MERITO

Commitment to a Cleaner Environment

Experiences in the Reuse of Wastewater in the Middle East

6th December 2006

AGENDA

Commitment to a Cleaner Environment

- **The rising demand for clean water**
- **Turning wastewater into clean water**
- **Water re-use case studies**

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THE SCALE OF GLOBAL NEED

- **Over 1.1 billion people lack access to improved water supplies.**
- **Over 2.6 billion people lack access to improved sanitation**
- **These are often the poorest in society**
- **More than 2 million children die each year from disease**
- **Improving access to safe drinking water and sanitation would deliver very real public health benefits**
- **Water is central to sustainable development**

Source: UN 2006

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WHY WATER REUSE

- Continuous population growth.
- Contamination of both surface and ground waters by industrial effluent and untreated domestic sewage.
- Uneven distribution of water resources.
- Periodic drought have forced water agencies to search for innovative source of water supply.

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FRESH WATER IN LIMITED SUPPLY AROUND THE WORLD

Global Water

97% Seawater

3% Freshwater

Global Freshwater

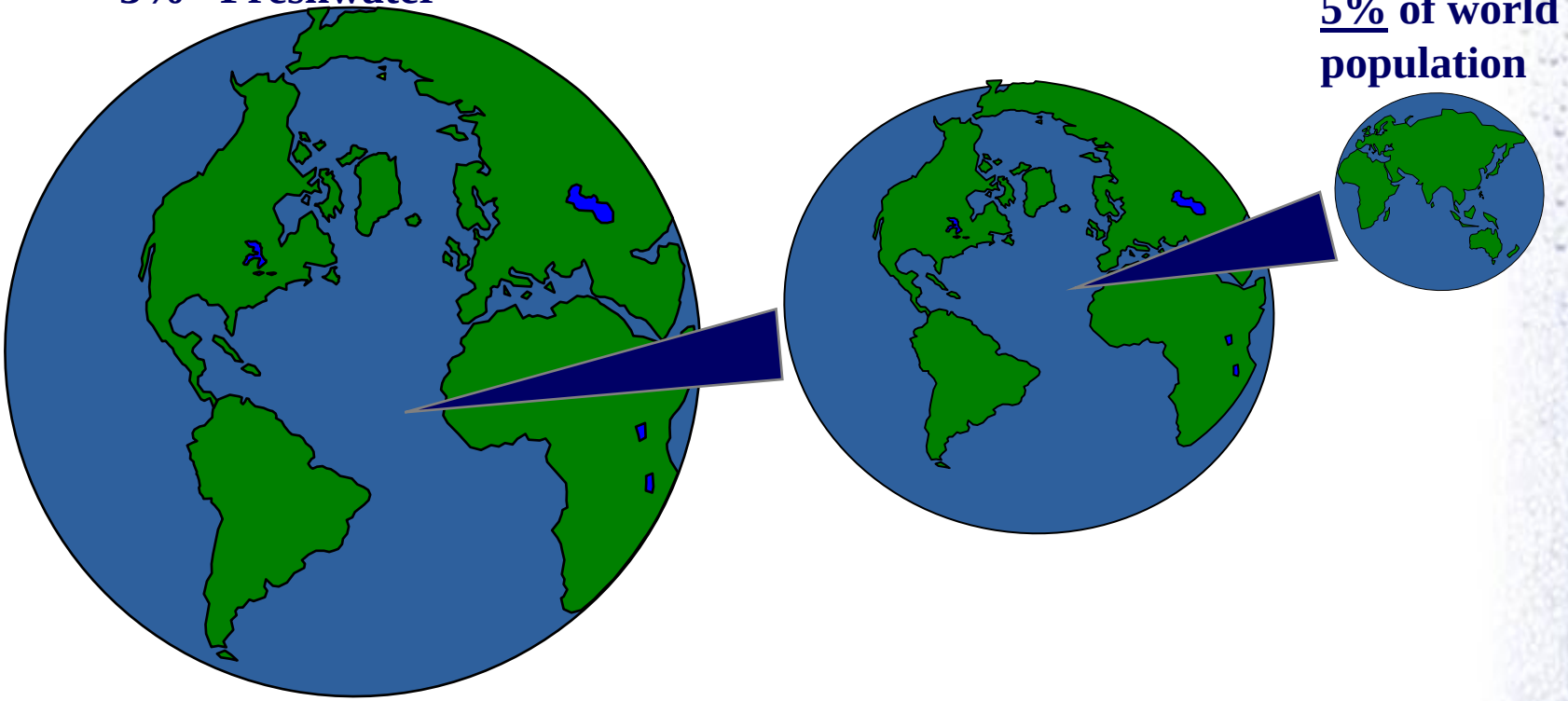
87% Not Accessible

13% Accessible

MENA

1% of accessible freshwater in the world

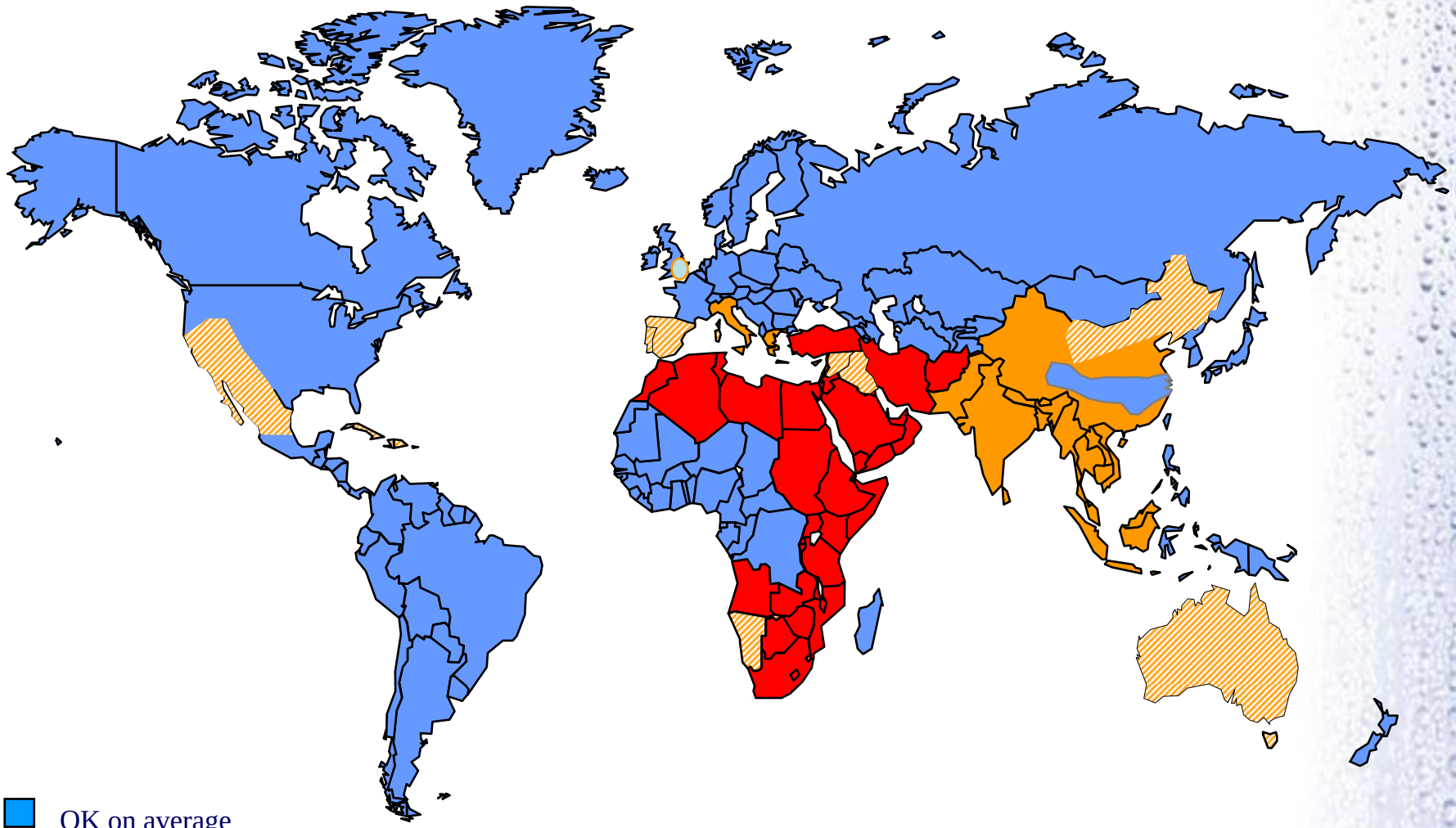
5% of world population



…and there are substantial disparities within MENA

Source:
World Bank, 2003

GLOBAL WATER SCARCITY - 2050



- OK on average
- Water shortages
- Severe water shortages
- Some areas prone to severe water shortages

