Data Integration and Dissemination: Overview Presentation

Session 5th World Water Forum
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The Challenge

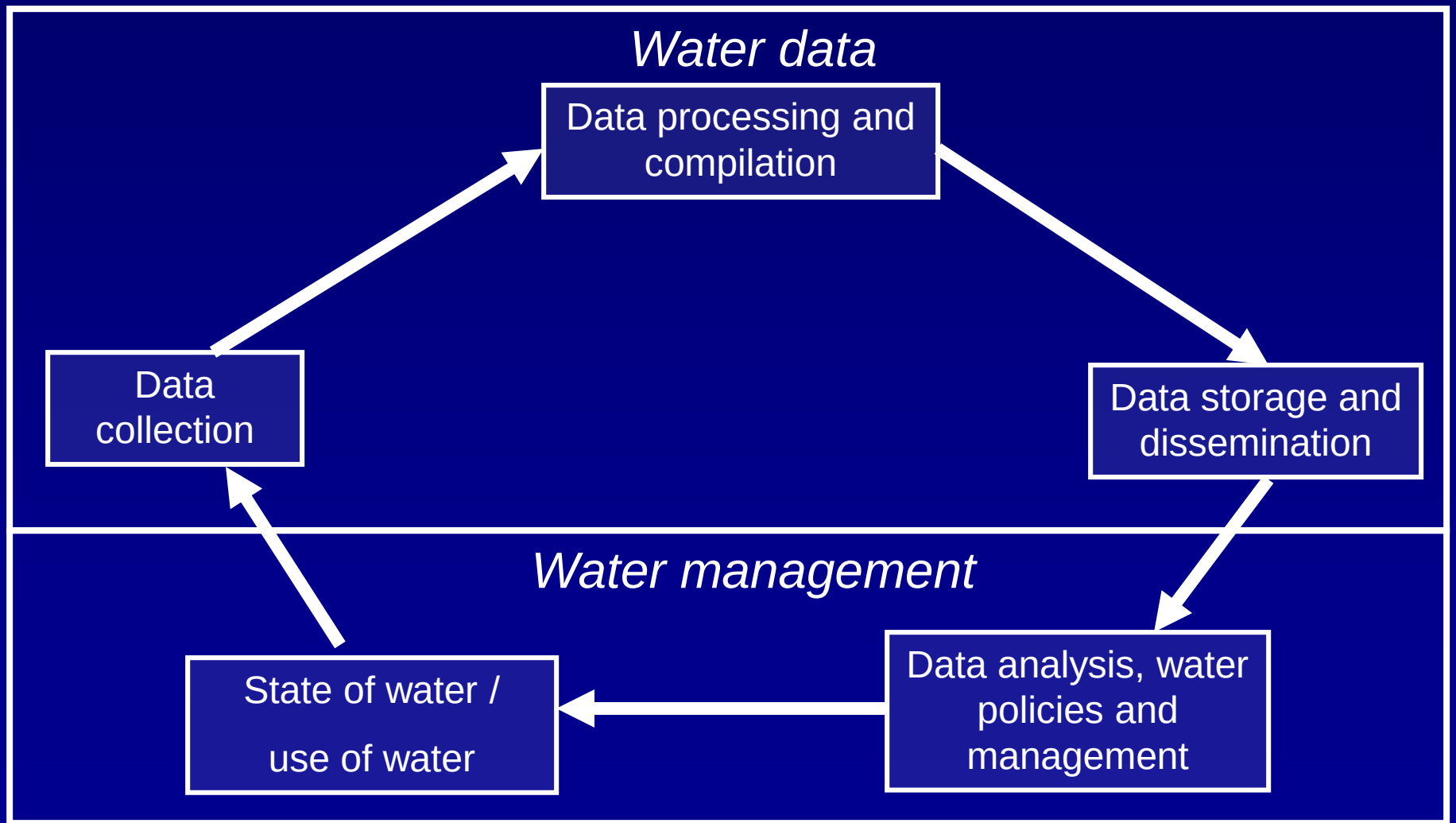
- Data on almost every subject related to water is usually lacking, unreliable, incomplete or inconsistent.
- Collecting data is not enough. Data must be compiled, analysed and converted into information and knowledge
- Data and information needs to be shared widely within and between countries and stakeholders to focus attention on water problems at all scales.
- It is only when the data has been collected and analysed that we can properly understand the many systems that affect water (hydrological, socio-economic, financial, institutional and political alike), which have to be factored into water governance.

