Resilient and Sustainable Governance of River Basins in Times of Climate Change

Avoiding flooding and water scarcity: the Dutch institutional arrangement for regional water management

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Kennis voor Klimaat

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- Facts & figures
- Water problems
- The status of water
- Good water governance: general, 10 leading principles and Ostroms Common Pool Resource Management design principles
- European and Dutch organisation of water management
- Legal arrangements: the right to water, legislation, distribution mechanisms for scarce water
- Economic arrangements: cost recovery of water services
- Technical measures
- Concluding remarks

Creating the Netherlands,
Polders by Leeghwater (1575-1650)

Concluding remarks (I)

- Sustainable water management needs an integrated and combined approach to governance (institutional, legal, economic) and technical arrangements
- Looking at basic concepts of good water governance we see the same elements in several theories
- Thinking of and using leading principles may help in a period of change towards a sustainable and fair use of water resources
- Both substantive and procedural arrangements are necessary
- River basin management and a local/regional approach with strong stakeholder participation and a relation between "stake – pay – say" works best

Concluding remarks (II)

- The scale of a water management unit (sub river basin) depends on the public task that is at stake.

  Nowadays the shift towards more centralization and the enlargement of management units (sub-river basins) may be necessary because of expensive waste water treatment installations and the sharing costs for flood protection works, but may cause problems in the future from a good water governance approach.

- The Dutch approach does not fulfil all these requirements for good water governance and a sustainable water resource management, but is still inspiring due to its long tradition and success

- What should be improved is a fair balance between what is at stake and payment by all water (service) users, especially agriculture has a privileged position

Facts & Figures: the Netherlands

- WEST PART OF THE NETHERLANDS 1682

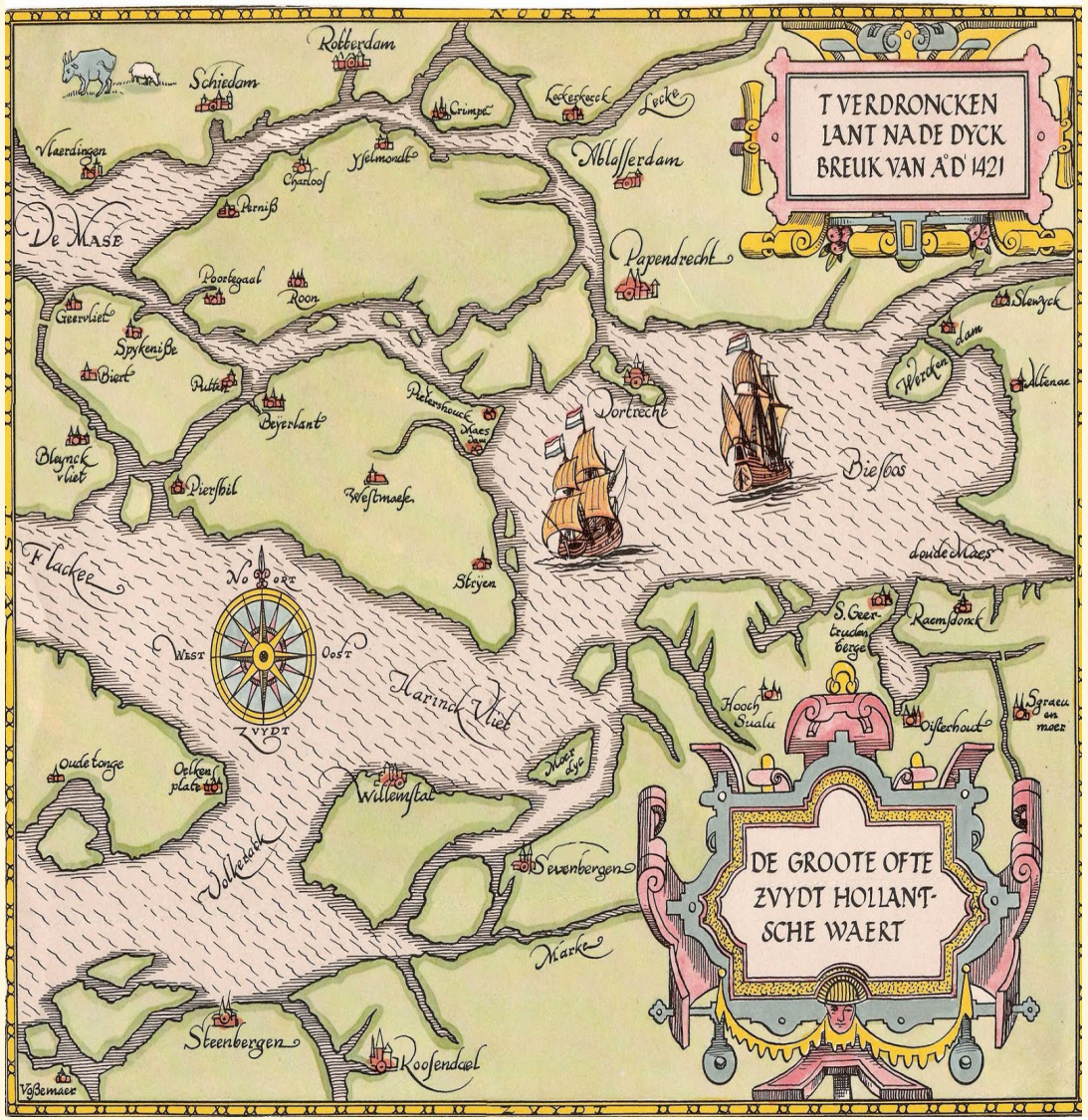
- A delta in North-west Europe
- Surface: 41,526 km2, 18% is surface water!
- Residents: 16,515,057
- Population density: 397.7 inhabitants per square kilometer
- 2/3 of the population live in an area with serious flood risk
- More than 50% of the country is threatened by floods (from rivers or the North sea)
- 3291 kilometers of dikes and dams; 268 kilometers of dunes, 808 artificial water works to protect against flooding
- Over 3000 polders that must be drained
- Drinking water quality is good, chemical and ecological status are not sufficient
- 4 river basins: Rhine, Meuse, Ems and Scheldt