Source:
Fischer and Heilig, 1997

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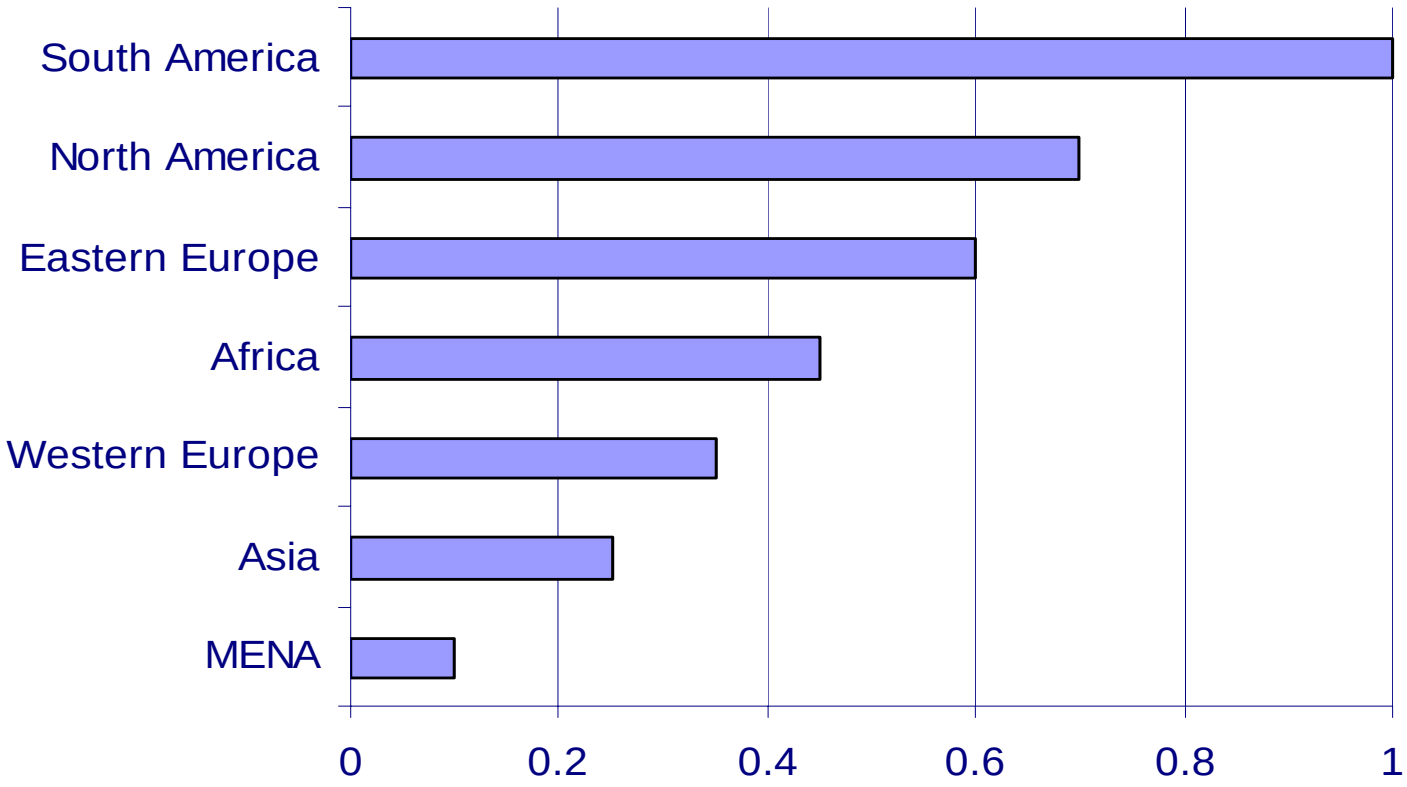
GLOBAL RELATIVE RAINFALL



MENA Region has the lowest rainfall

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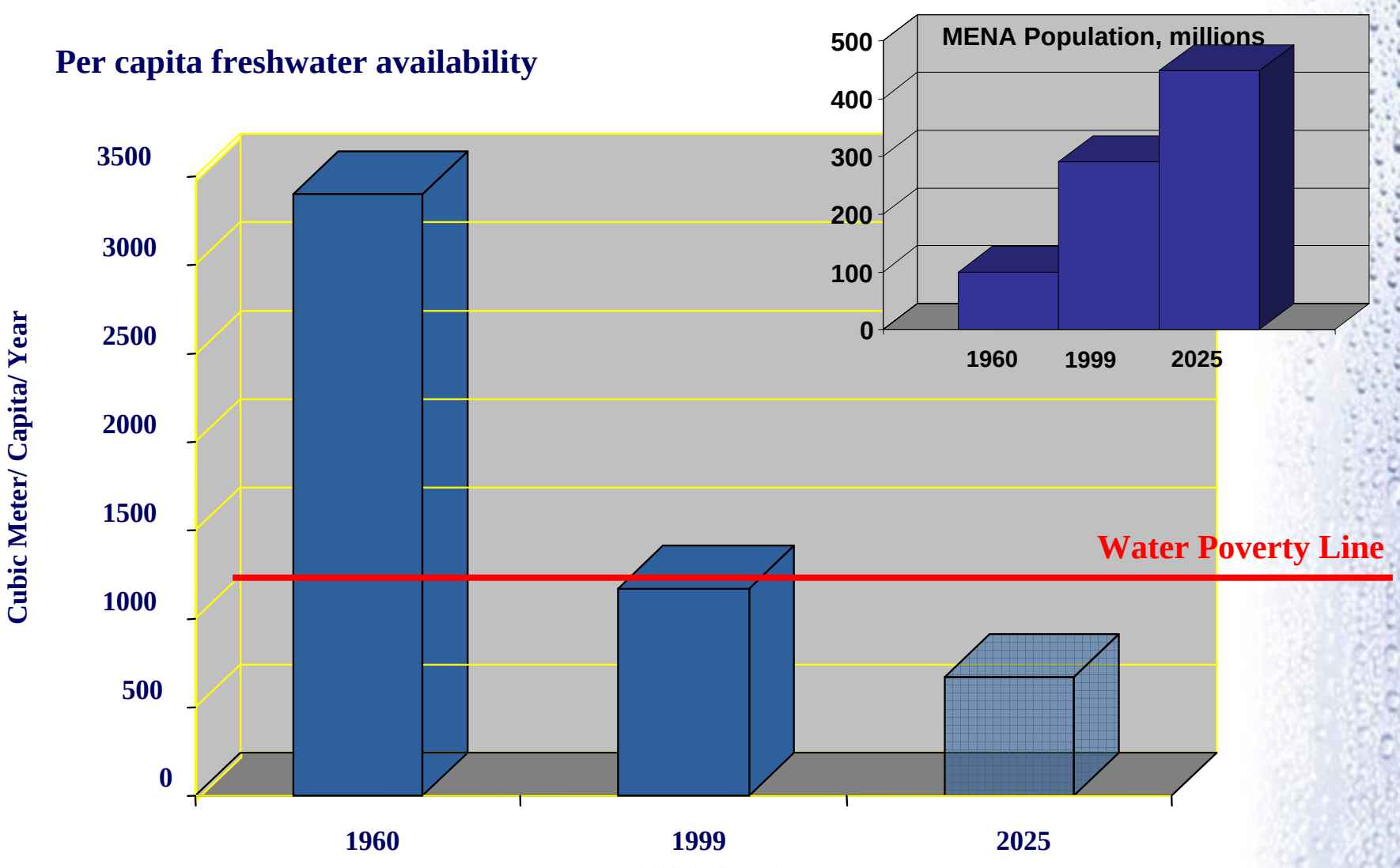
FRESHWATER AVAILABILITY FALLING TO CRISIS LEVELS IN MENA