(After quote on p. 44 of Water for People, Water For Life World Water Assessment Programme)

Integrated data is required for water policy and management

- Integrated Water Resource Management
- Global changes
  - Population growth and migration,
  - Economic growth, clearing of forests
- Climate change
  - Adaptation to changes in availability of water resources
  - Impact on agriculture and other activities reliant on water
- Economics of water
  - Water pricing and valuation in the absence of market prices
  - Water markets
  - Externalities
  - Economic efficiency and productivity of water supply and use
  - Water allocation
  - Investment in water supply and sewerage infrastructure
- Maintaining environment quality

The links between data and water policy and management



How to collect, integrate, organize, manage, store and access?

The answer to this question depends on how the data are to be used.

- Data must support needs of data users
- Users of data are typically diverse and come from a variety of areas – environmental, economic and social
- Users require different levels of spatial and temporal and resolution
- For data producers, different institutions and professions are involved in catering for particular data users

Areas of Information

Environmental

- Volume of water available. E.g. as rain, surface water flows or stored in reservoirs, (renewable) groundwater, wetlands
- Water quality and water pollution (surface water and groundwater)

Economic

- Price and value of water
- Water supply and sewerage treatment industries
- Use in agriculture
- Use by other production processes (e.g. manufacturing, hydro-power, cooling)

Social

- MDGs

Institutions

There are many institutions involved in water data and the management and information production

- Ministries of Government for
  - Water supply and management
  - Environment
  - Agricultural
  - National statistical offices
  - Economics and national development
  - Geological (groundwater)
- Government agencies at lower administrative level (cities, provinces, states)
- Water supply and sewerage “companies”
- Universities and other research agencies
- International agencies

Some problems of having many institutions

All have systems for data for their own needs (e.g. to support administrative/management functions)

- Data are collected using different concepts and methods
- Data use different spatial boundaries
- Difficult to assess if data is comprehensive / complete
- Some disincentives to cooperate or share data (e.g. the exposure of lack of progress against targets, inefficient use of resources, data is a source of revenue or power)
- Institutions may view each other with suspicion

Professions involved in water data production and use

Hydrologist, engineers, scientists, economists, accountants, sociologists, politicians, etc.

- Different traditions, philosophies, viewpoints and imperatives
- Different vocabulary, definitions and interpretations of words
- Different concepts and methods
- Often view each other with suspicion

Spatial scope and resolution

Geographic

- River basin or catchments (note these can span countries)
- Aquifers
- Continents
- Global

Administrative

- National boundaries
- Sub-national boundaries (e.g. states, provinces, local councils)
- Service areas of water suppliers and sewerage treatment
- Regional groupings of countries
- Global (i.e. all countries)

GIS provides a tool for spatial integration

Temporal resolution

- Minutely to hourly

  (e.g. emergency management – floods, cyclones, etc.)
- Daily to weekly

  (e.g. water quality, weather)
- Weekly to seasonally

  (e.g. water storage levels)
- Yearly and longer

  (e.g. economics of water supply and use)

The result of many institutions, professions, diverse range of information requirements at a range of spatial and temporal scales?

- Integration is difficult
  - Between different information areas (e.g. economic, social and environment)
  - Across spatial and temporal scales
- Many concepts, frameworks and methods are used, some data exist but it is not complete and little data can be integrated or reliably compared over time
- Often confusion and misunderstanding of roles among data producers and data users

Solution:

Need to understand and use agreed frameworks

Integration: Frameworks and indicator sets in use

Global

- World Water Assessment Program (WWAP) – environment, economic, and social
- Water Accounting (SEEA-Water) – environment and economic, some social
- Aquastat – hydrological and agricultural
- Millennium Development Goals (MDGs) – MICS/JMP, social (covered in session 6.2.1)
- UNEP – GEMS – water quality
- Flow Regimes from International Experimental and Network Data (FRIEND) – hydrological flows
- International Groundwater Resources Assessment Centre (IGRAC) – groundwater
- Global Runoff Data Centre (GRDC) – surface water

Regional approaches

- Water Environment Partnership Asia (WEPA) – water quality
- Water Framework Directive
  - Water Information System for Europe (WISE) – EEA and Eurostat – water quality and quantity

