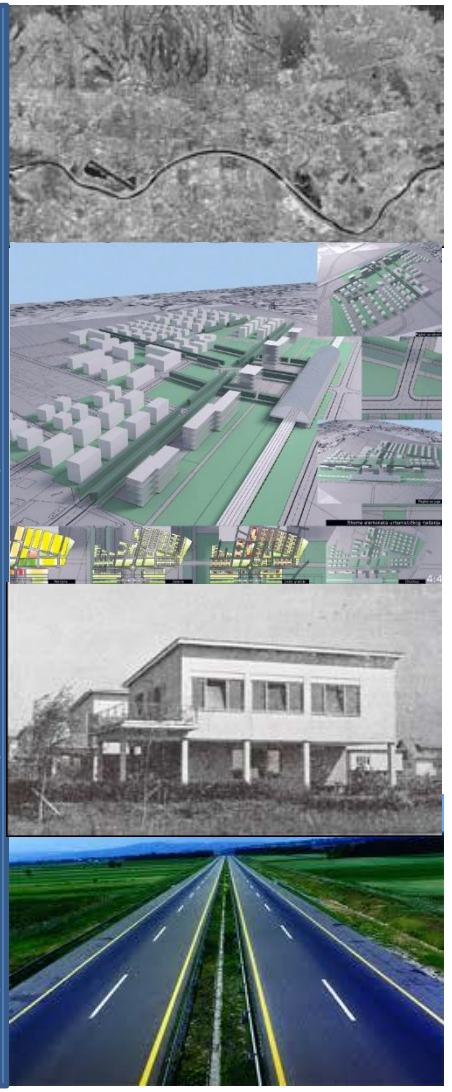
- urban plan
- zonning
- regulatory plan
- urban project **(urban design)**

Architectural design (buildings)

- architectural study
- architectural project

Civil engineering design

- Civil engineering structures projects



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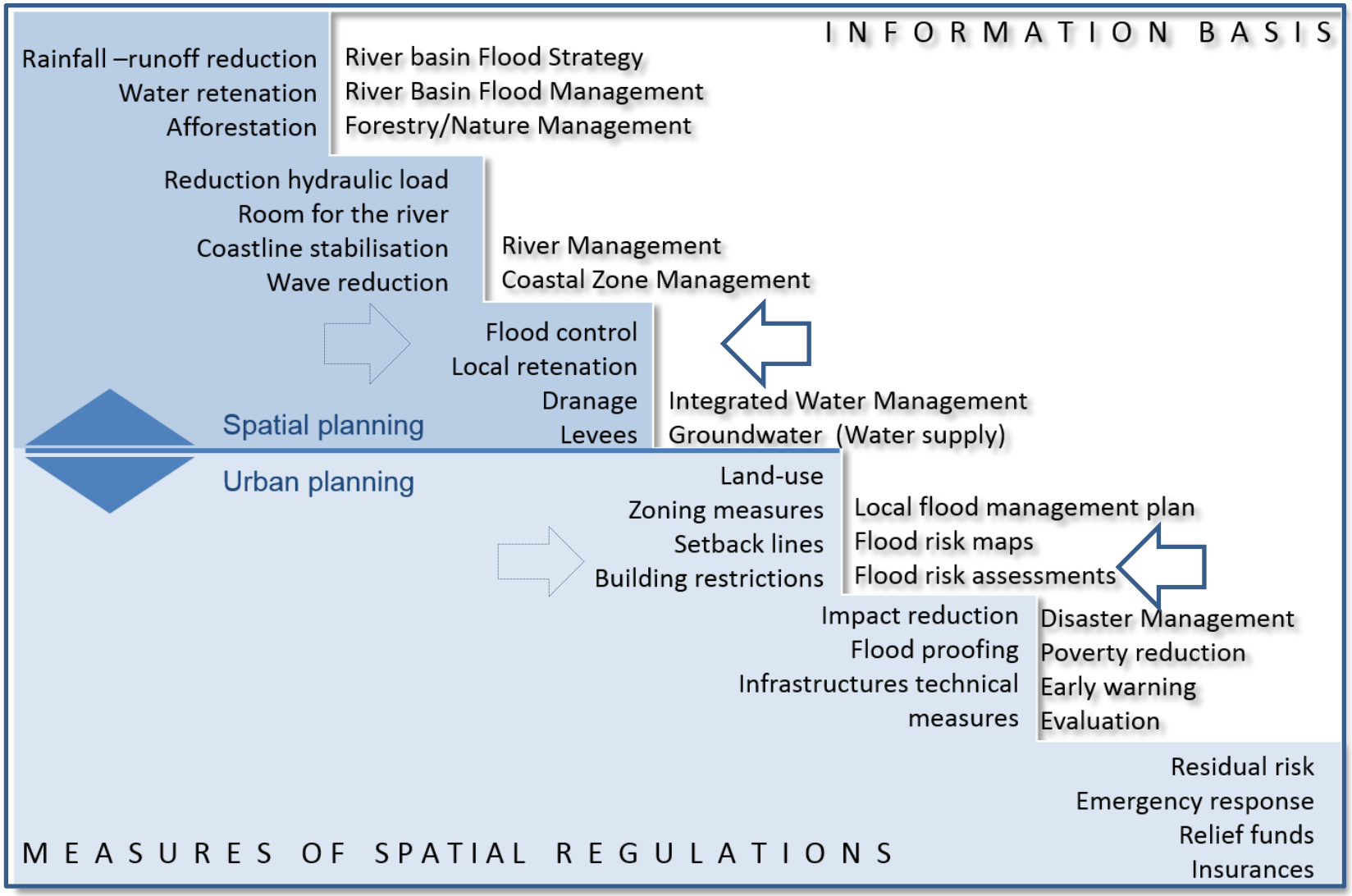
Flood risk management cascade (EU recommendation) and measures of spatial regulations in system of planning.