Water Problems over the years

- Too much water (a problem which has long existed), the risk of floods
- Poor water quality (has improved over the years)
- Water scarcity (a rather new problem)
- Many users: individuals, agriculture, drinking water companies, energy supply, industry, tourism, shipping, fishing
- People think they have an unlimited right to (almost) free water (services) and have a blind trust in the government
- Climate change leads to more periods of water shortage and more flooding
- **We have to rethink the existing governance and distribution mechanisms**

Flooding & Water quantity management

Hollandse Waard: flooding in 1421

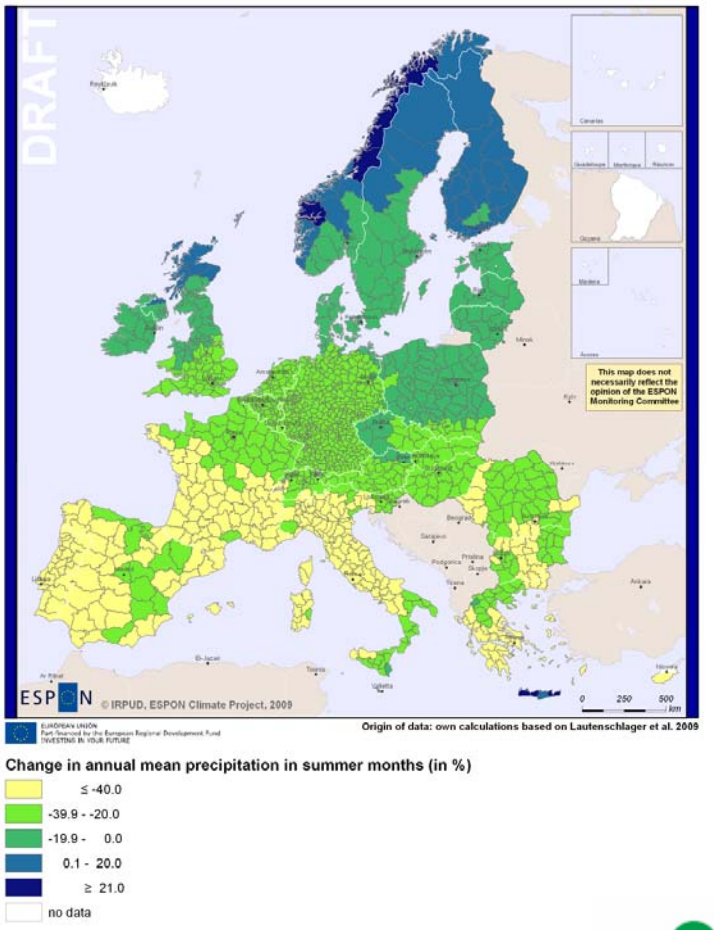


Solution: combining land use planning and water management (water storage for safety and water supply)

Rethinking water governance due to the impacts of climate change

Average water use in Europe:

Agriculture 32%
Electricity 31%
Industry 3%
Households 24%



Main Water Quality Problems:
Nitrates/Pesticides/chemicals/Blue Algae: Better coordination between water, agriculture and environmental law

Water scarcity

Fairness: sustainable use, cooperation and solidarity

Boerschap Bruntinge, gemobiliseerd in de strijd tegen de grote droogte 1959

The status of water

- The Netherlands: **water is a public good**,
- It belongs to everyone and nobody, a common pool
- How to avoid a tragedy of this commons?

- European Union: **water is not a commercial product like any other but a heritage which must be treated and defended as such**

Good water governance (I): general

- **legitimate**, i.e. ensuring transparency, accountability, fairness and equity
- **effective**, i.e. addressing the task decisively and efficiently through the right mix of norms, instruments, competent authorities and stakeholders, strategies and processes
- **resilient**, i.e. both enabling autonomous adaptation and building long-term capacity.