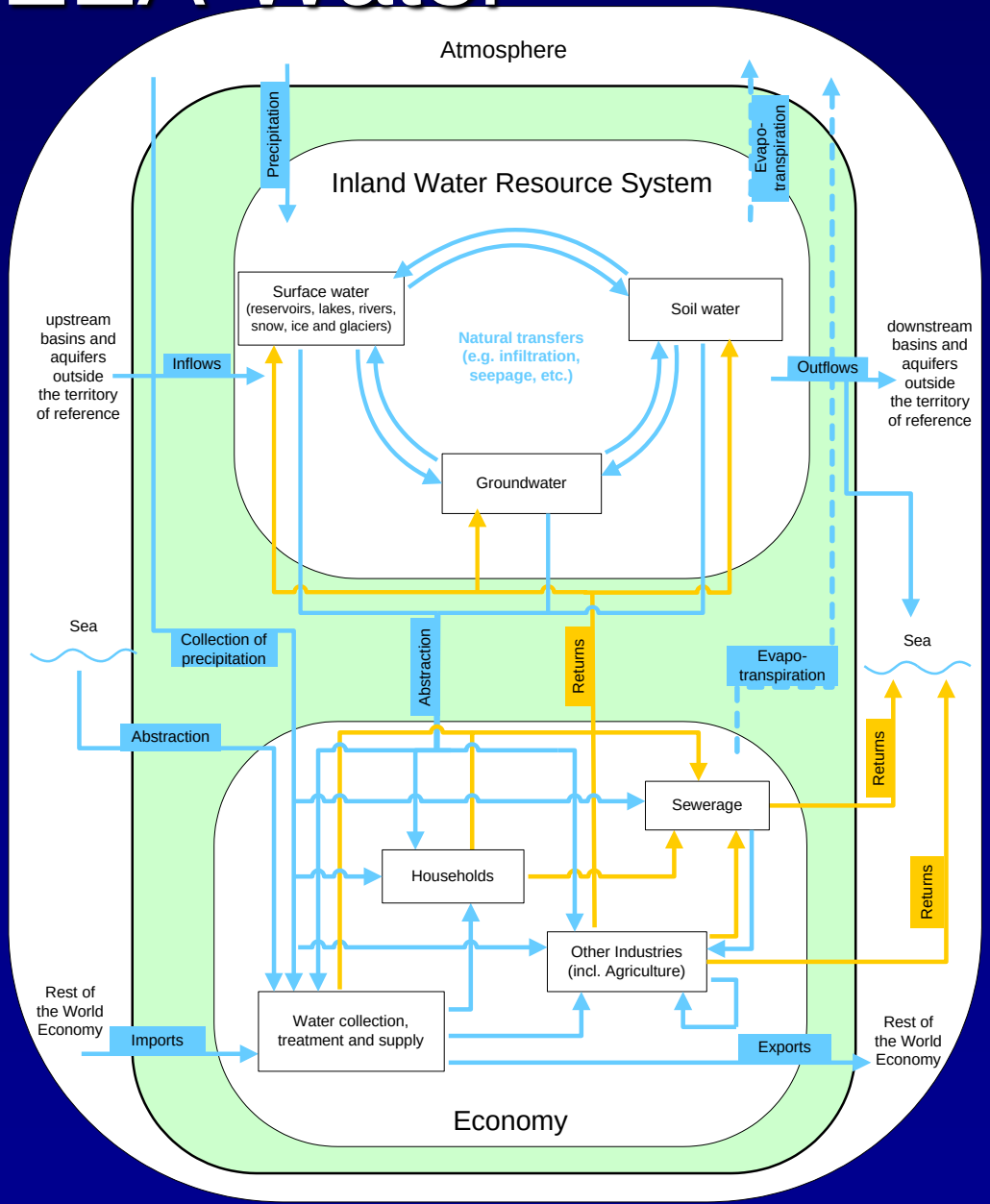
Plus country approaches

The New Framework: SEEA-Water

- The System of Environmental-Economic Accounting for Water (SEEA-Water)
- Developed by the international statistical community and adopted as an international statistical standard in 2007 by the United Nations Statistics Commission
- Comprehensive coverage of the environmental and economic stocks and flows of water (monetary and physical)
- Water accounting already used by 33 countries and planned to be used in 11 more
  - Examples: Australia, Austria, China, Jordan, Lebanon and Mexico
  - Shown to be useful, particularly in water scare countries and those with concerns about water pollution and water quality

