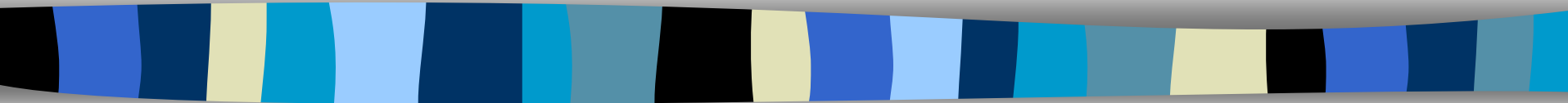
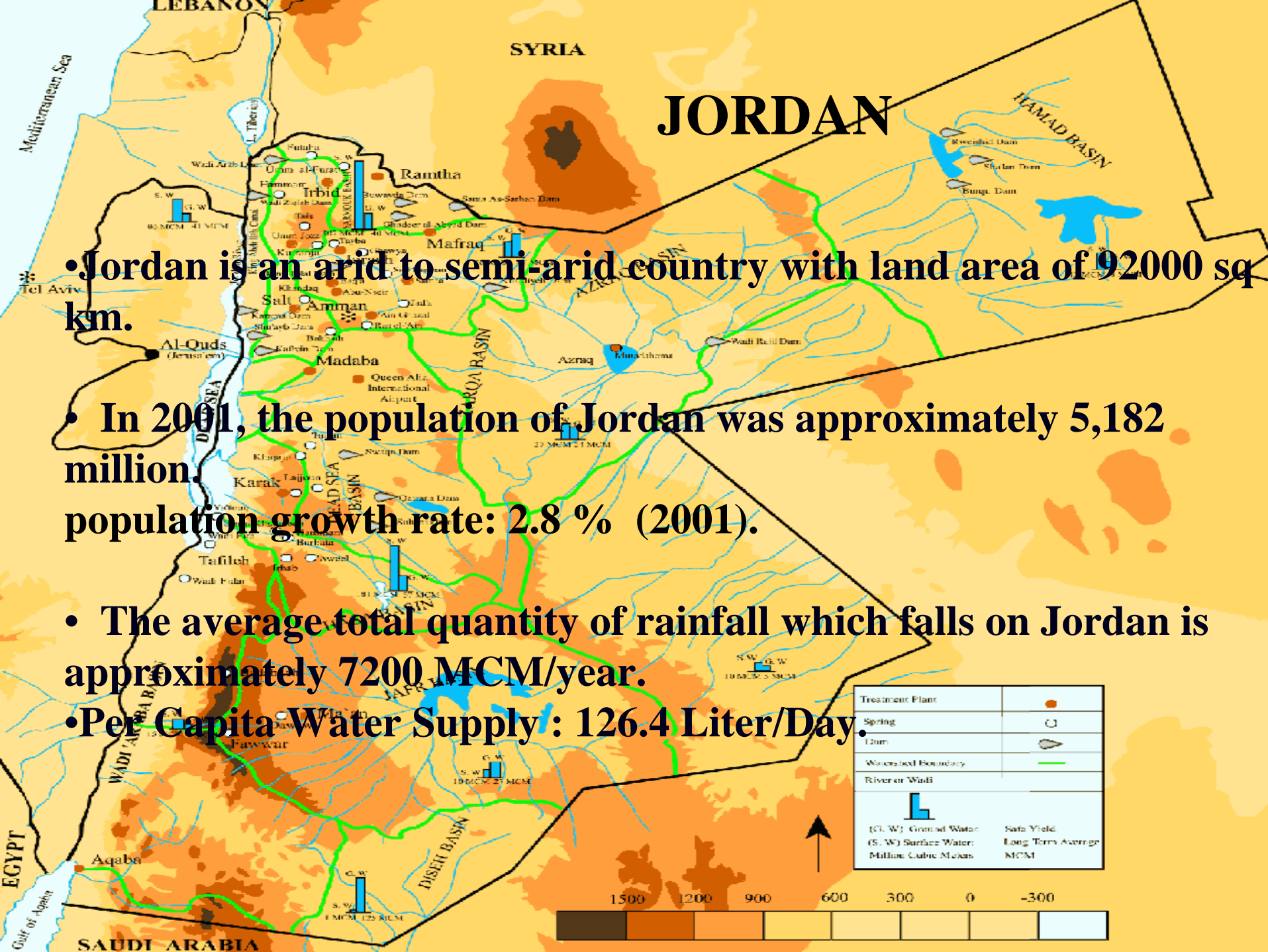