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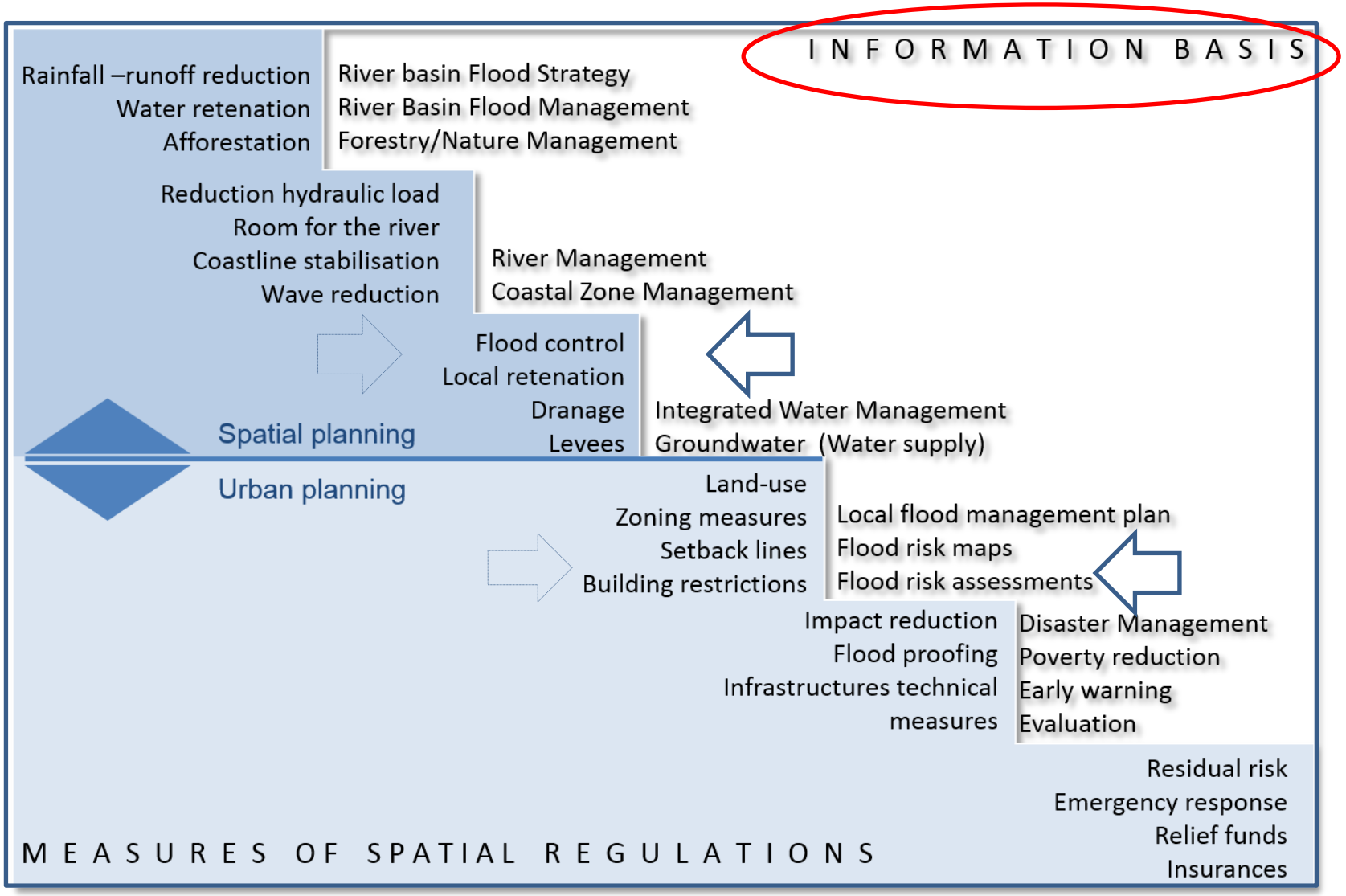