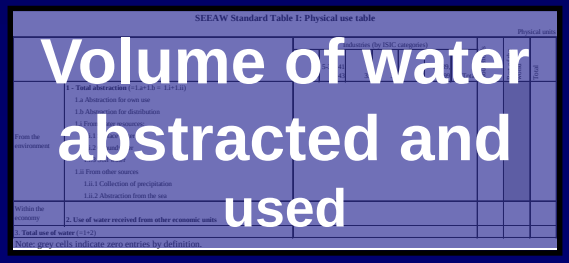
SEEA-Water

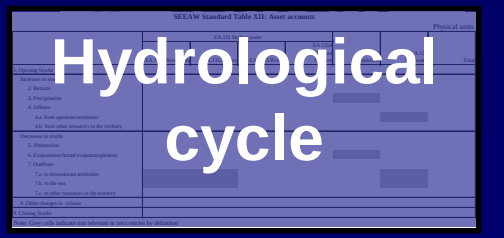
Stocks and flows in the environment

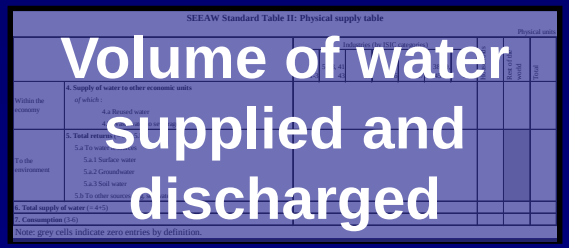


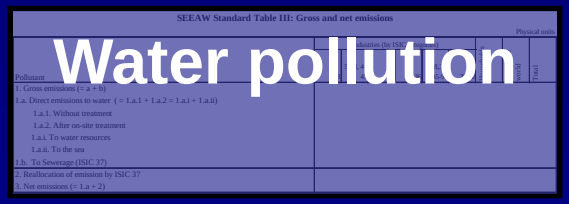
Stocks and flows in the economy

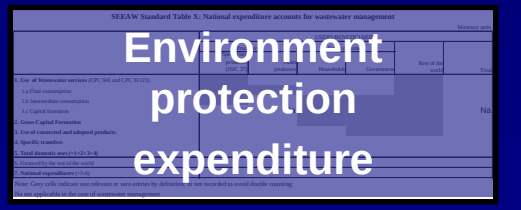
SEEA-Water: an integrated set of accounts

