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ジョルダン在外専門調整員 (水資源開発)

調査結果報告書

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JICA
企画部地域3課



ジョルダン在外専門調整員

調査結果概要報告

(水資源開発)

Mr. Hani Kurdi

業務内容

国際機関、他国援助機関のジョルダン水関連事業に関する実績の把握

REPORT ON MY WORK ACTIVITIES IN JICA JORDAN OFFICE

I started working with Japan International Cooperation Agency " JICA " on August 1st`92, as a research coordinator coordinating JICA`s activities with various Ministries and Institutions especially in the Water Sector.

Previously, I had been working with the Ministry of Water & Irrigation since 1978. My work with JICA is on a renewable annual contract basis.

Briefly listed below are my work contributions to JICA Jordan Office since August 1st`92 until now.

- Research study on Political, Economical, Social (Education, Health, Agriculture,...etc) and Financial issues in Jordan.

The references regarding the above subject were collected from various concerned Ministries and Institutions.

The report contained the political situation in Jordan, the major economic indicators, financial situation " budget and amount allocated for different sectors ", social issues and statistical figures concerning health, education, agriculture,...etc."

The above report covered the period from the year 1987 until the year 1992.

- Collecting and presenting information requested by the Japanese Embassy in the following areas :

- A report on water tariff and water cost in Jordan, for domestic, industrial, and irrigation uses.
- A report on Yarmouk River Basin, which contained development projects and distribution of water resources among the countries sharing the basin "Jordan, Syria, and Israel".
- A report on the present situation of the As Samra Wastewater treatment plant.
- A report on the existing 14 wastewater treatment plants.



1126326 [6]

- A report on the brackish water resources in Jordan with the emphasis on the Azraq Basin.
- Collecting information and presenting documents concerning the organizational chart of the governmental administration in Jordan as well as the organizational chart for some Ministries in Jordan.
- During my work with JICA two missions visited Jordan
 - * WATER HARVESTING MISSION - During September`92.
 - * BRACKISH WATER DESALINIZATION MISSION - During January`93.

My work with the Missions can be summerized as follows :

- Arranging and attending the Missions meetings with concerned bodies.
- Providing the Missions with relevant requested documents regarding the subject.
- Translating related Arabic written documents to English.
- Following up and responding to all matters with concerned bodies and reporting the results to the office.
- Any other related work needed during and after the Mission`s visit.
- In addition to the above, conducting day to day office work and activities as directed and instructed by JICA`s Resident Representative.

WORK EXPECTED TO BE DONE IN THE COMING YEAR

- . Analysis of the five year plan for economic and social development.
- . Analysis of 1993 budget including budget allocations for various sectors.
- . Research on some water resources projects.
- . Report on economic indicators, political and social issues.

- Following up previous missions work by collecting and providing relevant material.
- Arranging and assisting missions coming to Jordan in executing their visits objectives.
- Providing the Japanese Embassy with relevant information regarding various proposed projects.
- Following up questionnaires related to the JICA's completed studies with concerned Ministries & Institutions.
- Assisting the coming experts in different matters.
- Executing day to day office work.

DONOR'S CONTRIBUTIONS TO THE DEVELOPMENT OF WATER SECTOR IN JORDAN

This report is a brief document which overviews the major donor's contributions to the development of the water projects in Jordan. The data and information contained in this report were collected from donor's offices in Jordan, and from reports and issues written about the subject.

The report is organized to show the ongoing, and proposed projects for each donor, the international projects where no donors were identified, the completed projects (mainly irrigation projects) in the Jordan Valley area, and at the end, suggested projects (from my point of view) to enhance the water sector in Jordan.

I *** PROPOSED AND ONGOING PROJECTS

EUROPEAN COMMISSION

A brief description of the projects financed by EC are as follows :

- Wala/Nukheila Dams Study.
 - . Objectives : To conduct technical financial feasibility studies for constructing two dams for water storage in Wala and Nukheila areas.
 - . Duration : 1989 - 1991
 - . Est. Cost : ECU. 2 Millions.

- Rehabilitation of King Abdallah Canal.
 - . Objective : Design specifications for rehabilitation and upgrading of King Abdallah Canal through formulating hydraulic computer model.
 - . Duration : 1989 - 1992
 - . Est. Cost : ECU. 570,000

- Azraq Water Study.
 - . Objective : To assess the groundwater potential and exploitability of the middle and deep aquifer systems to allow for more efficient use of water resources.
 - . Duration : 1990 - 1993
 - . Est. Cost : ECU. 3 Millions.

