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Sustainable Water Resources management and EU legislation

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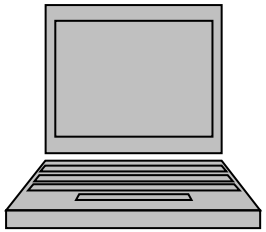
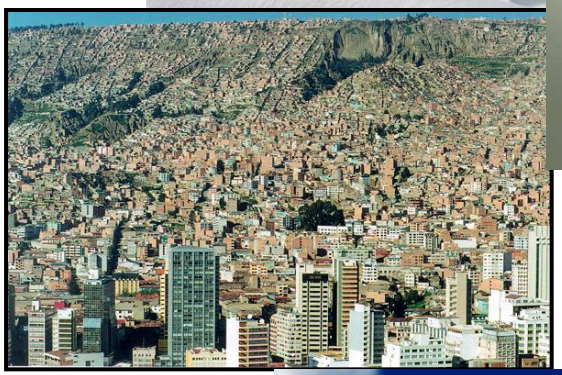


- Economic development and technological advances vs environment

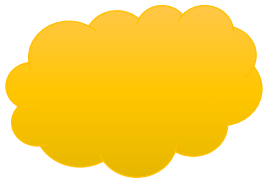
- The well-being of the 25% of global population cost the depletion of the 70% of earth's natural capital

GLOBAL ENVIRONMENTAL PROBLEMS

- Climate change
- Depletion of natural and energy resources
- Water problem
- Food production
- Desertification
- Loss of ecosystems
- Air, water, soil pollution
- Biodiversity extiction
- Urbanization/mega cities
- Deforestration


TOWARDS THE 21st CENTURY: 2 crises -1 reason



Economic crisis– Back to "real economy"

Environmental crisis-CC

Reason: Current Economic model- Unbounded growth

BY 2050

at current consumption we will need:

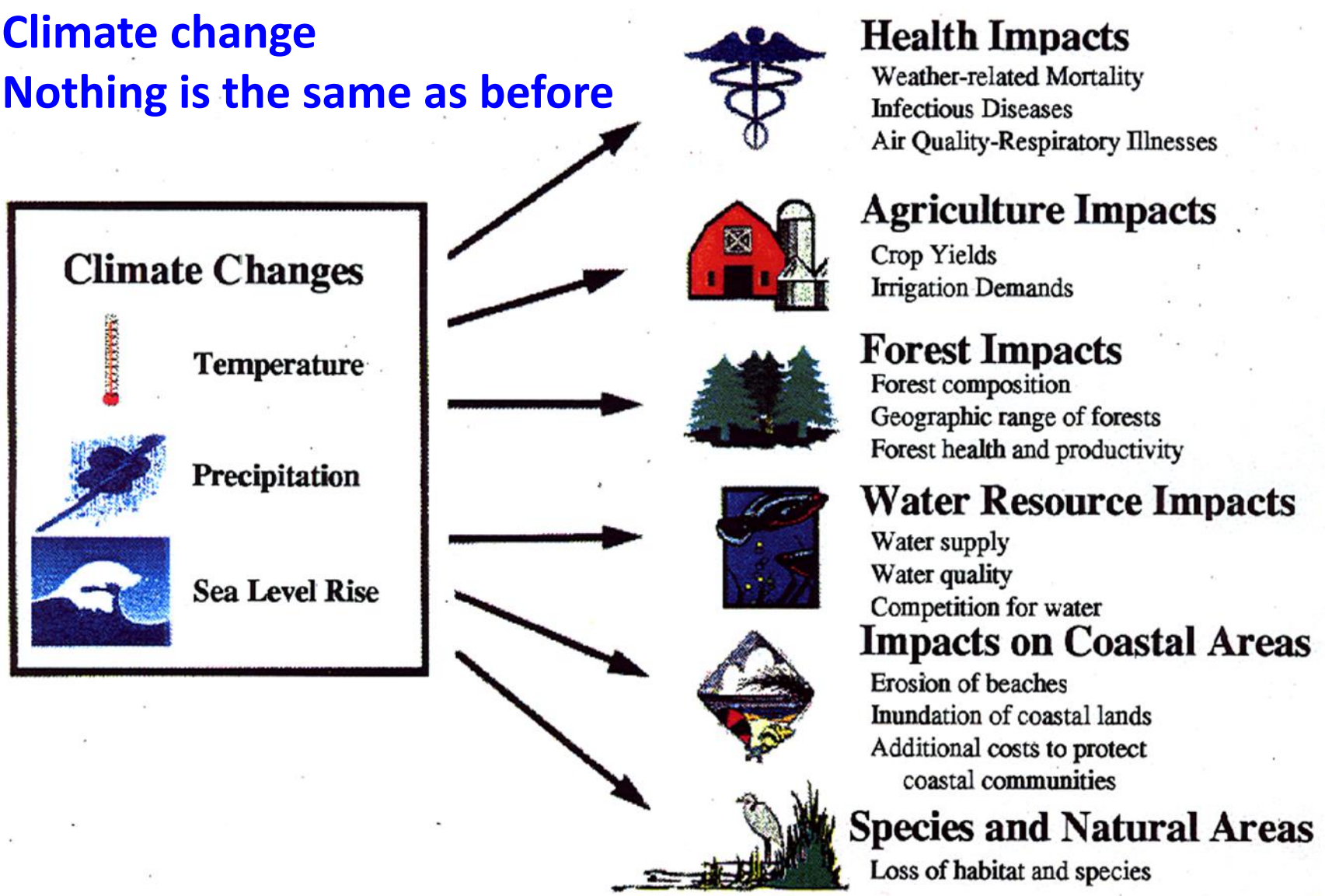
8.5 planets to absorb our carbon dioxide