Good water governance (II)
Ten leading international and European normative legal and policy principles

1. human dignity
2. solidarity
3. protection of property rights
4. equal treatment
5. the non-shift principle
6. the proportionality principle
7. the user and polluter pays principle
8. the precautionary principle
9. the subsidiarity principle
10. **the concept of decentralization.**

Good Water Governance (III)
CPR design principles Ostrom (1990)

1. Clearly defined boundaries
2. Congruence between appropriation and provision rules and local conditions (restricted access)
3. Collective choice arrangements
4. Monitoring
5. Graduated sanctions
6. Conflict-resolution mechanisms
7. Minimal recognition of the right to organize
8. Nested enterprises

Good Governance (IV):Main elements

- **Institutional arrangements:**
- River basin management
- Common pool resource management
- Water management by regional water authorities

- **Legal arrangements:**
- Water rights-based approach or water as a public good
- A right to water and how to implement it
- Planning, regulation, fair distribution, autonomous finance, enforcement

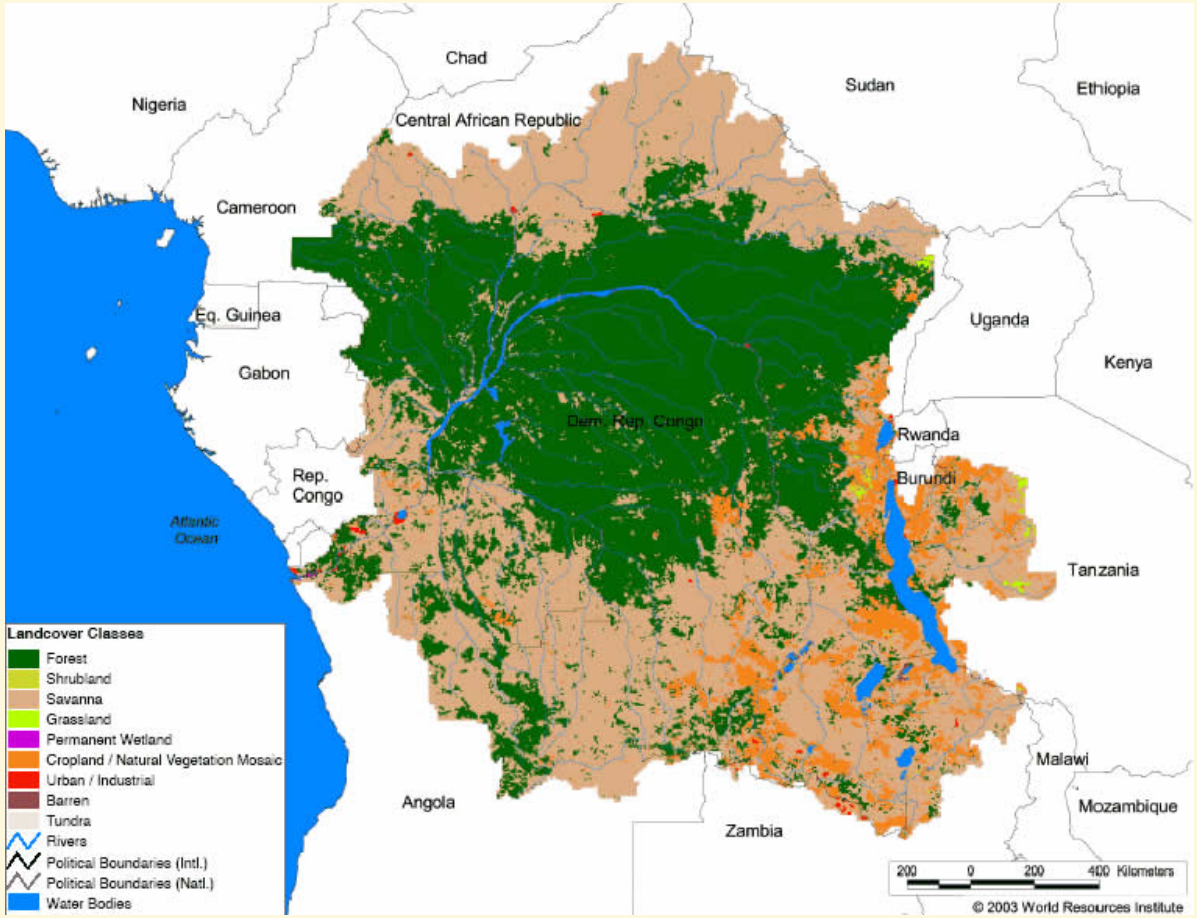
- **Economic arrangements**
- Cost recovery for water services:
- The user pays/the polluter pays

- **Technical arrangements**

Organizational principles (I)