- Kafraïn Dam Study.
 - . Objective : To study the technical and economic feasibility of increasing the storage capacity of the Kafraïn Dam by raising its height. If feasible, consultant will carry out the design and preparation of tender documents for construction as well as assist with tender evaluation and award of contract.
 - . Duration : 1990 - 1993
 - . Est. Cost : ECU. 450,000

- Hammad/Sirhan Basins.
 - . Objective : To evaluate groundwater resources in the Hammad and Sirhan basins in the eastern parts of the country.
 - . Duration : 1992 - 1995
 - . Est. Cost : ECU. 4 Millions.

- Review Of Water Resources Development.
 - . Objective : Studies to evaluate the conditions and efficiency of existing water supply, facilitate strategies and priorities for future investments in the water sector.
 - . Duration : 1992 - 1993
 - . Est. Cost : ECU. 200,000

- Programme For Water Supply & Wastewater Scheme.
 - . Duration : 1992 -
 - . Est. Cost : ECU. 12 Millions.

- Aqaba Environment.

- . Functions : Policy, Planning & Management.
- . Legislation, Licensing & Standards.
- . Research & Development, Exploration.
- . Duration : 1992 - 1995
- . Est. Cost : ECU. 350,000.

- Various Water Supply Project.

- . Functions : Design, Tender Documents & Construction.
- . Duration : 1992 - 1993
- . Est. Cost : JD. 6 Millions.

FEDERAL REPUBLIC OF GERMANY

* FINANCIAL COOPERATION :

Various irrigation projects in the Jordan Valley have been carried out during the 1980 th. for the near future the German Government is planning to finance the restoration of the North Eastern Ghor irrigation canal as well as two or three not yet specified projects in the sewage and portable water systems in Jordan.

* TECHNICAL COOPERATION :

The following projects are being carried out or have been terminated recently :

- Advisory Services To The Jordan Valley Authority.
 - . Objective : To provide technical assistance in the form of advisory services and training for JVA in fields related to water.
 - . Duration : 1984 - 1993
 - . Donor : GTZ.

- Advisory Services To Water Authority.
 - . Objective : To provide advisory services, training, and technical equipment to the Water Authority.
 - . Duration : 1990 - 1993
 - . Donor : GTZ.

- Qualification Of The Water Resources Studies Division.
 - . Status : To be commenced this year (1993).
 - . Counterpart: Water Authority Of Jordan.

- Advisory Services In The Water Sector.
 - . Status : To be commenced this year (1993).
 - . Counterpart: United Nations Economic & Social Commission for Western Asia (ESCWA).

- Cartography Of Groundwater Resources In Southern Jordan.

. Status : Terminated in 1989.

. Counterpart: Water Authority Of Jordan.

UNITED KINGDOM

* List of projects :

- Water Resources Investigation - QA-DISI.
 - . Objective : To collect information and develop a model for analysis of behavior of the groundwater resources associated with Qa` Disi Basin.
 - . Status : Ongoing.
 - . Donor : ODA.

- WAJ Central Workshops Project.
 - . Objective : To assist Water Authority in the improvement of operation and maintenance of their central workshop facilities.
 - . Status : Proposed.
 - . Donor : O D A.

- King Talal Dam Water Pollution Study.
 - . Objective : To identify the causes of pollution in the reservoir and river system, also to assess the impact downstream, the potential for clean up and control, the need for long term environmental management plan.
 - . Status : Preliminary report was submitted to GOJ.
 - . Donor : O D A.

- Thames - Water Authority Twinning.
 - . Objective : To assist WAJ to enhance its efficiency and better manage its water supply and sanitation system.
 - . Status : A diagnostic study for a twinning arrangement between WAJ and UK water utility was completed.
 - . Donor : ODA.

CANADA

* Canada involved in the following projects :

- Desert's Dams.

. Objective : To identify the potential locations " Rajel, Swaqa, Jordan, and Wadi Ritum " for constructing dams in the desert of Jordan, conduct the feasibility studies and prepare design and tender documents.

. Duration : 1989 - 1991.

. Status : Completed .

. Donor : CIDA.

- Deep Drilling RIG.