Source:
World Bank, 2003

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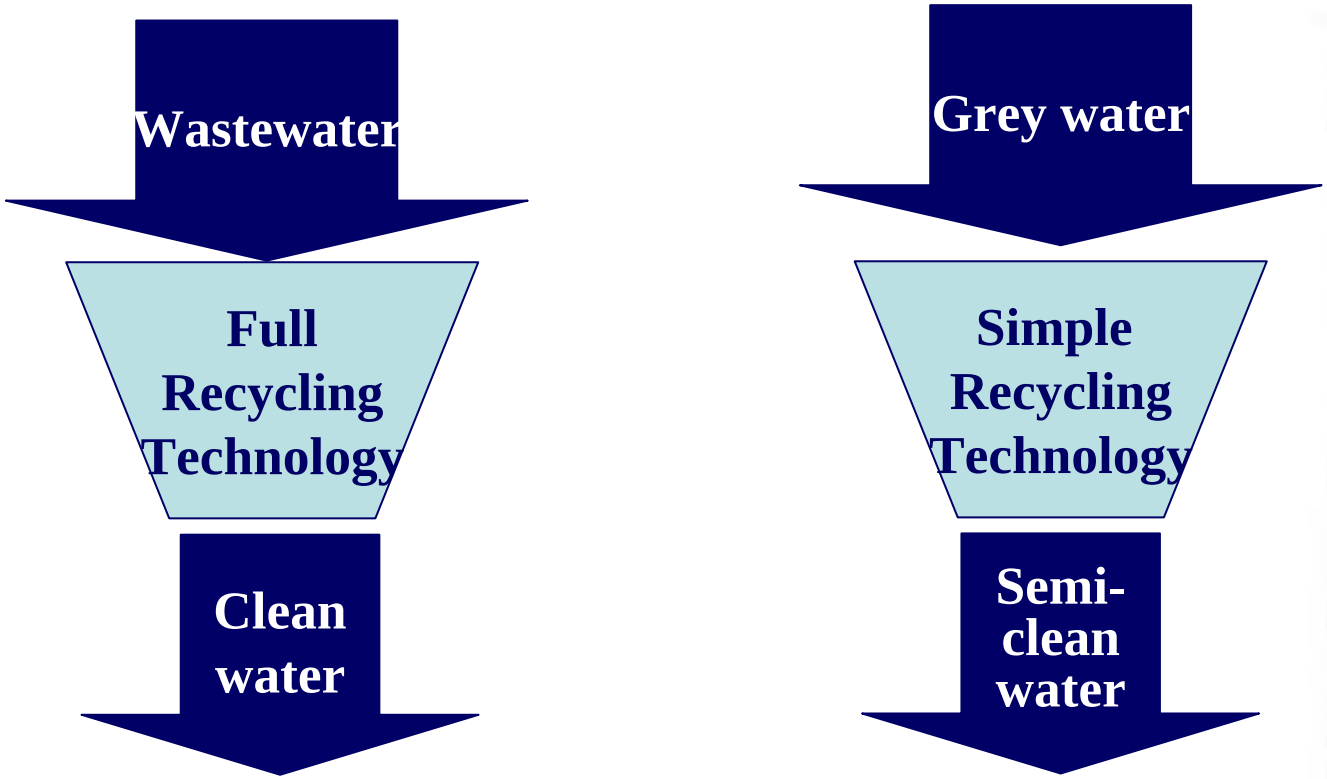
NON-CONVENTIONAL TECHNOLOGY OPTIONS