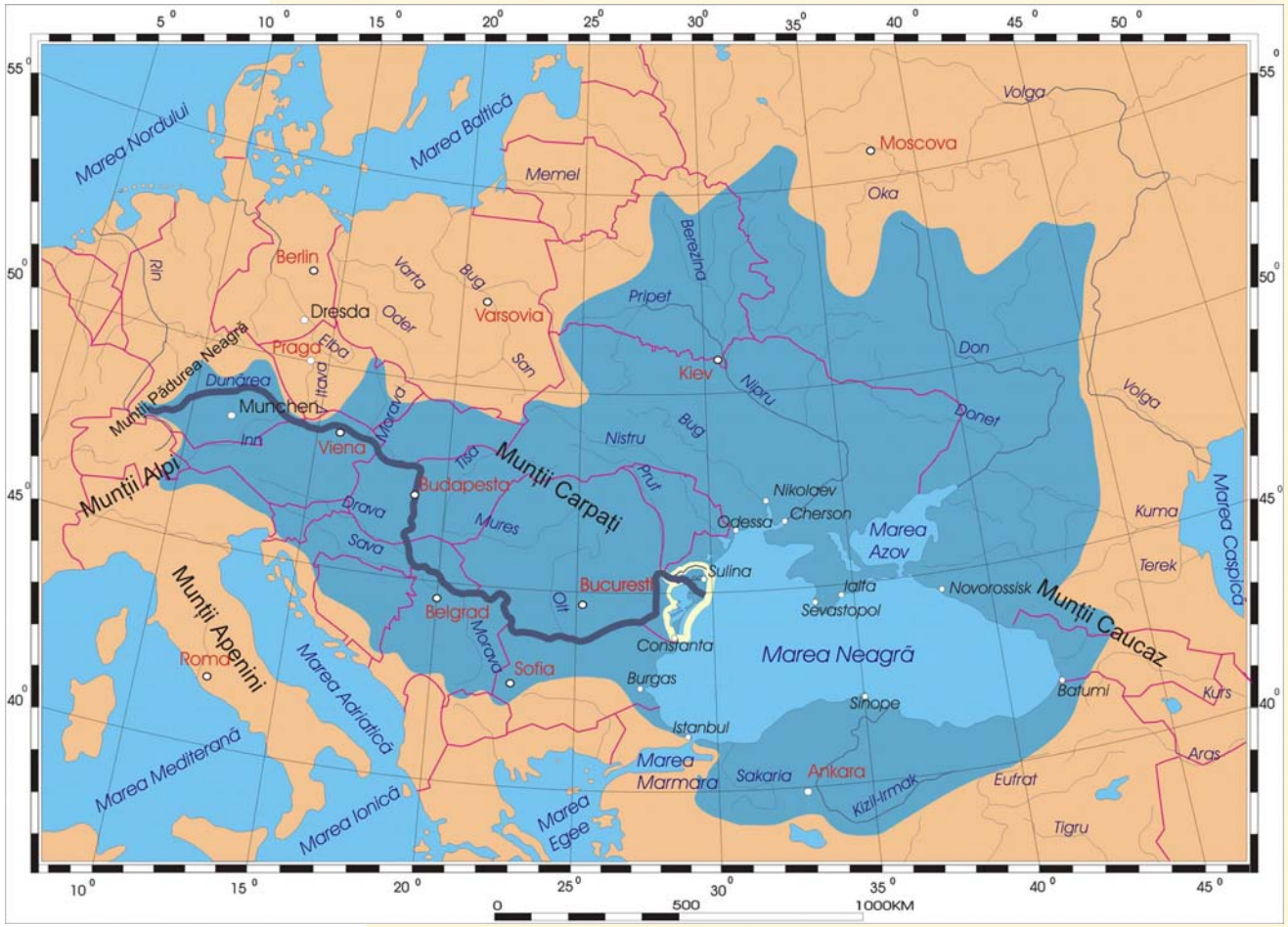
River basin management:

- Hydrological borders as an organizing principle
- sub-river basin districts



(Congo river basin)

Danube river basin: crossing many countries



Organizational principles (II)

Netherlands

- Since medieval times,
- Starting at a very small community scale
- "Stake-say-pay"
- Payments related to stake
- Say (participation) related to stake
- Payments originally in *natura*, later in money

Map: Water board Rijnland

See the smaller water management units (polders) with their similar organizational structure on a small scale

Dutch Competent water authorities

- Water management is a **shared responsibility**

- **Two water authorities** with management competences based on the Water Act:
  - **the Minister of Infrastructure and the Environment** (larger water systems including the marine environment) and
  - **25 Water Boards** (regional water systems and groundwater and waste water treatment)
    (Used to be thousands, enlarged because of expensive waste water treatment plants and flood protection works)

- **Provinces** have a role in strategic regional planning, coordination of water, land use planning, nature conservation and agriculture. They have supervision of municipalities and water boards, *competent authority for granting licences for large water abstractions (> 150,000 litres a year)*
- **Municipalities** have a duty of care for urban water management and land-use planning

