

Ministry of Water Resources and Irrigation

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**FINDINGS OF THE INTEGRATED WATER
MANAGEMENT DISTRICTS WORKSHOPS
(MAY 2003)**

REPORT NO. 74

July 2003

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WORKSHOPS (MAY 2003)**

Prepared by

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for

United States Agency for International Development/Egypt

under the

Integrated Water and Coastal Resources Management Indefinite Quantity Contract

Principal: Development Alternatives, Inc.

Subcontractor: International Resources Group

Foreword

The Ministry of Water Resources and Irrigation MWRI and the USAID requested Development Alternatives Inc. DAI to conduct four workshops for nominated staff from the four districts implementing Integrated Water Management. The purposes of the workshops were to inform the participants about the Integration Water Management Concept and to have them prepare preliminary implementation plans for their districts. Four sessions of the workshops were held over the period May 20 – 28, 2003 in Cairo. The workshops addressed four categories of participants; (1) managers and decision makers, (2) stakeholders, (3) field engineers, and (4) field technicians. Qualified instructors from within MWRI were selected to prepare the lecture notes and deliver the presentations.

Following implementation of the District IWRM Workshop Training, DAI subcontracted Dr. Abdallah S. Bazaraa (Professor of Irrigation and Drainage Engineering at Cairo University) and Eng. Samir I. Yacoub (1st Under Secretary of State and Former Chairman of the North Sinai Development Organization) to review the workshop structure and materials, seek the feedback of organizers, participants and instructors and submit a final report summarizing their findings and recommendations for future improvements of materials and presentations.

The two consultants performed their duties over a span of four weeks starting June 21, 2003. Two briefing meetings were conducted on July 21, 2003 and on July 28, 2003 and were attended by representatives of the Water Policy Advisory Unit (WPAU, MWRI) and USAID.

The consultants wish to express their gratitude to the persons interviewed—organizers, instructors and participants—for their time and valuable opinions. The consultants would like to acknowledge the contribution and support of the WPAU engineers: Alaa A. Hassan, Amira A. El-Diasty, Hisham S. Shehab and Moamen S. El-Sharkawy. The consultants would like also to thank Eng. Gamil Mahmoud (Chairman of the WPAU), Eng. Sarwat Fahmy (WPAU Consultant), Dr. Wadie F. Mankarious (USAID Project Technical Officer), and Dr. Ibrahim El-Assiouty (Local Studies Coordinator/ Facilitator, Water Policy Bridge Task Order), for their guidance and the smooth running of the assignment.

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ARABIC SUMMARY

نتائج ورش عمل هندسات الإدارة المتكاملة للموارد المائية (مايو 2003م)

تم عقد أربعة ورش عمل عن الإدارة المتكاملة للموارد المائية على مستوى الهندسة بالقاهرة خلال الفترة (20-28) مايو سنة 2003م وقد استهدفت مشاركة المستويات المختلفة من القائمين على إدارة المياه والجهات ذات الصلة (المديرين و متخذى القرار – المعنيين وذوى العلاقة - المهندسين – الفنيين)، وقد بلغ مجموع المشاركين فى ورش العمل الأربعة 114 فردا من الهندسات المستهدفة (الإبراهيمية - زفتى – غرب إسنا – الأقصر). تم طرح و مناقشة أحد عشر موضوعا رئيسيا خلال ورش العمل بواسطة متخصصون من وزارة الموارد المائية و الري كما تم توزيع مذكرات تحوى المادة العلمية التى عرضت تتكون من نحو أربعمائة صفحة كاملة. و يمكن حصر أهداف ورش العمل فيما يلى:

- نقل وتعميق الوعي بمفهوم الإدارة المتكاملة للمياه لدى أجهزة الوزارة والمعنيين وذوى العلاقة.
- خلق فرصة للحوار وتبادل الرؤى بين قيادات الوزارة والعاملين بها والمعنيين وذوى العلاقة بهدف تبادل الخبرات بين هندسات الموارد المائية المتكاملة وباقي الهندسات المستهدفة.
- وضع خطة تنفيذية مبدئية لتطبيق الإدارة المتكاملة للمياه على مستوى المركز من خلال مجموعة حلقات نقاشية.