. Objective : To assist in deep water drilling rig in Disi aquifer.

. Duration : 1990 - 1991.

. Donor : CIDA.

U N D P

* UNDP is involved in the following projects :

- Water Resources Policies Planning.
 - . Objective : To prepare guidelines for water resources policy and establish computerized water management system.
 - . Duration : 1989 - 1992.

- Strengthening Of National Capacity In Water Resources Planning.
 - . Objective : To establish within the Ministry Of Water & Irrigation the capability of analyzing and evaluating economic, social and environmental inputs of projects, policies and strategies for the water sector.
 - . Duration : 1992 - 1995.
 - . Est. Cost : US.\$ 0.5 Million.

- Protection And Rehabilitation Of Azraq Oasis " Wet Lands Of Azraq - Gef Project ".
 - . Objective : The projects aims are to maintain the environment of the area, protect it from pollution and enhance the living environment of the wild animals and birds within the area.
 - . Duration : 1993 - 1996.
 - . Est. Cost : US.\$ 3.3 Millions.

- Precipitation Enhancement Through Cloud Seeding.
 - . Objective : Transfer cloud seeding technology through training aimed at increasing the annual precipitation rate.
 - . Duration : 1992 - 1994.
 - . Est. Cost : US.\$ 100,000.

USAID

Agreements have been made between USAID and the Government of Jordan to finance the following projects :

- Rehabilitation of " Ain Gazal " As Samra Sewerage plant
- Reducing water losses :
 - . USAID will support the Water Authority in the improvement of its management with the aim of reducing water losses.

II *** Jordan Water/Wastewater International Projects

The source of the following tables are from a report on " Water Management Study For Jordan " issued on August 1992, by (PRIDE - Project In Development & The Environment). In addition to the projects mentioned in Part "I" of this report, the matrix lists other donor agency projects in the water sector as well as the international projects where no donors identified.

JORDAN WATER/WASTE WATER--INTERNATIONAL PROJECTS

FUNCTIONS:

PP = Policy, Planning and Management
 LL = Legislation, Licensing & Standards
 RD = Research & Development, Exploration
 FI = Finance
 DT = Design, Tender Documents & Construction
 OM = Operations & Maintenance
 ME = Monitoring, Evaluation & Interpretation
 EN = Enforcement
 TE = Training & Formal Education
 IC = Information, Communication & Public Awareness
 ES = Environmental Services Industry
 1 = WATER 2 = WASTE WATER 3 = BOTH

DONORS/PROJECTS	PP	LL	RD	FI	DT	OM	ME	EN	TE	IC	ES	S/F DATE	EST. COST--FOREIGN
MULTILATERAL DONOR AGENCIES:													
EC/Hammad Sirhan Groundwater Inv.			1									92/95	ECU 4 Mil
EC/Azraq Groundwater Study			1									90/93	ECU 3 Mil
EC/Design Wallace & Nyib Dams					1							89/93	ECU 2 Mil
EC/KAC Rehabilitation Study					1							93/96	ECU 570,000
EC/Sectoral Policy	3											92	ECU 200,000
EC/Raising Kafrein Dam Study					1							91/92	ECU 450,000
EC/Aqaba Environment	1	1	1								1	92/95	ECU 350,000
EC/Various Water Supply Proj.					1							92/93	JD 6 Mil
EC/Wadi Rajel Dam (Const.)					1							92/93	JD 1 Mil
EC/Wadi Jordan Dam (Const.)					1							92/93	JD 0.8 Mil
EIB/KFW/IBRD Rehabilitation Greater Amman Water System	1	1			1	1	1		1			93/95	JD 25 Mil
EIB/Zarqa Sewage Collection and Processing						2						92/94	50% Financing of ECU 12 Mil
EIB/Ramtha Water Supply												NA	JD 4-5 Mil
EIB/Raise Al Kafrein Dam					1	1						93/95	50% Financing of JD 6 Mil
EIB/Rehabilitation KAC					1	1						NA	50% Financing of JD 10 Mil
IBRD/Pollution control					2	2						NA	NA
IBRD/Regional Water Management Study	1		1									NA	NA
IBRD/Zarqa Water Pipeline System	1			1	1							90/92	JD 4.654 Mil

JORDAN WATER/WASTE WATER--INTERNATIONAL PROJECTS (Continued)

FUNCTIONS:

PP=Policy, Planning and Management
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DONORS/PROJECTS	PP	LL	RD	FI	DT	OM	ME	EN	TE	IC	ES	S/F DATE	EST. COST-- FOREIGN
MULTILATERAL DONOR AGENCIES:													
UNDP/Strengthening Policy & Planning in MWI	3									3		92/95	US\$0.5 Mil
UNDP/Wet Lands of Azraq--GEF Project			1		1							NA	US\$3.3 Mil
UNDP/Dana Wild Life--GEF Project	3									3		NA	US\$3 Mil
UNDP/Emergency Needs Assessment							1					92	US\$50,000
BILATERAL DONOR AGENCIES:													
ODA/Administration Systems in MWI	3											NA	NA
ODA/Thames Water Authority Twinning	3					3			3			NA	NA
ODA/Technical Assistance to MWI	3				3	3	3		3	3		NA	UK E4.5
ODA/Central Workshop						3						NA	NA
CIDA/Long-Term Technical Assistance to Water Sector	3	3	3		3					3	3	NA	NA
CIDA/Environmental Study Zarqa River Basin	3	3	3						3	3		4 yrs	JD 1.3 Mil
CIDA/Regional Water Conference										3		NA	NA
IDRC/Study Water Reservoir Use			1									NA	NA
IDRC/Study Plastic Film Production						1						NA	NA
IDRC/Study Waste Water Treatment			2									NA	NA
IDRC/National Information System										3		NA	NA
GTZ/Advisory Services to JVA	1				1	1	1			1		92/94	DM 1 Mil

JORDAN WATER/WASTE WATER--INTERNATIONAL PROJECTS (Continued)

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DONORS/PROJECTS	PP	LL	RD	FI	DT	OM	ME	EN	TE	IC	ES	S/F DATE	EST. COST-FOREIGN
BILATERAL DONOR AGENCIES:													
GTZ Ground Water Northern Jordan	1		1									91/93	DM 18 Mil
KfW/Renovating Water Meters						1						93	DM 5 Mil
KfW/North East Ghor Carrier Replacement					1	1						NA	JD 5 Mil
KfW/Irbid Governorate Sewage					2	2						93/96	DM 64 Mil
German Gov./Winter Damages						1						92	DM 5 Mil
Italy/Supplies for Ma'an						1						92	Lire 10 Bil
Japan/Study & Final Design Al Tannour Dam (Wadi Hassa)					1							36 Months	NA
Japan/Study Raising Wadi Arab Dam					1							NA	NA
an/Updating Water Master Plan	3											NA	NA
Saudi Fund/Southern Amman Water	1			1	1							87/92	JD 12.758
USAID/Water Quality Improvement and Conservation	3	3		3	3		3		3	3	3	92/97	US \$21 Mil
USAID/National Water Strategy Study	3	3	3	3	3	3	3	3	3	3	3	92	US \$0.4 Mil
USAID/Es-Samra Feasibility Study					2							91/92	US \$0.4 Mil
USAID/PL480/Equipment for Emergency						3						NA	NA
NO DONOR IDENTIFIED:													
Al Karameh Dam	1			1	1							92/95	JD 45 Mil
Construction Al Mujib Dam (Options-35/55/75)					1							93/96	Options--JD 62/79/86 MIL

JORDAN WATER/WASTE WATER--INTERNATIONAL PROJECTS (Continued)

FUNCTIONS:

PP=Policy, Planning and Management
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DONORS/PROJECTS	PP	LL	RD	FI	DT	OM	ME	EN	TE	IC	ES	S/F DATE	EST. COST-FOREIGN
NO DONOR IDENTIFIED:													
Convey Disi Water to North					1							92/96	JD 240 Mil
Rehab. Fuheis Water System					1							18 Months	JD 1.65 Mil
Ajlun District Water Projects					1							18 Months	JD 1.5 Mil
Wadi Musa Sewage					2							24 Months	JD 2.9 Mil
Mudawara Sewage					2							12 Months	JD 0.285 Mil
Salt Sewage Expansion					2							24 Months	JD 2.6 Mil
Jarash Sewage Expansion					2							24 Months	JD 2.7 Mil
Update National Water Plan	3											12 Months	JD 1.4 Mil
Study Deep Water Systems--Potable & Brackish	1		1									24 Months	JD 3.8 Mil
Souf Town & Refugee Camps Sewerage Project					2							24 Months	JD 2.75 Mil
Wadi Musa Water Project					1							18 Months	JD 1.05 Mil
Al-Aabour (Taffileh) Water Project					1							12 Months	JD 0.66 Mil
Salt Water Project					1							48 Months	JD 5 Mil
Mafraq Water Project					1							30 Months	JD 3.2 Mil
Adaba Sewerage Project					2							18 Months	JD 1.8 Mil
Fuheis/Mahis Sewerage Project					2							24 Months	JD 2.75 Mil
Various Water Projects					1							24 Months	JD 3.5 Mil
Various Sewerage Projects					2							24 Months	JD 5.5 Mil
Various Water & Sewerage Related Studies		3			3							24 Months	JD 2.3 Mil

