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WATER AND ENVIRONMENT: THE IWRM CONCEPT

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Global Water Profile

- **Global waters** are estimated at **1.4 Bkm^3**, only **2.5 %** is **FW**, unevenly distributed.
- **99.7 %** of FW is **ice and permanent snow** (mountains, Antarctic & Arctic regions), **shallow** & **deep GW**, **soil moisture**, **swamps**. **0.3 %** is **available** in rivers & lakes. **GW** is ~**90 %** of **available** FW (supports drinking needs for >1.5 B people).
- Total usable FW supply for ecosystems & humans is **~200,000 km^3** (<1 % of all FW resources, only 0.01 % of all water on Earth) mostly located far from human populations.
- **Agriculture** consumes **75%**, **industry 20%**, **domestic 5%**
- **Population growth** & **consumption patterns** deceased per capita annual share **from 12900 m^3 i**n 1970 to 9000 in 1990, **to 7000 in 2000**. Projected to drop to 5,100 by 2025.
- **1/3** world's population is **under moderate** or **severe water stress.** <1,700m^3/capita/yr defines stress. A drop below 1,000m^3 defines scarcity (UNPD, UNEP, WB, and WRI, 2000.).
- 3 B will suffer **water stress** by 2025. In Africa alone, 25 countries will experience water stress.
- **80 M extra** people tap into water supply yearly.

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Water Crisis: Impacts on Humans & Environment

- **Polluted water** affects the health of **1.2 B**. In 1990 water-related illnesses led to **3 million deaths**, 85 % in children.
- In 2000 **1.2 billion people** still lacked access to **safe water sources**.
- In 2000 **2 billion people** lacked access to adequate **sanitation**.
- **Hydrological** and **ecological functions** of over half of all **wetlands** have been altered due to encroachment.
- Water scarcity coupled with poor management leads to **land degradation** and **Biodiversity loss**, and could, if water needs for environment continue to be overlooked, result in **devastating impacts** on ecosystems well being.
- Abstraction of water for agriculture **dries up rivers**, **depletes ground water (GW)**, and causes **soil salinity/ pollution**.
- Wastewater effluents **pollute downstream ecosystems** and GW if not sufficiently treated. (**Only 5 % of global sewage are treated**!)

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Arab Region Water Profile

- Water Resources is ~**265 km^3** (SW 225, GW 40). **65%** of renewable resources originate outside the region *(Euphrates,Tigris,Nile)*. ***Conflict*** *over shared resources*
- Region suffers **water scarcity:** annual/ capita renewable resources is **<500 m^3 in 70 % of the region** (800 overall, 2181 Mashriq, 374 GCC, 1329 WA). Average annual rainfall <250 mm in 70 % of the region (<100 mm in GCC).
- Water scarcity led many countries to **fossil groundwater** exploitation and **sea water desalination**, options that involve high cost and adverse environmental impacts. (WD 7.2% in GCC, treated waste water 1.7%)
- **88%** used for **Agriculture**, **7% domestic** and **5% industrial** (for WA, slightly lower for agriculture and higher for other uses)
- **Water Scarcity coupled with high population growth rates significantly widen gap** between demand & availability
- **50 M** lack access to **safe drinking water** and **80 M** lack access to **proper sanitation. Furthermore, t**o achieve the **MDGs** the Region needs to provide drinking water to about **83 M**, and sanitation to about **96 M** by 2015.
- **Water pollution** poses serious threat to the already scarce water resources.

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IWRM Concept & Pillars

IWRM is a multi-user participatory systematic process for the sustainable development, allocation and monitoring of water resources use in the context of social, economic and environmental objectives.

IWRM Governance is based on three tools:

✓Enabling environment of appropriate policies, strategies

✓Adequate legislations

✓Institutional framework and management instruments

The **pillars of IWRM** are those of **sustainable development**:

❑**Social Sustainability/ equity**– It is a basic right to all including future generations to have access to water of adequate quantity & quality for their basic needs.

❑**Environmental and Ecological Sustainability** – managed in a way that does not undermine the ecosystems/ environment needs, and ensure sustainability for future generations

❑**Economic Sustainability** - must seek the most possible economic efficiency to allow fair accessibility, especially to the poor, at reasonable costs.

