Water Crisis and Food Security in the Arab World:

The Future Challenges

by

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Introduction

- **Arab World is facing severest water scarcity**
- **Located mostly in the arid and semiarid zone,**
- **most of the possible water resources already developed.**
- **Several Arab countries are suffering water deficiency and others heading that way.**
- **Per capita consumption rates are the lowest in the world**
- **municipal and industrial water will double and triple over next years.**
- **Depletion of non-renewable groundwater, pollution, salt-water intrusions, are common.**
- **Conflicts on shared water are higher than anywhere in the world.**
- **Agriculture is increasingly unable to meet demands levels and food imports increasing**

The Emerging Questions

i. Could water crisis be averted and could water be made more productive?

ii. How to meet the ample water demand at a time when pressures on resources are increasing and their mobilization is becoming increasingly expensive?

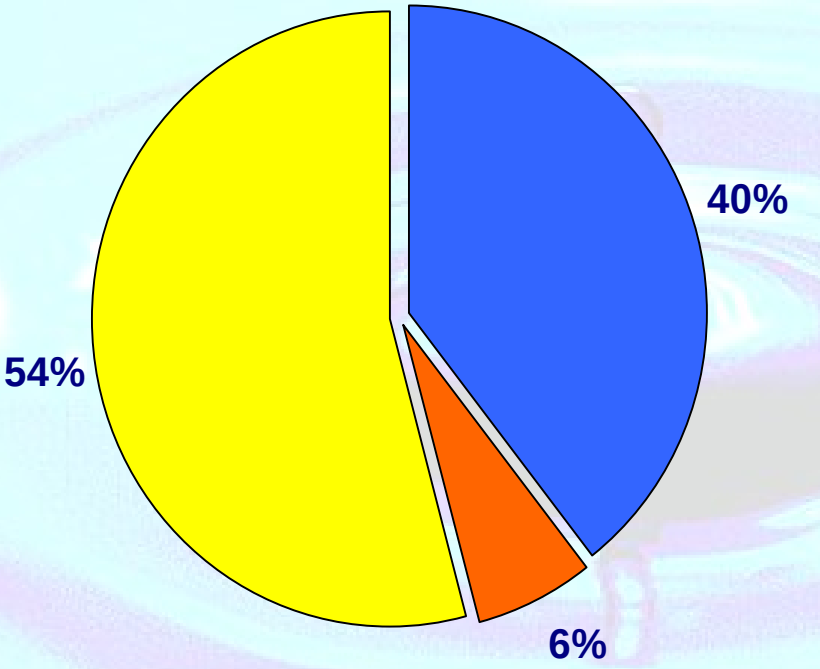
The answer is through

1. Better use and manage in all water use sectors particularly irrigation.
2. Producing more with less water or the same water,
3. Less need for infrastructure development,
4. Less conflicts among water use users,
5. Greater local food security, and
6. More water available for basic needs including the nature.

Water Resources

In the Arab World

Water availability



inter. surface water **123.9 km^3/year**

groundwater **19.6 km^3/year**

external water **169.7 km^3/year**

TOTAL 313.2 km^3/year

Water resources (km^3/year) availability in the Arab World

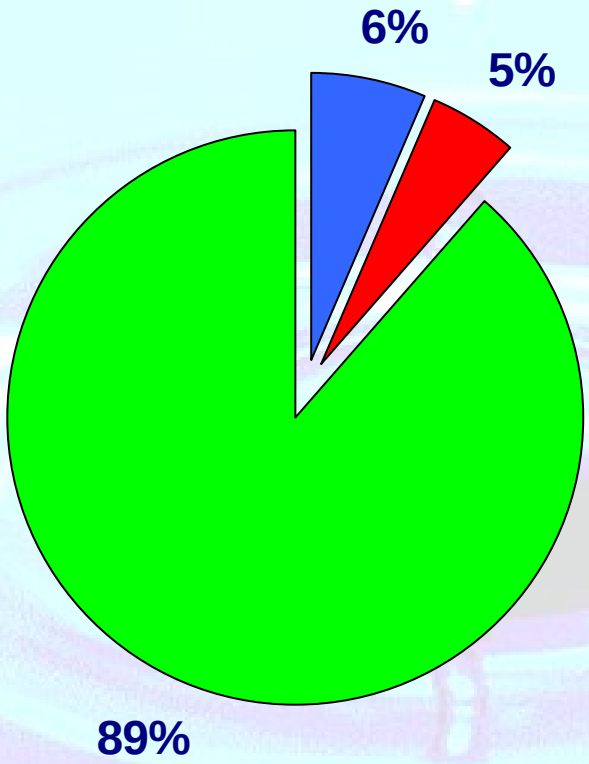
	External/Total resources
Kuwait	**100**
Egypt	**96.9**
Bahrain	**96.6**
Mauritania	**96.5**
Syria	**80.3**
Sudan	**76.9**
Somalia	**55.6**
Iraq	**53.3**
Jordan	**22.7**

Dependency ratio (%) on external water resources in some Arab countries

Dependency ratio (%) on groundwater resources in the Arab world

	Groundwater/Total resources
Palestine	**96**
Qatar	**94.3**
Comoros	**83.3**
Libya	**66.7**
Morocco	**24.1**
Tunisia	**23.9**
Lebanon	**15.9**
Syria	**8.4**
Saudi Arabia	**8.3**
Algeria	**4.9**