و لقد تم إعداد هذه الدراسة بناء على طلب وزارة الموارد المائية و الري وهيئة المعونة الأمريكية بالقاهرة لعرض نتائج ورش العمل الأربعة والأساليب الممكنة لتطويرها على أن تتضمن الدراسة الإطلاع على المادة العلمية التى تم تقديمها وعرض ملخص لكل منها، مراجعة الأسلوب التنظيمي لورش العمل ومقترحات تطويره، مراجعة أسلوب إعداد خطط العمل المقدمة من المشاركين، عرض نتائج الاجتماعات الميدانية مع السادة المشاركين بالهندسات الأربعة، عرض نتائج المناقشات مع السادة المحاضرين و منظمى ورش العمل، التوصيات و أية تعديلات يمكن أن تؤخذ بعين الاعتبار فى حال عقد ورش عمل أخرى. و قد استغرقت الدراسة أربعة أسابيع تبدأ من 21 مايو سنة 2003م تم خلالها القيام بالمهام التالية:

- الإطلاع على المحاضرات المقدمة للدارسين وعمل ملخص لكل منها.
- استطلاع رأى المشاركين فى ورش العمل من خلال عقد عشرة مقابلات ميدانية مع القائمين على إدارة المياه (المديرين – المهندسين – الفنيين) وذوى العلاقة بهندسات الإبراهيمية و زفتى وغرب إسنا والأقصر وقد اشترك فى المناقشات 56 ممن شاركوا فى ورش العمل.
- عقد عشرة مقابلات مع السادة المحاضرين وقيادات الوزارة الذين شاركوا فى ورش العمل.
- تحليل نتائج استطلاعات رأى السادة المشاركين من واقع الاستبيانات التى تمت مع نهاية ورش العمل.
- الإطلاع على الخطط التنفيذية المبدئية المقدمة من المشاركين.
- استعراض ملخص التقرير المبدئى للدراسة وما انتهت إليه من توصيات مع السادة ممثلى الوحدة الاستشارية للسياسات المائية بوزارة الموارد المائية و الري و هيئة المعونة الأمريكية بالقاهرة و ذلك يومى 21 & 28 يوليو سنة 2003م.

توصيات الدراسة:

توصيات عامة لتطوير ورش العمل:

- حذف التكرار أو التداخل فى بعض الموضوعات التى تم عرضها مثل موضوعات التلوث ونوعية المياه ، إعادة استخدام مياه الصرف و كذلك موضوعات الرصد والمتابعة ، توزيع وإدارة المياه ، التوافق بين الطلب والمتاح.
- التأكيد على علاقة ودور الهندسات المتكاملة بالموضوعات التى يتم عرضها (الإدارة المتكاملة، الإصلاح المؤسسى، مشاركة المزارعين، الإعلام المائى)
- ترتيب زيارات للمشاركين فى ورش العمل للهندسات التى تم تطبيق الإدارة المتكاملة بها لتبادل المعرفة والخبرات.
- تجميع كافة المشاركين (القائمين على إدارة المياه وذوى العلاقة) فى المحاضرات ذات الصلة العامة بهدف إثراء المناقشات على أن يتم الفصل بين المجموعات المختلفة المشاركة فى المحاضرات المتخصصة و فترات التدريب العملى.
- إضافة محاضرة عن أساسيات علم الإدارة لتوضيح مفهوم ومحتوى الخطط التنفيذية.

