

**THE MANAGEMENT OF WATER SECTOR IN THE  
MIDDLE EASTERN COUNTRIES WITH THE GAZA  
STRIP AS A CASE STUDY**

**(Institutional Responsibilities)**

**With a comparative study (Gaza Strip-PNA, Jordan, Israel and USA)**

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**Abstract** The purpose of this paper is to highlight the crucial management elements of several water sector systems in Middle Eastern countries, namely Jordan, Israel with Gaza Strip as a detailed case study. USA as a developed country has been studied for comparison purposes. Management of Water Sector (WS) has been studied to reach an evaluation model to cover the following dimensions/activities; macro and micro planning, needs identification, design, operation, maintenance, evaluation, legislation, financing, awareness, institutional responsibilities matrices and standards among other elements.

At the end of this paper an Environmental Infrastructure Management Model for water Sector in the Gaza Strip, has been introduced with the needed justifications.

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## **Management of Water Sector**

### **Nomenclature**

EIM	Environmental Infrastructure Management
MEC	Middle Eastern countries
WS	Water Sector
O&M	Operation & Maintenance
LR	Leading role
CR	Coordination/Consultation Role
PECDAR	The Palestinian Economic Council for Development and Reconstruction
PNA	Palestinian National Authority
WU	Water Utility
MENA	The Ministry of Environmental Affairs
JVA	Jordan Valley Authority
PWA	Palestinian Water Authority
MoLG	Ministry of Local Government
WAJ	The Water Authority Of Jordan
UNWRA	The United Nations Relief and Works Agency for Palestine Refugees

### **1. Introduction**

The management of water sector as an environmental infrastructure component, in Middle Eastern Countries (MEC) has different dimensions. The effectiveness of water sector (WS) management varies dramatically among MEC. In some MEC mandates, duties and roles are mixed up among institutions with duplication and contradictions. This has led to improper delivery of different services involved.

The purpose of this paper is to study several systems in MEC, namely Jordan, Israel with Gaza Strip as a detailed case study. To highlight the crucial management elements; USA- as a developed country- has been studied for comparison purposes.

WS management involves, macro and micro planning, design, operation, maintenance, evaluation, legislation, financing, environmental awareness, institutional responsibility matrices and standards among other elements detailed in this paper.

In this paper only water related institutional activities are discussed, although the same institution could be involved in managing more than one sector.

A thorough review of EIM-WS in Jordan, Israel, USA and Gaza Strip has been carried out through direct meetings, literatures, Internet sources, meetings and questionnaires.

Recommendations have been introduced for a proper WS management in MEC.

**Methodology adopted for analysis of existing situation:**

As there is a large diversification in parameters and directions in the EIM-WS, the analyses of existing situation have been divided into three major dimensions;

**A. The concerned Institutions:**

The Bodies involved in the management process; this includes governmental, semi-governmental and non-governmental bodies. In studying each country different countries have different bodies running the same activities.

**B. Activities (i.e. Activities that are carried out by each body in the EIM-WS) :**

To run the water sector; all encountered activities have to be carried out to deliver the needed services, which leads to a standard list of activities for all countries. Standardising the activities included in the WS has facilitated the analysis process and comparison between different MEC. These activities are:

**Water Management Activities**

- Needs identification
- Macro Planning
- Micro Planning
- Design of Facilities
- Project implementation/ Directing
- Operation & Maintenance (O&M)
- Awareness Campaigns (Water Saving)
- Donor Co-ordination
- Development of Human Resources
- Legislation
- Inter-Sectoral Co-ordination
- Environmental Awareness
- Environmental Emergencies
- Data Base/ documentation
- Budgeting /Financing

**C. The Roles of each institution; i.e. which institution is taken care of which activities (who is doing what):**

It has been found after very thorough research that all responsibilities can be classified into two roles;

**Leading Role (LR);** this means that the institution has the lead on the activity and that it is the major responsible body

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**Co-ordination/consultation Role (CR);** this means that the institution will be consulted for the concerned activity, but has no direct responsibility for it.