Water withdrawal



domestic	11.86 km^3/year
industry	8.76 km^3/year
agriculture	162.16 km^3/year

TOTAL 182.78 km^3/year

Water withdrawal per sector in the Arab World

Non-conventional water resources

Egypt	**5.90**
Syria	**0.26**
Saudi Arabia	**0.15**
Tunisia	**0.14**
UAE	**0.14**
Kuwait	**0.12**
Jordan	**0.07**
Morocco	**0.07**
Yemen	**0.03**
Oman	**0.02**

TOTAL 6.9 km^3/year

3.8%

Wastewater use (km^3/year) in Arab countries

Saudi Arabia	**0.71**
Kuwait	**0.65**
UAE	**0.55**
Qatar	**0.12**
Algeria	**0.07**
Egypt	**0.06**
Bahrain	**0.04**
Oman	**0.03**
Libya	**0.03**
Iraq	**0.03**
Yemen	**0.02**
Morocco	**0.01**

TOTAL 2.32 km^3/year

1.3%

Desalinised water use (km^3/year) in Arab countries

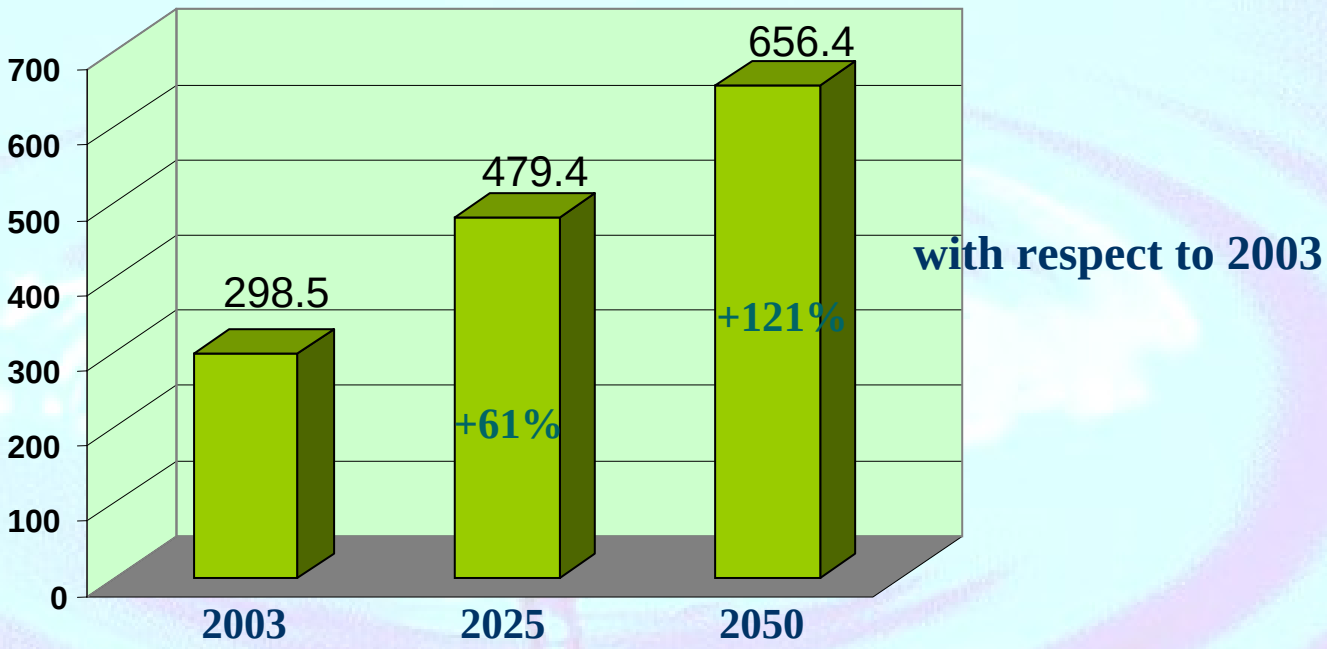
Groundwater mining in some Arab countries

	Mining as % of total water withdrawal
Kuwait	**46.5**
Bahrain	**40.2**
United Arab Emirates	**70.9**
Qatar	**14.9**
Libyen Arabe Jamahiriya	**90.0**
Jordan	**17.5**
Saudi Arabia	**79.5**

- effects including lower water tables, saltwater intrusion, land subsidence and decreased flow of streams.

- *how do we reach consensus on what constitutes a safe and sustainable use?*

Population trend in the Arab World (2003-2050)