6 planets worth of steel

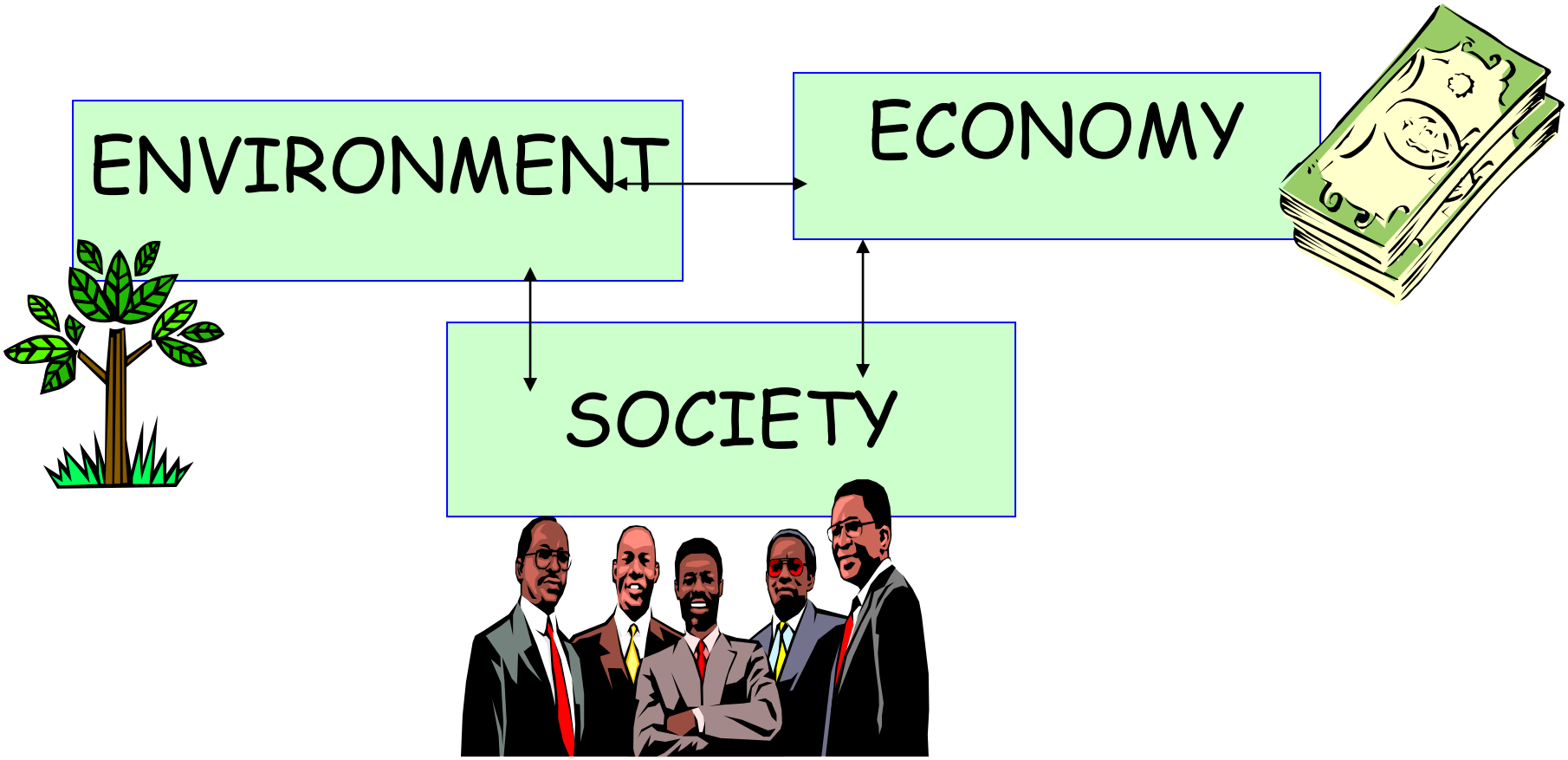
3.5 planets to sustain cement supply

3.5 planets to meet current timber demand

Environmental crisis-
Climate change
Nothing is the same as before



Sustainable Development



the environment is really the fundamental bottom line, as without a safe and stable environment we can have no economy or society.

SUSTAINABLE DEVELOPMENT

“meeting the needs of the present without compromising the ability of future generations to meet their own needs” **,**

1987-Our Common Future

Global population

1800: 1 billion people
1960: 3 billion people
2012 :6,4 billion people
2020: 7,5 billion people
Gain 1 billion people every 10 years

"The question is not 'How many people can the earth support' but rather at what quality of life?"

Isaac Asimov

SUSTAINABLE DEVELOPMENT

- **Development compatible with the carrying capacity of the earth.**
- **a “red line” for environmental management**

SUSTAINABLE DEVELOPMENT

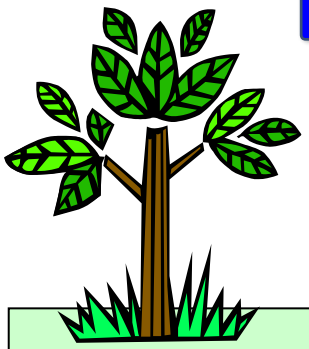
- **Introduces the need to adjust economic development to the limits of nature.**

- **Reorientation of economic activities towards resource conservation and protection**

Prerequesites for SD

- A social system that is capable of tackling with inequalities globally
- A political system which can assure engagement of the civil society, environmental enactment
- A new, technological system which can adapt innovation and respond to new challenges
- A system of production which can coincide with the environmental and SD notion.