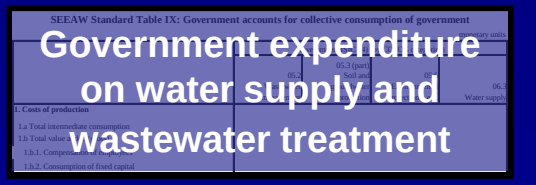


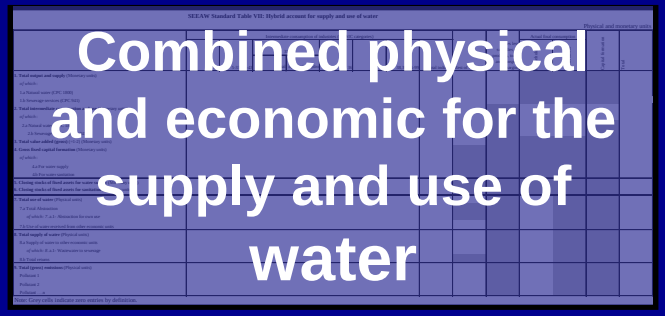


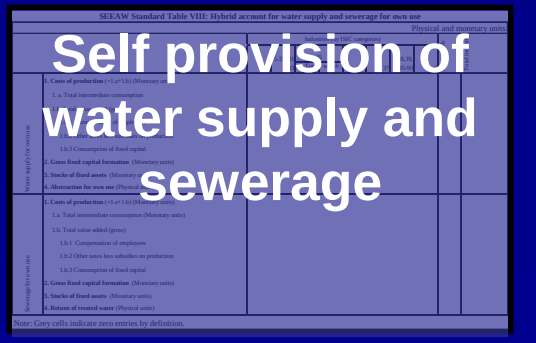












SEEA-Water: an integrated set of accounts

MWR – China

DOS – Jordan

Eurostat

CONAGUA – Mexico

MWR – China

Umweltbundesamt – Austria

Umweltbundesamt – Austria

MWR – China

Umweltbundesamt – Austria

Eurostat

MWR – China

Eurostat

MWR – China

UNESCO – FRIEND

IGRAC

GWP

ANA –

WSSCC

Med Stat II

CONAGUA

WEPA

GEMS Water

GRDC

FAO Aquastat

UNEP

EEA

SKYE – Finland

CAS – Lebanon

Water quality accounts

Environment

Eurostat

expenditure

Eurostat

wastewater treatment

BoM – Australia

MWR – China

BoM – Australia

MWR – China

Eurostat

MWR – China

CONAGUA – Mexico

CONAGUA – Mexico

Scope and coverage of SEEAW

		Industries (by ISIC categories)							Households	Rest of the world	Total
		Agriculture	2-33, 41-43	35	36	37	38,39, 45-99	Total			
From the environment	**1 - Total abstraction** (=1.a+1.b = 1.i+1.ii)										
	1.a Abstraction for own use										
	1.b Abstraction for distribution										
	1.i From water resources:										
	1.i.1 Surface water										
	1.i.2 Groundwater										
	1.i.3 Soil water										
	1.ii From other sources										
	1.ii.1 Collection of precipitation										
	1.ii.2 Abstraction from the sea										
Within the economy	**2. Use of water received from other economic units**										
3. **Total use of water** (=1+2)											

FAO

GRDC

IGRAC

UNSD/UNEP & OECD/Eurostat

Note: grey cells indicate zero entries by definition.

Frameworks require data

All frameworks rely on data

- Basic data are generally collected by government agencies within countries
- These data are often supplemented by estimates based on a wide range of available data from within the country (e.g. from universities) or from near-by countries
- These data are assembled and used by a range on international agencies and research institutions

Producing the data

- Data collection
- Data capture and storage
- Data processing (compilation, aggregation and integration of data)
- Data storage and dissemination (data access and storage)

Data collection

Direct measurement (e.g. stream flow, temperature, metered water use, groundwater level)

- Fewer monitoring sites than in past
- The representativeness of monitoring sites may not be ideal

Survey (e.g. cost of water, uses of water, value of products produced from water use) /Self-reported

- How accurately can people and business owners report data that is not measured?

Estimated (Evapotranspiration, run-off, green water, recharge)

- In the absence of direct data, need to estimate
- In some case there is a reliance on old data

Use of technology (e.g. remote sensing, water balance models)

Metadata and data quality assessment

Metadata (information about data)

- Describes the concepts, classifications, sources and methods used to produce the data as well as other details, such as the ownership of data

Data quality assessment criteria

- Accuracy, timeliness, coherence, accessibility, credibility, relevance

Examples of data quality assessment provided by contributors

  - GEMS Water
  - Brazil, ANA
  - Finland, SYKE
  - UNSD – International Recommendations for Water Statistics

Dissemination of data

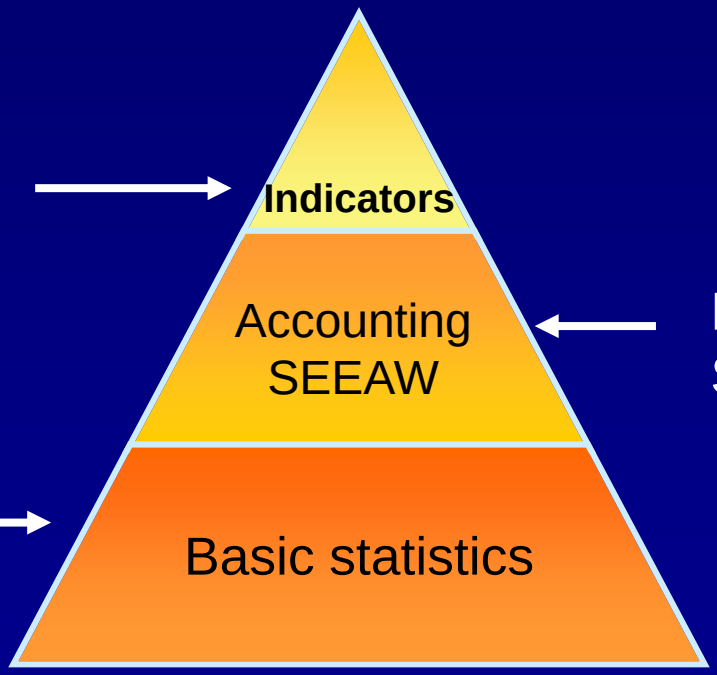
- Web based static (and CD)
- Web based interactive (and CD)
  - e.g. interactive maps, databases, tables
- Paper publications
- Tables, Maps and Graphics
- Use of GIS

Examples of dissemination provide by contributors:

- Global
  - WWAP, FAO-Aquastat, MDGs, GEMS, FRIEND, IGRAC, GRDC,
- Regional
  - Water Environment Partnership Asia, WISE-European Environmental Agency/Eurostat, ESCWA, Med Stat II
- Country
  - Austria, Australia, Brazil, China, Finland, Jordan, Lebanon and Mexico

Audiences for information

Media
The public
Politicians



Policy makers
Strategic planners

Researchers

Data access policies

- Data in the public domain at no cost
- Data available to all but at a cost (cost recovery)
- Data available only to specific users at no cost (e.g. non-commercial uses such as: science; research, and; education)
- Only selected data, or summaries of data are available to users at cost or no cost
- No data available to anybody outside of the data collection authority

What is needed to advance data integration and dissemination?

- Increasing the use of agreed concepts, definitions and classifications
- Extending the understanding of the need for better data for enhancing water policy and water management
- Understanding, clarifying and strengthening the roles and responsibilities of the institutions producing and using water data

How to advance data integration and dissemination

- Strong leadership and commitment to providing integrated data for water management and water policy
- Leveraging current circumstances and initiatives.
  - The current suite of global crisis (financial, food and water) and a range of initiatives (Green New Deal) provide opportunities for change
- Understanding and cooperation
- Enabling institutional environments
- Increasing human and financial resources

Understanding and Cooperation

Understanding

- Of the roles and contributions of different agencies and professions at all levels (sub-national, national, international) and all sectors (government, business, academic and NGO)
- Of data users needs

Cooperation

- Between agencies and professions
- Between government, academic, business and NGO communities
- Between levels of government
- Between countries and international organizations
- Between international agencies

Legal and institutional arrangements

Clear legal mandates for the collection, integration, dissemination and sharing of data (e.g. include monitoring and accountability in national water laws)

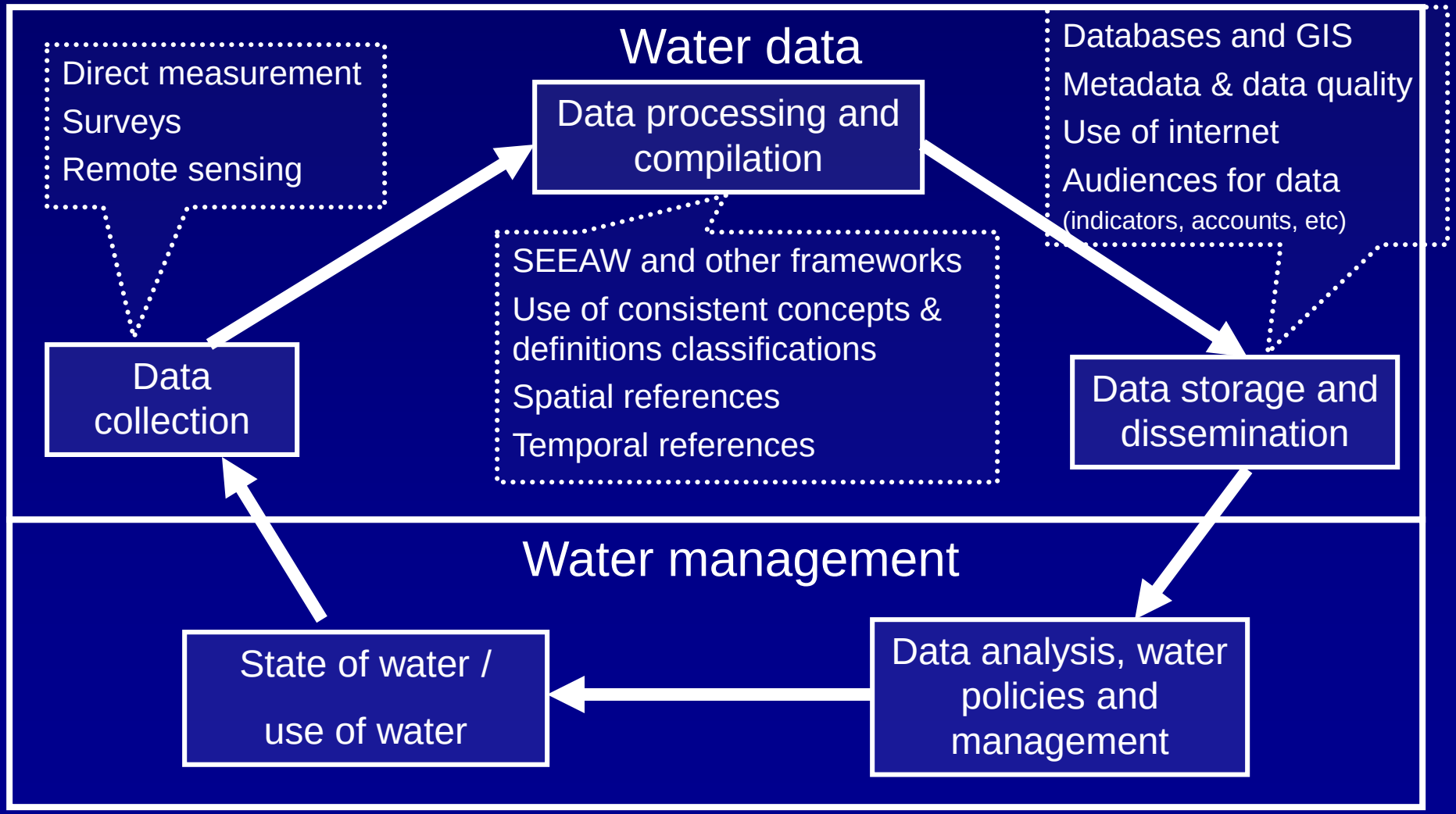
- At present much depends on goodwill and informal networks and there is a degree of overlap and confusion in responsibilities relating to water data
- Access to existing data is often not possible for legal or administrative reasons