Water Sector Challenges In Jordan



JORDAN

- Jordan is an arid to semi-arid country with land area of 92000 sq km.
- In 2001, the population of Jordan was approximately 5,182 million.
population growth rate: 2.8 % (2001).
- The average total quantity of rainfall which falls on Jordan is approximately 7200 MCM/year.
- Per Capita Water Supply: 126.4 Liter/Day.





Water Situation in Jordan

- Jordan is facing a chronic imbalance in the population-water resources equation
- The total renewable freshwater resources of the country amount to an average of 775 MCM per year
- The per capita of water was 160 cubic meter per annum in 1999 and declines at a rate equal to that of population increase.
- An additional 143 MCM/year is estimated to be available from fossil aquifers. Brackish aquifers are not yet fully explored but at least 50 MCM/year is expected to be accessible for urban uses after desalination
- Due to its water scarcity, water is a precious resource that is of vital importance to the continued socio-economic development of the Kingdom. It requires careful planning and must be used in an equitable way, taking into consideration various water rights, priority for reasonable domestic use, established socio-economic development and other uses such as agriculture, industry and tourism.
- The projected supply, demand and deficit are as follows. Despite the huge investment in the water sector, a considerable water deficit will still be facing Jordan. The water deficit for all uses is projected at 360 MCM/year in the year 2020.

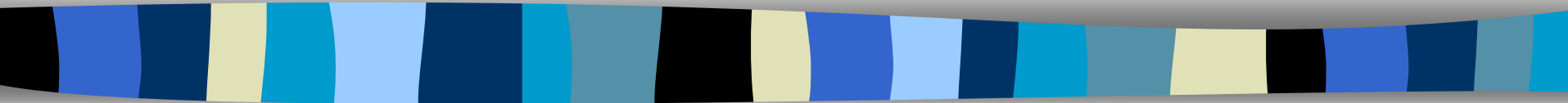


Water Resources

Sources of water use in Jordan in 2000.

- Surface water: 271 MCM
- Ground water: 473 MCM
- Treated wastewater: 72 MCM
- Total Uses: 817 MCM

HASHIMITE KINGDOM OF JORDAN



STRATEGIC ENVIRONMENTAL ASSESSEMENT STUDY- WATER SECTOR

June -2002



SEA?

Is a tool for up-streaming environmental and social issues into development planning, decision-making, and implementation processes at the strategic level.



SEA - Water Sector Purpose:

- Review water sector investment programs in Jordan to develop a strategic perspective of water related environmental issues.
- Identify policy, regulatory, and institutional mitigation measures to assure environmental protection of water resources and management on sustainable basis



STRATEGIC ENVIRONMENTAL ASSESSMENT OBJECTIVE

- To identify issues in advance that may require further actions or coordination for meeting future project requirements related to environmental assessments and safeguard policies.



Jordan's Water Sector: Challenges and Responses

- High population growth rate including the influx of displaced persons
- Expansion of the cities and demand for water and sanitation services
- Limited renewable water resources, exacerbated by frequent drought
- Degrading water quality
- Less than expected efficiency of water delivery services
- Less than expected cost recovery for services provided
- Insufficient tariffs to cover real water costs particularly in the irrigation sector
- Excessive groundwater pumping and increased pollution
- Competing sectoral and economic interests for limited water, particularly between domestic and irrigated agriculture use.
- Loss of biodiversity due water scarcity and frequent drought
- General social, economic and environmental impacts of water scarcity



Water strategy focus on:

- Development of water resources including reclaiming wastewater, use of brackish water, and consideration of non conventional sources such as desalination
- Enhance integrated management of sustainable sources
- Improved institutional organization and legislation
- Pursuit of shared water resources within the region
- Enhanced public awareness, monitoring, and reporting to promote conservation and reuse
- Improved performance efficiency in utilities and human resources
- Increased participation of private sector in water resources management
- Recognition of health standards for water quality
- Research and development of improved technologies and data analysis



Proposed water intervention:

- **The MWI has prepared a document entitled " Water Sector Planning and Associated Investment Program,2002-2011". This document identifies projects in categories related to water supply, water demand management, strategic planning and management, and institutional reform.**



Investment Program,2002-2011: Goals

- Unification of water sector projects into one document
- Creation of uniform projects baseline
- Schedule projects based on multiple scenarios
- Identify a role for private sector participation
- Identify least-cost solutions for development projects.

Jordan Water Strategy : Potential issues

Water resource development (1)

Intervention	Potential strategic issues
Rehabilitation of Amman distribution network	Routine Construction
Zai alla Der water treatment expansion	Routine Construction
Amman Disi Rum Aquifer and Conveyer	water body Transboundary Right of way Indigenous people Biodiversity
Hasa and Wala & Myjeb Wadis reservoir	saftey Dams Biodiversity
Zarqa / Wastewater Amman Treatment	Wastewater disposal and reuse Routine construction
Wadi zara Ma'en –Hisban supply and treatment	Wastewater disposal and reuse biodiversity

Jordan Water Strategy : Potential issues

Water resource development (2)

Intervention	Potential strategic issues
Wehdeh reservoir	International water body saftey Dam Resettlement Biodiversity
Wadi araba aquifer invistigation	Safe yield International water body
ground water desalination Brakish	Brine effluent disposal
Sea water desalination	International water body Brine effluent disposal biodiversity
Marginal water use in the JV	Biodiversity quality Wate
Transfer JV water to karama dam	biodiversity

Jordan Water Strategy : Potential issues

Water demand management

Intervention	Potential strategic issues
Tarrif increases to recover O&M	Economic (ability to pay)
New irrigation methods use efficiency	
Groundwater increasing and enforcement	
New building codes with water savings fixture	economics
Customs exemptions on water saving device	
Conservation and public awareness	

Jordan Water Strategy : Potential issues

Strategic planning & management

Intervention	Potential strategic issues
National water master plan	
Amman water and wastewater management contract	
Water information system analytical tools	
UFW programs	
5—year plan for JVA	
Demand management program	economic
National water master plan	
Supply augmentation programs	economic
Increased PSP in water and WW operation	
Increased public awareness	



Jordan Water Strategy : Potential issues

institutional reform

Intervention	Potential strategic issues
Water agencies restructured	
Water quality improvement and conservation	economic
Operations and management support	
Program Management Unit established	
Human resources development.	



Jordan water strategy: Alternatives

- Sectoral water re-allocation
- Water Tariffs
- Use of non-conventional water sources
 1. water importation from outside the country
 2. Desalination of brakish water
 3. Desalination of sea water
- Issues:
 1. Water security
 2. High cost
 3. Socio –economic assessment is needed



Jordan water strategy: Mitigation Measures

■ Conservation measures

1. Improving efficiency of irrigation use
2. Reducing UFW including leakage and financial billings
3. Economic pricing of water including polluter pays principles

■ Sustainable supply measures

1. Effective allocation of existing renewable water supplies
2. Maximizing wastewater reuse
3. Increased brackish water treatment and reuse
4. Reducing groundwater pumping to sustainable level
5. Use of drainage water



Jordan water strategy: Other Issues

- Institutional Capacity
- Environmental Monitoring and Enforcement
- Human resources and training need
- Involvement of PS
- Role of NGOs
- Public consultation



Next Steps

■ Near Term

1. Seminars and Training on the Environmental Issues
2. Subjects should include elements of environment analysis
3. Environmental Training is advised in all water related organizations

■ Longer Term

1. EIAs and related social assessment should be routinely carried out for all indicated water investment projects to assure environmental protection and sustainable water resource management.