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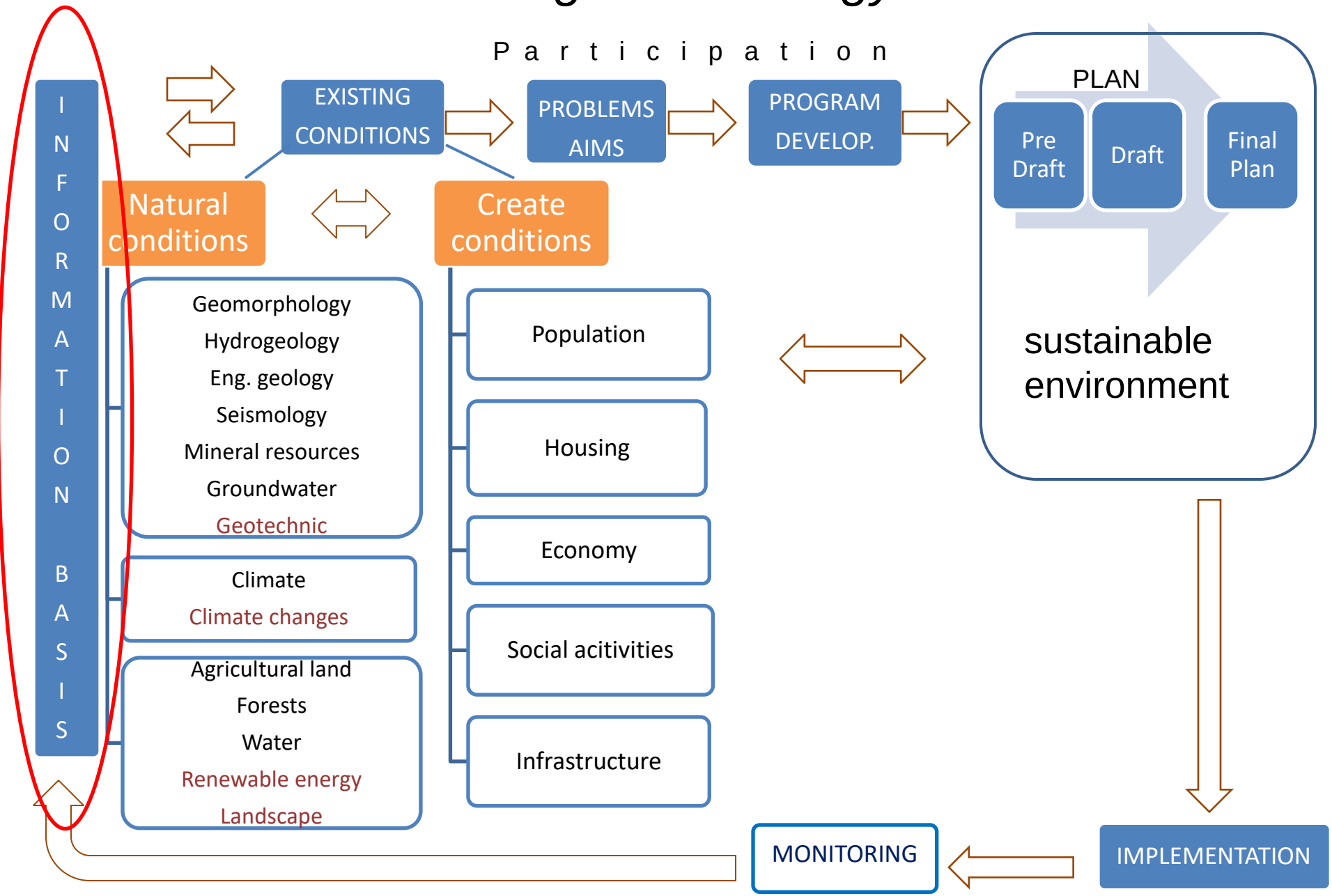
Planning methodology



EU flood Directive

(2007/60/EC)

„Reduce and manage the risk that floods pose to human health, the environment, cultural heritage and economic activity in EU countries“.

LAND USE PLANNING BECOMING MORE IMPORTANT

The requirements for member states were:

- to carry out a preliminary assessment to identify areas at risk of flooding (2011),
- to draw up flood risk and hazard maps (2013)
- to establish flood risk management plans that focus on prevention, protection and preparedness (2015).

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Practice in EU countries

Many European countries have taken significant steps in accordance with the EU Floods Directive.

Dutch projects: *The Room for the River, Nijmegen city*
Source: www.roomfortheriver.com

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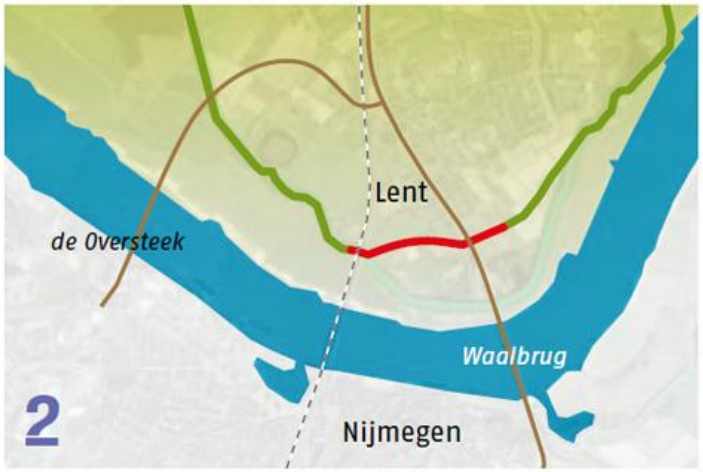
Dutch projects *The Room for the River, Nijmegen city*

The initial situation with the existing dike.



The dike was moved 350 metres inland.

An ancillary channel is to be dug in order to give the river more room. This will create an elongated island.

Bridges across the ancillary channel.

Source: www.foomfortheriver.com

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Spatial planning and Flood protection