Countries and international organisations must establish a workable set of institutional arrangements for the collection, integration, dissemination and sharing of data

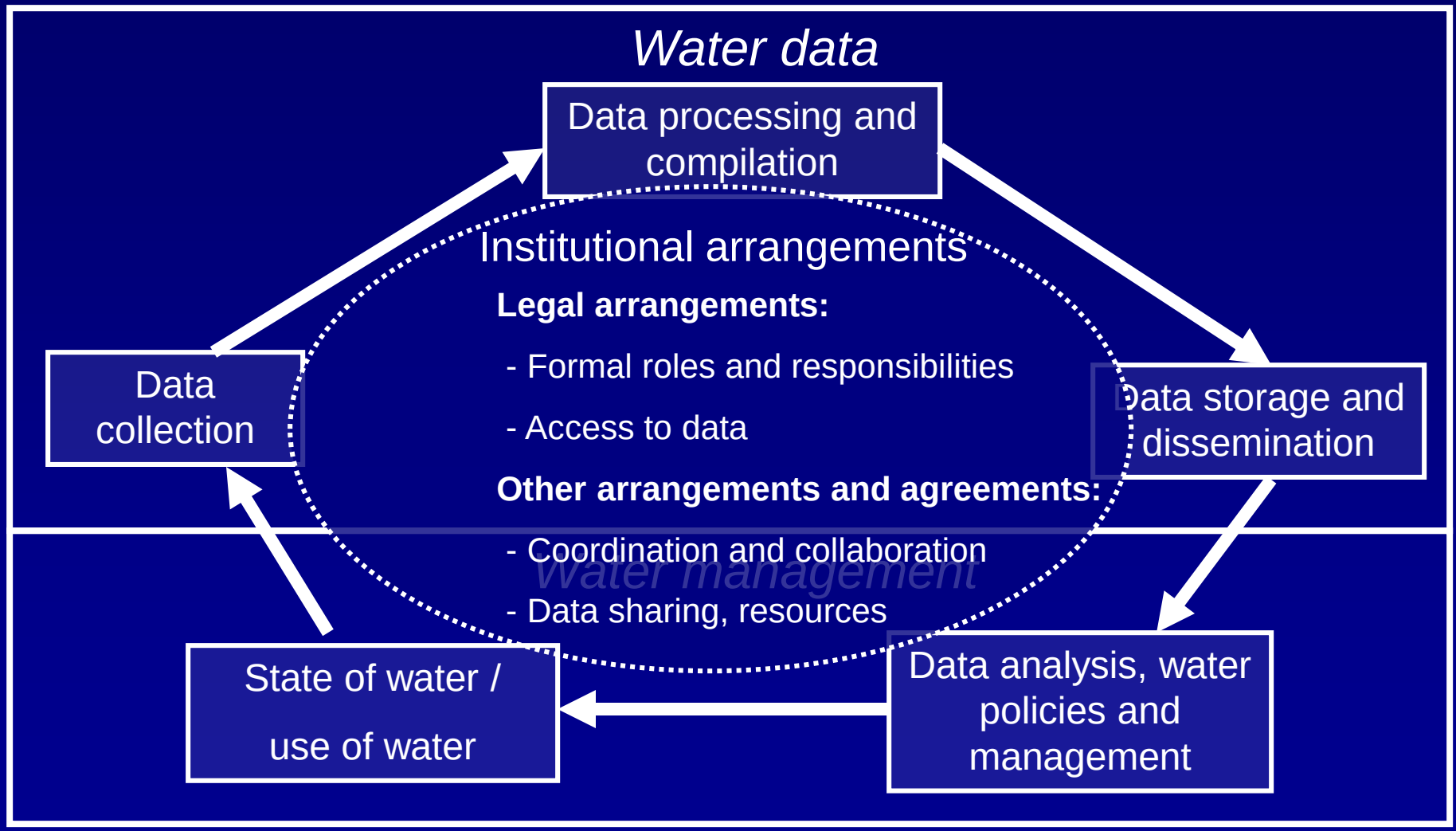
Human and Financial Resources

- Sufficient and efficiently used resources are needed for data integration and dissemination
  - At the country and international levels
- There is a need to provide practical assistance to countries at all stages of the data cycle
  - Data integration is a special need that is usually poorly addressed
  - Training via web-based or written material for practical implementation
  - Finance

How should we integrate, store and access data?



How should we manage data?



Questions for discussion

- Is the SEEA-Water a step forward in meeting the demand for integration information needed for water policy and management?
- How can the use of common concepts, definitions and classifications be encouraged?
- How do we establish best practices for data collection and management (including data integration, storage, access and dissemination)?

Implementation in Mexico, Matrix of Transfers in the Economy.