- إتاحة تدريب تخصصي للسادة المهندسين على مستوى الهندسة عن التوافق بين الطلب والمناخ من الموارد المائية – المياه الجوفية – تبادل المعلومات – مع التدريب العملي على القياسات الحقلية للمهندسين والفنيين.
- الاستعانة بمركز التدريب التابع للوزارة (أو احد المراكز الخاصة في إقليم الهندسة) لتدريبات الحاسب الآلي.
- إلغاء الفترة المسائية وإعادة توزيع المحاضرات والتدريبات والحلقات النقاشية بين الساعة التاسعة صباحا والخامسة مساء.
- إتاحة مذكرات ورش العمل وتوزيعها على المشاركين قبل بدء الدورة.

توصيات بخصوص أسلوب إعداد الخطط التنفيذية للإدارة المتكاملة للموارد المائية

- بالرغم من النجاح الملحوظ لورش العمل في نقل مفهوم الإدارة المتكاملة للمياه والتوعية بهندسات الموارد المائية والرى حسب ما جاء في استبيان المشاركين في ورش العمل و نتائج المقابلات الميدانية إلا أن الخطط التنفيذية الثمانية المقدمة من المشاركين في نهاية ورش العمل قد اقتصرت في مجملها على وصف الوضع الحالي بالهندسات ولم تعكس بصورة واضحة الآلية اللازمة لتطبيق مفهوم الإدارة المتكاملة وتحقيق اللامركزية وقد يرجع ذلك إلى:
- ضيق الوقت المخصص للحلقات النقاشية حول وضع الخطط التنفيذية خلال الدورة و الحاجة لاستيعاب و تمثيل المادة العلمية المقدمة.
 - حاجة المشاركين إلى التعرف على المزيد من الخطوط الإرشادية لوضع تلك الخطط
 - ما أبداه بعض المشاركين عن عدم وضوح العلاقة بين الهيكل التنظيمي المقترح للهندسة المتكاملة وبين القيادات المحلية (رئيس الإدارة المركزية – المدير العام) و باقي الأجهزة المعنية بالوزارة خصوصا وأن الإدارة المتكاملة للموارد المائية تتم بهندسة مركز واحدة داخل الإدارة مما يستلزم دراسة إمكانية التنفيذ بجميع هندسات الرى التابعة للإدارة العامة.
 - عدم وضوح الرؤية لدى بعض المشاركين عن دور القطاع الخاص ودور الهندسة المتكاملة في مواجهة مشاكل التلوث وتدهور نوعية المياه

لذلك فإننا نرى أهمية التركيز على النقاط التالية عند عقد ورش العمل القادمة:

- تحديد الحدود الإدارية للهندسة.
- تحديد مصادر المياه المختلفة الحالية والمقترحة.
- دراسة الاحتياجات المائية للهندسة (زامم الهندسة – التركيب المحصولي – احتياجات مياه الشرب والصناعة) خطط الصيانة للترع والمصارف ومحطات الرفع والآبار
- قياس التصرفات ومعايير نوعية المياه.
- استخدام الحاسبات وقواعد البيانات في دراسة التوافق بين الطلب والمناخ من المياه.
- علاقة الهندسة المتكاملة بباقي أجهزة الوزارة مع التأكيد على التعريف بمسؤوليات وسلطات مديري الهندسة.
- التعريف بدور مجالس المياه و اتحادات مستخدمي المياه وعلاقتها بالهندسة المتكاملة.
- الهيكل الوظيفي للهندسة و الاحتياجات التدريبية للعاملين بها.
- إعداد الميزانيات و الاحتياجات المالية

و يجب الاستفادة من المادة المتاحة في التقارير الصادرة عن الوحدة الاستشارية للسياسات المائية خاصة التقرير رقم 49 (ديسمبر 2001م) و التقرير 62 (سبتمبر 2002م) مع إتاحة الوقت الكافي للمشاركين للتدريب على كيفية إعداد الخطط التنفيذية خلال ورشة العمل، و يمكن أن تتولى بعد ذلك مجموعة عمل مشكلة من المديرين و المهندسين و الفنيين و المعنيين و ذوى العلاقة على مستوى الهندسة إعداد خطط العمل التنفيذية التفصيلية التي تتضمن الحدود الإدارية، الهيكل التنظيمي، الاحتياجات البشرية، التدريب اللازم، المعدات و مصادر التمويل و ذلك في مقر عملها حيث يتوفر الوقت اللازم و البيانات مع المتابعة و الدعم اللاحق.