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REUSED WATER HAS MANY USES

FULL RECYCLING	GREY WATER RECYCLING
• Direct potable use • Indirect potable use – Aquifer recharge – Reservoir recharge – Surface water recharge • Industrial use – Cooling tower make up – Refineries and petrochemicals – Textiles – Paper mills • Agriculture – Restricted – Unrestricted • Municipal – Road washing – Car washing	• Domestic grey water

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MEMBRANE BIOREACTOR TECHNOLOGY

- State of the art technology that doesn't require chlorination, tertiary treatment or sludge digestion
- Over 1,500 plants operational or under construction
- Small footprint, approximately 50% of that required for Extended Aeration
- Extremely good, odourless, and consistent treated effluent, that can be used for un-restricted irrigation and district cooling towers applications

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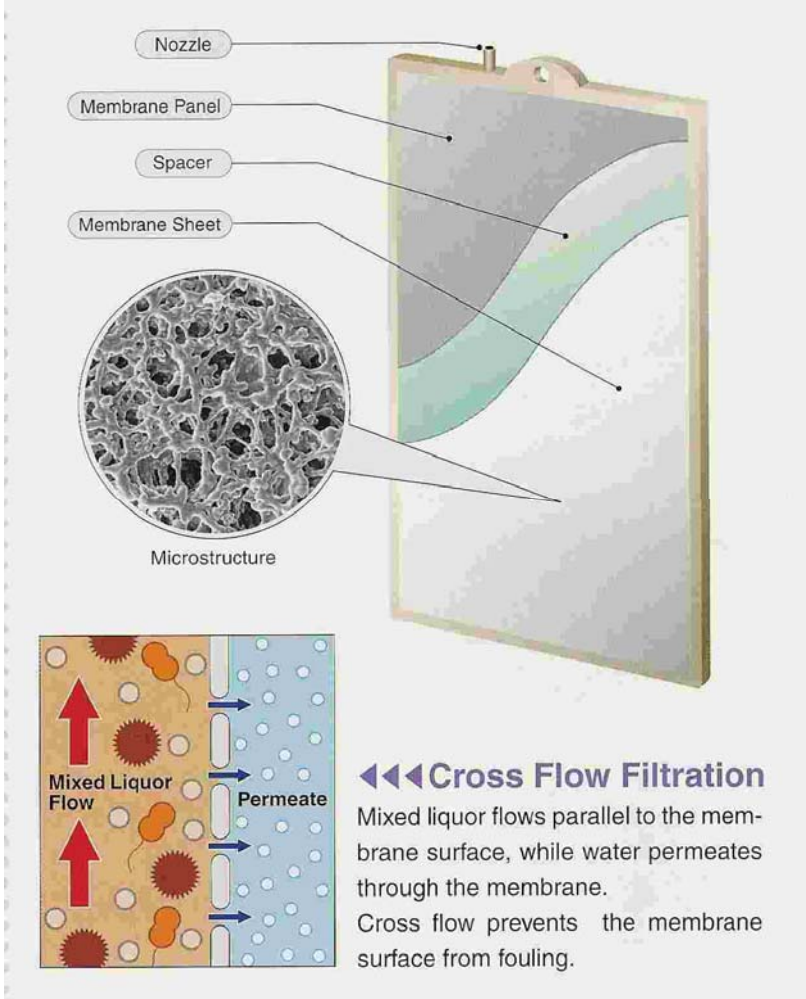
MEMBRANE BIOREACTOR TECHNOLOGY



- **Easy to operate and maintain**
  - **Less manpower**
  - **Lower operational costs**
- **Plants can be installed completely underground, semi underground or above ground**
- **No noise**
- **Minimum sludge production**