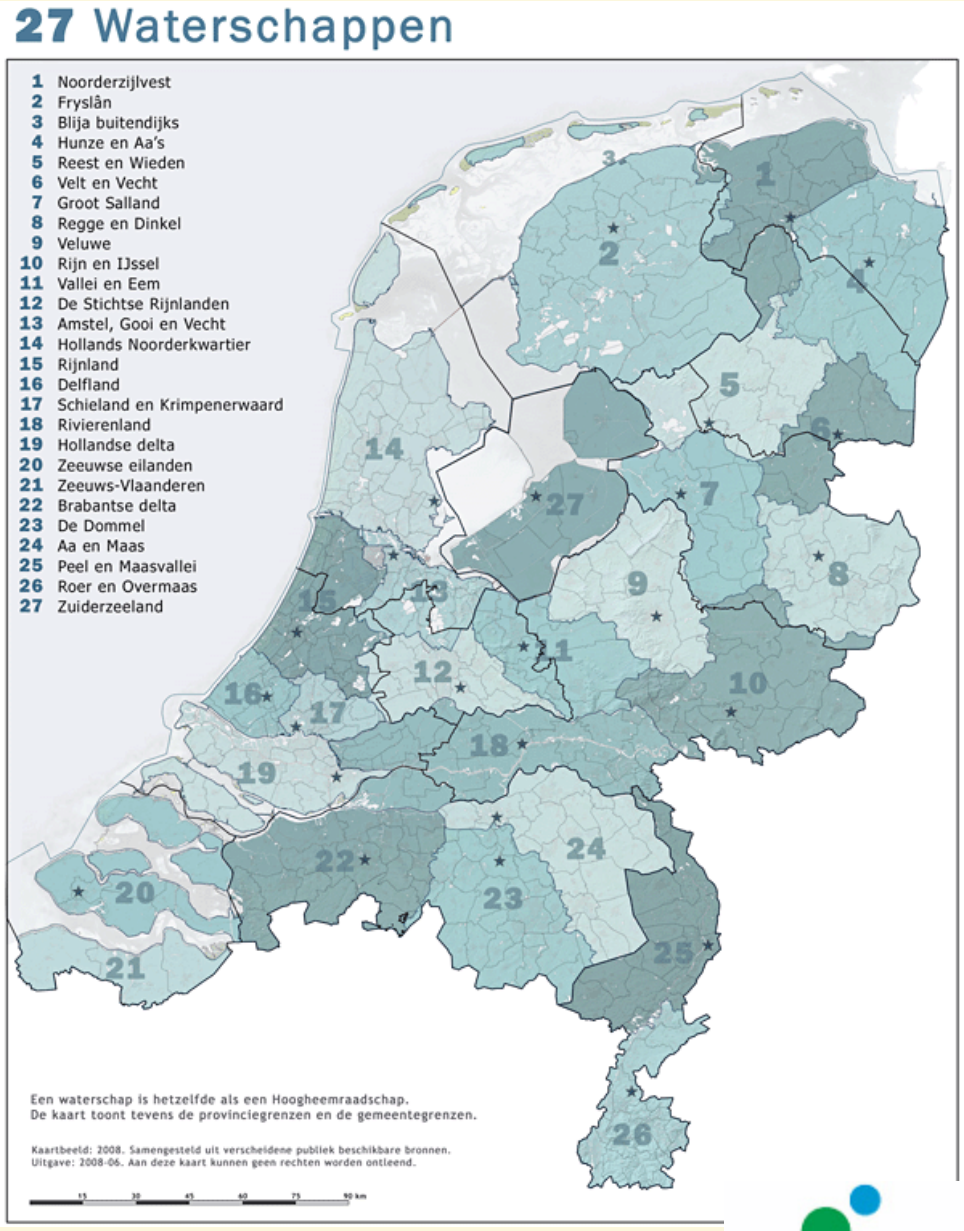
European and Dutch Organizational principles

Adaptive and resilient elements

- Invest current situation, impact of human activities and main threats
- Formulate the public interest by clear goals and standards, with revision after regular periods and adequate exemptions
- Planning cycle
- Monitoring
- A mix of regulation tools (pick and choose the most appropriate)
- **Public information and participation requirements**

Dutch approach:

Regional water governance and ‘democracy’ since the middle ages



Participation in regional Dutch water management

Representation by designation and a guaranteed delegate in the board of the daily management

- Agriculture
- Nature conservation organizations
- Industry/Commerce

Direct elections

- Citizens

European and Dutch Organizational principles

- **Financial autonomy**
  - EU: Cost recovery, polluter pays principle, user pays principle
  - At Dutch water board level; self supporting and a relation between stake – pay – say
  - **Not** at Dutch state/central level

Twofold Legal Framework: European and Dutch Water Law

European Union and the Netherlands have 1 legal order,
European law always prevails

Europe:

- European Water Framework Directive
- Directive on public participation and access to justice

The Netherlands:

- Dutch Constitution,
- Water Act and
- Water Board Act

A (human) right to water?

- Not formally recognized in European legislation or the Dutch Constitution

- Realization of the right to water by normal legislation:
  - European directives and Dutch water law
  - Substantial and procedural elements

- Combination of the right to water and common pool resource management

The right to water: substantive elements

International law:

- protection of the quality of water: safe and free from micro-organisms and chemical substances
- accessibility to water and water services,
- sustainable and equitable use of scarce fresh water

Extra in European and Dutch water law:

- protection against flooding
- protection of ecosystems
- a fair price for water services

The right to water: procedural elements

- accessibility of relevant information,
- transparency,
- participation in decision making,
- accountability, and
- access to justice.

Fair distribution: mechanisms

- First come, first served: is this fair enough?
- “Reasonable use”: but how to realize this?
- Quota or ranking
- Planning & Regulation
- Land-use planning
- Water pricing
- Tradable water use rights: who owned the first rights?

European water scarcity approach

- Communication of the European Commission on water scarcity and droughts:
- Pricing of water use
- Efficient allocation of water
- Drought risk management (by WFD)
- Integration of water interests in other policy fields
- Efficient water technology
- Stimulating water saving
- Improvement of knowledge
- Water infrastructure works (last solution!)
- Enough to guarantee a sustainable water use?