BASIC PRINCIPLES of SD



EFFICIENCY

Integrated approach

EFFECTIVENESS

Demand management

EQUITY

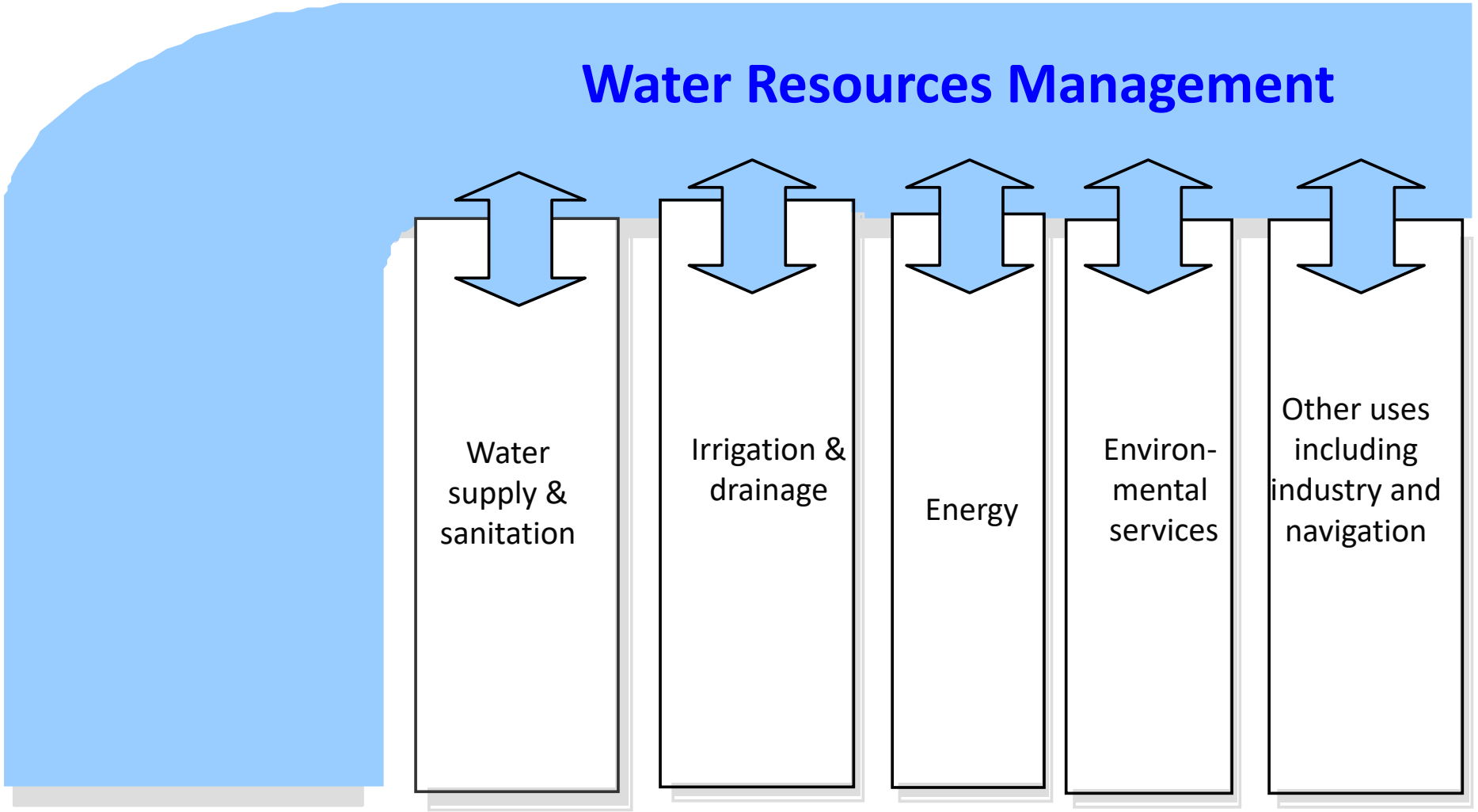
Decentralized participatory approach

WHY IS WATER CENTRAL TO SUSTAINABILITY?

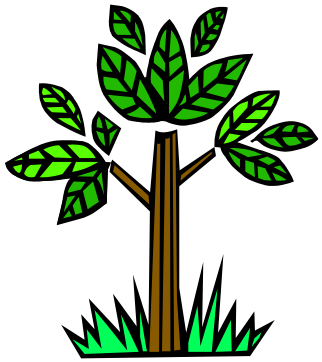
- Essential to maintain life
- Main economic driving force
- Vital component of ecosystem

WATER RESOURCES – Many Uses, Many Users

…



Basic principles of sustainable water management



Sustainable Water Management

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Sustainable water management requires the use of the renewable water resources only

This is the only way to respond to the basic concept of sustainability, which is to give perspectives to our childrens' children…

Water Supply Management

- Water Supply Management is the traditional practice of increasing water supply through the design and construction of new engineering projects, i.e. dams, reservoirs etc, in order to meet the increasing water needs.

- High economic development resulted to a systematic increase in water demand. Supply Management practices have lead to negative water balances and therefore is the main reason of depletion of surface and groundwater resources in urban, agricultural, industrial and touristic catchment areas

DEMAND MANAGEMENT

Demand Management is the only way to address water stress problems in the new era of climate crisis.

Demand Management is the contrary of Supply Management. It is the water saving practice according to which the water demand has to decrease in order to meet available water supply

Demand Management

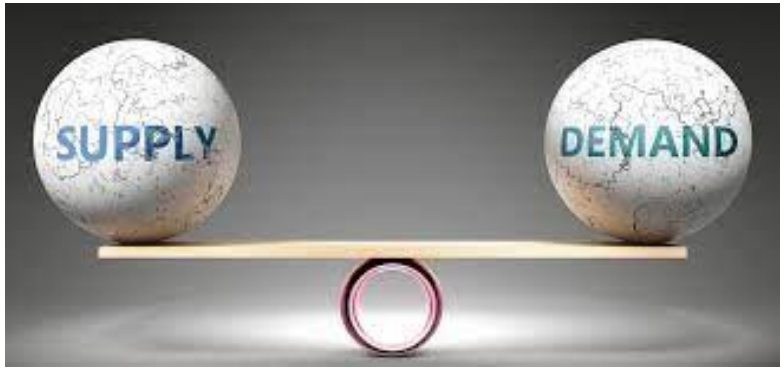
Demand Management means:

1. Saving water by using environmentally friendly technologies (recycle, reuse, new agricultural practices, technologies for decreasing water losses in water networks etc)
2. Changing economic activities in order to adjust water demand to the limited water availability conditions (agricultural reform towards less water consuming cultivations)

Balancing Water Supply & Water Demand

- Water Resources Management deals with balancing water supply & water demand.

- It is an effort to bridge the gap between limited water availability and increasing water demand.



Negative Water Balance

- Negative water balances in catchment areas indicate that not only the renewable, but also the permanent water deposits are being used and depleted
- Negative water balances are the indication of non-sustainable water resources management

Climate Changes

- Water stress problems have been deteriorated during last 2 decades due to climate changes conditions.
- Climate changes are mainly connected with a considerable change in the distribution of the precipitation in time and space, as well as with more often extreme events, i.e. droughts, floods, very high and very low temperatures
- Less precipitation and the change in water supply distribution through time and space are the main reasons for a further deterioration of the water stress problems

Water Resources Depletion

- The increase in water demand due to the aggressive economic development model and in the same time the decrease of water supply due to water consumption and pollution practices and climate crisis are the main reasons for water resources depletion.

- Climate change is one more threatening factor for the already depleted water resources

Water Shortages

- Water shortage is not the result of less water availability due to natural conditions only, but also the impact of increased water demand

Combating Climate Change

- There are two ways to combat climate change:

1. Mitigation methods, i.e. gas emission reduce, decrease of energy production, shift to Renewable Energy Sources
2. Adaptation methods, i.e. learning to live with the new climate and environmental conditions (Demand Management)

BASIC PRINCIPLES OF SUSTAINABILITY (3Es)

- **Effectiveness**
- **Efficiency**
- **Equitability**

EFFECTIVENESS

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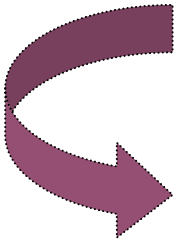
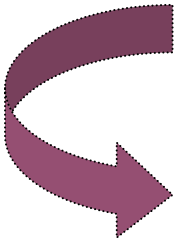
Achieving the objective of Integrated Water Resources Management (IWRM)

Integrated river basin approach, as a part of a national strategy for water resources management



Promotes qualitative and quantitative aspects of water by developing monitoring mechanisms, for controlling and assessing the different water parameters.



Water resources development plans through integrated designing of water projects.

EFFICIENCY

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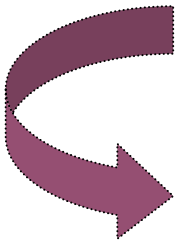
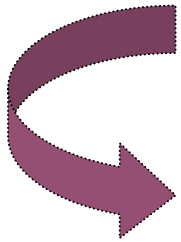
Implementation of a series of economic instruments (pricing, taxes and other economic incentives) and rules in order to achieve the objectives of Demand Management:



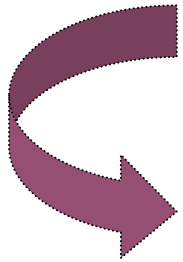


distribution of costs rehabilitation, protection and preservation of water deposits.