LIST OF ABBREVIATIONS AND ACRONYMS

APRP	Agricultural Policy Reform Program
BCWUA	Branch Canal Water User Associations
DAI	Development Alternatives, Inc.
DRI	Drainage Research Institute, MWRI
GOE	Government of Egypt
IAS	Irrigation Advisory Service
IIP	Irrigation Improvement Project
IRG	International Resources Group, Ltd.
IWMD	Integrated Water Management District
MALR	Ministry of Agriculture and Land Reclamation
M&E	Monitoring and Evaluation
MISD	Matching Irrigation Supply and Demand
MED	Mechanical and Electrical Department, MWRI
NWRC	National Water Research Center, MWRI
NOPWASD	National Organization for Potable Water and Sanitary Drainage
O&M	Operation and Maintenance
RIGW	Research Institute of Groundwater
USAID	United States Agency for International Development
WPAU	Water Policy Advisory Unit
WUA	Water Users Associations

1. BACKGROUND

The Ministry of Water Resources and Irrigation (MWRI) has a long term goal to adopt a policy to integrate all water management functions at the district level. The main objective of this policy reform is to move towards the goal of reorganizing MWRI internal functions and operations including devolution of authority to the local level thereby decentralizing water management and eliminating district level inefficiencies and redundancies.

Two Irrigation Water management Districts (IWMD) were selected based on several critical criteria developed to consider most of MWRI activities at the district level. Both districts are in Lower Egypt. The Ministerial Decree No. 506 was issued on December 10, 2001 to recognize the IWMD in the following pilot districts:

- South Zifta Irrigation District in the Menufia General Irrigation Directorate.
- El-Ibrahimia Irrigation District in West Sharkia General Irrigation Directorate.