*Based on researchers assessment the LR and CR for each institution has been determined, as will be shown later in this paper.*

## 2. Existing Environmental Infrastructure Management Systems EIM-WS in Middle Eastern Countries (Institutional Responsibilities)

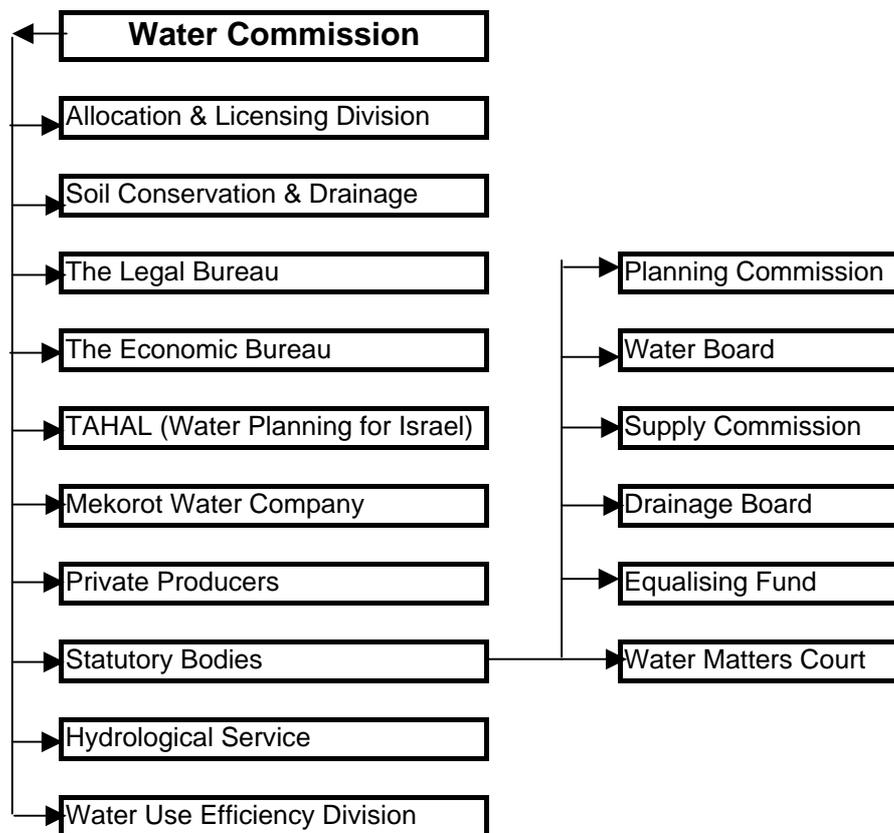
### 2.1 Israel's EIM- WS [Ref. 9,16, 22]

#### A. The Concerned Institutions

##### A.1. The Water Commission

Israel's water system is centrally controlled through the Water Law and bodies responsible for implementing and applying it. Its authority and control affect, use of water from any source, allocation of water quotas to the various users and control over the price of water, including maintenance of an Equalising Fund, which regulates prices.

**Figure (1) Organisational Chart for Israeli Water Commission**



The Water Commission is a government body, which controls the water sources, covering the whole subject of water use rights and overall management of Israel's water affairs. The Water Commission is headed by the Water Commissioner in whom is vested legal responsibility for water and wastewater matters, and whose prerogative it is to decide and make rulings in any water and wastewater related matter, subject to the Water Law and any other law. [see Figure (1)]

#### **A.2. TAHAL (Water Planning for Israel)**

TAHAL is the planner of the State's water system. Its functions extend from state-wide water planning to engineering design of water projects.

#### **A.3. Mekorot Water Company**

Mekorot, the National Water Company, executes water source development projects, establishes and operates water schemes and supplies water to users. The company serves as a national water authority, which set up the national water project and is responsible for its operation and maintenance.

#### **A.4. Ministry of Environment**

The goals of the Ministry of the Environment are to formulate and implement a comprehensive national environmental policy. The Ministry seeks to incorporate environmental considerations into decision making and planning processes; to implement programs for pollution control, monitoring and research; to develop and update legislation of and standards; to ensure effective enforcement and supervision; to promote environmental education and awareness; and to advance regional co-operation.

#### **A.5. Ministry of Interior**

The municipal, regional and local councils are under the supervision of the Ministry of Interior. Local authorities serve as the implementing arm of the central government. Municipalities are responsible for local environmental planning, operation and maintenance of environmental infrastructures such as EIM-WS and monitoring of drinking water.

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### B. The Roles of each institution:

Table (1) and show institutional roles of involved bodies in EIM-WS in Israel.