Funding of hydraulic projects

EQUITABILITY

Participatory and Decentralized approaches



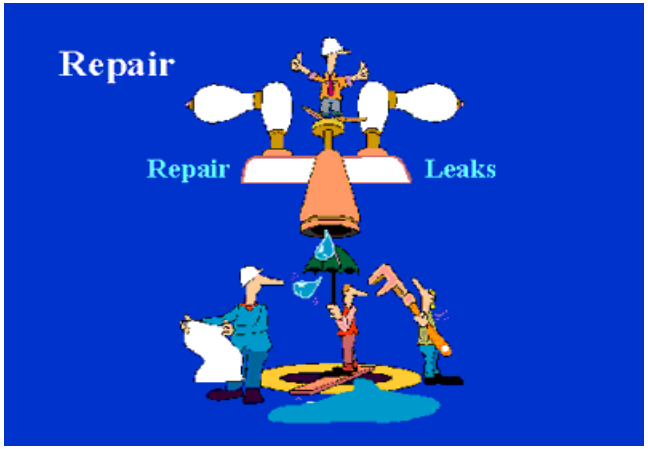
Adoption of rules and measures for the fair access to water resources

Economic techniques

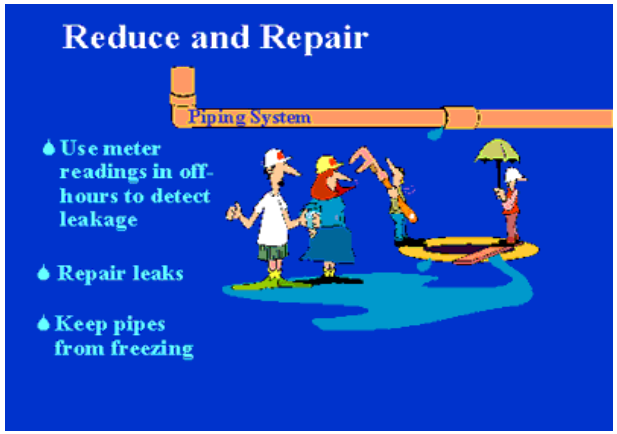
- ✓Economic incentives (subsidies, taxes, fines etc.)
- ✓Water pricing as an incentive for water conservation and water protection

Operational techniques

Water metering



Water saving devices



Leakages' control

Public awareness

from public information….

to

active public involvement…

Today, the major concern is, …… …… interested parties agree. How a consensus between the interested parties will be reached, how mutually satisfactory solutions will be found.

Effective adaptive measures

- Water pricing across all sectors for sustainable water use
- Demand management measures which will improve water efficiency and promote water conservation
- Design and implement drought management plans at river basin scale
- Raising public awareness and information
- If demand management approach is not adequate alternative supplies such as re-use of water, desalination or treated wastewater might be a possible solution
- Reduce of illegal water use

Green Economic Development

- Demand Management means changing the economic development model to meet the new climate and environmental conditions
- Demand Management is connected with a political reform towards a green economic development model

Let's try to find out what would the 3Es mean for a transboundary river basin

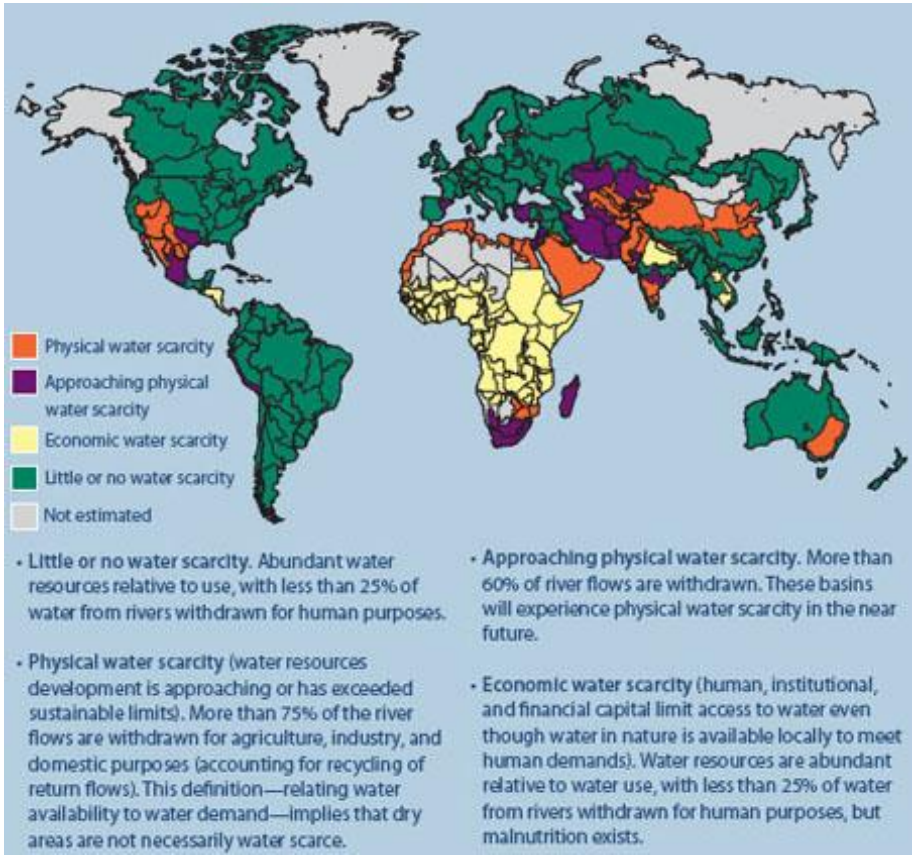
The challenges:
Water scarcity and Climate Crisis

The Challenges

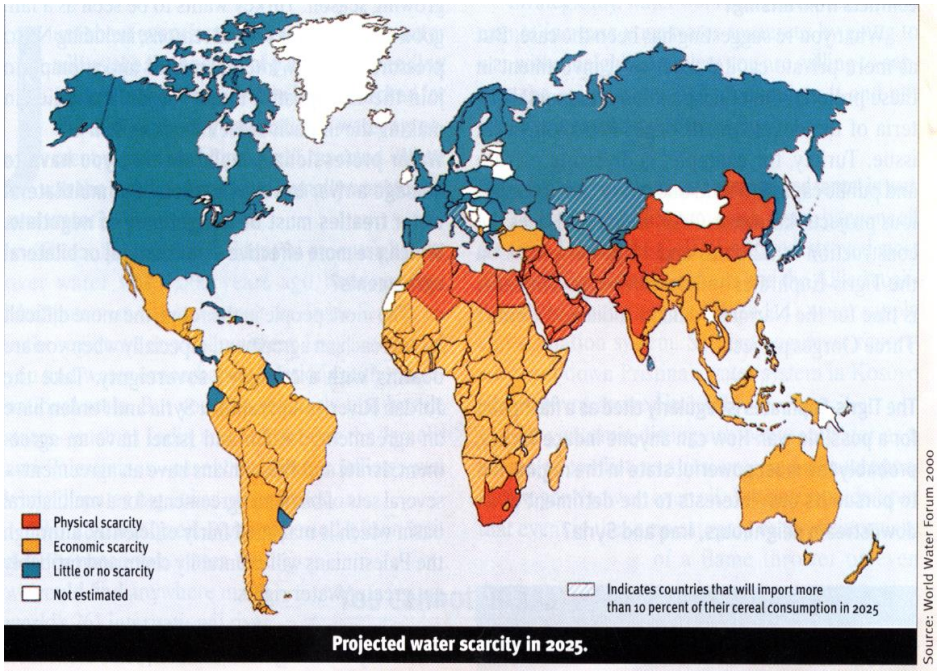
- **Water scarcity-imbalance between water supply and demand**
- **Climate Crisis/water**

Water scarcity

Water scarcity



- Little or no water scarcity. Abundant water resources relative to use, with less than 25% of water from rivers withdrawn for human purposes.
- Physical water scarcity (water resources development is approaching or has exceeded sustainable limits). More than 75% of the river flows are withdrawn for agriculture, industry, and domestic purposes (accounting for recycling of return flows). This definition—relating water availability to water demand—implies that dry areas are not necessarily water scarce.
- Approaching physical water scarcity. More than 60% of river flows are withdrawn. These basins will experience physical water scarcity in the near future.
- Economic water scarcity (human, institutional, and financial capital limit access to water even though water in nature is available locally to meet human demands). Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.