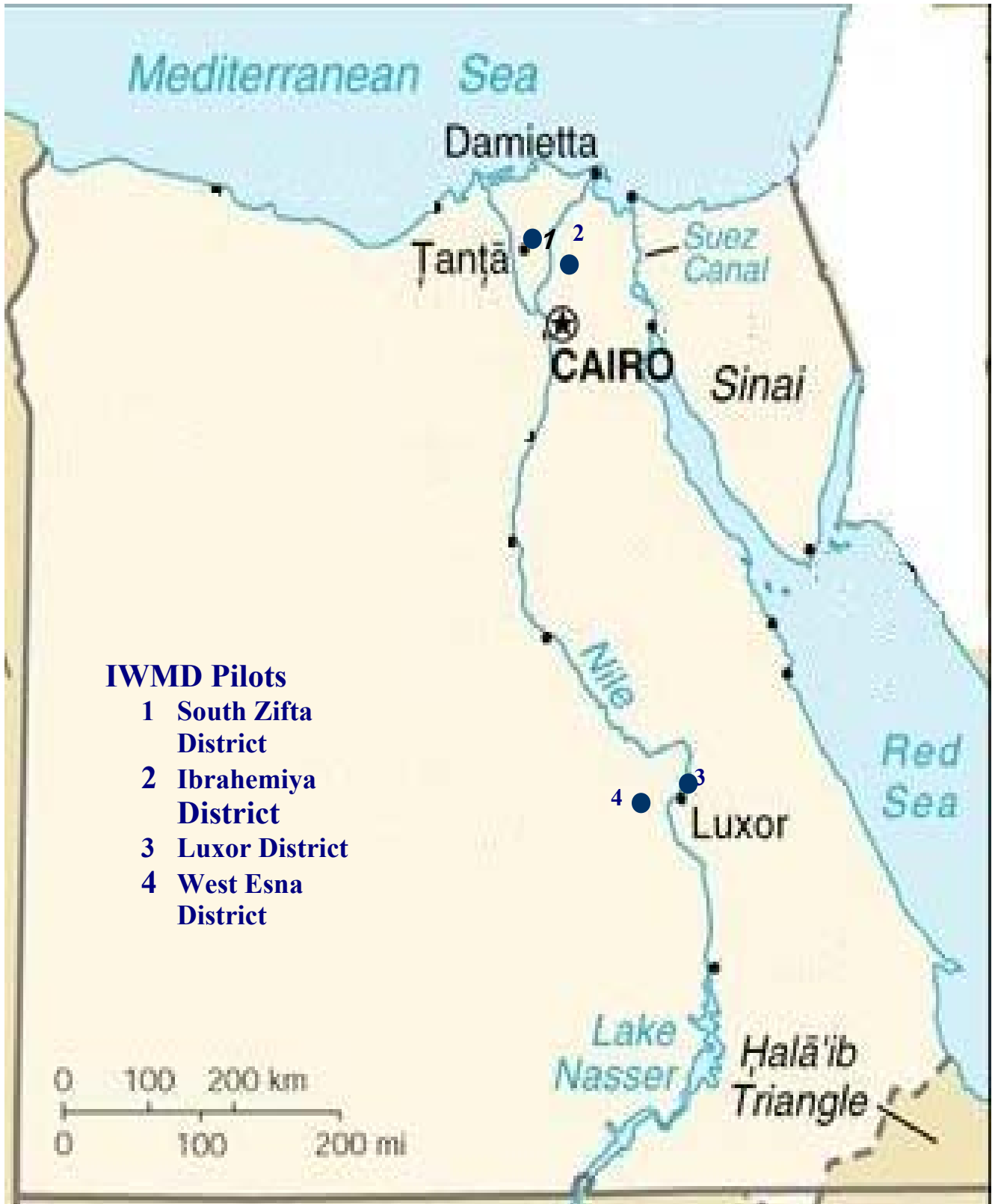
Two additional districts in Upper Egypt were also nominated to further extend the application of the IWMD concept. These are West Esna Irrigation District and Luxor Irrigation District. The two districts fall within Qena General Irrigation Directorate. The locations of the four districts are shown in Figure (1).

The definition of what constitutes an Integrated Water Management District as developed by the IWMD Tranche V working group, WPAU (2002), is as follows:

“The Integrated Water Management District is an entity that has sufficient manpower, material, and fiscal resources to operate and maintain all water resources under its jurisdiction. As the primary responsibility of the district is to deliver water to the users, therefore, all the divisions support the water distribution process to ensure that water is delivered equitably. As a result the different water entities currently existing at the district level should be merged to constitute only one entity defined as an IWMD”. The developed organization of an IWMD includes mainly four sections. These are: water management and distribution, maintenance, planning and follow up, and administration. Article No.3 in Ministerial Decree No. 506 states that the district director has to supervise all the activities of irrigation, drainage, groundwater, drainage water reuse, operation and maintenance of the irrigation and drainage networks, pump stations, and groundwater wells within the district’s borders.

The Ministry of Water Resources and Irrigation and the USAID have requested Development Alternatives Inc. (DAI) to conduct four workshops for nominated staff from the four districts implementing integrated water management. Four sessions of the workshops were held in Cairo (over the period May 20 - 28, 2003), one for MWRI managers, one for stakeholders, one for field engineers and one for field technicians. The subject area focused on gaining knowledge on the concept of integrated water management and initial preparation of action plans to implement such concept on the district level. Qualified instructors were selected (mainly from within MWRI) to prepare the required material and conduct relevant presentations and training sessions for the four workshops.