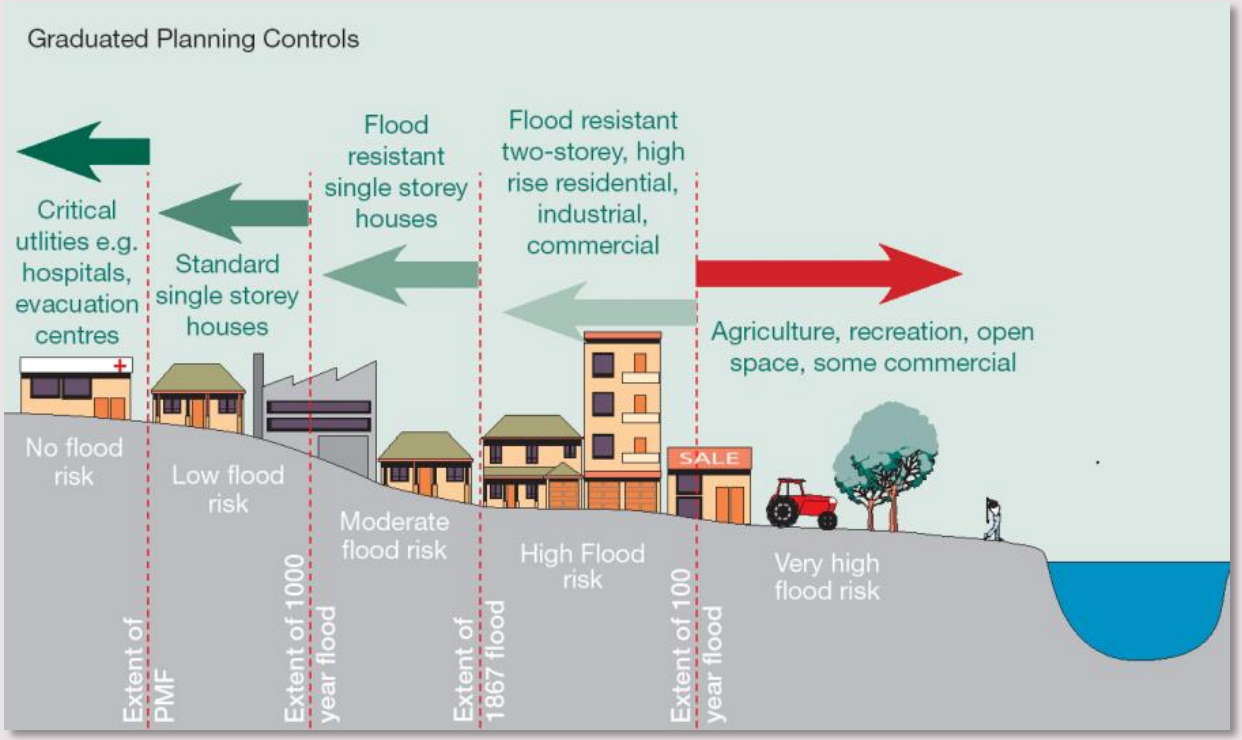

Figure Graduated land-use planning controls to reduce flood risk
(Hawkesbury City Council's Floodplain Risk Management Advisory Committee, 2012)

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Flood Hazard and Flooding Scenarios for Danube Basin

Integral water management of the Danube basin

(Convention on Cooperation for Protection and Sustainable Use on the Danube River, signed in 1994, enforced in 1998)

ICPDR, Wiena, December 2014.

Source:www.ingkomora.org.rs/...2015/20151216_6708_odbrana_od_poplava.pdf

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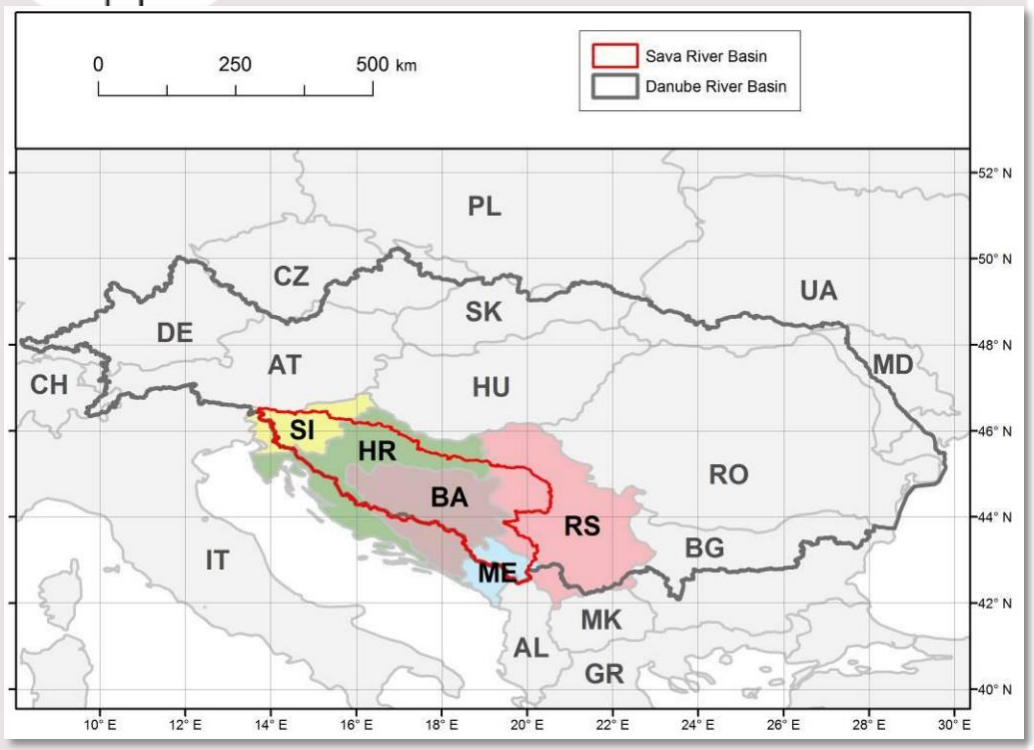
Practice in Balkan countries

- **Integral water resources management of the Sava river basin**

  Serbia, Bosnia & Herzegovina Slovenia and Croatia) ratified the Contract on the international basin of the Sava River in 2002

- **Joint management of flood risk Romania-Serbia (**Govermens of Romania and Serbia and Structural Funds of EU 2007-2013)



Insert of 'The Management plan for the Sava river basin' – Draft plan dating 2011, adopted December 2014.