Implications

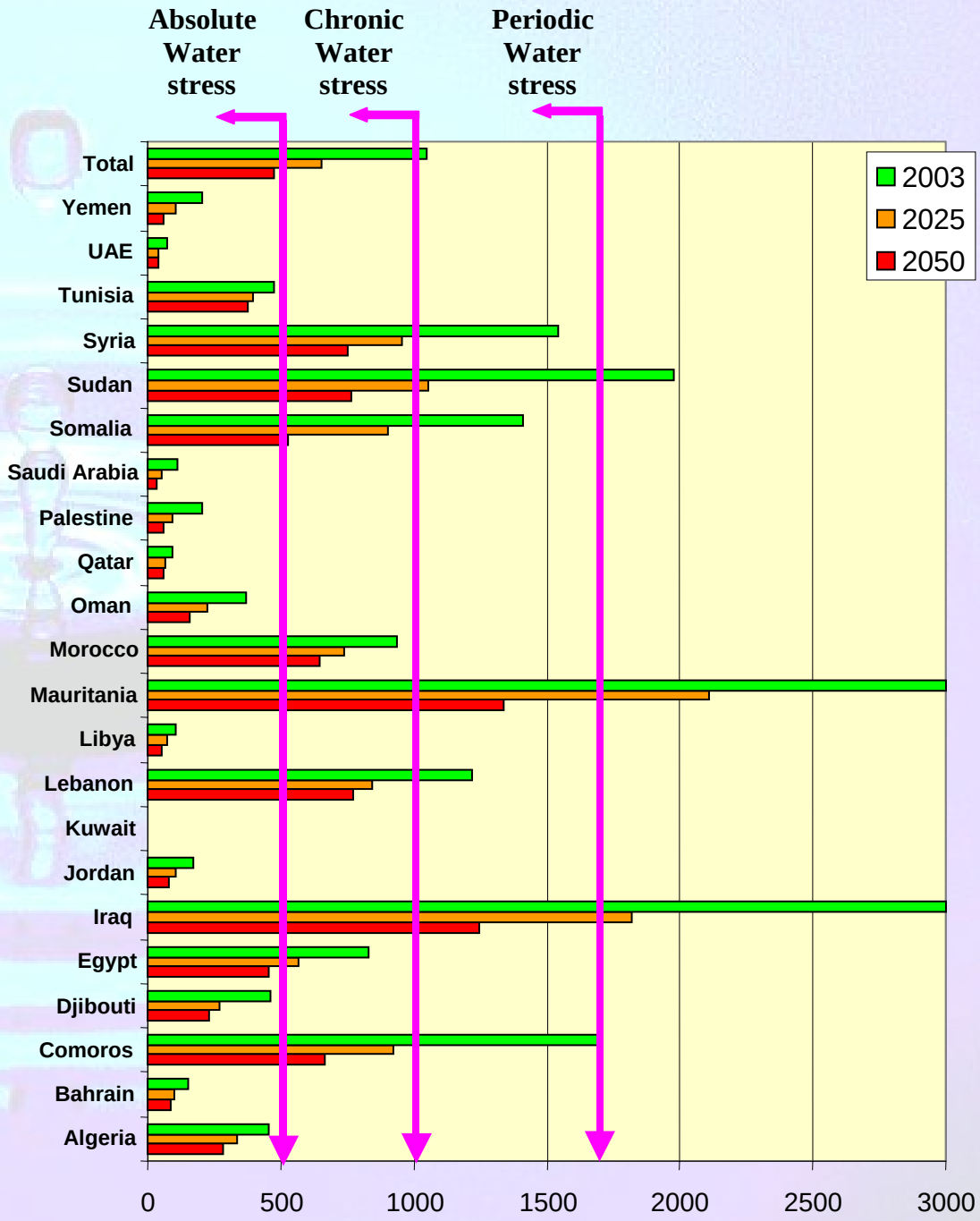
❖An increase of demands by about **4.6 km³ every year** to satisfy a population growth rate of **7.5million per year**.

Water resources availability trend in the Arab World (2003-2050)