S. No	Activity	Institutions											
		The Water Commission	TAHAL Company	Mekorot Water Company	Private Sector	Local Authorities	Ministry of Environment	Ministry of Interior	Ministry of Health	Ministry of Agriculture	Customer		
<b>A</b>	<b>Water Supply</b>												
1	Need identification	LR				CR						CR	
2	Macro Planning		LR										
3	Micro Planning					LR							
4	Design of Facilities		LR	LR									
5	Project implementation/ Directing			LR									
6	O&M			LR	LR								
7	Awareness Campaigns (Water Saving)						LR						
8	Donor Coordination	LR											
9	Development of Human Resources	LR											
10	Legislation						LR						
11	Inter-Sectoral Coordination	LR											
12	Environmental Awareness												
13	Environmental Awareness (Decision makers level)						LR		CR				
14	Environmental Awareness (Community level)						LR		CR				
15	Environmental Emergencies												
16	Data Base/ documentation	LR											
17	Budgetting /Financing	LR	CR		CR		CR						

## 2.2 Jordan's EIMS [Ref. 8, 10, 11]

### A. The Concerned Institutions

#### A.1 The Jordan Valley Authority (JVA)

The Jordan Valley Authority assumes direct responsibility for the planning, design and construction of all economic and social development projects in the Jordan Valley. Water and water projects were retained by the JVA for operation and maintenance responsibilities, and all other projects were handed over to the concerned government agencies for operation and maintenance.

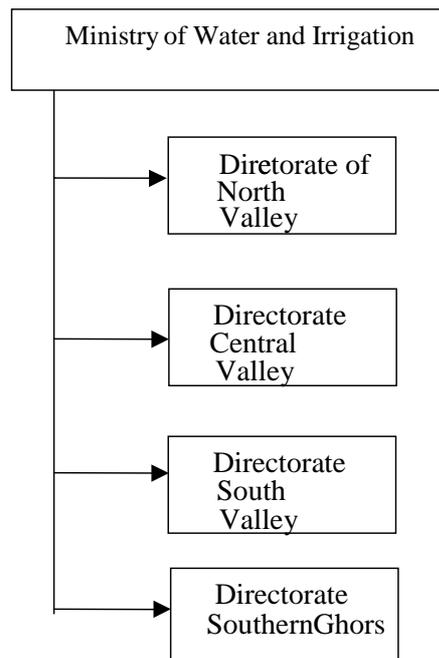
### **A.2 The Water Authority Of Jordan (WAJ)**

WAJ has the responsibility for all water matters in Jordan excluding irrigation projects. It has all the water responsibilities of the municipal and village councils including the capital city of Amman. It, also, has the responsibility on matters related to water exploration and drilling licensing

### **A.3 The Ministry of Water And Irrigation**

The Ministry is composed of the JVA and the WAJ. It was formed due to the limitation on usable water resources and the escalating demand for more water which has triggered competition over these resources between irrigation users (JVA) and domestic water users (JVA and WAJ). [See Figure (2)].

**Figure (2) Ministry of Water & Irrigation-Jordan**



### **A.4 Ministry Of Municipal and Rural Affairs And Environment**

The responsibilities of protecting Jordan's environment and resources (including water) and promoting nature conservation are divided among

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several ministries and agencies. These responsibilities are shared by JWA and JVA under the auspices of the Ministry of Water and Irrigation, the Ministry of Agriculture, the Royal Society for the Conservation of Nature, the Ministry of Health, the Ministry of Energy and the Mineral Resources, the Department of Antiquities and the Ministry of Municipal and Rural Affairs and Environment.

### B. The Roles of each institution:

Table (2) and show institutional roles of involved bodies in EIM-WS in Jordan.

Table (2) EIM-WS in Jordan (Roles of Institutions)

S. No	Activity	Institutions																		
		JVA / WAJ	Ministry of Wat. & Irrigation	MMREA	Municipalities	Ministry of Health	Ministry of Agriculture	Ministry of Planning	Customer	Private Sector										
<b>A</b>	<b>Water Supply</b>																			
1	Need identification	LR										CR								
2	Macro Planning	LR								LR										
3	Micro Planning				LR															
4	Design of Facilities	LR																		
5	Project implementation/ Directing	LR																		
6	O&M	LR																		
7	Awareness Campaigns (Water Saving)			LR	CR															
8	Donor Coordination									LR										
9	Development of Human Resources	LR																		
10	Legislation			LR																
11	Inter-Sectoral Coordination									LR										
12	Environmental Awareness			LR	CR															
15	Environmental Emergencies	LR			CR															
16	Data Base/ documentation	LR	LR																	
17	Budgetting /Financing	LR	CR	CR																

