

THE HASHEMITE KINGDOM OF JORDAN

Ministry of Water & Irrigation

Policy Paper No. 2

Irrigation Water Policy

Amman, Jordan
February, 1998

FOREWORD

A Water Strategy for Jordan was prepared by the Minister of Water and Irrigation and was debated by the staff of the Ministry, the Jordan Valley Authority (JVA) and the Water Authority (WAJ). It was adopted by a joint session of the Board of Directors of both the JVA and WAJ.

The Strategy was then debated and approved by the Ministerial Development Council of the Government, and was forwarded to the Council of Ministers who debated the same and approved it on 29 April 1997. Under this Strategy, a series of policies are to be formulated by the Ministry and its two authorities and adopted by the competent bodies of Government.

The first such policy addressed the Water Utility. It was prepared by the Minister and his staff. The Board of Directors of WAJ debated and approved it. The document was then forwarded to the Prime Minister for consideration by the Ministerial Development Council. It was reviewed and debated by the Council and was approved on 23 July 1997, and the Council of Ministers approved it on 26 July 1997.

The second policy is the subject of this volume. It addresses the Irrigation Water and the Government policy in its regard. The policy has been formulated by the Minister and his staff, debated and approved by the Board of Directors of the JVA, and was subsequently forwarded to the Prime Minister for consideration by the Ministerial Development Council. The Council debated the document on 7 January and 11 February 1998, and forwarded it to the Council of Ministers who debated and approved it on 14 February 1998.

The Irrigation Water policy addresses most of the issues related to the irrigation water supply, and spells out the Government policy towards them. It is understood that, while the goals of the Strategy are long term goals, those of the policy are not as permanent, and would change with changing times, circumstances and relevant factors.

It is hoped that the various water policies would serve the purposes for which they were formulated for a period of no less than five years. They, nonetheless, respond to an urgent need at this time, and serve to assist in the clarity of vision and the transparency of government intentions regarding the various composites of the water sector.

Dr. Munther Haddadin

(signed)

Minister of Water and Irrigation

The Hashemite Kingdom of Jordan

Prime Ministry

Number: 57 - 11 - 1 - 1271

Date: February 18th 1998

His Excellency the Minister of Water and Irrigation

I refer to your letter no. MWI/6/13/2/77 dated February 1st, 1998.

The Council of Ministers reviewed your Excellency's letter and the attached fourth draft of the Irrigation Water Policy document, and decided in its session of February 14th 1998 based on the recommendation of the Ministerial Development Council in its session of February 9th 1998, the approval of the Policy Paper on Irrigation Water in the form received from the Council.

Respectfully,

The Prime Minister
(signed)

cc: H.E. Minister of Agriculture
Economic Advisor
Economic Department

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IRRIGATION WATER POLICY

Background

The Hashemite Kingdom of Jordan has been facing a chronic imbalance in the population - water resources equation, which imbalance is manifested by a substantial imbalance in the foreign trade in food commodities (\$110 per capita in 1997), and by rationing of municipal water that is serviced to the population twice a week. The total renewable freshwater resources of the country amount to an average of 750 MCM per year. The population of 1997 is around 4.4 million people, growing at an annual rate of 3.6%. The per capita share was 160 cubic meter per annum in 1997 and declines at a rate equal to that of the population increase.

The production of food in semi arid countries like Jordan is hardly possible without irrigation. The irrigated areas are located in the Jordan Valley (some 33,000 hectares), and in the Plateau (some 44,100 hectares). Some 400,000 hectares are fit for dry land farming, but it is practiced on half of this potential because of the insecurity associated with erratic rainfall and other reasons. Irrigated agriculture, however, provides most of the agricultural production in the Kingdom and offers the higher percentage of agricultural jobs and other jobs in support services.

Because of the huge imbalance in the population - water resources equation, the treated wastewater effluent is added to the water stock for use in irrigated agriculture. It will constitute a substantial percentage of the irrigation water in future years.