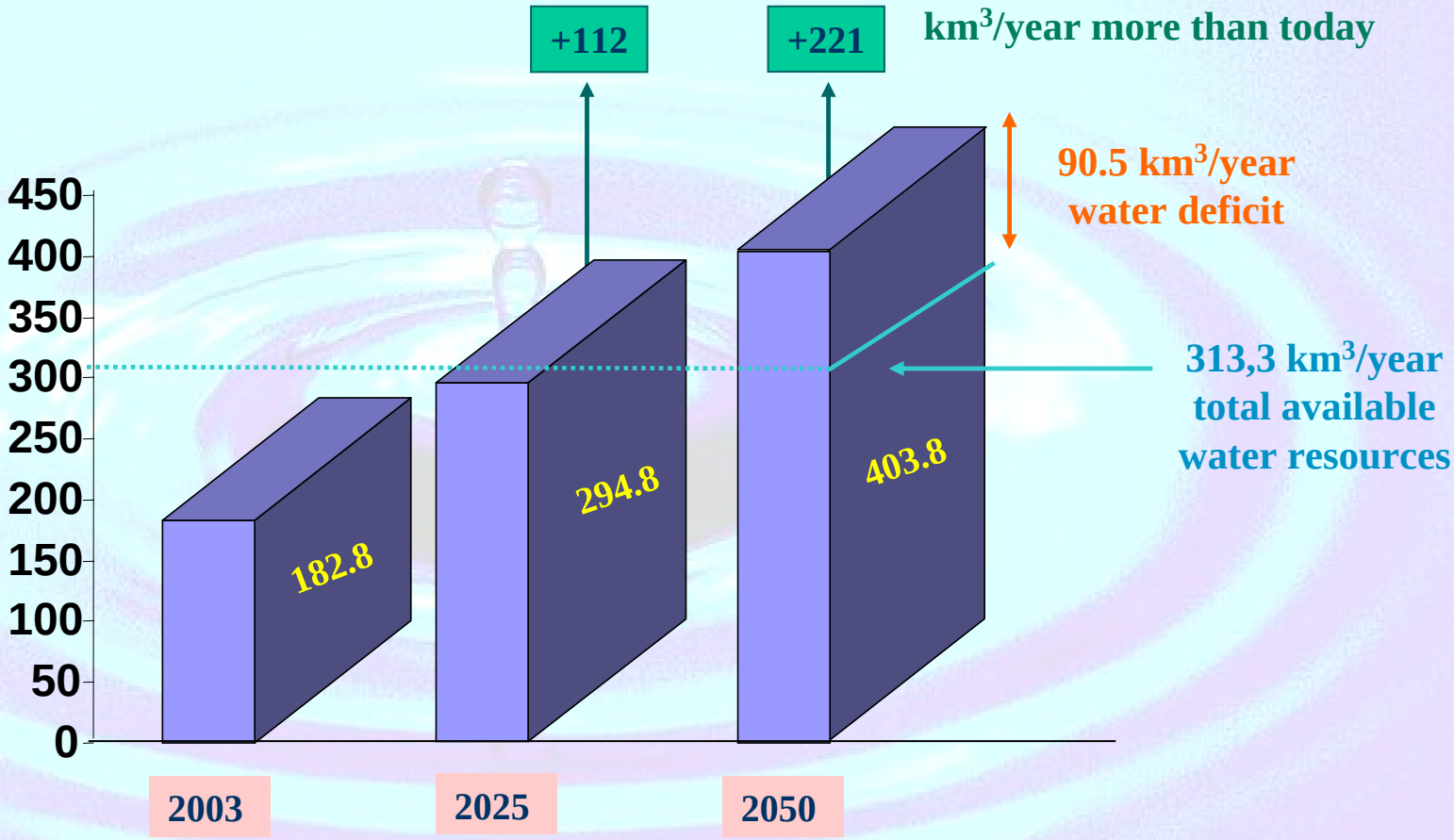
Implications

❖decrease of the current per capita share from 1051 to 674 m^3/person/year in 2025 and to **476 m^3/person/year in 2050**.

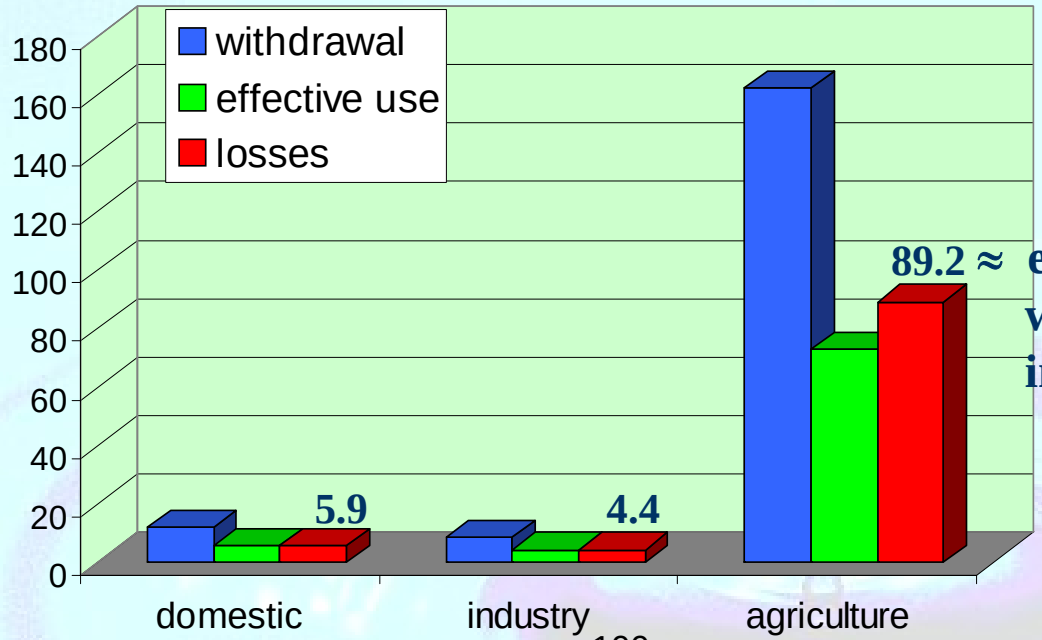
❖the whole region will experience **absolute water stress** and almost all (except Mauritania and Iraq) will suffer **chronic water stress**.