Dutch water scarcity approach

- Trying to realize a balance between supply and demand
- Planning (WFD/water plans)
- Legal ranking of water use in times of drought/water scarcity
- Licenses (first to come, first to serve)
- Temporary prohibition of irrigation
- Water agreements (between water authorities)
- Emergency plans
- Obligation to take water interests into account in land-use planning

- No tradable water rights

Planning

National Water Plan **>>**
Strategic / integrated

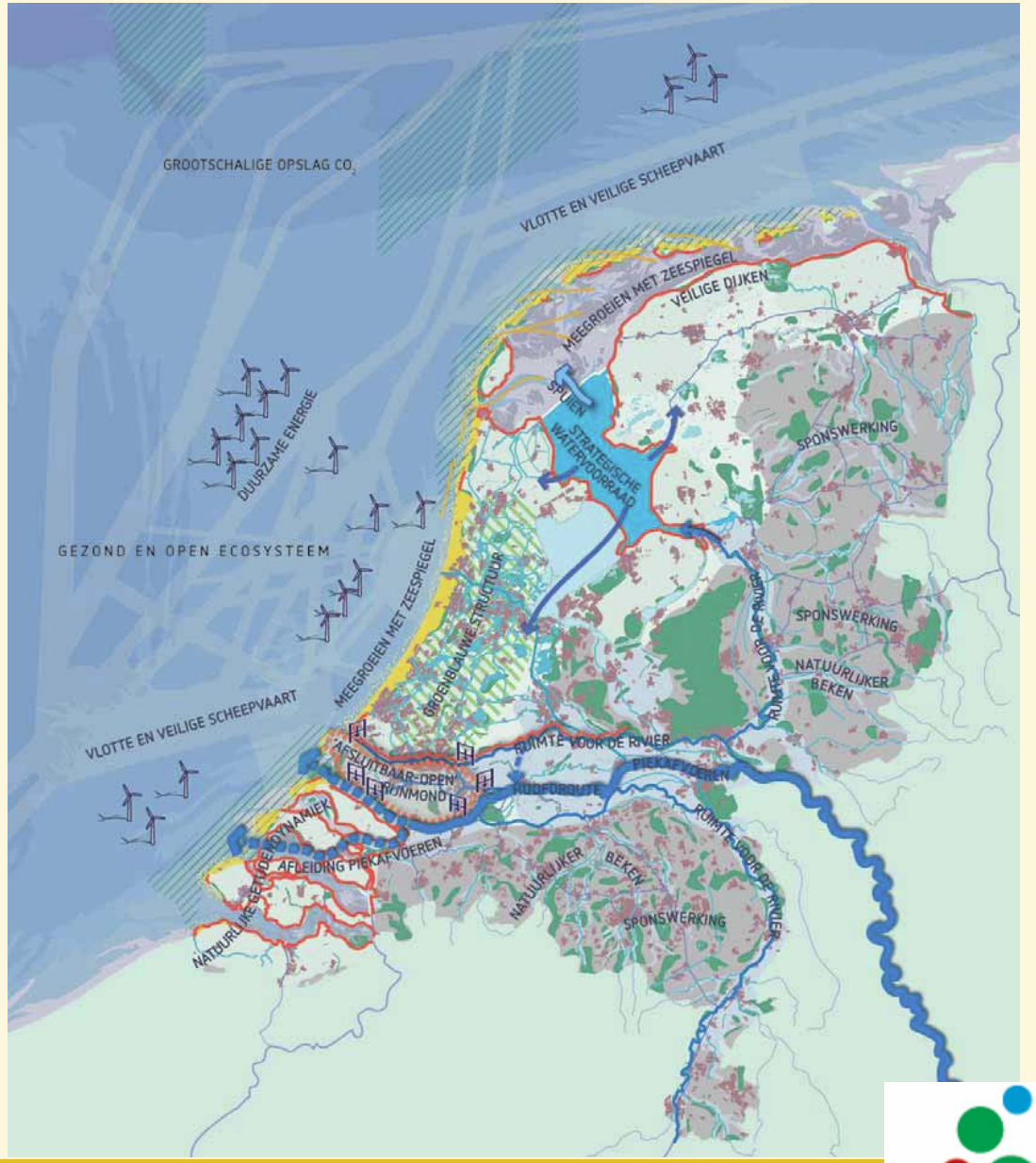
National management plan for large water bodies
(operational) / integrated

Provincial water plan
Strategic/ integrated

Water board water management plan
Operational/ integrated

Municipal water plan
Collecting urban waste water

Rain water and ground water management within urban areas



Legal Ranking of Water Use

Regulated on the central level:

1. Water safety and the prevention of irreversible damage to water works and nature
2. Guaranteeing Public Services:
   1. Drinking water Supply,
   2. Energy supply
   3. Irreversible ecological damage

Regulated on the regional level:

1. Small High-quality use: irrigation, industry, urban areas
2. Other use: shipping, agriculture, nature conservation, industry, tourism, fisheries, drinking water, energy, other use

Cost recovery of water services

- Tax on the use of groundwater
  - no tax or charge for the use of surface water!!
- Paying for drinking water services
  (Euro 1.50 for 1000 liters of clean healthy water)
- Specific charges to pay the water boards for
  - water system management (solidarity principle)
  - the treatment of waste water (profit principle)
- General tax to pay the general government
  (not allocated for water management or water services)

- No tradable water rights!

Drinking water supply through the ages

1853:
one cent a bucket &
no more than 2 buckets
for each person
to get at a fountain:
clean drinking water
trough infiltration in
sandy dunes

2011:
1,50 euro for
1000 liters delivered
'at home' by taps
water use: 130 liters pp


COMMISSARISSEN en DIRECTEUREN der DUIN-WATER-MAATSCHAPPIJ berigten bij deze, dat zij, uit aanmerking der tijdsomstandigheden, besloten hebben

HET DUINWATER

tijdelijk verkrijgbaar te stellen, dagelijks, te beginnen met MAANDAG 12 DECEMBER e. k., van des morgens acht tot des namiddags vier ure, aan de Fontein buiten de Willemspoort alhier, tegen betaling van

EEN CENT PER EMMER

Niemand zal meer dan Twee Emmers te gelijk kunnen bekomen.