Development of Irrigated Agriculture

Irrigated agriculture has been practiced in the Jordan Valley since the dawn of human civilization. Archaeological remains tell of the construction of water storage facilities and irrigation networks by the Nabateans before the Christian era in the Jordan Rift Valley and elsewhere. Irrigation was developed in the Rift Valley by channeling the uncontrolled perennial flow of side wadis and rivers through well developed water conveyance systems and irrigation techniques.

Formal development and a rebirth of irrigated agriculture in Jordan started in the early fifties in the Zarqa Triangle with irrigation from the uncontrolled flow of the Zarqa River. The Deir Alla agricultural experimental station was established at that time. The more serious effort was planned in 1954-1955, and implementation commenced with grant assistance from the United States towards the East Ghor Canal Project, renamed in 1986 as the King Abdullah Canal Project. The Project was implemented between 1959 and 1966 with USAID grant funds, and between 1968 - 1970 with support from the Kuwait Fund, between 1975 and 1980 with loan funds from USAID, IDA and KFW, and between 1983 and 1988 with loan funds from KFW, and, south of the Dead Sea with loan funds from the Kuwait Fund, the Saudi Fund and the Government of Italy. The older parts of the project were upgraded by conversion of surface

canal networks to pressure pipe distribution networks between 1986 and 1996 with loan funds from the Arab Fund and the Government of Japan.

Five storage dams have been built in the process; they serve as important feeders to the King Abdullah Canal. The Canal itself has been rehabilitated between 1994 and 1998 with funds from the EIIB.

The total area thus developed in the Jordan Valley, under the responsibility and supervision of successive Government agencies, is about 33,000 hectares. About 8,000 more hectares of arable lands remain to be irrigated north of the Dead Sea, and some 2,000 hectares south of the Dead Sea. A potential exists for irrigated agriculture in Wadi Araba with groundwater sources and surface water sources.

More development has taken place on the plateau using ground water sources. The private sector was behind all that development, with the exception of small and scattered irrigation projects supervised by Government agencies in the 1960's. The total area thus irrigated amounts to about 44, 1 00 hectares.

The Policy

Objective

The following policy statements detail the long term objectives outlined in the Water Strategy. It is to be noted that this policy addresses the irrigation water and does not extend to the issues of irrigated agriculture. It addresses in more detail water related issues of resource development: agricultural use, resource management, the imperative of technology transfer, water quality, efficiency, cost recovery, management and other issues. Linkages with energy and the environment are accorded a separate chapter. This policy is compatible with the Water Strategy and is in conformity with its long-term objectives. Most of the provisions of this policy are being exercised, and some others are needed to maximize the benefit from irrigation water, and improve the social returns from its uses.

While the policy is national, its implementation is vested in the respective Government agencies as stipulated by applicable laws. Of particular importance is the role of the Ministry of Water and Irrigation and the Ministry of Agriculture.

On the Role of Irrigated Agriculture:

1. Irrigated agriculture is a trade of Jordanian ancestry practiced in the Jordan Rift Valley and on its escarpment. Archaeological irrigation networks and facilities are standing evidence. Irrigated agriculture contributes to the production of food, and provides job opportunities in direct and indirect agricultural employment and supporting services. It also enhances the environment and helps arrest desertification.

On Sustainability of Irrigated Agriculture:

2. Existing areas of irrigated agriculture shall be accorded the chances for sustainability. No diversion of its waters to other uses shall be allowed without providing a replacement source fit for agricultural use unrestricted by health and public health considerations, and unduly hampered by chemical constraints.
3. Sustainability of agriculture shall be compromised only if it threatens the sustainability of use of ground water resources. Potential pollution of underlying aquifers or the depletion thereof are among the reasons that can prompt such compromise.
4. Irrigation water sources shall be protected against pollution which degrades water quality, is hazardous to the environmental integrity of soils, or can endanger animal health, particularly livestock. In this regard the adoption of biological control methods shall be promoted in lieu of the use of pesticides. Where desalination of brackish water is practiced, particular attention will be paid to the disposal of brine; especially when such practice is done within the catchment area of dams.
5. Close co-ordination shall be maintained with the Ministry of Agriculture and its research and development arm and with other related institutions with the aim of enhancing on-farm irrigation efficiencies and maximizing the agricultural output of a unit of land area per unit flow of irrigation water.
6. Surplus surface water during the wet season shall be provided to farmers through the irrigation networks free of charge to leach soils; especially those farms that are irrigated with treated wastewater in the dry season.
7. Drainage networks shall be installed in irrigated areas where natural drainage is not sufficient to serve the purpose. Disposal of drainage water shall be made in an environmentally friendly manner. Maintenance of such networks shall be accorded attention similar to that paid to the maintenance of irrigation networks.

On Resource Development and Use:

8. For irrigation purposes, and in light of the tight water situation, wastewater is considered a resource and cannot be treated as "waste." It shall be collected and treated to standards that allow its reuse in irrigation unrestricted by health and public health considerations or unduly constrained by high salinity contents.
9. In remote sparsely populated areas, and after satisfying the local municipal and industrial needs from unallocated water resources, water resources shall be allocated to agricultural production including livestock. Such development shall be planned and implemented in an integrated social and economic fashion in order that communities can be formed, settled and developed.

10. Maximum use shall be made of rainfall for crop production, and supplementary irrigation shall be employed to maximize production including increasing cropping intensities.
11. The use of brackish water in irrigation shall be pursued with care. Soil salinity resulting therefrom shall be monitored and its buildup managed and mitigated. Land shall be managed with the attention it deserves as a non-renewable resource.
12. A revolving development plan for water resources, including irrigation resources, shall be adopted. The use of modern techniques made available by software development will be employed for the purpose.

On Technology Transfer and Adaptation:

13. Despite the high percentage of agricultural water uses, the quantities used fall short of the needs. Higher agricultural yields shall be targeted and the transfer of advanced technology shall be endorsed and encouraged. The transformation of traditional irrigation and farming practices into modern methods shall be endorsed and promoted.
14. Such advanced methods as drip irrigation, spray irrigation, micro-sprinkler irrigation are favored over less efficient methods. Local manufacturing of these equipment will be encouraged.
15. Irrigation water conveyance and distribution shall be made through the installation of pressure pipe networks. Maximum use shall be made of gravity generated pressures to operate these systems.
16. Operation of the irrigation network will be improved to have the water filling the network for 24 hours. Such operation will enhance the benefits that accrue from drip irrigation. While in a rotation system the drip irrigation pipes act as on farm conveyor, the 24 hours operation has the advantage of operating the drippers as designed.
17. Plant varieties developed as a result of genetic engineering research shall be favored for introduction into Jordan's markets. Maximizing resistance to pests, salinity and adverse conditions are features that are needed. Additionally, the maximization of crop yields is another beneficial feature of such varieties.
18. Leasing of Government lands with permits to use water resources not earmarked for higher priority uses, especially in remote areas, shall be encouraged with the view of introducing advanced agricultural practices. Co-operation with advanced countries through technical co-operation shall be sought and promoted to advance technology transfer and adaptation.

On Farm Water Management:

19. Crop water requirements in the various micro-climatic zones of the country shall be experimentally determined taking into consideration the prevailing different water qualities.
20. Farmers shall be encouraged to monitor soil moisture on their farms to determine the timing for irrigation water application. The rate and duration of the application shall be adjusted to match the crop water requirements.
21. In as much as is practical, investments on-the farm to provide over-night water storage facilities shall be discouraged through providing a continuous supply of irrigation water in the distribution networks.
22. Along with water management, farmers should be able to manage such other agricultural inputs as chemical fertilizers with the irrigation water.
23. Night application of irrigation water, especially in the dry season, shall be encouraged to reduce evaporation losses.
24. Automation of on farm irrigation networks and their operation will be encouraged and training of farmers on advanced water management techniques shall be sought by co-operating with the research and extension service of the Ministry of Agriculture. Co-operation with other countries in this regard and in technology transfer in general shall be pursued.
25. Programs shall be prepared to raise the public and farmers' awareness of the availability of irrigation water, its rational and economic use and on the impacts of its quality.