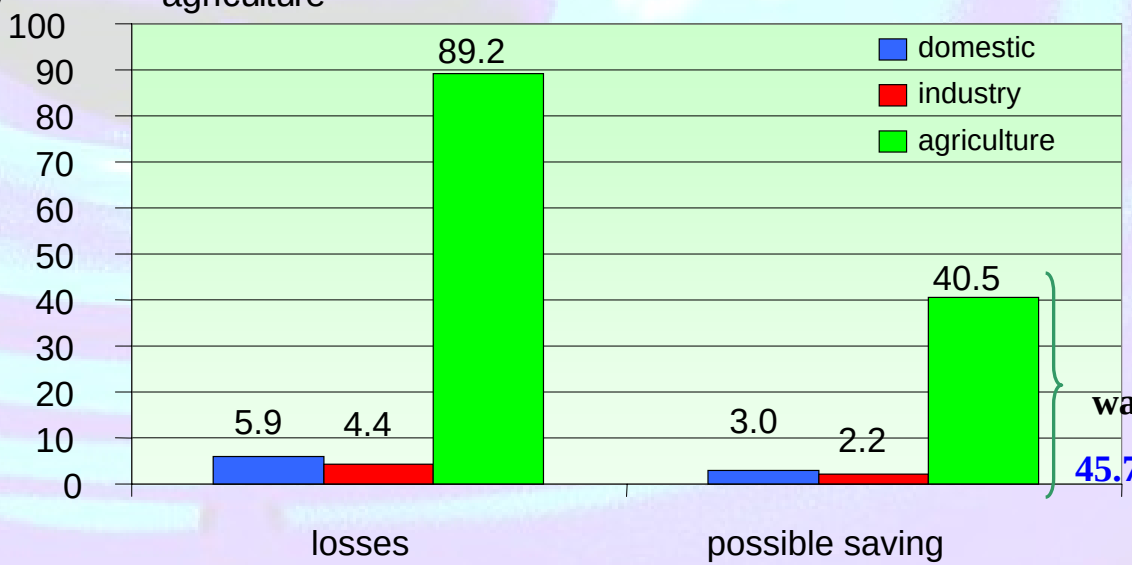


Water demand perspectives



Sectorial water effective use and losses





Water losses and possible savings (km^3/year) per sector in the Arab World

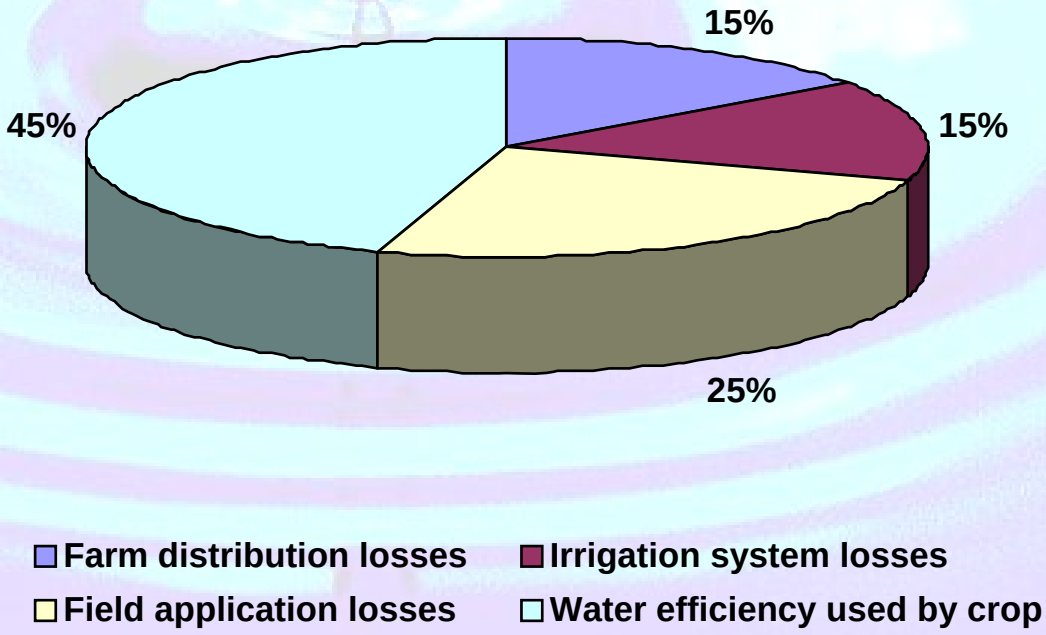
The challenges

- **Coping with increasing water scarcity and growing imbalance between population and available water supplies.**
- **Salinization, siltation, faltering aquatic ecosystems,**
- **Mounting competition for water, and**
- **Constraints on future food production**
- **Impact of global climatic change.**
- **A crisis of water governance**
- **ILL funded and badly organized institutions**
- **Incremental and out-dated legislation poorly enforced**
- **Fragmented institutions - divorced from the environmental management**
- **Data and information are often inadequate, inconsistent and unreliable.**

How do we reach consensus on what constitutes a **safe and sustainable water supply** ?

Irrigation and Agricultural Water Use

- **Agriculture is the key sector of water consumption both now and in the coming decades with significant saving potential.**
- **At present, the irrigation water sector is lacking a visionary strategy and marketing presentation.**
- **New arguments are needed to bring the focus and priority to the agricultural water sector.**