NOTE: Some of the international projects have not all been confirmed/verified by GOJ or the donors.
NA=Information Not Available

III *** Jordan Valley Development Projects Until
The Year 1987.

Jordan rift valley extends between Syria and the Occupied Land up to the Red Sea. It is considered the main area in Jordan for irrigated agriculture, therefore most of irrigation and water projects as well as social development projects were carried out in this area. Over the last 25 years most of the Jordan Valley Projects were funded partly by the government of Jordan, and partly by the financial assistance from external sources in the form of loans or grants, the following table presents a summary of the external assistance received by the government of Jordan in connection with most of these projects until the year 1987.

External Assistance to the Government of Jordan for
Jordan Valley Development

Project	Currency	Amount (millions)	Source
<u>East Ghor Canal</u>			
1. Original EGMC (69km)	\$US	12.0	USAID
2. 8-km extension	KT. Dinars		
3. 18-km extension	\$US	10.0	USAID
4. 14.5-km extension	DM	101.5	KFW
<u>Zarqa River Complex</u>			
1. King Talal Dam	Abu Dh Dhiram	21.5	Abu Dhabi Fund
2. Zarqa Triangle Irrigation	\$US	4.5	USAID
3. Raising King Talal Dam	KD	10.0	Kuwait
<u>Northeast Ghor Complex</u>			
1. W. Ziglab Dam & W. Jurum Irrigation	\$US	7.5	I.D.A.
2. W. Arab Dam & Irrig.	Yen	7000.0	Japan
<u>Southeast Ghor Complex</u>			
1. Kafrein Dam			U.K.
2. Hisban-Kafrein Irrig.	DM	14.9	K.F.W.
<u>Other Projects</u>			
1. Portable sprinkler farm equipment	\$US	4.5	USAID
2. Subsurface drainage			
3. Land redistribution			
4. Jordan Valley Ag. Services	\$US	6.4	USAID
5. JVFA	\$US	2.7	USAID
6. Water Management Tech	\$US	1.3	USAID
7. Village Dev. I,II,III	\$US	29.2	USAID
8. Valley Domestic Water Supply	DM	6.3	KFW
9. Rural Electrification	DM	16.3	KFW
Housing Project	DM	1.0	KFW
11. Packing & Marketing Centers	FL	10.0	Neth.
	\$US	2.9	ODA
	DM	15.0	KFW
12. Yarmouk-Dead Sea Rd.	\$US	3.9	USAID
13. Farm Roads	\$US	0.6	USAID
14. Maquarin Dam Studies	\$US	16.0	USAID
<u>Water Supply Projects</u>			
1. Deir Alla-Amman Water Carrier	\$US	24.0	USAID
	Riyals	117.1	Saudi Arabia
2. Irbid Water Supply	\$US	23.5	USAID

IV *** Suggsted Projects

All expert teams who examined Jordan's water issues in the last years came to a conclusion that Jordan does not have enough water for the future, in my opinion proper management of Jordan's limited water resources will make a significant contribution towards minimizing the water problems, therefore particular attention should be devoted to projects specifically dealing with:

- . Strengthening the capability of water institutions and organizations, so they can fully develop & implement sound water management.
- . Establishing an information center "water data bank" to store, update and upgrade quantitative and qualitative water data in the Kingdom. Developing methods of regular data collection and monitoring of water resources.
- . Identification and utilization of non-conventional water resources such as :
 - Recycling and re-using of wastewater.
 - Artificial recharging of aquifers.
 - Desalinization of brackish water.
- . Capturing or harvesting storm and surface water flows.
- . Conserving water by repairing leaks and maintenance program for water systems.



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