Figure 1. Pilot Integrated Water Management Districts



2. WORKSHOP OBJECTIVES

The four workshops were organized to serve the following objectives:

- To introduce or to increase the awareness of MWRI staff and concerned stakeholders about the integrated water management district concept and to survey related water management activities.
- To facilitate and support discussions among different levels of decision making within MWRI and between MWRI personnel and stakeholders and also to share experiences gained so far in districts implementing IWMD and those districts nominated for extended implementation.
- To develop preliminary work plans for extended implementation of the integrated water management at the district level.

3. LAYOUT OF THE WORKSHOPS

3.1 Dates and Place:

The four workshops were held in a hotel conference room(s) in downtown Cairo (Flaminco Hotel). Workshop participants were accommodated in the same hotel for the duration of each workshop. The four workshops were conducted as follows:

- Two (3-day) workshops, one for MRWI managers and one for concerned stakeholders, were held in parallel over the period May (20-22), 2003.
- Two (5-day) workshops, one for field engineers and one for field technicians, were held in parallel over the period May (24-28), 2003.

3.2 Participants:

The participants of the four workshops came from the four irrigation districts currently implementing or nominated to implement the integrated water management concept.

- South Zifta District of the Menoufia General Irrigation Directorate
- Ibrahimia District of the West Sharkia General Irrigation Directorate
- West Esna District of Qena General Irrigation Directorate
- Luxor District of Qena General Irrigation Directorate

Workshop participants represent four categories; 1. MWRI managers and decision makers (26 persons), 2. Stakeholders (27 persons), 3. field engineers (30 persons) and 4. field technicians (31 persons). The total number of participants in the four workshops was 114.

Table (1) shows the split of the participants over the four irrigation districts. A list of invited participants who attended the workshops is included in annex A1.

Table 1. Number of Participants in the Four Workshops

Workshop No.	Category	Irrigation District				Sub-total No.
		Ibrahimia	S. Zifta	W. Esna	Luxor	
1	Managers	6	6	8	6	26
2	Stakeholders	8	5	7	7	27
3	Engineers	10	7	8	5	30
4	Technicians	10	8	7	6	31
Total		34	26	30	24	114

3.3 Workshop Topics:

The central theme of the four workshops is integrated water management district. Lectures and training sessions were organized to cover the following topics:

- Principles of integrated water management (Eng. Abdel Rahman Shalaby)
- Institutional reform and its impact on integrated water management (Dr. Hisham Kandil and Dr. Mohsen El-Arabawy).
- Introduction to computers (Dr. Mohamed Ramy and Dr. Hatem Hassan)
- Management and use of data and information (Dr. Mohamed Ramy and Dr. Hatem Hassan)
- Water quality and pollution control (Dr. Shaden Abdel Gawad)
- Water monitoring including water quantity and quality measurements (Eng. Gamal El-Shafi and Tanta Water Measuring Group)
- Groundwater principles and conjunctive use of surface and groundwater (Dr. Fatma Abdel Rahman)
- Reuse of drainage water and wastewater (Dr. Samia El-Guindy and Dr. Ragab Abdel Azim)
- Water Management, water allocation and matching supply and demand (Eng. Maher El-Khodary, Eng. Hussien Elwan and Dr. Ragab Abdel Azim)
- Public and private sectors collaboration in water management and decision making (Eng. Essam Barakat)
- Role of the Water Communication Unit in increasing public awareness (Dr. Hisham Moustafa)

All topics were discussed at each workshop. Emphasis varied on the focus group. In addition to the formal day time lectures and training, the participants indulged in evening group discussions to come up with preliminary implementation plans for the integrated water management at the four districts. Table (2) shows the distribution of the lecture hours and training sessions over the different topics and group discussions for the four workshops. A

complete list of the instructors of the different lectures together with their titles is given in Annex (A2).