## 2.3 USA's EIM-WS [Ref. 25]

### A. The Concerned Institutions

#### A.1 Municipalities

Municipalities in the USA deal with Macro Planning and needs

identification, it is also responsible for customer needs

**A.2 USA’s EPA**

The mission of the U.S. Environmental Protection Agency is to protect human health and to safeguard the natural environment (air, water, and land) upon which life depends

**A.3 Water Districts**

The main responsibility on water services in the USA is envisaged in the water districts.

**B. The Roles of each institution:**

Table (3) and show institutional roles of involved bodies in EIM-WS in USA.

Table (3) EIMS USA (Roles of Institutions)										
S. No	Activity	Institutions								
		Env. Protec. Agency (EPA)	Municipalities	Water Districts	Private Sector	Ministry of Health	Ministry of Agriculture	Customer		
<b>A</b>	<b>Water Supply</b>									
1	Need identification			LR				CR		
2	Macro Planning		LR							
3	Micro Planning			LR						
4	Design of Facilities			LR						
5	Project implementation/ Directing			LR						
6	O&M			LR	LR					
7	Awareness Campaigns (Water Saving)			LR						
8	Donor Coordination									
9	Development of Human Resources			LR						
10	Legislation	LR						CR		
11	Inter-Sectoral Coordination			LR						
12	Environmental Awareness	LR				CR				
15	Environmental Emergencies	LR								
16	Data Base/ documentation	LR		LR			LR			
17	Budgeting /Financing			LR						

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### **2.4. The Gaza Strip EIM-WS [Ref. 2, 3, 12,13, 22, 23, 24]**

#### **A. The Concerned Institutions**

##### **A.1 Palestinian Water Authority (PWA)**

The PWA is recognised as a key organisation in the management of water resources throughout Palestine. The main aim pursued by the PWA is to control knowledge and utilisation of local resources whilst facilitating initiative taken by the various public and private promoters. The PWA is responsible on granting licenses, permits and concessions for any type of water and wastewater utilisation. The PWA role is especially important in the preparation of regional water and wastewater plans. The PWA supervises and monitors individual water projects as well as the preparation of the national water plan.

##### **A.2 Ministry of Planning & International Co-operation (MOPIC)**

The Ministry of Planning & International Co-operation has an important role to play at macro-economic level in integrated planning, while sectarian planning is the basic responsibility of operating ministries, in charge of implementation.

Monitoring progress in the implementation of sectorial policy, projects and programmes is an essential role of the MOPIC.

##### **A.3 The Ministry of Environmental Affairs (MENA)**

MENA is generally in charge of project supervision and co-ordination with a view to overall protection of natural resources and the environment. One of the major concerns of MENA is to preserve the consensus between the various authorities involved and to supervise various projects managed by other organisations. MENA works closely with the PWA and Regional Utility or Municipalities and Village Councils.

##### **A.4 PECDAR**

The Palestinian Economic Council for Development and Reconstruction (PECDAR) is directly under the authority of the Ministerial Cabinet of PNA. It ensures the functional links between Municipalities and donors on investment projects. This agency identifies project priorities, carries out strategic planning, and obtains funding for projects and co-ordinates designs.

**A.5. Ministry of Local Government Affairs (MoLG)**

The Ministry is responsible for the co-ordination of the provision of services by the regional utilities. Its role is to control technical and financial operations. It is in charge of pricing policy in each municipality.

**A.6. Regional Councils and Municipalities**

Regional Utilities are mainly represented by Governorates. Finance for operation and maintenance of water supply is the responsibility of the municipalities and village councils. The recurrent expenses are mainly wages, raw materials, supply of spare parts. They are responsible for the collection of all revenue (water, electricity fees) and taxes. Revenue collection is regulated by the guidelines established by the Ministry of Local Governmental Affairs.

**A.7. UNWRA**

The United Nations Relief and Works Agency for Palestine Refugees in the Near East has had a quasi governmental role in the Gaza Strip for a long time and has made an important contribution to the strengthening of the powers and responsibilities of the PNA. Today, the Agency is still involved in advice for the implementation of water supply, solid waste management and environmental sanitation in refugee camps and works very closely with MOPIC on municipality and regional utility-oriented lines to involve them more in programme management.