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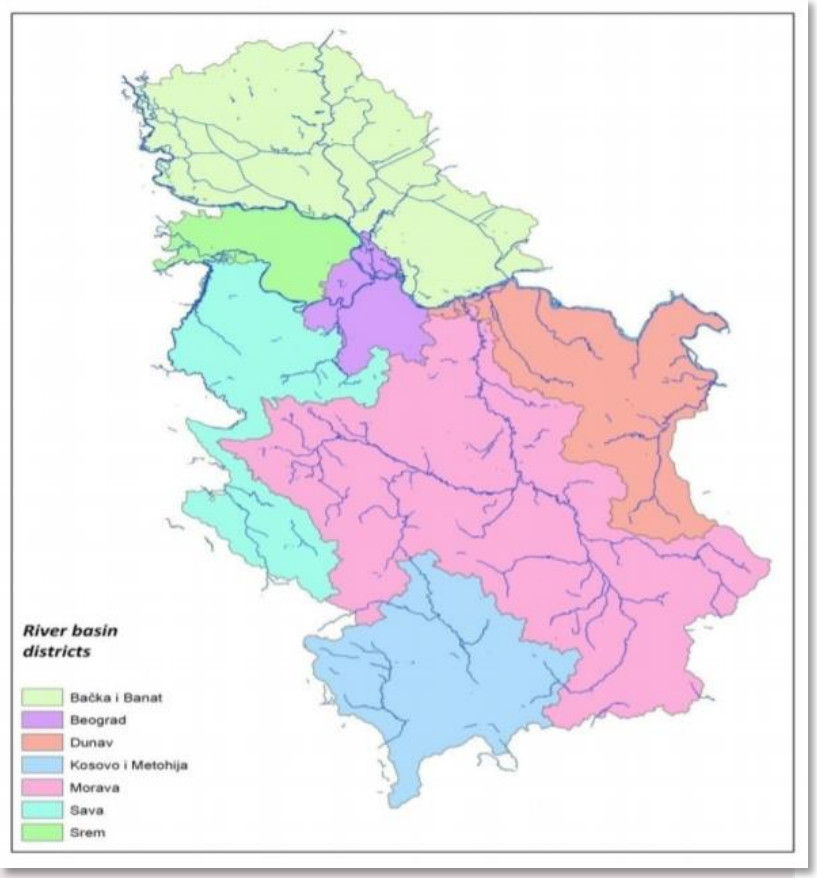
Practice in Balkan countries

Institutional competences for flood protection in Serbia:
Direction for water Serbia
Serbia water
Vojvodina water
Belgrad water

- Map of hazard and risk
- Flood Risk Assessments
- Flood risk managent plans
- Local projects



Serbia, River basin districts
(Source Ivan Irkic, 2015)

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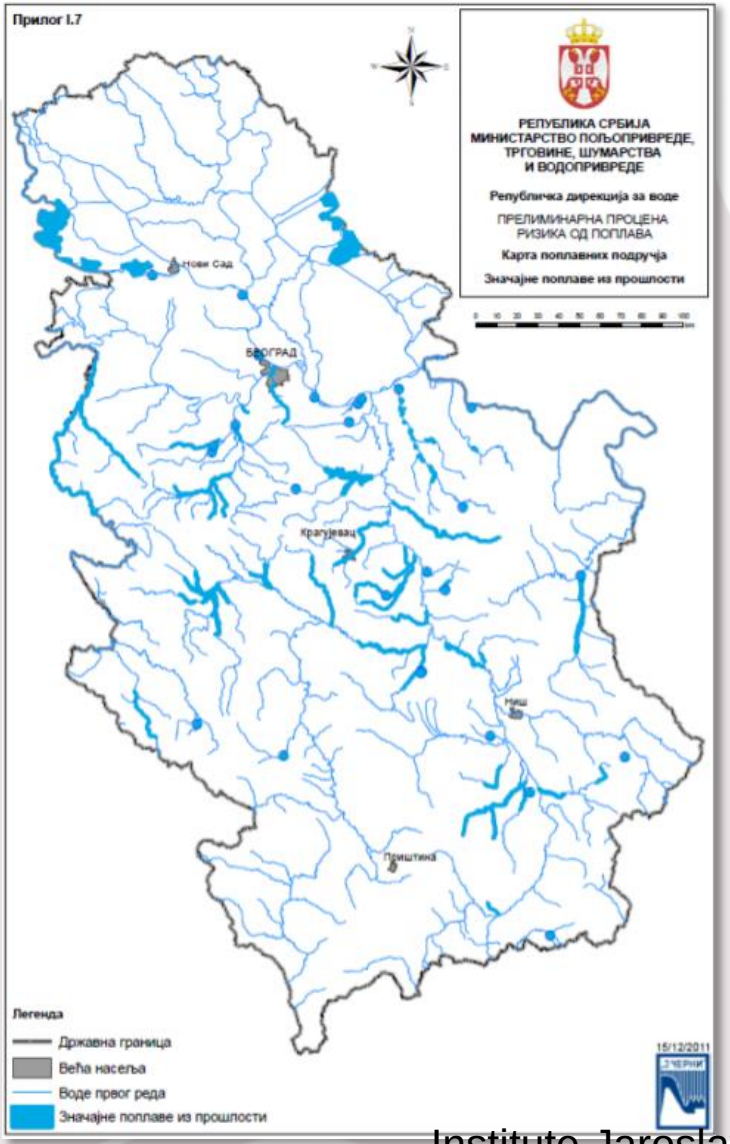