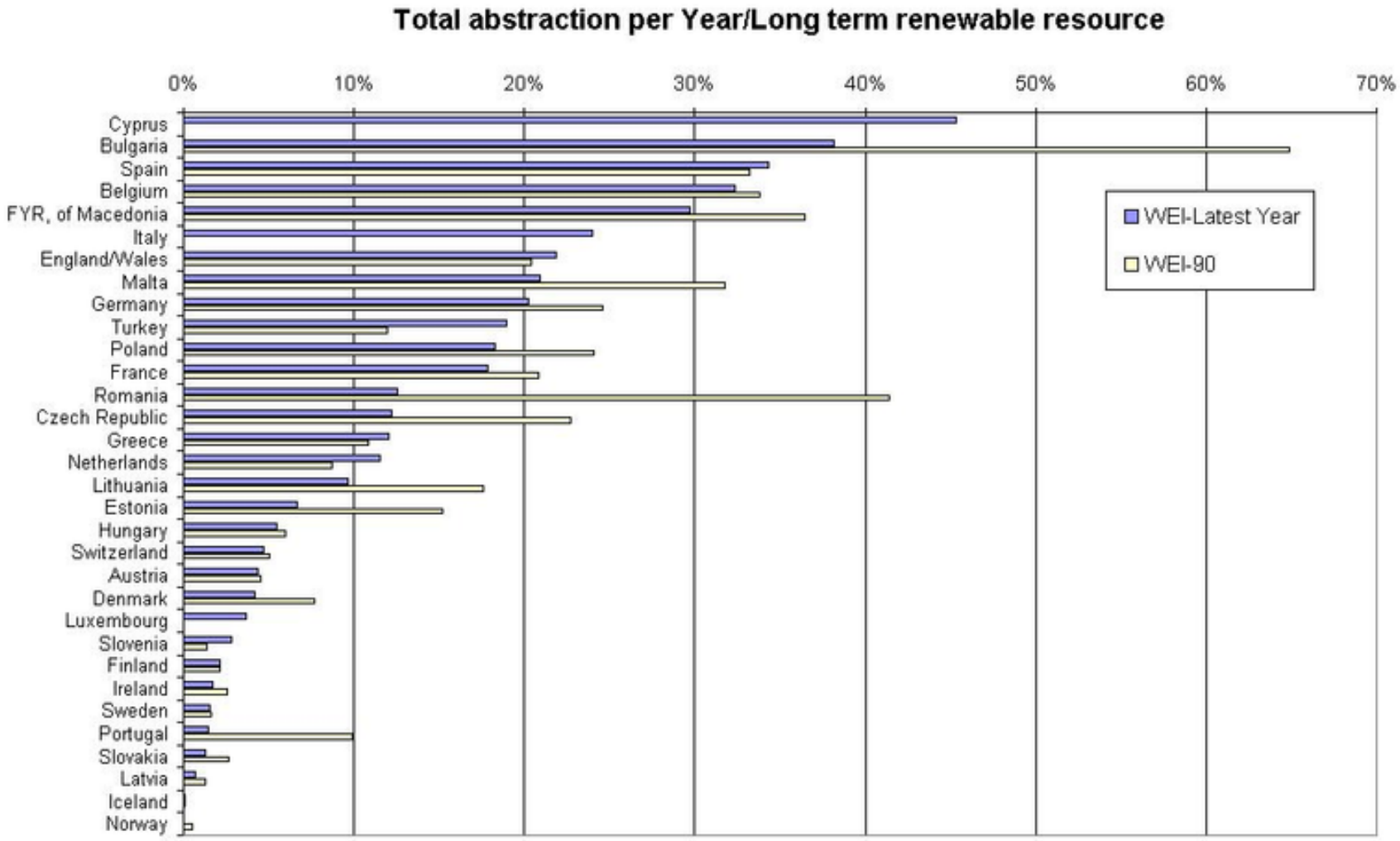


WEI: Water exploitation Index

It provides a useful indicator for water scarcity

It is calculated annually as the ratio of total freshwater abstraction to the total renewable resource.

A WEI above 20% implies that a water resource is under stress and if it exceeds 40% it indicates severe problems, unsustainable use of the water resource


Total abstraction per Year/Long term renewable resource
0%
10%
20%
30%
40%
50%
60%
70%
Cyprus
Bulgaria
Spain
Belgium
FYR, of Macedonia
Italy
England/Wales
Malta
Germany
Turkey
Poland
France
Romania
Czech Republic
Greece
Netherlands
Lithuania
Estonia
Hungary
Switzerland
Austria
Denmark
Luxembourg
Slovenia
Finland
Ireland
Sweden
Portugal
Slovakia
Latvia
Iceland
Norway
WEI-Latest Year
WEI-90

Climate Change/crisis

Effects of Climate Crisis in water

- Water stress problems have been deteriorated during last 2 decades due to climate change conditions.
- Climate change is mainly connected with less precipitation and more often extreme events, i.e. droughts, floods, very high and very low temperatures
- Less precipitation and the change in water supply distribution through time and space are the main reasons for a further deterioration of the water stress problems

EU WATER POLICY

- The need for a more sustainable and integrated approach to managing water resources in Europe
  is already reflected in water-related policy and legislation.

- And also EU policy tried to relate sustainable and integrated approach to managing water resources under climate change conditions

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EU legislation

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WFD
Floods Directive
EU Adaptation,
White Paper, adaptation to climate change in water management,

regulatory and economic policy instruments,
Nitrates Directive
CAP
Urban Waste Water Directive
Natura 2000
Integrated Coastal Zone Management work complementary as a roadmap to adaptation.

R&D programs (FP7, FP8, Joint Research Center)) and financial mechanisms for funding (LIFE, EU Cohesion Funds, etc.) also support this effort.