To evaluate the strength of the different factor of the evaluation criteria the following points system has been initiated

Leading Role

- Single relevant leading role = 10 points
- Two relevant leading role = 5 points
- Irrelevant leading role = 0 points
- Missing leading role = -10points
- Three relevant leading roles = 3.3points
- Four relevant leading roles = 2.5 points
- Five relevant leading roles = 2 points

Irrelevant activity should not be considered (i.e. as if it is not there)

Customers Involvement (Customers should be involved / consultation regulations and need identification)

- Relevant customers role = 10 points
- Irrelevant customers role = 0 points
- Absent customers role = -10points

Co-ordination Role

- Each relevant co-ordination role makes = 10 points
- Absence of a co-ordination role = -10points

Privatisation

Private sector involvement in EIM-WS s a positive sign (usually involved in O&M)

- Relevant role of private sector = 10points
- Irrelevant role of private sector = 0 points
- Absence of the role = -10points

**The results of the evaluation criteria have been summarised in Table (5) for the USA, Israel, Jordan and the Gaza Strip.**

It can be seen from Table (5) that the EIM-WS in Gaza Strip has the lowest score among the three other countries. This is simply due to the following:

1. No clear line of institutional responsibilities among different bodies of the government
2. The mandates of most institutions in the field of WS are vague and overlapping.
3. No serious consideration for customer involvement
4. The private sector is not involved in this sector

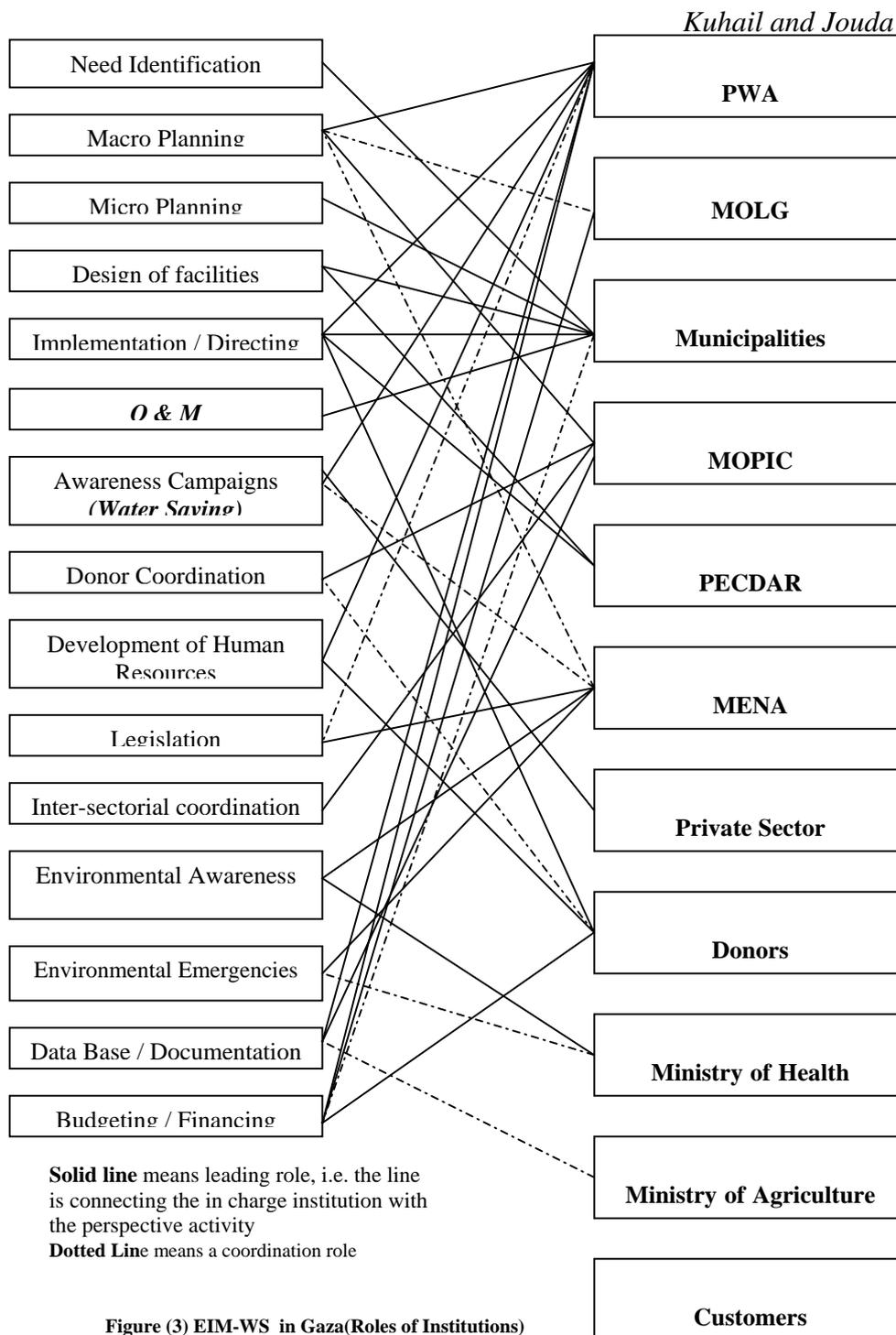
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5. The same activity is shared by more than one institution.