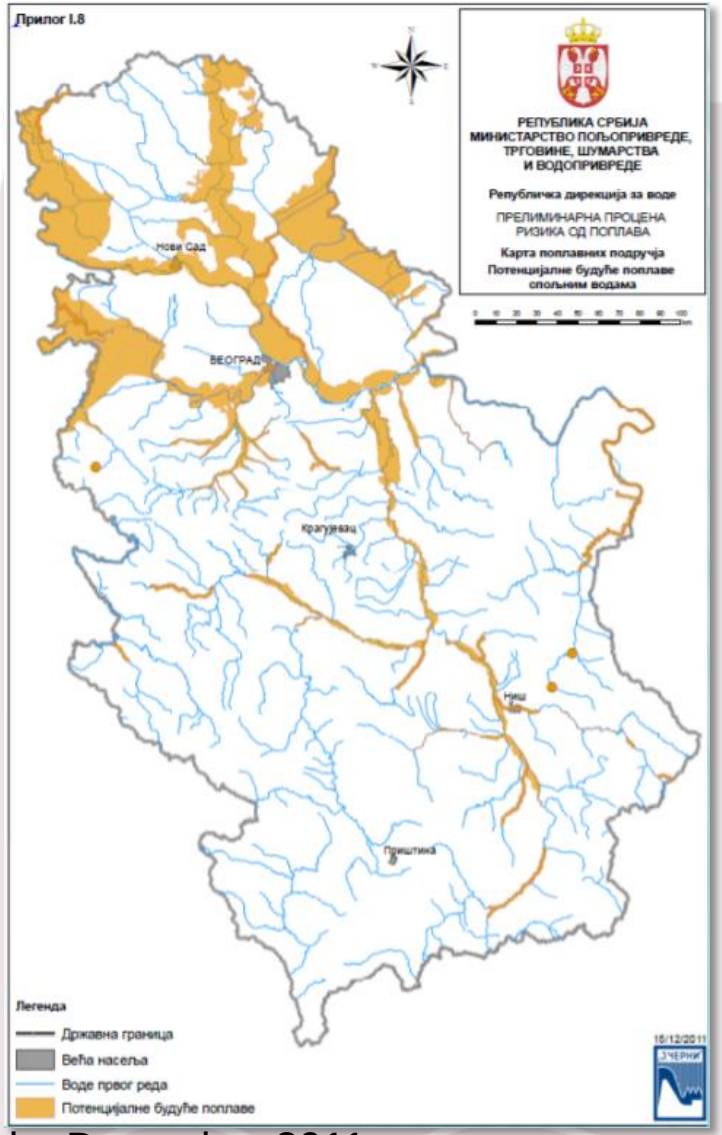

Institute Jaroslav Cerni, Belgrade, December 2011.

Source:www.ingkomora.org.rs/...2015/20151216_6708_odbrana_od_poplava.pdf

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Practice in Balkan countries

Action plan for flood protection and river management in B&H 2014-2017

Lack of:

- flood risk managements plans on the local level
- flood hazard and risk maps
- integrated spatial planning

Regulation of river Bosna
http://voda.ba/uimages/20122016_news_13.jpg

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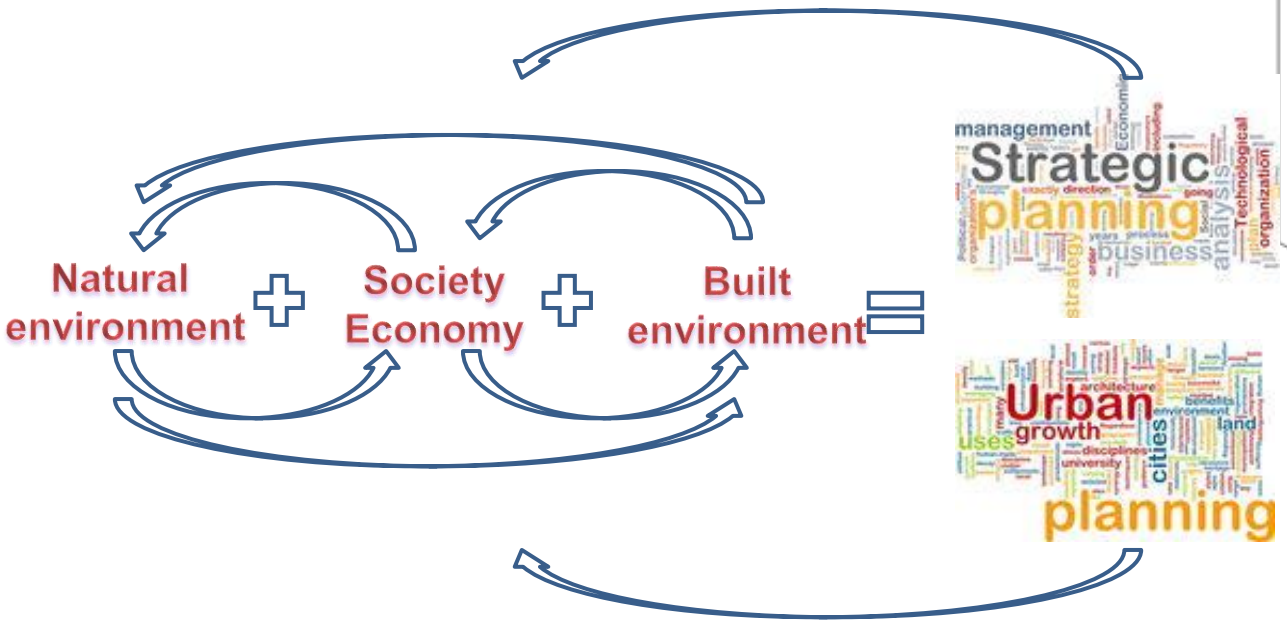
WHY INTEGRATED PLANNING?

Integrated planning is an essential integration and interaction of all levels of planning and all aspects of the space in order to complete deliberations on who, what and how to do in an urban area.