Average irrigation water losses

Principal Problems in Irrigation Water Management

Market Failure

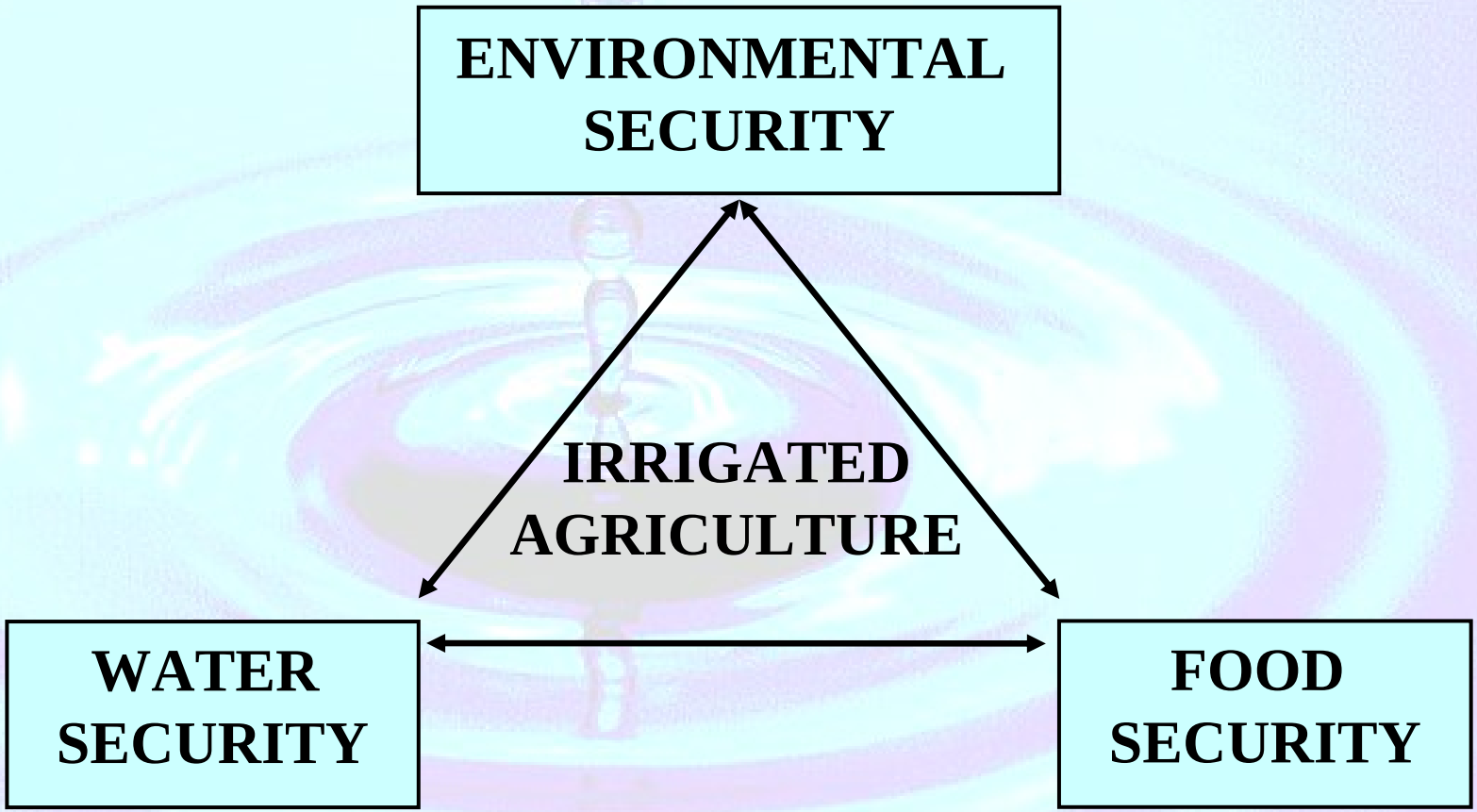
- **the inability of the market mechanisms to allocate water properly to different users in various sectors;**
- **external factors such as pollution, water logging and over-use of ground water as well as the high transaction costs;**
- **the lack of secure and effective property rights of water for each user.**

Government failures

- **fragmentation leads to uncoordinated decision-making**
- **malfunction, weakness and poor capacity building of the institutions**
- **Heavy centralization in planning, operation and maintenance**
- **inadequate services**