THE EU WFD 2000/60
The water "Bible" for integrated and sustainable water management

Final goal of good "water status" of Europe's waters until 2015

WFD

Key notion:

integration

Selected items related to an integrated approach	Some examples of information needed
Integration of environmental objectives	Information on water-quality, water-quantity and ecological status as well as objectives/targets for protecting highly valuable aquatic ecosystems and ensuring a general good status of other waters.
Integration of all water resources	Inventories of fresh surface water and groundwater bodies, wetlands, coastal water resources at the river basin scale and their interactions.
Integration of all water uses, functions and values	Knowledge on the links between functions and uses in a specific river basins (e.g. water for the environment, role of ecosystems such as forests and wetlands in the water cycle, water for health and human consumption, water for industry, transport, leisure (see table section 3.4) and their societal valuation.
Integration of disciplines, analyses and expertise	Uses of resources, hazardous activities (e.g. manufacturing industries), water-construction works and other economic activities to assess current pressures and impacts on water and water-related ecosystems by combined knowledge on hydrology, hydraulics, morphology, ecology, chemistry, soil sciences, technology, engineering, social and political sciences, and economics.
Integration of all significant management and ecological aspects	Knowledge on the extent of floodplains; inventories of land use (e.g. forests, agricultural areas, urban areas); inventories of protected areas and their relationship with, or influence on, the ecological situation; link between policy measures and ecology to assess effectiveness of measures.
Involvement of stakeholders and the civil society in decision-making	Local experience and traditional knowledge on water issues; identification of stakeholders and their information needs; reporting requirements/information needs of the stakeholders and general public (e.g. level of detail, frequency of reports).
Integration of different decision-making levels that influence water resources and water status	National legislation; transboundary agreements; decisions taken at international forums (e.g. MDGs); functions and mandates of local, provincial, national and transboundary authorities and other bodies

http://www.unece.org/env/water

EU WFD

The EU WFD through the 3Ps:

a. integrated Planning and management,

b. Demand Management through Pricing and true cost recovery and

c. Participation and improved decision making,

represents an important step towards sustainable use of water resources in Europe.

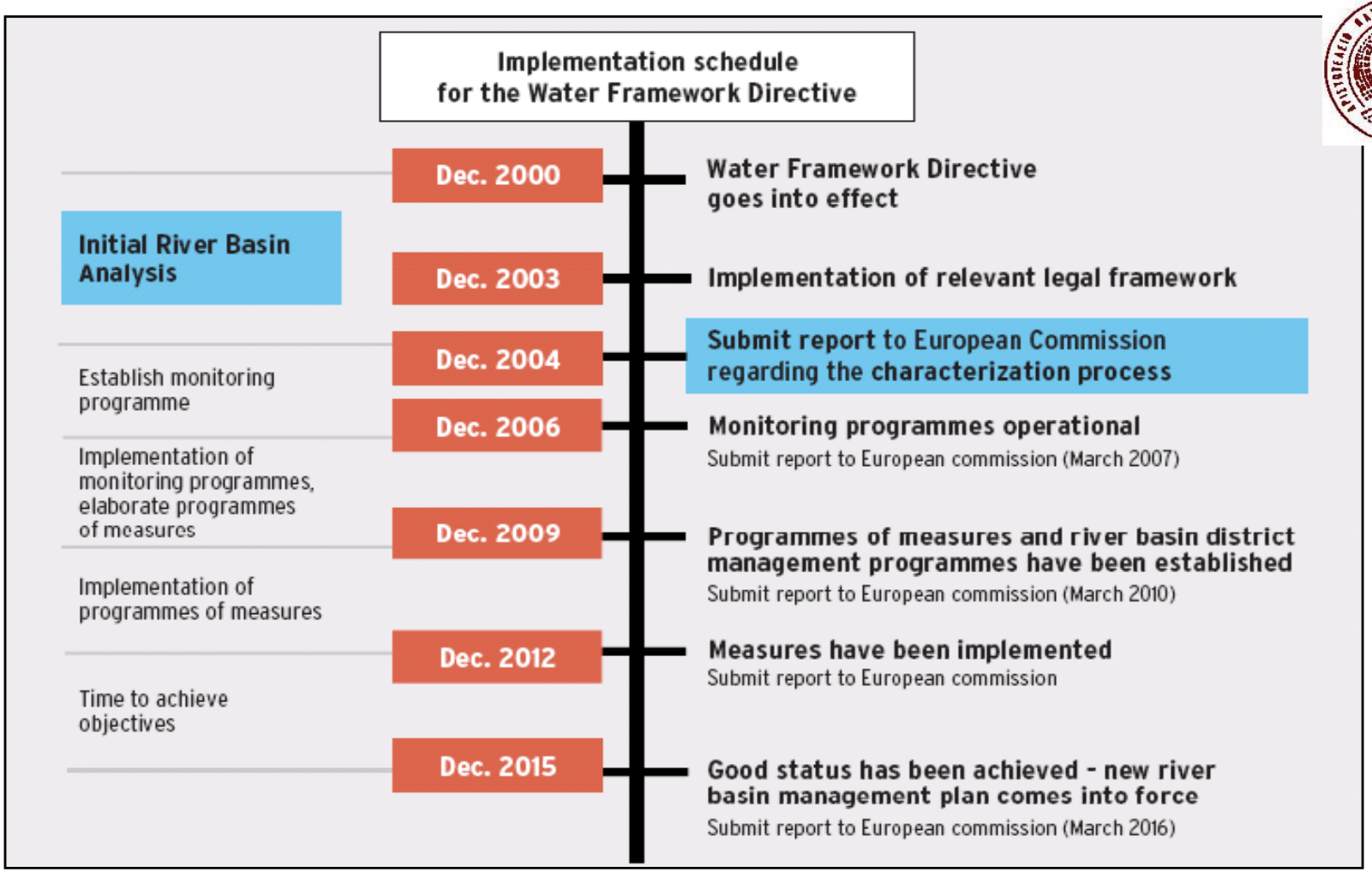
EU WFD

- The application of river basin approach
- The identification of environmental pressures
- The long –term ecosystem management
- the river basin management plans
- The full cost pricing -get prices right
- The public participation-get citizens involved

are some of the applied mechanisms to secure sustainable water management and "good water status" of Europe's waters.

The Directive defines **six-year management cycles** until the final goal of good "water status" in 2015.

