

# WATER STRATEGY FOR JORDAN

## Background

1. The population pressure on the water resources of Jordan has never been as intense as it is today. Measured by the per capita share of indigenous renewable water resources of 175 m<sup>3</sup> in 1996, and an average share of 0.1 hectare per capita of rain fed agricultural land, the country can hardly loope for a balance in the trade of food commodities, and can afford to allocate only a modest annual quantity of municipal water to its population that averaged in 1996 a share of 57 m<sup>3</sup> per capita (156 liters per cap per day). The deficit in the foreign trade balance that year ran at \$ 475 per capita, of which food trade deficit accounted for \$95 per the renewable freshwater resources by more than 20%. After the year 2005, freshwater resources will be fully utilized and there remain no more known resources within the country to develop.
2. The population increase of the country has not been normal, nor has the natural growth rate been sustainable. Jordan has hosted several waves of refugees, displaced persons and returnees as a result of the prolonged conflict in the Middle East. The population centers sprang at locations distant from water resources. The result has been a high cost of projects for municipal water supply and wastewater collection and disposal, and another high annual cost for their operation and maintenance, of which energy is responsible for 55%. Additionally, the toxicity index as measured by the pollution is high compared to other countries in the region.
3. Water and energy are twins; sweet water is generated from salty waters with energy inputs, and energy is generated from water falls. Jordan is almost void of indigenous energy resources, is below the water poverty line, and is managing a fragile environment.
4. The reaction to the abrupt surges in population levels, water wise, has been over-abstraction from groundwater aquifers. This was exacerbated by relaxed controls on drilling operations, and the near absence of controls on licensed abstraction rates. Groundwater aquifers are exploited at more than double their sustainable yield in the average.
5. The inhabited productive area of the country does not exceed 6% of its total area, and borders the Badia to the east, and the Jordan Valley to the west. Both regions are semi-arid and agriculture is possible in them only through irrigation. The environment of the country is fragile, and the protection against desertification requires sustainability of agriculture.
6. The per capita share of the GDP in 1996 did not exceed the equivalent of \$1,634, which was less than its level of \$1,775 in 1980. The country suffered setbacks in its economic performance—due to regional and international economic downturns, and as such incurred high external debt that amounted to the equivalent of \$2,189 per capita in 1990. It had to undergo economic structural adjustment with austerity measures. The external debt level was brought down to \$1,632 per capita in 1996.
7. A Peace Treaty was concluded between Jordan and Israel in October of 1994 by which the water dispute has been all but resolved. Water projects were envisaged, and their implementation will slightly relieve the population - resources imbalance. Still, the hoped-for economic development boom has not been realized.
8. The marginal cost of water is high by world standards. The investment portfolios for water and wastewater projects are high and will be on the rise. Rehabilitation of old water networks is needed and is highly challenging both technically and financially. Additional water resources that can be mobilized are modest. The current per capita share of the GDP does not allow full cost recovery before it is drastically improved.

9. Cognizant of the above, the Jordanian Government has adopted the following water strategy, and will supplement it with a set of policies and measures to help achieve its objectives.

## **The Water Strategy**

### **On Resource Development:**

10. Water is a national resource and shall be valued as such at all times. A comprehensive national water data bank will be established and kept at the Ministry of Water and Irrigation, and shall be supported by a decision support unit. It will be supported by a program of monitoring and a system of data collection, entry, updating, processing and dissemination of information, and will be designed to become a terminal in a regional data bank setup.

11. The full potential of surface water and groundwater shall be tapped to the extent permissible by economic feasibility, and by social and environmental impacts. Investigation works of deep aquifers shall be conducted to support development planning. The interactive use of ground and surface water with different qualities shall be considered. Assessment of the available and potential resources shall be conducted periodically.

12. Wastewater shall not be managed as "waste". It shall be collected and treated to standards that allow its reuse in unrestricted agriculture and other non-domestic purposes, including groundwater recharge. Appropriate wastewater treatment technologies shall be adopted with due consideration to economy in energy consumption, and quality assurance of the effluent for use in unrestricted agriculture. Consideration shall be given to blending of the treated effluent with fresher water for appropriate reuse.

13. Marginal quality water and brackish water sources shall be enlisted to support irrigated agriculture. They shall be listed, along with sea water for desalination, to produce additional water for municipal, industrial and commercial consumption. Technology transfer and the findings of advanced research in genetic engineering shall be introduced to the extent possible for this purpose.

14. A far sighted plan shall be formulated for the development of resources, and a revolving five- year plan shall be extracted from it and updated as necessary. The revolving plan shall be compatible with those formulated for the other sectors of the economy. A parallel investment plan shall accompany the development plan.

15. The priority criterion for project implementation, and for additional water allocation, shall be based on economic, social and environmental considerations. A "critical path" shall be established for the allocation of each new source of water. Consideration shall be given to the sustainability of the allocation in the light of the national water balance situation and the economic, social and environmental opportunity cost of forgone alternative uses of water.

16. First priority will be given to allocation of the basic human needs; as such, first priority is given to allocation of a modest share of 100 liters per capita per day to domestic water supplies. Expensive additional water has municipal purposes as a first priority in allocation, followed by tourism and industrial purposes.