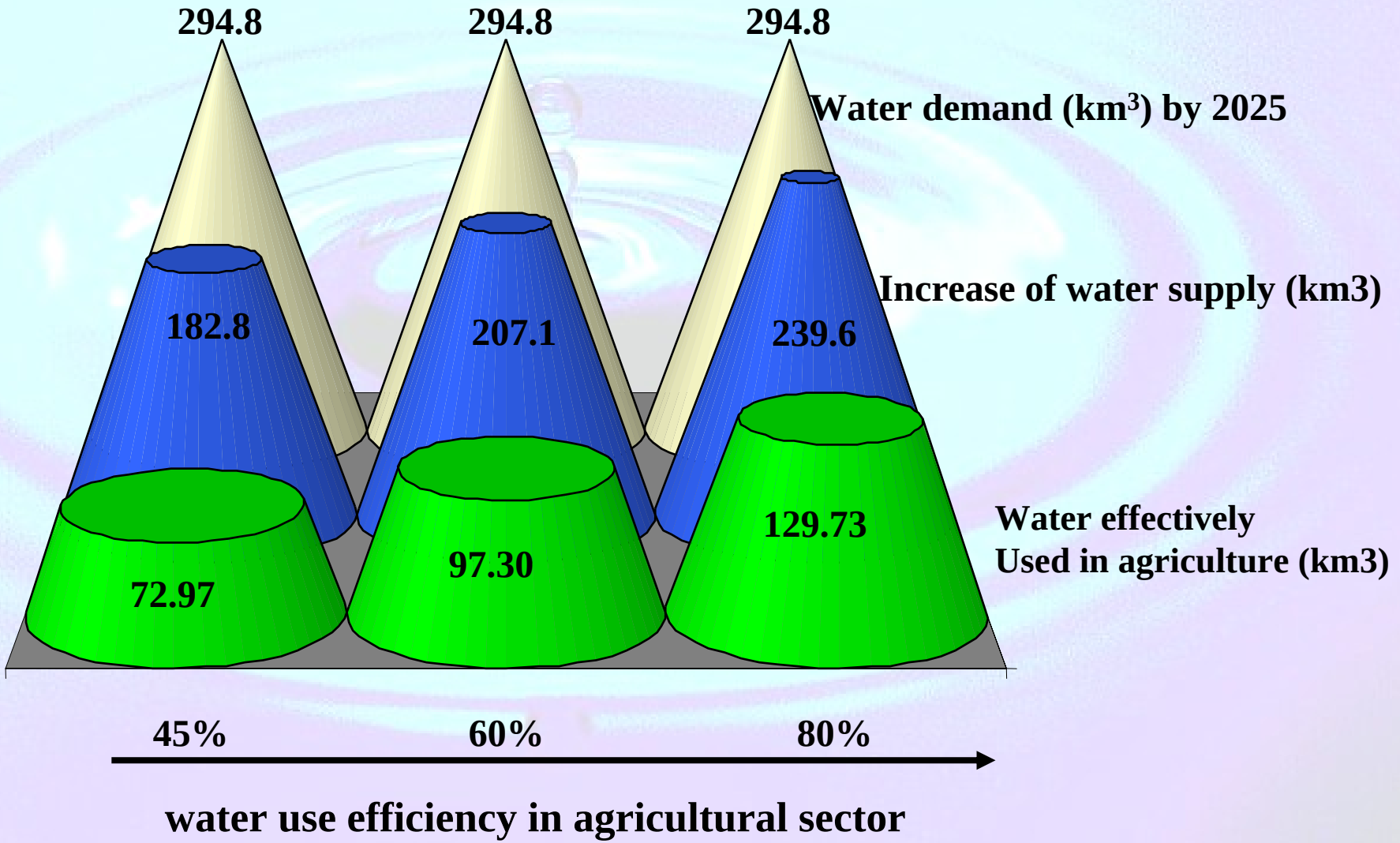
Environmental degradation

- **dumping of treated and untreated municipal and industrial wastes**
- **agriculture runoff and seepage**
- **hazardous and toxic wastes from solid waste disposal**
- **salt water intrusion in over-exploited coastal aquifers**