To clarify the findings a schematic chart has been introduced as shown in Figure ( 3 ), the solid lines in this chart show the direct responsibility of the concerned institution(s), while the dotted lines shows the co-ordination/consultation role. The overlapping of one solid line from the same activity means deficiency in the system as it is ideal to have only one institution leading a specific activity, i.e. one solid line coming out of each activity. It is expected, and some times, desirable to have as many dotted lines as possible coming out of the same activity, this means that the activity is co-ordinated very well.

**Table 5 Water Supply Points**

S/N	Activity/Country	G A Z A				U S A				I S R A E L				J O R D A N			
		LR	CI	CR	PS	LR	CI	CR	PS	LR	CI	CR	PS	LR	CI	CR	PS
1	Needs identification	10	-10	-10	-	10	10	10	-	10	10	20	-	10	10	10	-
2	Macro Planning	5	-	30	-	10	-	-	-	10	-	-	-	5	-	-	-
3	Micro Planning	10	-	-	-	10	-	-	-	10	-	-	-	10	-	-	-
4	Design of facilities	5	-	-	-	10	-	-	-	5	-	-	-	10	-	-	-
5	Project implementation	2.5	-	-	-	10	-	-	-	10	-	-	-	10	-	-	-
6	O&M	10	-	-	-10	5	-	-	10	5	-	-	10	10	-	-	-10
7	Awareness Campaings (water saving)	10	-	10	-	10	-	-	-	10	-	-	-	10	-	10	-
8	Donor Co-ordination	10	-	10	-	-	-	-	-	10	-	-	-	10	-	-	-
9	Development of Human Resources	5	-	-	-	10	-	-	-	10	-	-	-	10	-	-	-
10	Legislation	10	-10	0	-	10	10	10	-	10	-10	-	-	10	-10	-	-
11	Inter-Sectoral Coordination	10	-	-	-	10	-	-	-	10	-	-	-	10	-	-	-
12	Environmental Awareness	5	-	-	-	10	-	10	-	10	-	10	-	10	-	10	-
13	Environmental Emergencies	10	-	10	-	10	-	-	-	10	-	10	-	10	-	10	-
14	Data Base/ documentation	5	-	-	-	3.3	-	-	-	10	-	10	-	5	-	-	-
15	Budgeting and Financing	3.3	-	10	-	10	-	-	-	10	-	30	-	10	-	20	-
<b>Total</b>		<b>110.8</b>	<b>-20.0</b>	<b>60.0</b>	<b>-10.0</b>	<b>128.3</b>	<b>20.0</b>	<b>30.0</b>	<b>10.0</b>	<b>140.0</b>	<b>0.0</b>	<b>80.0</b>	<b>10.0</b>	<b>140.0</b>	<b>0.0</b>	<b>60.0</b>	<b>-10.0</b>
<b>Ideal</b>		<b>150</b>	<b>20</b>	<b>-</b>	<b>10</b>	<b>140</b>	<b>20</b>	<b>30</b>	<b>10</b>	<b>150</b>	<b>20</b>	<b>-</b>	<b>10</b>	<b>150</b>	<b>20</b>	<b>-</b>	<b>10</b>
<b>Percentage of Ideal</b>		<b>73.87</b>				<b>91.64</b>				<b>93.33</b>				<b>93.33</b>			



*To understand the above figure; the left hand side activity such as macro-planning is carried out by MOPIC & PWA (i.e LR) and it is denoted by solid line, in consultation with MOLG and MENA, which is shown as dotted line (i.e. CR)*

## **Management of Water Sector**

### **5. Proposed (Recommendations) EIM-WS Model for The Gaza Strip**

Based on the previous analysis, a new system for EIM-WS has been suggested to take care of all deficiencies in the existing system and to reach a better workable and efficient system.