On Irrigation Water Quality:

26. Irrigation water quality shall be monitored through sampling at the sources and from the conveyance and distribution network. Farmers shall be alerted to any degradation of water quality. This is important so that they can plan the use of such water for the suitable farming purposes.
27. Where marginal quality water, such as treated wastewater effluent, is a source of irrigation water, care should be taken, to the maximum extent possible, to have the quality improved to standards that allow its use for unrestricted irrigation. This can be achieved through blending with fresher water sources.
28. The same applies to the potential use of drainage water or brackish water sources. However, farmers should be appraised of the potential quality of irrigation water so that their choice of crops is made with the necessary background information and knowledge.
29. Soil salinity and water chemical contents are also constraining factors. Where its salinity is combined with water salinity, the environment of the root zone can cause high stress.

Care shall be taken in providing testing services to farmers, and in promoting extension service in such zones where soil salinity and irrigation water salinity produce hostile roots environment.

On Management and Administration:

30. Government agencies have been responsible for the development of water resources in the Jordan Valley and for the construction of the irrigation network. The Jordan Valley Authority (JVA) is the legal successor of these agencies and has been in operation since May 1977. It is the agency amongst them that has lived longest. The JVA is, as the predecessor agencies had been, responsible for the operation and maintenance of irrigation facilities, from the source (dams, rivers, springs) to the destination (farm gate).
31. Piped irrigation networks shall be the standard method of irrigation conveyance and distribution. Where possible, gravity pressure shall provide the heads in the distribution networks. Supplementary pumping shall be used where needed.
32. Irrigation water shall be metered at the farm turn-out. Digital meters shall be installed at each farm unit for volumetric measurement of in-flowing water.
33. Government shall gradually phase-out of the business of irrigation water distribution, as is feasible, as soon as possible.
34. Pilot irrigation areas shall be designated to test the workability of Participatory Irrigation Management (PIM), where farmers will assume the responsibility of water delivery to their farms. When found successful, PIM will be extended to the Jordan Valley irrigation systems.
35. Development of water resources, including groundwater, outside the Jordan valley has been the responsibility of the Water Authority, WAJ which since 1983 has been the successor, among others, of the Natural Resources Authority. Private farmers are allowed, by license and abstraction permit from WAJ, to exploit groundwater for all purposes, including irrigated agriculture. These private farmers operate their irrigation systems, and have introduced advanced irrigation techniques to their operations.
36. Abstraction from all groundwater wells shall be metered, and monitoring of abstraction shall be made periodically to assure conformity with the provisions of the abstraction permits.

On Public Awareness:

37. Public awareness campaigns shall be waged to urge the public to protect water resources against pollution, and to bring home the economic and social value of a unit flow of water.
38. The cost of irrigation water development shall be emphasized, and the importance of protection of structures and utilities against vandalism shall be advocated.

On Water Pricing:

39. Irrigation water shall be managed as an economic commodity that has an immense social value. Like the rest of water resources, irrigation water is a national commodity owned by society at large without prejudice to existing water rights.
40. Agriculture provides service to society in the form of employment, population distribution, provision of food that will otherwise have to be imported, and enhancing the environment. It is for this reason that agriculture enjoys support from society in the form of tax exemptions and subsidies.
41. The water price shall at least cover the cost of operation and maintenance, and, subject to some other economic constraints. It should also recover part of the capital cost of the irrigation water project. The ultimate objective shall be full cost recovery subject to economic, social and political constraints. Due consideration shall be made of any water rights as established by law.
42. Part of the capital cost shall be recovered through the application of a one time charge against irrigation rights. This is applied as a rate per unit area of the irrigated farm. The size of the portion thus recovered shall not be less than half the irrigation network development cost.
43. Differential prices can be applied to irrigation water to account for its quality.