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Matriz de transferencias dentro de la economía (MTE)

	Usuarios / Ofertantes	A	B	C	D	E	F	G	H
		ISIC 1-3	ISIC 5-33	ISIC 35		ISIC 36	ISIC 37		
		Agrícola	Industria y Servicios	Termoeléctricas	Hidroeléctricas	Redes de distribución municipal	Alcantarillado	Doméstico	Total de agua ofertada
21	Agrícola								0
22	Industria sin producción de energía eléctrica	1 357					442		1 799
23	Termoeléctricas								0
24	Hidroeléctricas								0
25	Redes de distribución municipal		1 017					4 652	5 669
26	Alcantarillado	2 767	566	62					3 395
27	Doméstico						3 499		3 499
28	8. Total de agua recibida de otras unidades económicas (uso)	4 124	1 583	62	0	0	3 941	4 652	14 362

Dissemination of Statistics in Mexico (9 years). Many elements of the accounts

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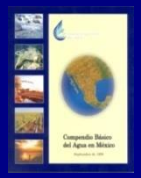
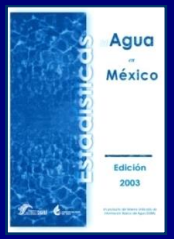


1999

2001

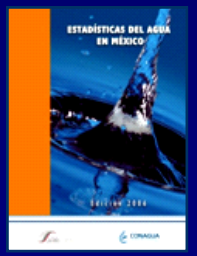
2002



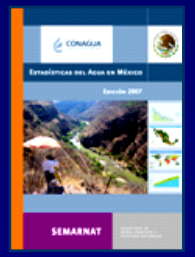
2003

2004

2005

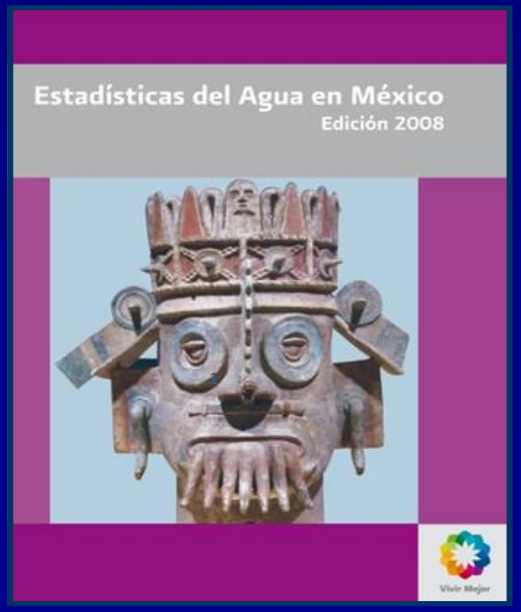


2006



2007

2008



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