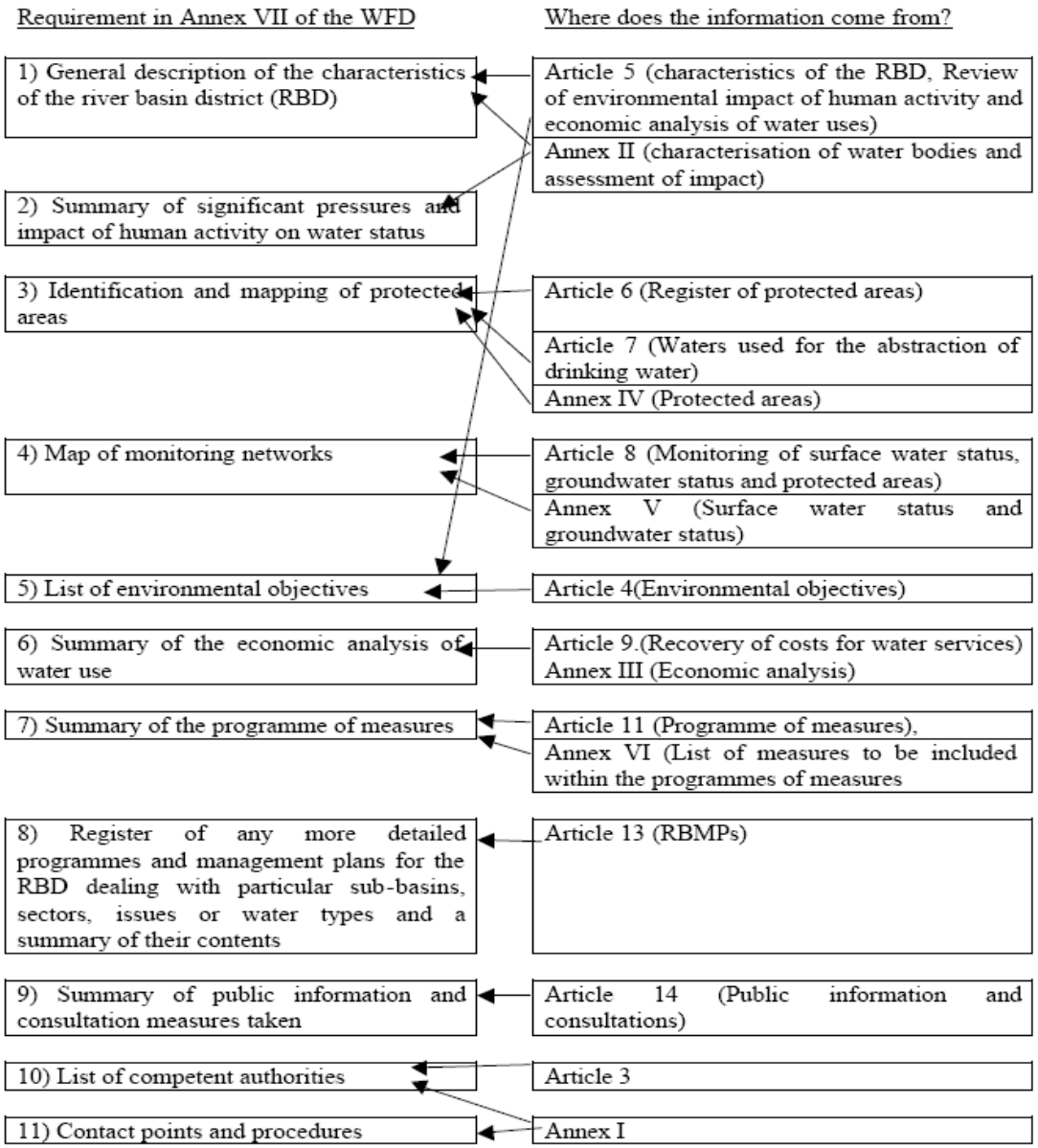
NEXT CYCLES 2016-2021 AND 2021-2027



2015Second river basin management plan & first flood risk management plan.

2016-2021 Second management cycle ends

2027 Third management cycle ends.



http://www.unece.org/env/water

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WFD Reporting

River basin districts, their sub-units and competent authorities

Surface water bodies, pressures and status of waters

Ground-water bodies, pressures and status of waters

Protected areas (protection of waters, conservation of habitats and species)

Surface water monitoring stations

Ground-water monitoring stations

Monitoring information (water status)

Programmes of measure, environmental objectives, water use

Surface waters related background documentation

Ground waters related background documentation

WFD common (code lists)

Guidance for spatial data

WFD-Climate Changes

As WFD does not directly addresses issues of climate change consequences, the challenge is trough the incorporation of measures to cope with climate change as part of its implementation.

And through other Directives of course

The biodiversity strategy (COM (2011) 244)

The Common Agricultural Policy (CAP)

Water Framework Directive 2000/60/EC

Flood & Drought Directive 2007/6/EC

Water Scarcity and Drought Strategy COM2007/ 414

Nitrates Directive 91/676/EEC

Water Quality Directive

Marine Directive 2008/56/EC

EU POLICY- MITIGATION MEASURES

- **40% reduction of GHS until 2020 (in relation to 1990)** The EU's 2020 target is almost equivalent to removing emissions from all transport across Europe!!! Limiting temperature increases to 2 ° C requires as much as a 50 % reduction in global gas emissions by 2050.

- **20% energy saving –demand decrease**

- **20% of the total energy demand covered by exploitation of renewable resources (Danish example)**

ADAPTIVE MEASURES
WHY DEMAND MANAGEMENT

- **Because the water needs are increasing three (3) times faster than the relevant population increase.**

- **It is estimated that the exploitation of every new cubic meter of water will cost 2-3 times more than it cost until now.**

- **It is also estimated that by 2025 the 1/3 of the world's population would live under water scarcity conditions- almost 52 countries.**

Effective adaptive measures

- Water pricing across all sectors for sustainable water use
- Demand management measures which will improve water efficiency and promote water conservation
- Design and implement drought management plans at river basin scale
- Raising public awareness and information
- If demand management approach is not adequate alternative supplies such as re-use of water, desalination or treated wastewater might be a possible solution
- Reduce of illegal water use

Public awareness

from public information….

to

active public involvement…

Today, the major concern is, how can interested parties agree. How a consensus between the interested parties will be reached, how mutually satisfactory solutions will be found.

The 3Es

- **Envisioning**

  Share the dream, share the goals
- **Empowerment**

  Joint decision making, power sharing
- **Enactment**

  Implementation, civic engagement

EU Adaptation Policies to confront climate change

Adaptation

Successful adaptation to the impacts of climate change will depend not only on effective national and European water regulations but also to the ability of current water management strategies to be integrated into affected sectoral policies

WFD AND CC

The Water Framework Directive (WFD), with its objective to prevent further deterioration and to protect and enhance the status of aquatic and related ecosystems, provides a valuable framework for introducing climate change impacts into water resources management and river basin planning, as well as for assessing changes in the conditions of other sectors and for co-ordinating possible adaptation activities with the needs of these sectors.

At a minimum, a screening of the likely effects of climate change on the pressures identified in the article 5 analysis and of the climate impact sensitivity of the Programmes of Measures is the first step. This will help selecting measures today that will be effective, sustainable and cost efficient under changing conditions.

Of course, In the second planning cycle, climate change impacts should be taken fully into account.

WFD AND Climate Change

Climate change impacts should be taken into account when assessing pressures and impacts on water resources.

- **The identification of environmental pressures**

Measures to cope with these impacts should be incorporated in

- **the river basin management plans** and

become **part of the Programmes of Measures** in a stepwise manner.

The **long –term ecosystem management** should also take into account climate change

"CC AND THE EU WATER POLICY"

OBJECTIVES

Identify best uses of current and existing EU water legislation.

- To identify impacts of climate change on qualitative and quantitative issues in different regions of the EU
- To identify what can and should be done in the different upcoming River Basin Management planning cycles

"CC AND THE EU WATER POLICY"

OBJECTIVES

Identify adaptation measures and best practices at different levels.

- Contribute to European Adaptation Strategies and ensure a cross-sectoral perspective;
- Identify opportunities for adaptation and counter-productive actions in other EU policies;
- Identify strategies and possible measures at national/regional level;
- Identify EU funding possibilities for adaptation measures

"CC AND THE EU WATER POLICY"

OBJECTIVES

Strengthen the Science/Policy link on Climate Change and Water and ensure a science / policy interface by identifying research needs, communicating them to the research community and making best use of available research results.