On Regulation and Controls:

44. Planting of crops with high water requirements shall be discouraged. Market forces shall be applied to discourage such plantations.
45. Planting of perennial crops shall be allowed only with permits until such time as the water balance and the operation system show no signs of water stress in any of the dry months.
46. Co-operation with other countries, regional and world-wide, shall be promoted to enhance the marketing potential of Jordanian agricultural commodities and the products of its agro-industries.

On Irrigation Efficiency:

47. Maximum overall irrigation efficiency shall be a standing target. Government agencies in charge of operation and maintenance shall endeavor to approach this target and maintain it.

48. Automation of irrigation networks shall be pursued, and electronic surveillance and monitoring of irrigation networks shall be employed to reduce losses through leakage and breaks.
49. Preventive maintenance of pumps, motors and valves shall be programmed and conducted periodically. Human resources for proper management of maintenance shall be secured to the maximum extent possible.
50. On-farm automation, although the responsibility of farmers, shall be promoted through extension service and demonstration farms.
51. Programs for manpower training to perform duties of irrigation operations, forecasts and scheduling of irrigation service shall be a standing objective.

On Linkages with Energy and the Environment:

52. The use of herbicides that are environmentally friendly shall be encouraged. The savings in evapo-transpiration by unwanted plants is a positive outcome. Similar advantage is gained through the savings in plant nutrition that otherwise will be absorbed by unwanted vegetation.
53. Serious care shall be taken in choosing the technology of wastewater treatments. The treated effluent, considered part of the irrigation water stock, shall be maintained as an environmentally accepted resource that can be safely handled by agricultural labor. It shall not be harmful to wild life or to domesticated animals on the farms.
54. A trade-off shall be made between capital investment, energy requirements for operation, and the losses that will otherwise be incurred in the irrigation water resource. Choice of the optimal configuration shall be based on a thorough analysis of these factors.
55. Maximum use shall be made of the gravity head inherent in the irrigation water sources of the Jordan Rift Valley. Supplementary head shall be generated through pumping interventions to maintain a suitable pressure head at the farm gate.

On Legislation and Institutional Arrangements:

56. Legislation and institutional arrangements for the development and management of irrigation water resources shall be periodically reviewed. Gaps shall be filled, and updating of institutional arrangements with parallel legislation shall be made periodically.
57. The role of government shall be fine-tuned and its involvement reduced over time to regulation and supervision. Involvement of Stakeholders and the private sector in irrigation management and support will be introduced and expanded.
58. The role of the private sector in the development of irrigated agriculture shall be promoted. Care will be taken to monitor and supervise the use of water resources in that regard.

On Shared Water Resources:

59. Shared water resources occur in the Jordan River basin and in ground water resources to the south, east and north, and that are either used for irrigation or are mixed with irrigation water of the Jordan Valley. Priority shall be given to the development and management of shared water resources.
60. The quality and flow rates of water obtained by Jordan shall always be monitored and proper records kept of such data.
61. The establishment of Joint Water Committees to co-operate with neighboring countries over issues affecting other riparians shall be promoted.
62. Regional co-operation will be proposed, promoted and sustained with the neighboring countries with whom Jordan shares international waters.

On Research and Development:

63. Applied research on water topics will be adopted and promoted. Such topics as water economics, resource management, crop water requirement, use of brackish water, irrigation technologies, farming practices, crop yields, moisture storage and the like are among favored topics.
64. Co-operation with specialized centers in the country and outside will be promoted, and raising of funds for this purpose will be supported.
65. Technology transfer and adaptation to local conditions will be a primary target for development activities and for adaptive research.