The proposed EIM-WS for Gaza Strip describes;

- Who should carry out different WW activities
- How and why.

In EIM-WS, in other countries such as USA, Israel and Jordan that tasks and responsibilities are divided into three levels, national, regional and a local level.

#### **4.1 The national level**

EIM on national level is responsible for setting up the legislation, making national policies, making statutory orders and guidelines for all essential activities in EIM-WS. This includes water operation and maintenance.

#### **4.2 The regional level**

EIM-WS on regional level is typically responsible for the regional specification of quality of waters, coastal and freshwater, setting standards and licenses for effluents and their discharge to the waters, EIA requirements, monitoring the aquatic environment.

#### **4.3 The local level**

The most important task for the local level in EIM-WS is the responsibility for proper operation and maintenance of water equipment.

There may be variations in the detailed task distribution between the different levels. The operation may thus be placed at the regional level (as it is seen in the USA, and as it is proposed for Gaza). A guiding principle is, however, that the responsibility for the quality of the aquatic environment is separated from the operational level and the private sector interests.

#### **4.4. The need for a central responsible body and for standards**

The situation of everybody applying their own standards and lack of involvement of a central responsible body must come to an end. Agreement must be reached on relevant effluent standards, appropriate EIA procedures etc. Most important of all, these issues must be referred to the relevant central PNA bodies for approval and to ensure compliance to national policies and guidelines.

#### 4.5 The Water Utility (WU)

The proposed Water Utility is meant to meet the needs and expectations of the consumers. Therefore, consultation between the Water Utility and the community should be planned and undertaken by both parties as equal partners. The community should feel that it owns the WU. This will help to ensure that consultation produces acceptable and workable solutions.

The important requirement is that community representatives should fully represent the views and needs of all consumers and special groups.

#### 4.6. Recommended Task Responsibility Matrix

Table (6) represent the task/responsibility relations which represents also a proposal for distribution of planning and implementation activities relating to the EIM-WS in Gaza. The matrix has been developed on the basis of meetings and interviews with all involved institutions and thus represents a synthesis of the stakeholder analysis. In addition, The authors have tried to benefit from the long experience of two neighbouring countries (Jordan and Israel).

Table (6) Proposed EIM-WS Model for Gaza (Roles of Institutions)

S. No	Activity	Institutions											
		Palestinian Water Authority	Water Utility	Ministry of Local Gov.	Municipalities	MOPIC	MErA	S.W.M.C.	Ministry of Health	Ministry of Agriculture	Customers		
<b>A</b>	<b>Water Supply</b>												
1	Need identification				LR							CR	
2	Macro Planning	LR		CR		CR	CR				CR		
3	Micro Planning		LR		CR								
4	Design of Facilities		LR										
5	Project implementation/ Directing		LR										
6	O&M		LR										
7	Awareness Campaigns (Water Saving)	LR					CR				CR		
8	Donor Coordination	CR				LR							
9	Development of Human Resources	LR											
10	Legislation	LR					CR				CR		
11	Inter-Sectoral Coordination	CR				LR							
12	Environmental Awareness	CR					LR						
13	Environmental Emergencies	LR					CR						
14	Data Base/ documentation	LR											
15	Budgetting /Financing	LR											

## **Management of Water Sector**

### **4.7. Main Features of the proposed EIM-WS Model for the Gaza Strip**

The proposed model for the EIM for water sector in the Gaza Strip has the following features

- The role of the PWA in water management will be limited to economic and technical regulations.
- The creation of the water utility, whose overall management should be envisaged into a board of directors elected from the mayors of Gaza municipalities and supported by technical members. A technical team headed by the executive manager should constitute the executive management of the utility. The water and assets owned now by the municipalities will eventually be transferred to the water utility as a public property. It should also continue to be owned by the municipalities.
- The purpose of creating the water utility is to separate the service delivery (which could be owned by the private sector in the future) and the regulating body (PWA). This will be for the benefit of the customers. Furthermore, fragmentation of service provision will be eliminated through the creation of one utility with more technical and financial resources.
- The role of MOPIC will be the planning on central government level.
- The central government role in regulating the environmental considerations will be introduced through the Ministry of Environment, which will have an environmental regulating role.