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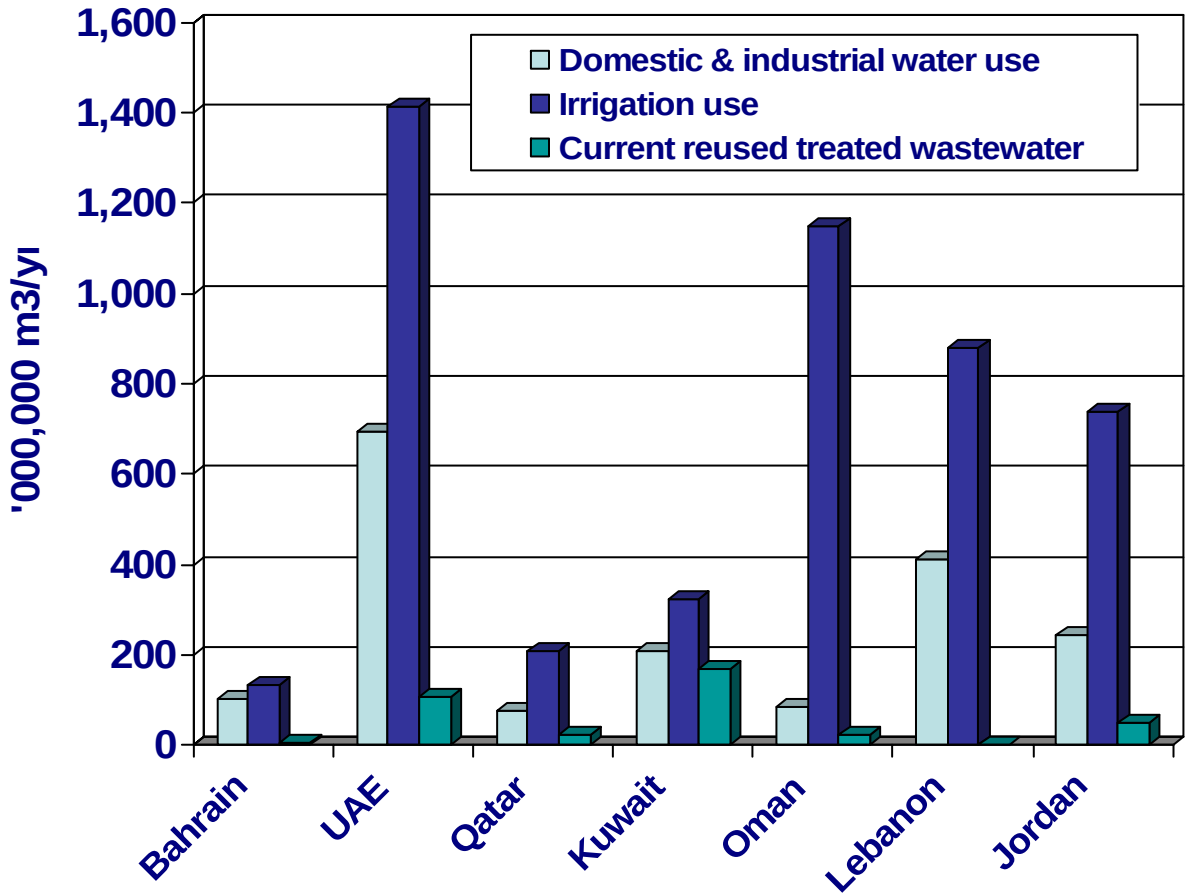
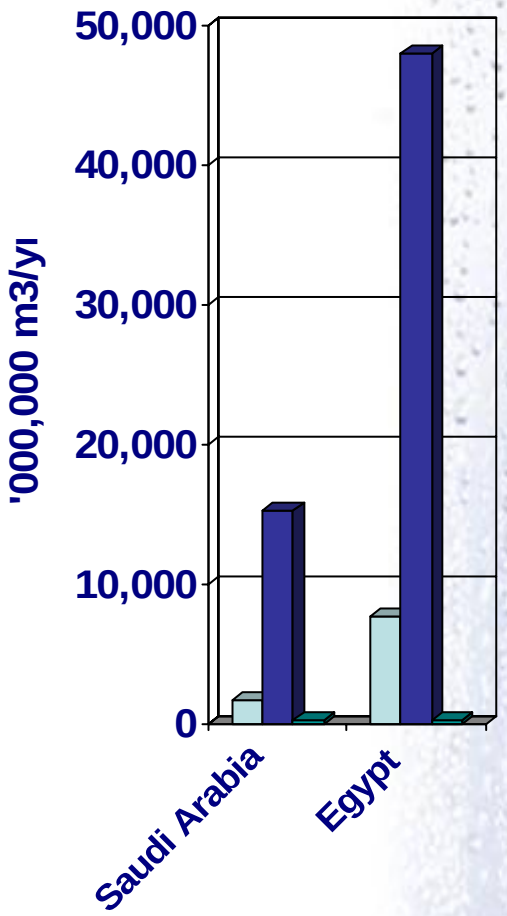
WASTEWATER GENERATION AND REUSE