Table 2. Distribution of Lecture Hours and Training Sessions Over the Different Topics and the Group Discussion Periods

Topic	Managers		Stakeholders		Engineers		Technicians	
	Lect.	Prac.	Lect.	Prac.	Lect.	Prac.	Lect.	Prac.
Principles of integrated water management.	1	0	1	0	2	0	1	0
Institutional reform	2	0	2	0	2	0	1	0
Basic computer use	1	1	1	0	2	2	3	4
Data and Models	1	0	0	0	2	0	2	0
Water quality and pollution control	1	0	1	0	2	0	2	0
Water monitoring and measurements	1	0	1	0	1	4	1	4
Groundwater	1	0	1	0	2	2	2	1
Reuse of drainage water and wastewater	1	1	1	1	2	1	1	0
Water management, matching supply and demand	1	0	1	0	1	2	1	2
Public-private sectors collaboration	1	0	2	0	1	0	1	0
Water Communication Unit	2	0	2	0	2	0	2	0
Working groups and Discussions	3	0	3	0	3	0	3	0
Preparation of Implementation Plans	0	2	0	2	0	4	0	4
Total Hours	16	4	16	3	22	15	20	15

3.4 Time-table:

A full day consisted of four morning sessions, two or three afternoon sessions and an evening group discussion period. Each lecture, training session or group discussion period had duration of one hour. Lectures started each day at 9:00 am and continued up to 1:00 pm. There was a 30-minute break from 1:00 to 1:30 pm. Lecture resumed from 1:30 to 3:30 pm (workshops 1 and 2) and from 1:30 to 4:30 (workshops 3 and 4). The evening group discussion started at 8:00 pm. Exact schedules for the four workshops are given in Annex A3.

4. SUMMARY OF MATERIALS PRESENTED

An ensemble of workshop notes was distributed to the participants on the first day of each workshop. The material for each topic is either prepared and delivered by a single instructor or by more than one person. The notes are either typed manuscripts or copies of overhead transparencies or PowerPoint slides prepared for the workshop presentations. The course notes consist of some 400 A4 pages. In addition, an 83 page notes on groundwater development and management written in English Language were distributed to the engineers only of Workshop (3). Following are synopses of the lecture notes covering the different copies of the workshop.

4.1 Integrated Water Management: Basic Principles and Concepts

Eng. Abdel Rahman Shalaby, (Advisor of the Ministers' Office, MWRI).
[16 pages of workshop notes]

Brief introduction to the elements of the hydrologic cycle, variation of water availability over the globe and rising trends of water scarcity with continuous increase in World's population is given. The concepts of sustainable development and integrated water management as initiated in Dublin (Ireland) and Rio de Janeiro (Brazil) in 1992 are outlined including 1) the need for effective water resources management using holistic approach that considers socio-economic factors and that protects the ecosystem, 2) the importance of involving water users and stakeholders in decision making regarding water resources planning and management and 3) the need to recognize the economic value of water.

The notes summarize past, present and future efforts to manage water resources in Egypt. The following points are emphasized; 1) consider all water resources in planning and management, 2) augment the supply, 3) manage the demand, 4) carefully match the supply and the demand, 5) implement needed institutional reform, 6) encourage decentralization in decision making, 7) encourage the participation of non governmental organization, private sector and other forms of civil society, and 8) strengthen cooperation and coordination among relevant institutions and organizations at all levels (national, regional and international).