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IWRM: Major Milestones

1. **International Conference on Water & Environment, Dublin, Ireland, Jan. 1992: Sets** basic water management principles:
   - *Fresh water is a finite vulnerable resource*
   - *Water development and management should be a participatory approach, involving users, planners & policymakers at all levels.*
   - *Women role is central in water management and safeguarding*
   - *Water has economic value and should be recognised as an economic good.*

2. **Earth Summit, June 1992 (Agenda 21, Chapter 18)** calls for:

   Application of integrated approaches to the development, management & use of water resources

3. **Millennium Declaration, UN (2000): MDGs (GOAL 10)**
   - ✓ *To halve by 2015 the proportion of People without sustainable access to safe water or lacking water and basic sanitation.*

4. **WSSD, Johannesburg (2002):**
   - ✓ *A Target to develop IWRM plans by 2005*

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IWRM Environmental Benefits

- A **voice for environmental** needs in water allocation
- Better **pollution control**, and **improved wastewater management** considering environment and human health
- Preservation of **biological resources/ biodiversity** such as forests, wetlands, vegetation cover, etc.
- **Promote water conservation behaviour** and thus sustainability of resources.

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Public-Private WDM Options (WB, 2003)

Type of Contract	Duration	Responsibility of operator	Payment of operator	Asset ownership
Service Contract	*3-5 yrs*	*Specific task (billing, …)*	*Fixed fee*	*public*
Management Contract	*3-8 yrs*	*Some O&M functions*	*Fee with incentives*	*public*
Lease/ Affermage	*8-15 yrs*	*All O&M; excl. investments*	*% of tariff collected*	*public*
Concession/ BOT	*20 – 30 yrs*	*All O&M plus investment*	*Contractual tariff*	*Private then public*

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IWRM: Water Supply Cost Recovery

Why?

- Besides the environmental, social & public health value water has also an economic value (Dublin conference, 1992).
- To ensure efficient water allocation.
- To recover water supply costs.
- To internalize the external (environmental) costs.
- To send as a signal to consumers to reduce water consumption & to induce behavioural changes.

Special considerations:

- Subsidy for **poor** people accessibility to **basic water needs**
- Incentives to encourage use of water saving **technologies**

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Obstacles for Implementation of IWRM

- Lack of **data** (withdrawal, use, waste, pollution)
- Lack of **awareness:** there is a need for a **general policy package** with **regulation**, **public education** and **investment** in water efficient infra structure & technologies.
- Political, social & public **resistance to** new taxes, prices associated with **cost recovery**
- Fragmented institutional frameworks (Lack of **integrated multi-objective interdisciplinary/ multi-stakeholder management schemes**.
- There is **no one solution that fits all.** Every country may need to tailor own management system to fit its specific needs**.**

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UNEP's Selected Interventions

- **IWRM** (in partnership with **ESCWA, FAO, UNESCO, WHO**)
- **Global Programme of Action** for Protection of Marine Environment (UNEP, IMO, FAO, IAEA)
- **Global International Waters Assessment (** UNEP/ Swedish activity supported by GEF, 15 Mega Regions, 66 Subregions, West Asia is a part of Indian Ocean Mega region. ROWA coordinated WA activities. 5 subregions in WA: Gulf of Aden, Red sea area, ROPME sea area, Jordan Valley, Arabian sea)
- **Desalination (WHO)**
- Rehabilitation of Iraqi **Mesopotamian Marshlands**
- *Water is thematic network within **UNCCD/SRAP-WA** coordinated by **UNEP/ ROWA**. Related activities include: establishment of* Regional Database on **Sustainable Water Resources** *administered by ICARDA. Promotion of Water harvesting technologies in the context of the* Integrated Natural Resources Management projects in **Lebanon, Yemen, Syria and Jordan**.
- **Development in partnership** with regional partners the proposed project concepts endorsed by **CAMRE** (2004) **Algeria Arab Summit** (2005) under **Arab Initiative for Sustainable Development** (AISD) & (ADI). Project concepts include:

✓ *Awareness Program on rationalization water use in the Arab Countries*
✓ *Improving Water Harvesting Techniques in the Arab Countries*
✓ *Water Demand Management in for Agriculture, etc…*

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Conclusions

- **Water crisis will continue** to be a **central concern at the global, regional and national levels**. Thus the of **IWRM** concept should be further promoted to ensure water resources sustainability & availability for basic human needs
- **Economic Instruments in water management** should be considered ensure resources sustainability for humans and environment. These instruments should include subsidies for basic water needs for the poor.
- **National institutional frameworks** involved in water management should be assessed to ensure alignment with IWRM principles.
- Further **Capacity Building on IWRM** should be provided at the national and regional levels
- **Public awareness on water issues**, including promotion of water conservation techniques should be fostered.
- **National & regional databases on water resources** are needed to serve the analysis, monitoring and decision making process.

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THANK YOU