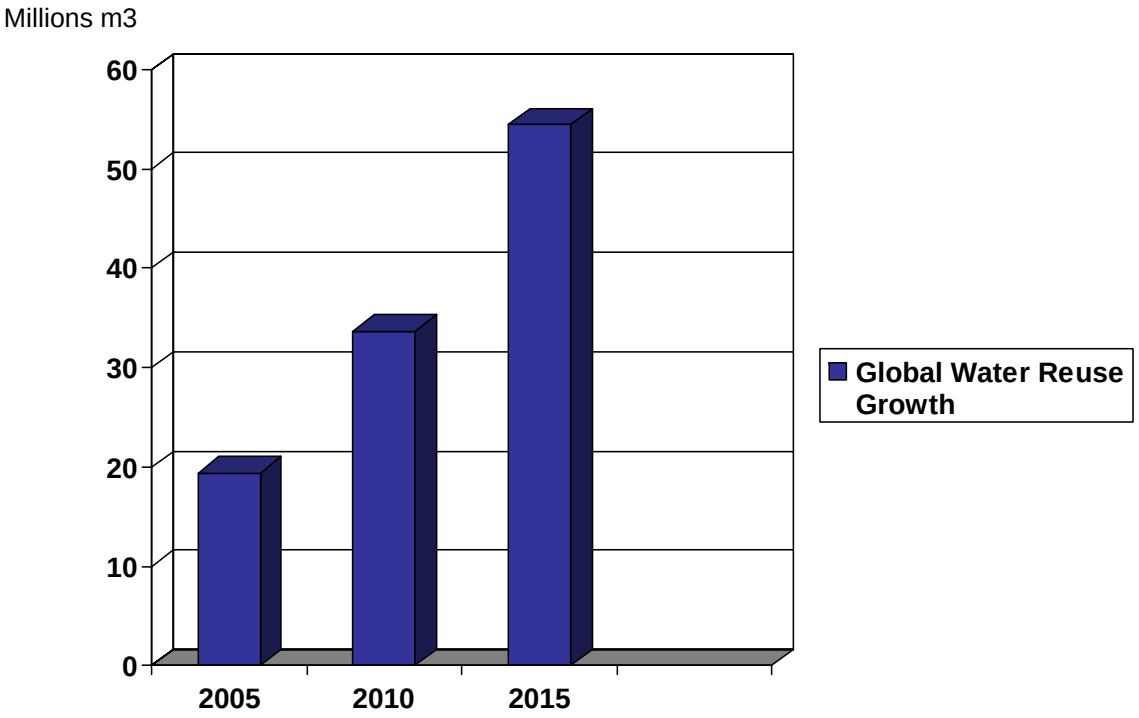
Only 1% of Wastewater Generated is Reused





Source:
Global Water Intelligence

GLOBAL WATER REUSE AND GROWTH MARKET



- **Global water reuse capacity will rise from 19.4 million m³ in 2005 to 33.7 million m³ in 2010 and to 54.5 million m³ in 2015, a 181% increase over the decade.**
- **The largest growth market will be: China, USA, MENA (Middle East and North Africa), Western Europe and South Asia.**

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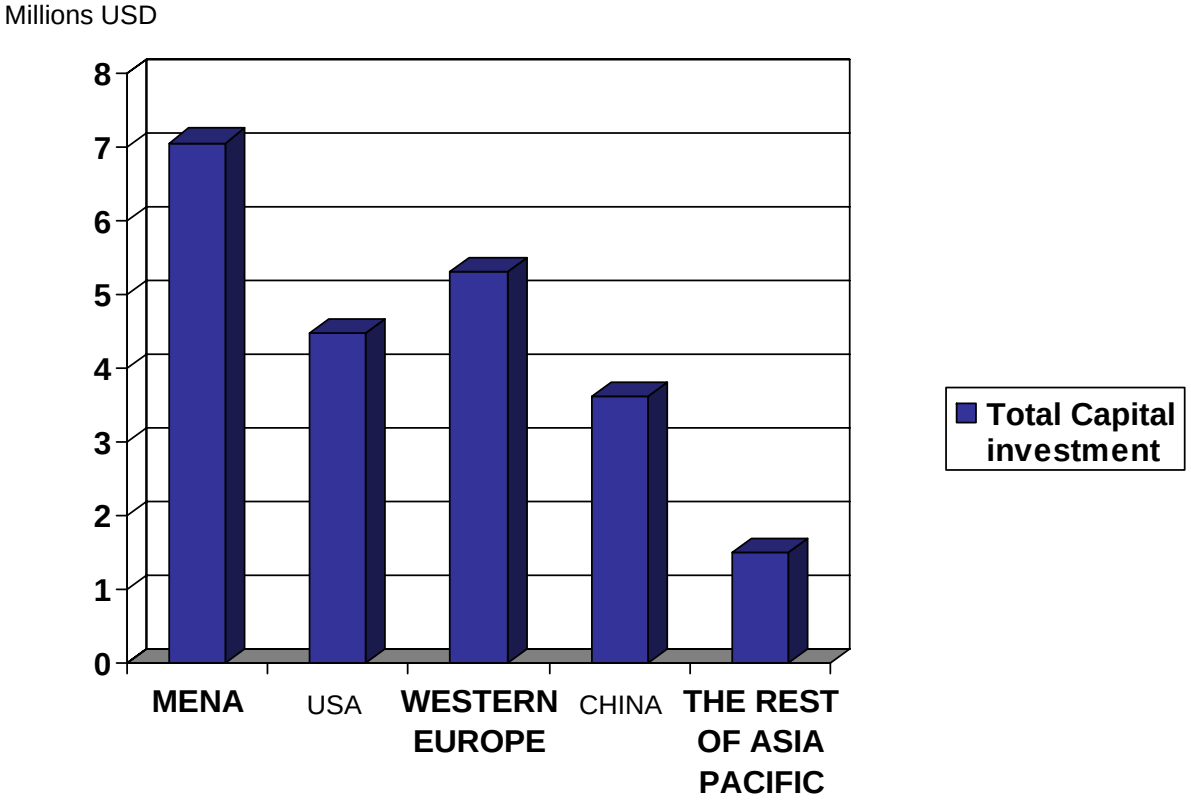
TOTAL CAPITAL INVESTMENT FOR WATER REUSE



