

TOWARDS THE APPLICATION OF ENVIRONMENTAL STATISTICS IN THE KINGDOM OF BAHRAIN

Overview on Waste Water Related Environmental Indicators

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Presentation Outline:

-Introduction.

-Water Management In Bahrain and the Need of Environmental Statistics.

-Overview on Water and waste water Related Environmental Indicators.

-Conclusion

Introduction

- **The Environmental Degradation, and The continuous Stresses on Eco-systems During the past Three Decades.**
- **Growing awareness and application of Sustainable Development Concept.**
- **Forced Governments to Monitor the State of the Environment and detect the changes in its condition.**
- **The Env. Indicators proved to an necessary tools help in monitoring the trends towards sustainable future.**
- **In year 2000, Kingdom of Bahrain, started adding some of the Env. Statistics**

Water Management In Bahrain and the Need of Environmental Statistics.

- Over Thirty Island, has an Arid to Extremely Arid Climate.**
- Prior to 1925, Population depends entirely on the land and offshore fresh water naturally flowing springs (100 MM³).**
- In early 1930's the mechanized well drilling and abstraction of the ground water was introduced.**
- In the past 50 years, while the agriculture have fluctuated around the 100 Mm³/y.**
- the municipal water consumption has increased substantially from about 5 Mm³/y in 1952 to about 47 Mm³/y in 1980 as a reflection of rapid growth.**
- In order to conserve the scarce water resources, The government in 1974 introduce non-conventional sources of water by constructing desalination plant. More plants were added subsequently and continue to be added.**

Continue/ Water Management

- The First Sewage Treatment Plant was built in eighties to meet the agricultural demand.**
- TSE is used more and more in order to reduce the withdrawal from the aquifer.**
- The present contribution of TSE is about 14 Mm³/y, and with expansion of the existing plant TSE expected to reach 60 Mm³/y by 2005 and 72 Mm³/y by 2008.**
- The industrial sector relies mainly on desalination plants (10 Mm³/y).**
- The water deficit estimated for about 110 Mm³/y in year 2000.**
- Water situation in Bahrain is critically moving to jeopardizing process due to the abstraction from aquifer, absence of market mechanism, and lack of management.**

Aims of Water related Environmental indicators

Adopting Water related Environmental indicators in water management process in Kingdom of Bahrain could help on the followings:

- To support priority setting, by determining main factors that cause pressure on the water related environment;**
- To supply policy-makers with information on the state of water environment;**
- To control the impacts of policy responses of water management.**

Water Related Environmental Statistics (Indicators)

- **The risk of wars because of water.**
- **Small part of the world's population have the access to clean drinking waters.**
- **In Areas with high population density, concentrated industrial activity, and intensive agriculture the human activities affect the available water resources and water quality.**

The key targets for the selected water related Env. Indicators:

- **The prevention of over-exploitation of ground water and surface water for drinking water or industrial or other purposes;**
- **The prevention of pollution of ground water from diffuse sources;**
- **And a better ecological quality of surface and marine water.**

Overview on Water and waste water Related Environmental Indicators

Sectors/ Driving forces	Indicator	* DPSIR	Source of Indicator	The availability in Bahrain	Remarks
Resource Depletion	Water Consumption	P	Eurostat	Available	
Agriculture	Irrigated area as %	D		Available	
Dispersion of toxic chemicals	Index of heavy metals emissions to water	P		Not-available	
Urban environmental problem	Non-treated waste water	P		Not-available	available with some institutions
Water Pollution	Nutrient use (Nitrogen +phosphorous)	S	Eurostat	Not-available	available with some institutions
	Ground Water Abstraction	P		available	
	Pesticides use	P		Not-available	available with some institutions
	Nitrogen quantity used	P		Not-available	available with some institutions
	Water Treated/Collected	R		Available	
	Emission of organics as BOD	P		Not-available	

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Overview on Water and waste water Related Environmental Indicators

Water Quantity	Water Balance	S	EEA	Not-available	available with some institutions
	Water use by sectors	D-P		Available	
	Irrigation water use	D-P		Available	
	Public water supply	D-P		Available	
	Water Price	R		Not-available	Available with the related Authority
Eutrophication	Nitrogen Source	P	EEA	Not-available	
	Phosphorous source	P			
	Nitrogen Balance	P			
	Status of Nitrate in ground water	S			
	Urban waste water treatment	R		Available	
	consumption of phosphorous in detergent per capita	P		Not-available	

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Overview on Water and waste water Related Environmental Indicators

Waste	Sludge from Waste water treatment	P-R	EEA	Not-available	Available with the related Authority
	Continents of sewage sludge	P-R			
Fresh water resources	Intensity of use of water resources	P		Not-available	Available with the related Authority
Fresh water quality	Waste water treatment connection	R		Not-available	

Conclusion

The Experience of kingdom of Bahrain on application of water related environment indicators shows that environmental indicators are effective and suitable tools for monitoring and assessing the environmental progress and measuring the environmental performance. However, the current situation with regard to this field shows significant gaps between the needs and what are available, required efforts from all concerned parties in order to bridge the gaps, these efforts could be summaries as the followings:

- **Improve the quality and comparability of existing data;**
- **Further concepts and estimation methods need to be developed;**
- **Other sectoral water related indicators need to be covered (Tourism, Industry etc.).**
- **Strength the cooperation between national institutions to develop work;**
- **Link the indicators more closely to the national goals,**
- **and the international commitments.**