Amsterdam, 9 December 1853.

Commissarissen en Directeuren der Duinwater-Maatschappij,

ARTHUR R. ADAMS, *Commissaris.*

J. VAN LENNEP, *Voorzitter.*

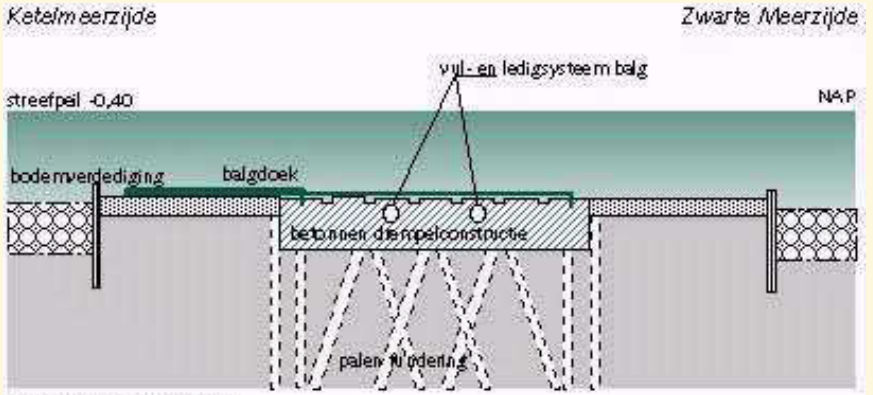
J. G. JÄGER, *Secretaris.*

NB. Er wordt geen Geld gewisseld.

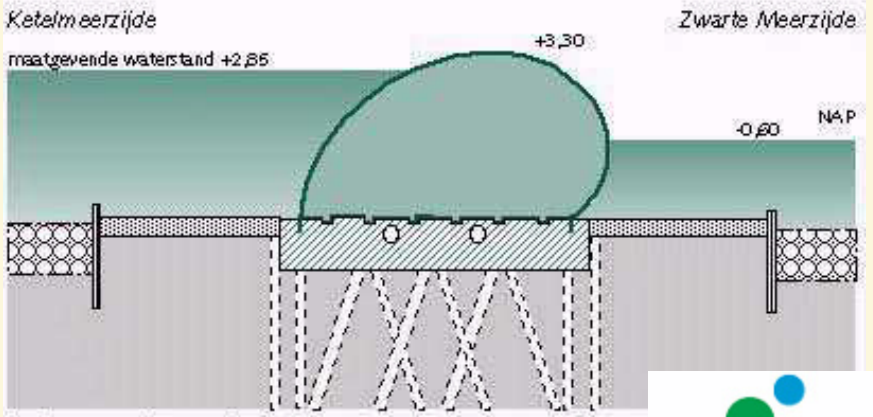
J. A. Groen jr. | Het Amsterdamse drinkwater door de eeuwen heen

Technical measures: Flood protection

Building & Restoring dikes
Creating room for water
Innovative solutions like an inflatable 'balgstuw'

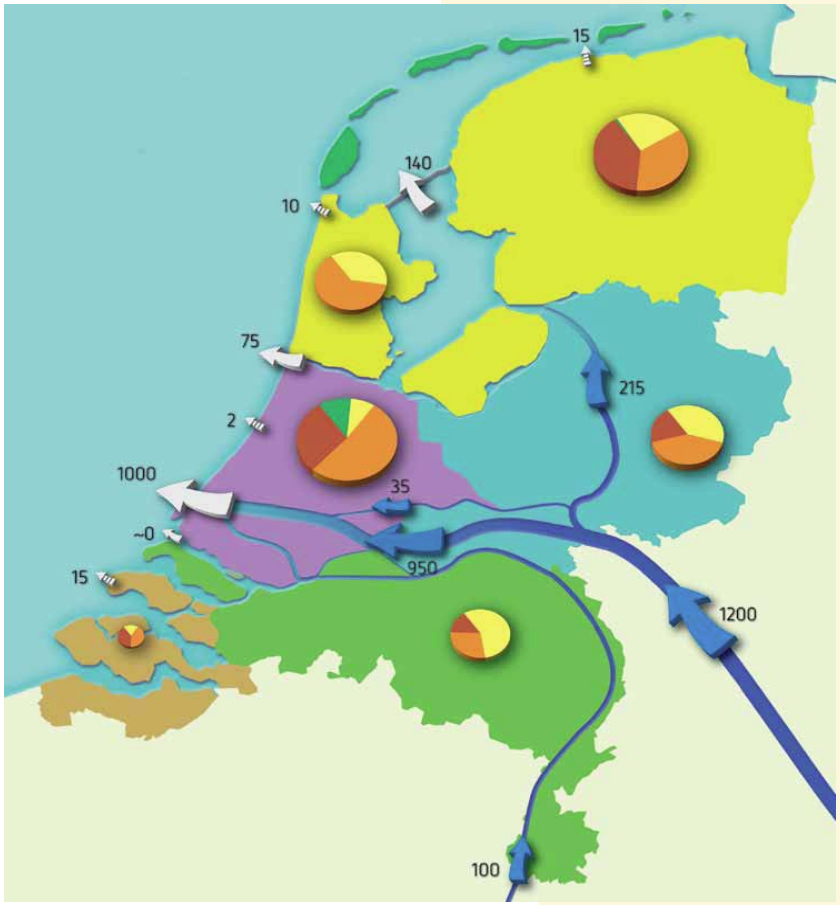


balgstuw in rustfase



balgstuw in keringsfase

Technical measures (II) distribution of surface water
(Rhine 1200 m3/s)