THE EU CAP

Climate change and agriculture

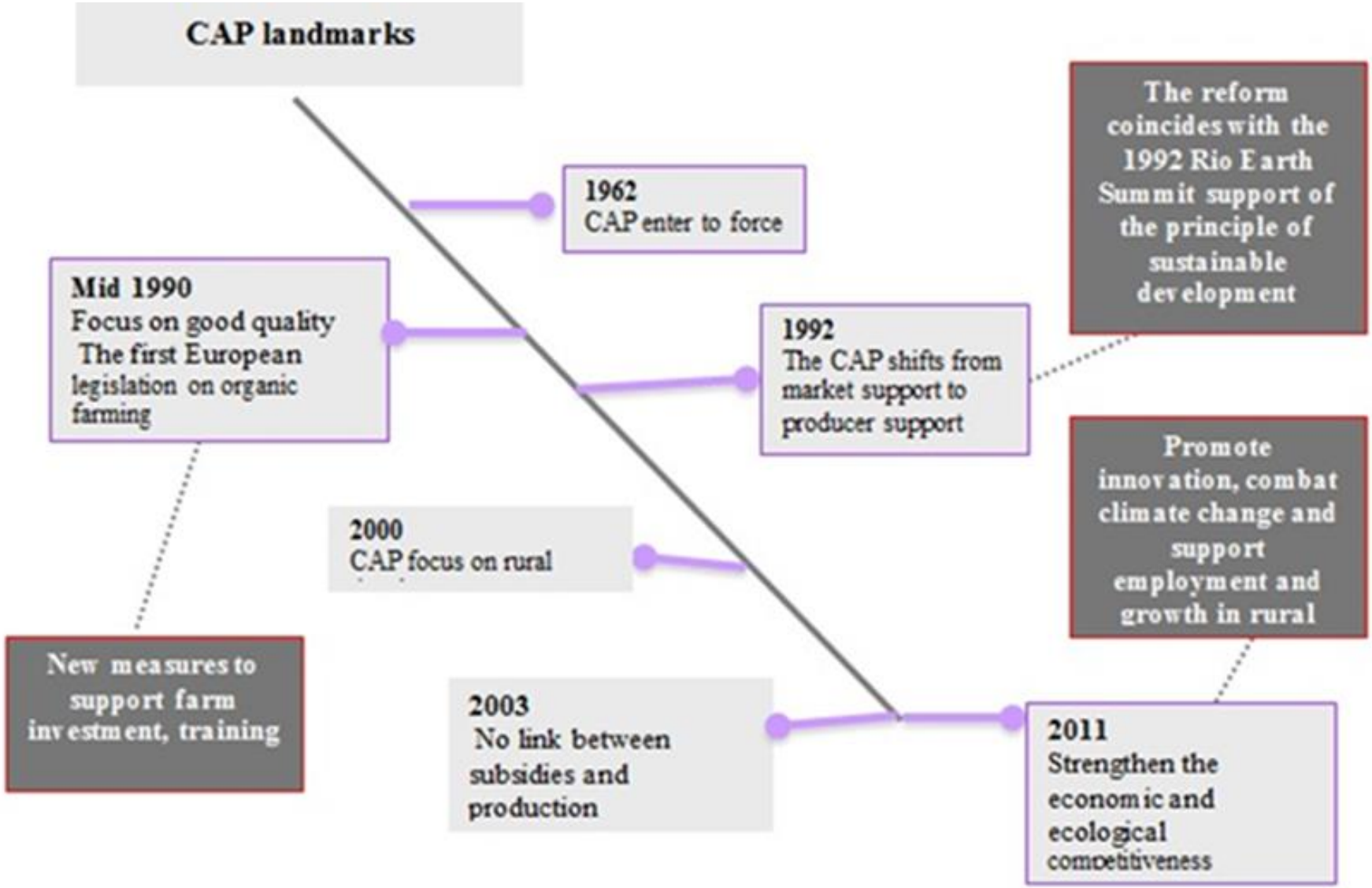
The agricultural sector accounts for 69% of water consumption globally and 9% of greenhouse gas (GHG) emissions in European Union, thus constituting the second largest emitting sector in Europe after the energy sector.

Climate change, water and agriculture

The identified linkages between agricultural activities and water protection render the necessity to look for synergies in present agriculture and water policies.

It is important to identify the pressures and the negative impacts that agriculture puts on water.

This will facilitate the better design of national rural development plans and the successful implementation of the WFD.


CAP landmarks
1962
CAP enter to force
Mid 1990
Focus on good quality
The first European legislation on organic farming
1992
The CAP shifts from market support to producer support
The reform coincides with the 1992 Rio Earth Summit support of the principle of sustainable development
2000
CAP focus on rural
Promote innovation, combat climate change and support employment and growth in rural
New measures to support farm investment, training
2003
No link between subsidies and production
2011
Strengthen the economic and ecological competitiveness

THE MARINE STRATEGY DIRECTIVE

Marine strategy directive (MSD)

Europe's marine waters cover about 3 million square kilometres.

- The main objective of the Marine Strategy Directive is in accordance to WFD goal, to achieve environmentally healthy marine waters by 2020.
- This will be achieved by establishing marine regions and sub-regions, which will be managed by member states in an integrated manner based on environmental criteria.
- Climate was fully taken into consideration
- Main contribution to adaptation will be through reducing pressures placed on marine ecosystems

Marine Strategy Directive

Each marine strategy consists of an action plan to be implemented in several stages.

- Member states will first need to assess the state of the environment and the main pressures in their respective marine regions
- Determine what can be considered as a good environmental status
- Establish targets, indicators and monitoring programmes. Programmes with measures must be drawn up by 2015 to attain good environmental status by 2020.

THE FLOOD DIRECTIVE

EU Flood Directive

- Adaptation to climate change is already built in with the 6 year planning cycles
- Climate change scenarios and extreme flood events should be taken into account in flood risk management plans in order to reduce risks
- Assessment and management of floods will focus on:
  - prevention, protection and preparedness
  - Soft non-structural measures should be prioritised
  - Hard structural flood defences will continue to be important to cope with extreme flooding

The Floods Directive (Directive 2007/60/EC)

- "Flood Action Program" for the assessment and management of flood risks aimed at reducing the adverse consequences for human health, the environment, cultural and economic activity associated with floods in Europe.
- The Directive requires Member States to perform a preliminary assessment by 2011 to detect the river/coastal basins which may have the risk of probable flooding. For such zones, flood risk maps should be developed by 2013 while by 2015 flood risk management plans should be made focused on prevention, and preparedness.

WATER SCARCITY AND DROUGHTS

FLOOD RISK MANAGEMENT PLANS

River Basin general presentation
Flood risk at the River Basin Administration level
Description of the flood risk management objectives
Sinthesis and prioritisation of the proposed measures
Description of the progress implementation monitoring
Public information and consultation
The list of competent authorities

Description of cost – benefit methodology, when is available, used in the transnational context;

Description of the coordination process at international basin level;

Description of the coordination process with W.F.D. (2000/60/CE).