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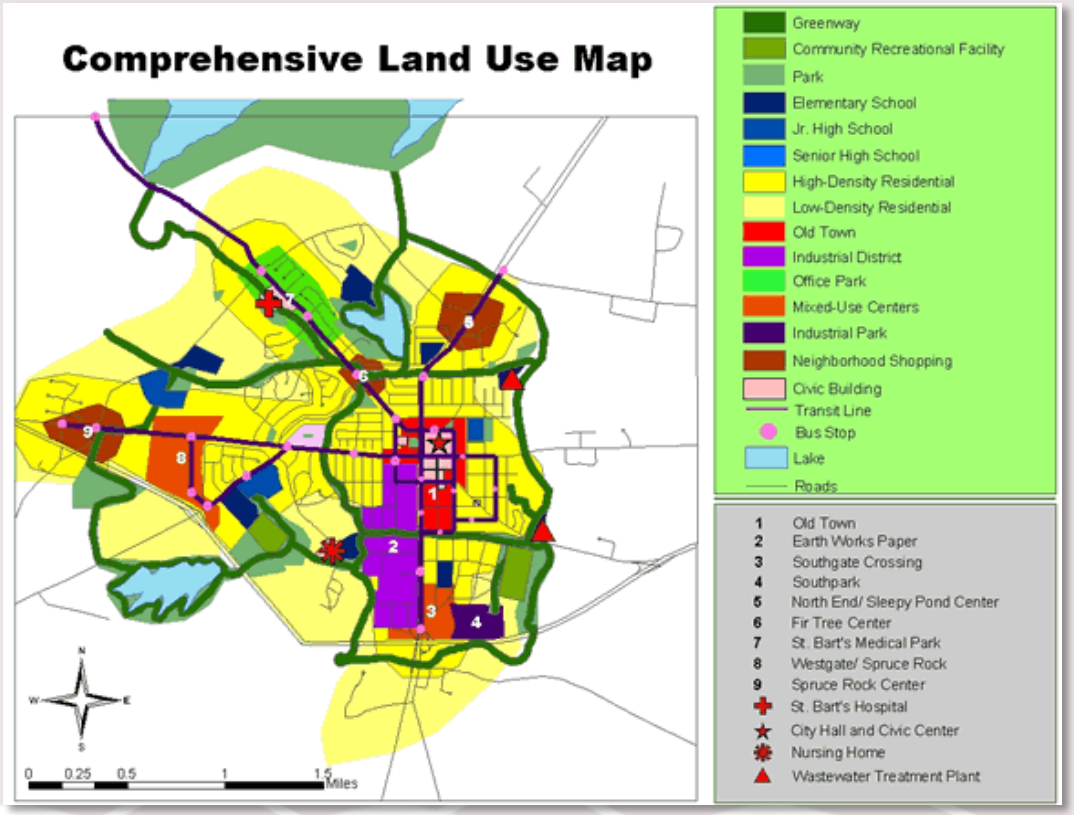
Integrated planning

Land-use plans, with their 'physical' solutions to social problems, became strategic plans with short-term actions and the framing activities of stakeholders to help achieve shared concerns about spatial changes (Albrecht, 2004).



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Urban planning today

- comprehensive in terms of including complex and dynamic development aspects
- adaptable, and participative with the aim of having sustainable and resilient urban space and environment
- human aspect by improving the quality of citizens' life through the protection of nature, created values, and optimal conditions for present and future generations

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Future planning

- More diversified
- Responding to upcoming needs and ever changing situations
- Focusing on “big issues” and dealing with the “small needs” or even small groups of stakeholders.

(Lorens, 2018)

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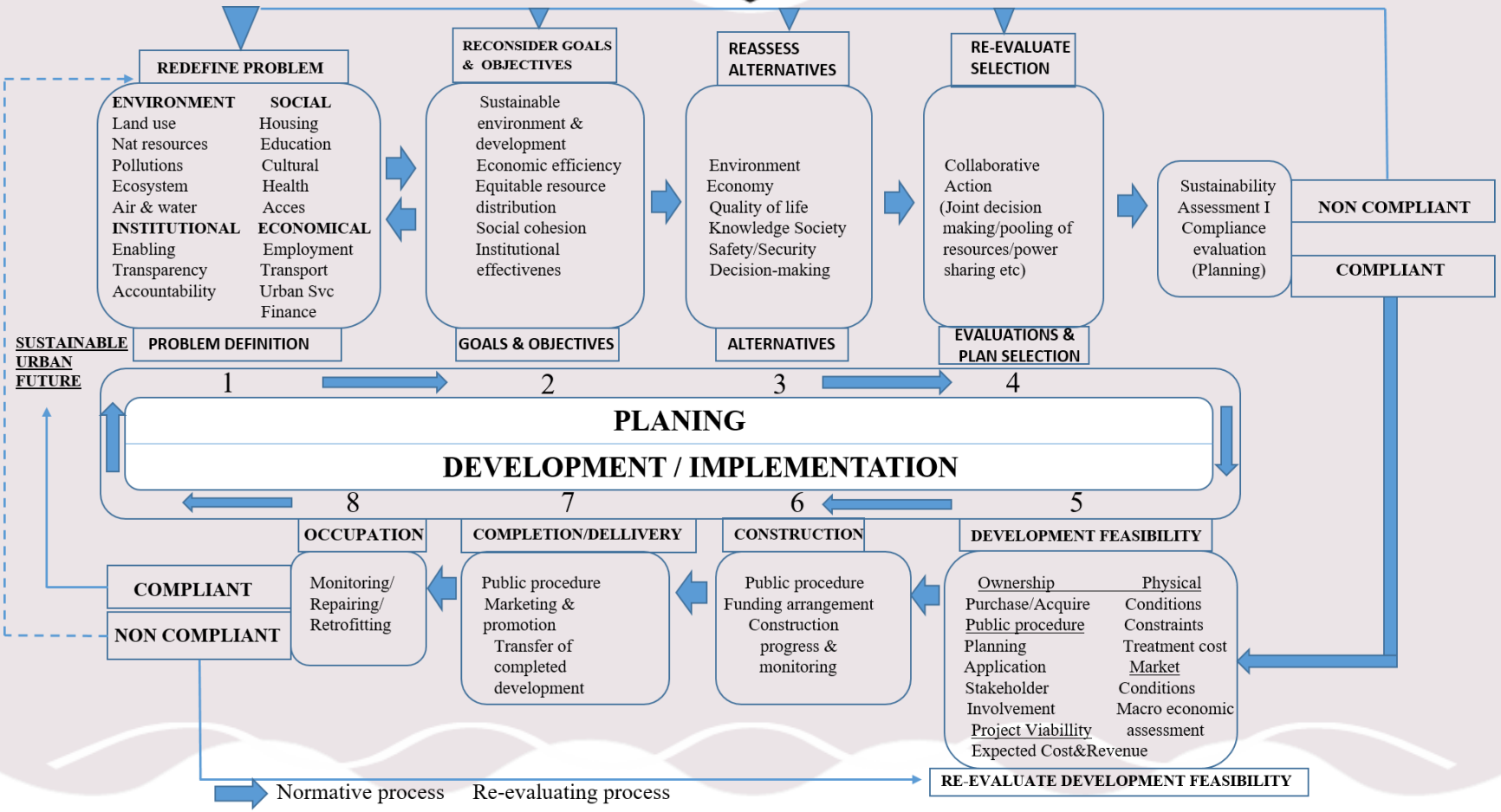
Integrated planning