- Yellow: IJsselmeer
- Blue: Rhine, IJssel, Waal
- Green & Purple: Meuse
- Dark green: no water supply
- Brown: Lek, Brielse Meer and Amsterdam Rijn Canal

Use:

Orange: water levels in polders

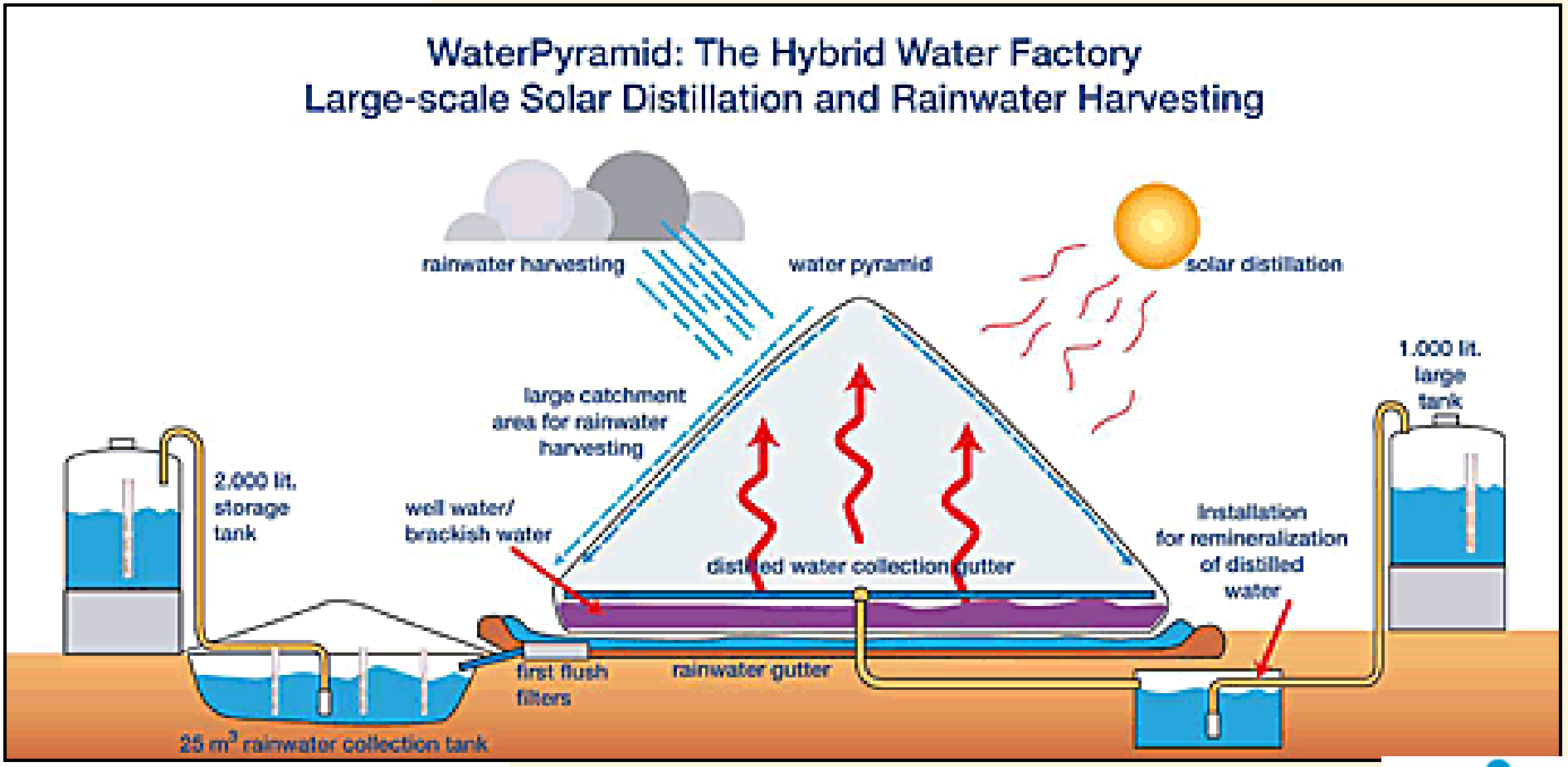
Yellow: agriculture

Red: water management/ flushing through

Green: other

Technical measures III
Waste water treatment

Innovative technical solution for fresh water supply in countries dealing with water scarcity
the water pyramid (Auqua-Aero Water systems, Delft)



Considering that in the end

- water as a common and public good,
- management at local/regional level,
- based on sub river basins
- and financial self supporting
- with strong public participation and
- a direct relation between say & stake & pay
- attention for local/national diversity

is most profitable for a fair, equitable and sustainable water management and enhances adaptive and resilient water management

Concluding remarks (I)

- Sustainable water management needs an integrated and combined approach to governance (institutional, legal, economic) and technical arrangements
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