Food security, water security and environmental security relationship

Efficient water use in the agricultural sector and its impact on water supply



Water Planning and Management
the Need for a New Approach

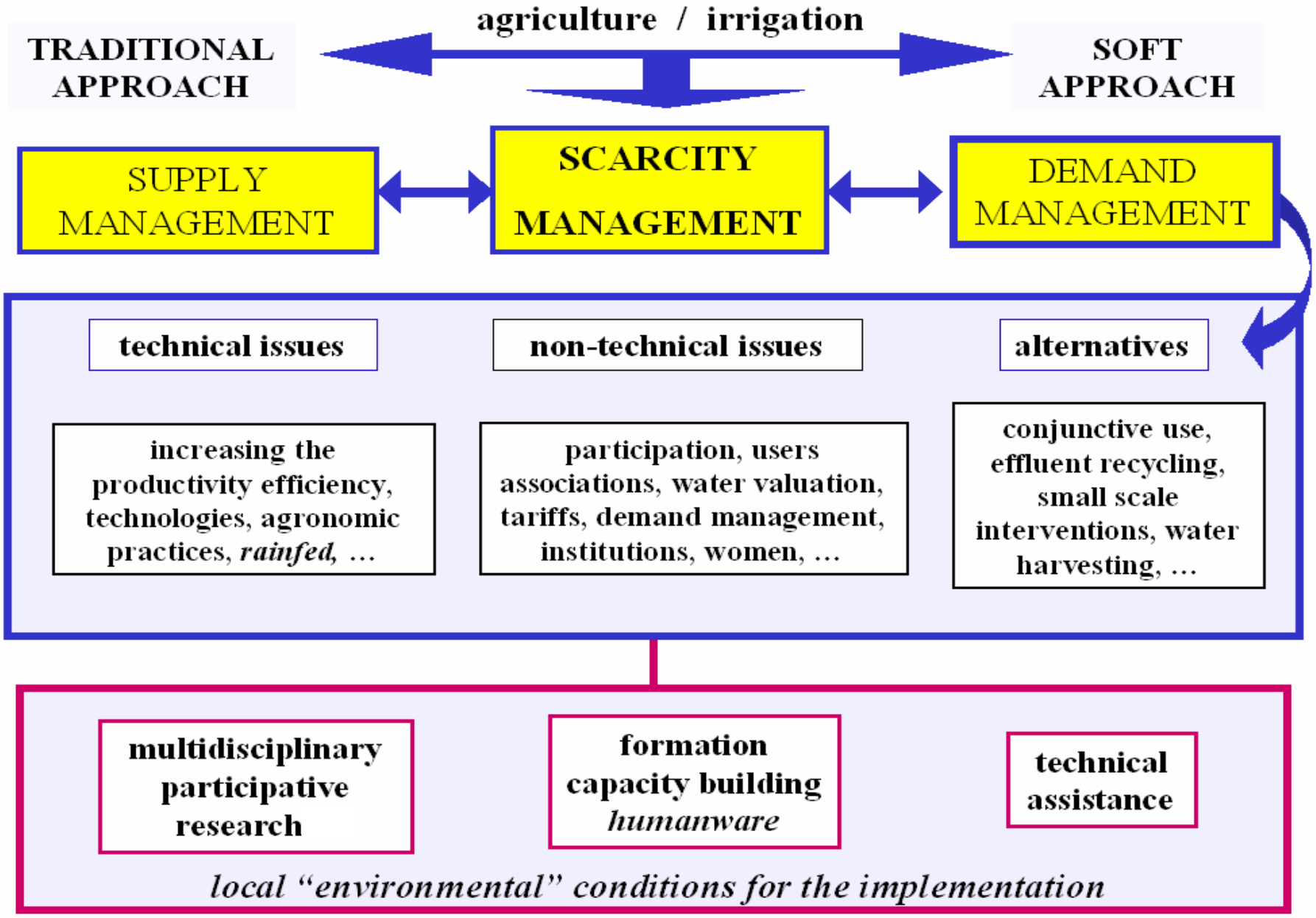
The Traditional Hard Path Approach

- focusing on the supply side only.
- Criticized for environmental, economic and social reasons
- Basic human needs for water still remain unmet
- incomplete analysis of water use, nor common goals for development and natural resources protection
- New systems are increasingly expensive for governmental budget support.

The Soft Path Approach

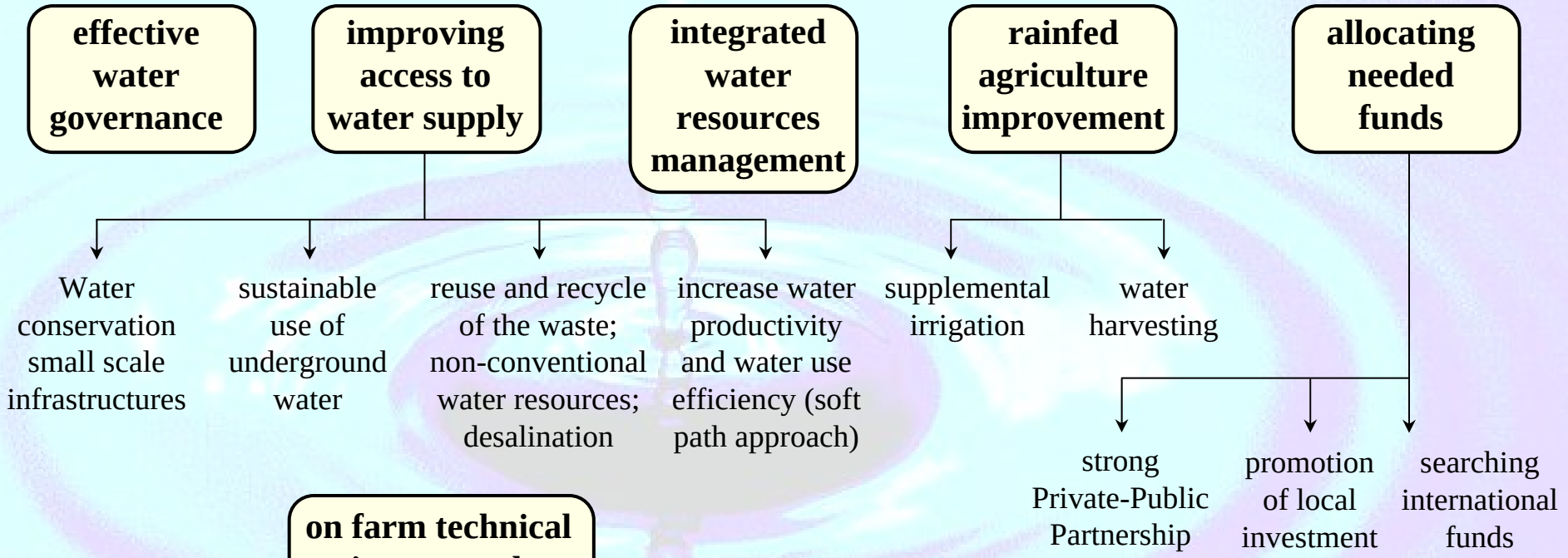
- Meet the growing water demands without major new construction or new large scale water transport
- efficiency improvements and options for managing demand and reallocation of water among users, avoiding conflicts
- Meet water needs with fewer resources, less ecological disruption and less cost.

Managing water scarcity:major issues



From Scarcity to Security: The Need for Radical Policy Reforms

Water Security and Food Security: the Way Forward – Principal Issues



supporting issues

- **on farm technical assistance and adequate service**
- **capacity building improvement**
  - H.R.D., training (technical managerial, administration), promotion of applicable research, gathering scientists from different disciplines (networking)
  - Institutions: introducing new technologies, coordination of activities
- **gender involvement of the stakeholders** → decentralization approach of on-farm water management (Participatory Irrigation Management); promotion WUAs and the integration of gender issues; accelerating transfer of water management

The Future Challenges

Challenge N°1

Developing Holistic Approaches to Water Resources Management.

Challenge N°2

Promoting Central Policies and Decentralized Management

Challenge N°3

Building a Partnership Approach

Challenge N°4

Promoting Gender Equity in Water Decision-Making

Challenge N°5

Managing Water and Energy Benefit Both

Challenge N°6

Improving Financings and Financial Sustainability of the Water Sector

Challenge N°7

Promoting Public- Private Partnership in development and management of water projects.

Challenge N°8

Changing the Attitude and Behaviour of People Towards Water

Challenge N°9

Capacity Building for the Local Institutions and Water User Group

FINAL Challenge

Establishment of a common body - a think tank - for regional and international cooperation in the field of water resources management in the Arab world

The Arab Water Council, a unique body able to fully consider all water problems in the region and to be, at the same time, the reference point to all other international institutions working in the water resources sector in the Arab region.


Thanks for your attention