### **On Resource Management:**

17. Priority is given to the sustainability of use of the previously developed resources including resources mobilized for irrigated agriculture in the Jordan Valley and other established uses. Special care shall be given to protection against pollution, quality degradation and depletion.

18. Mining of renewable groundwater aquifers shall be checked, controlled, and reduced to sustainable extraction rates. Mining of fossil aquifers shall be planned and carefully implemented.

19. Resource management shall continually aim at achieving the highest possible efficiency in the conveyance, distribution, application and use. It shall adopt a dual approach of demand management and supply management. Tools of advanced technology shall be adopted to enhance the resource management capabilities.

20. A dynamic regime of demand and supply shall be instated and updated. Minimum cost of operation and maintenance shall be targeted. The cost of production of future industrial, commercial, tourism and agricultural projects shall be measured also in terms of their requirements of units of water flow.

21. Interactive use of multiple resources shall be targeted to maximize the usable flows, and maximize the net benefit from the use of a unit flow of water.

22. Human resources development shall occupy an advanced rank in the priority scale. Continuous education, on-the-job training and overseas training programs shall be organized and implemented. Over-employment shall be trimmed to reach optimum employment levels compatible with efficient management.

23. Management of waste water shall receive attention with due regard to public health standards. Industrial wastewater shall be carefully watched to avoid degrading the quality of the effluent of wastewater treatment plants destined for reuse.

### **On Legislation and Institutional Set-Up:**

24. Periodically review institutional arrangements and legislation in effect to appraise adequacy of the status quo through the changing conditions and times. Institutional restructuring shall be made to match the changing needs.

25. Update legislation whenever necessary to respond to emerging needs including the needs for improving performance efficiency. Laws in effect shall be enforced with due diligence.

26. Introduce and enhance the participation of stakeholders, and legislate for their involvement wherever necessary.

27. Assure cooperation and coordination among public and private entities involved in water development and management.

### **On Shared Water Resources:**

28. The rightful shares of the Kingdom shall be defended and protected through bilateral and multilateral contacts, negotiations, and agreements. Peace water and wastewater projects, including the scheme for the development of the Jordan Rift Valley, shall be accorded special attention for construction, operation and maintenance.

29. Due respect will be given to the provisions of international law as applicable to water sharing, protection and conservation, and those applicable to territorial waters.

30. Bilateral and multilateral cooperation with neighboring states shall be pursued, and regional cooperation shall be advocated, preferably within the provisions of a Regional Water Charter.

### **On Public Awareness:**

31. The public shall be educated through various means about the value of water for them and the wellbeing of the country for the sustainability of life, and for economic and social development.

32. Challenges in the water sector are to be faced not only by the water administration, but also by the public. The roles in water conservation to be played by the different sectors of society shall be defined and assigned.

33. Facts about water in Jordan shall be disseminated along with the cost incurred to provide service, and the mounting pressure of population on the water resources. Introduction, adoption and use of water-saving and recycling systems and devices shall be promoted.

34. Economic measures shall be adopted to reinforce public awareness. Such measures as demand management and efficiency improvements within supply management techniques shall be employed.

### **On Performance:**

35. Performance efficiency of the water and wastewater systems and the management thereof shall be monitored and rated, and improvements on performance shall be introduced with due consideration to resource economics.

36. Human resource performance shall be continually appraised to upgrade capabilities and sustain excellence. Incentives for excellence shall be introduced in compliance with the needs for dedication.

### **On Health Standards :**

37. Setting and enforcing national health standards shall be enhanced and sustained, especially in regards to municipal water supply.

38. Concerns for public health and the health of workers shall be a focus in the programs of reuse of treated wastewater.

39. Laboratories for controls shall be maintained and properly equipped.

### **On Private Sector Participation:**

40. The role of the private sector shall be expanded. Management contracts, concessions and other forms of private sector participation in water utilities shall be considered and adopted as appropriate.

41. The concepts of BOT/BOO shall be entertained, and the impact of such concepts on the consumers shall be continually assessed, and negative impacts mitigated.

42. The private sector role in irrigated agriculture shall also be encouraged and expanded. Emphasis shall be placed on the social benefits in conjunction with private investments.

### **On Financing:**

43. Recovery of the cost of utilities and the provision of services shall be targeted. Recovery of operation and maintenance cost shall be a standard practice. Capital cost recovery shall be carefully approached. The role of water tariffs shall be considered as a tool to attract private investment in water projects.

44. Cost recovery shall be linked to the average per capita share of the GDP and its level. It shall also be connected to the cost of living and the family basket of consumption. However, profitable undertakings in industry, tourism, commerce and agriculture shall be made to pay the fair water cost.

45. Until the cost recovery is full, and the national savings reach levels capable of domestic financing of development projects, project financing will depend on concessionary loans, private borrowing and/ or BOO and EOT arrangements.

**On Research and Development:**

46. Efforts will be made to encourage and enhance indigenous water research targeted at the improvement of resource management, enhancing the understanding resource economics, and adapting the research findings in other environments to local conditions, including but not limited to, crop water requirements, minimizing evaporation and controlling evapo-transpiration and the like.

47. Emphasis will be placed on liaison with international institution to keep abreast of modern technological advances, and to facilitate technology transfer and adaptation.