- **Total capital investment in the sector will be US$28 billion;**
- **MENA US$7.053 billion, USA US$4.473 billion, Western Europe US$5.3 billion, China US$3.615 billion, and the rest of Asia Pacific US$1.5 billion**

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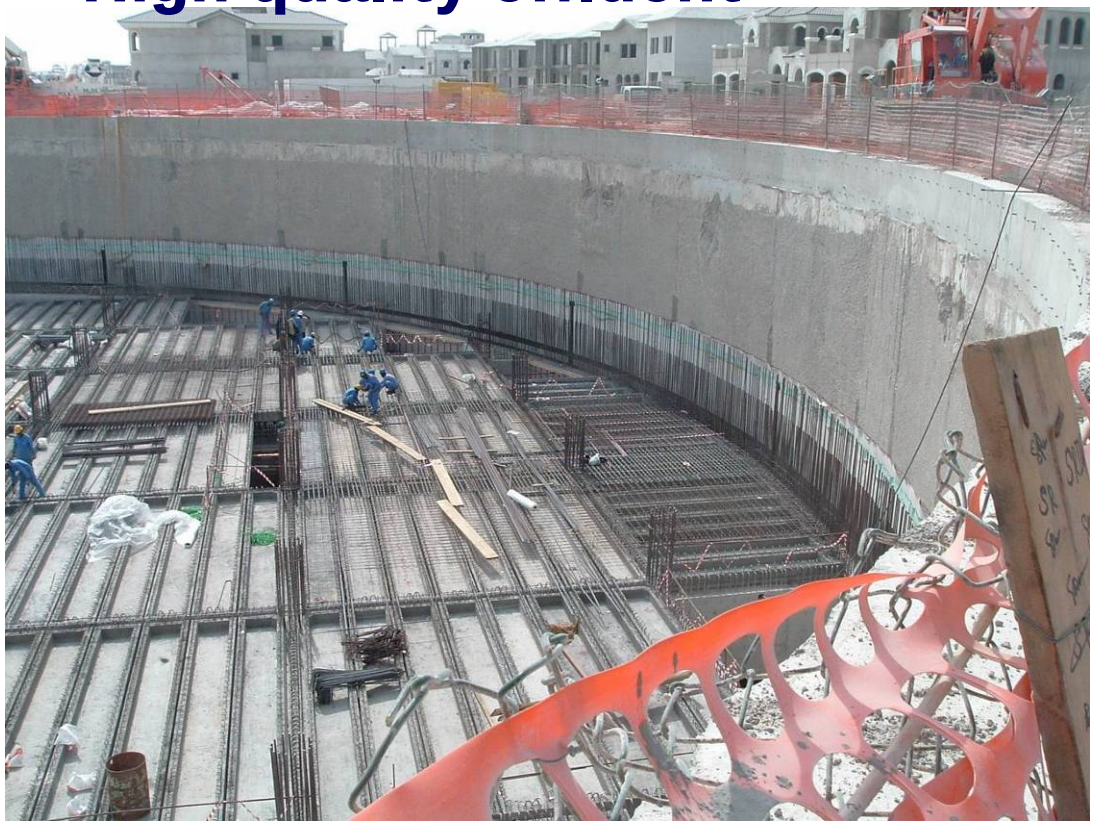
PALM ISLAND

Advanced underground water reuse

- Fully underground 22,000 m^3/d
- No odour or noise
- High quality effluent



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EMAAR THE GREENS AND EMIRATES HILLS

Upgrading and retrofitting an existing system

Existing Installation

- Designed to cater for The Greens community housing only, with a capacity of 3,000m3/day
- Utilises Extended Aeration Activated Sludge process without tertiary treatment
- Uses online irrigation filters instead of tertiary sand filters
- No odour control system

Specific Client Requirements

- Upgrade capacity of existing plant without operation interruption:
  - 3,000 m3/day to 10,000 m3/day
- Produce high quality TSE suitable for un-restricted irrigation applications
- Odourless and noise free plant
- Low footprint

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DUBAI INVESTMENT PARK
A simple outsourcing example

- The first BOOT sewage treatment plant in the UAE
- Built in modular phases, starting with 100m³/day in 1999
- Ultimate capacity of 40,000m³/day
- Designed to cater for all DIP wastewater requirements
- High quality effluent produced used for irrigation purposes
- Significant ongoing savings to the park, and improved environmental impact

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