The role of the donors in the EIM-WS should be back into the right track, i.e. the Palestinian institutions should have the maximum possible freedom to plan, implement, control and operate and maintain the facilities. The role of the customers should at least be taken into consideration in two areas; need identification and regulations.

### **6. Conclusions:**

In this paper an effort has been exerted to find a way of analysing any existing situation of a water management system. The adopted evaluation system has been tested and applied to three Middle Easter Countries and one developed country (namely; Jordan, Israel, Gaza Strip and USA , respectively). A thorough comparison has been carried out to highlight weaknesses and strengths of the EIM-WS in different MEC countries. This has been achieved by creating and applying a scoring system that can be used in any further assessment of a WS in any country.

At the end, after studying the weaknesses of the WS in The Gaza Strip, through the above-mentioned scientific procedures, a new WS has been

introduced and tested against the adopted criteria and scoring system. By applying the recommended WS, the Gaza Strip WS can achieve high scores and accordingly better performance and achievements.

## **7. References**

1. Donald M, "Evaluation in Environmental Planning". Assessing Environmental, Social, Economic and Political Trade Offs Mc Allister, The MIT Press, 1995.
2. World Bank, "West Bank and Gaza Municipal Infrastructure Development Project", 1996.
3. Danish International Development Assistance, "Urgent Action Plan for Waste Water Management, Gaza Governorates", Danida, 1996.
4. W. Hudson, "Infrastructure Management", etal, McGraw Hill, 1997.
5. World Health Organisation "Financial Management of Water Supply and Sanitation", A. Handbook, , Geneva, 1994.
6. Okke Braadbaart and Klaas Schwartz "Private Business, Public Owners, Government Shareholdings in Water Enterprises", Edited by Maarten Blokland, , The International Institute for Infrastructure, Hydraulic and Environmental Engineering (IHE), Delft, the Netherlands, 1999.
7. HMSO London "Water Act 1989, Chapter 15", , July, 1989.
8. Economic and Financial Aspects of Water Resources and Institutional and Legal Aspects "Jordan River Basin Study", Jordan, Volume 2,; 1993.
9. Ben-Gurion University of the Negev in Cooperation with TAHAL Consulting Engineer LTD "Israel Water Study for the World Bank",,, 1994.
10. Water and Environmental Studies Centre "Middle East Regional Study on Water Supply and Demand Development", Al-Najjah University, 1996.
11. The International Bank for Reconstruction and Development "Jordan River Basin Study", The West Bank, , 1993.
12. Camp Dresser & Mc Kee " Strategic Actions for the Development of the Environmental Health Sector in Gaza Strip", , UNRWA, 1993.
13. (WRAP) Task Force UNDP "Water Resources Action Programme", 1994
14. Kuhail Z. "Preliminary Engineering Study of Sewage Problems Impacting on the Gaza Storm Water Drainage project", Gaza Municipality 1994.
15. Ministry of Planning and international Cooperation, " Environmental

## Management of Water Sector

- Impact Statement for Gaza Sea Port", , 1996.
16. Sabri Jiryis et al "Israel, a general Survey", Palestinian studies Institution, 1997
  17. The World Bank "Developing the Occupied Territories, an Investment in Peace" 1993.
  18. UNDP "Institutional Development of Municipalities in the West Bank and the Gaza Strip", 1993
  19. Keren Assaf et al "a Proposal for the Development of a Regional Water Master Plan", Israel/Palestine Centre for Research and Information, 1993
  20. Gershon Baskin "Water Conflict or Co-operation" Israel/Palestine Centre for Research and Information, 1993
  21. MOPIC "Regional Plan for Gaza Governorates", , 1998
  22. Gabby S. "The Environment in Israel" , , Israeli Ministry of Environment, 1994
  23. MENA "Environmental Strategic Plan", , 1999
  24. MENA " Environmental Frame Work", , 1999
  25. Internet websites for different Official bodies (EPA, Ministry of Env.,...)