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Integrated planning

- Interaction of all planning steps
- Multidisciplinary and integrated analysis of all relevant aspects of space
- Professional capacity
- Planning flexibility and adaptability
- Connection of spatial levels
- Institutional and financial support

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Integrated planning

- Participation
- Effective and transparent planning procedures
- Creation of updated spatial database (cadaster, natural resources, map of risk of floods, earthquakes, renewable energy resources, maps of landslides…)
- Regulatory framework
- Education and skills

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Guidelines to improving planning methodology in Balkan countries (integrated approach)

- Interaction of all planning steps
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Conclusions

- Spatial planning is a basic instrument for having integral flood management.
- There is interaction between flood management and spatial planning:
  - FM is necessary part od information basis for sustainable and resilience SP.
  - SP is the instrument for all kind of structural intervention in space, including measures of flood protection.

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Conclusions

- There is lack of flood management plans, as well as lack of spatial plans that deal with this topic integrally at the strategic and local level in.

- Active inclusion of spatial planning into the issue of flood protection in Balkan countries requires improvement of spatial planning methodology in aim of more integrated approach.

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Conclusions

- Proactive and responsible role of states and municipalities, professional institutions and civil sector in Balkan countries is necessary in aim to improve situation in domain od flood protection including more

KnowledgeFORResilientsoCiEty

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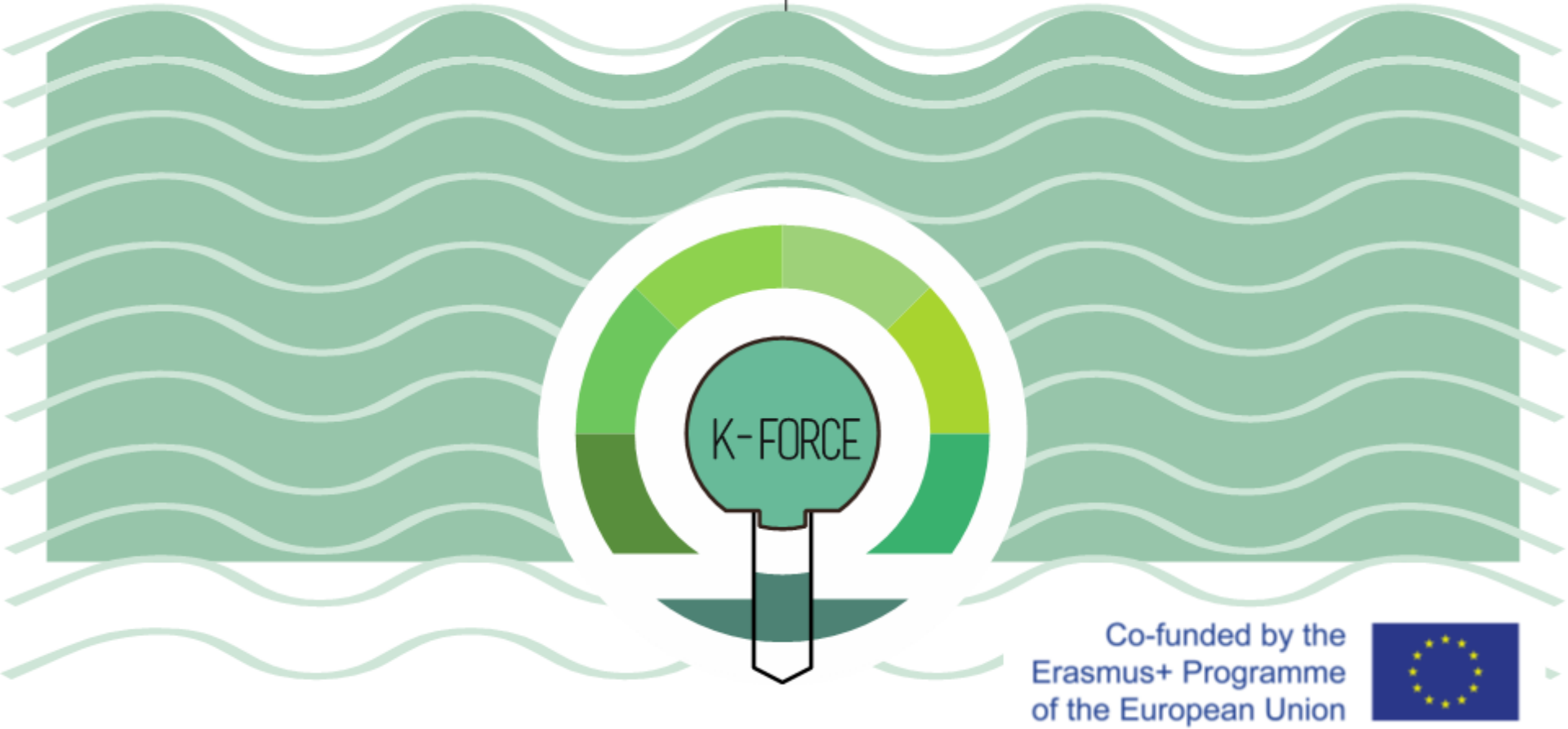

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