The need to establish integrated water management districts is presented together with the main constraints to implementing the concept. First phase organization chart of an integrated water management district (IWMD) is discussed. The organization includes four main sections; 1) water management and distribution, 2) maintenance, 3) planning and follow up, and 4) administration. Roles and activities of each section are outlined

4.2 Effect of Institutional Reform on the efficiency of Water Resources Management

Dr. Hisham Kandil, (Director, Technology and Information, Ministers' Office, MWRI) and Dr. Mohsen El-Arabawy, (Deputy Director, the Institutional Reform Unit, MWRI)
[18 page of workshop notes]

Through a set of 71 slides, this topic was presented to the workshop participants. Challenges facing the water sector in Egypt and strategic choices for the water policy are delineated. These can be broadly divided into; 1) optimum use of available water resources, 2) water quality protection and pollution control, 3) water resources development in close cooperation with other Nile Basin countries. The organization chart of MWRI is outlined together with the main duties of the Ministry which includes 1) formulating water policies and required programs for its implementation, 2) Planning and execution of new water resources projects, and 3) management of the extensive irrigation and drainage network (water distribution, conflict resolution, water quality protection, maintenance procedures, etc).

The notes provide an outlook on the following aspects; 1) conversion to integrated management of water resources, 2) improving the efficiency of the provided services, 3) promoting decentralization and decision making abilities at all levels, 4) enhancing the role of the private sector, 5) conversion of several Ministry units into independent and financially self sufficient units, 6) increasing water user participation and 7) adopting modern management systems and technologies.

There is a real need for institutional reform within MWRI and there are expected positive returns for such reform. The notes further discuss the governing rules for the institutional reform in Egypt and what have been achieved so far. The Ministry would keep its maintenance and operation responsibilities at a higher level encouraging the users to carry more responsibilities at the lower levels. Private sector and holding companies are given major responsibilities in the management of mega scale reclamation projects. The notes end by stressing the importance of public participation in decision making and summarizing the roles of the newly established institutional reform unit within MWRI and the roles of the integrated water management districts. The lecture left few open questions regarding the extension of the IWMD to more pilot areas, ways to strengthen links between water boards and IWMD and the dependence on the water boards and the private sector in the maintenance and operation activities.

4.3 Data and Information: Introduction to Computers

Dr. Mohamed Ramy, (Director, Main Information Center, MWRI) and Dr. Hatem Hassan, (Specialist, Consultation office of Integrated Systems)

[43 pages of workshop notes]

The lecture notes can be divided into three sections dealing with word processing, spread sheets and the internet. The notes give a brief introduction to computers by defining the operations of input, processing and output together with the hardware (physical units) associated with each operation. The two main types of software (operating systems and application programs) are also defined.

For word processing, the participants were introduced to the commonly used Microsoft Office (Word). Program capabilities of input, edit, format, save and print a document were reviewed. Participants were also introduced to opening a file existing on the hard disk of the computer or on a floppy. How to shift from Arabic to English and vice versa in the same document? and how to use the page set up to decide on the page layout, margins and size?

The ability to manipulate large amount of data (usually numerical) arranged in a set of rows and columns was demonstrated using the commonly used Microsoft Office (Excel). The program provides spread sheets of 256 columns designated by letters and 65536 rows designated by numbers (the number of rows depends on the version). The intersection of a column and a row is called a cell which is used to save a number, text or an equation. Participants were introduced to starting a new work sheet, opening an existing sheet, saving and formatting a sheet. Use of simple functions (arithmetic or statistical) to manipulate data was reviewed.

The third section of the notes is devoted to the definition of computer networks; 1) local area networks where several computers are connected together to share and exchange data usually through a server and 2) wide area networks where several computers in different locations are connected through satellites, micro-wave or telephone lines. Participants were introduced to the World Wide Web where files can be downloaded or uploaded any where in the World. Participants were introduced to surf through the net using appropriate addresses. Some important search sites were listed. Finally the use and merits of electronic mail were discussed.

4.4 Data and Information: Data Bases and Geographic Information Systems

Dr. Mohamed Ramy, (Director, Main Information Center, MWRI) and Dr. Hatem Hassan, (Specialist, Consultation office of Integrated Systems)

[55 pages of workshop notes]

The lecture notes cover two main topics namely; data bases and geographic information systems (GIS). The data base section includes a definition of the data base and an introduction to the commonly used Microsoft Office (Access). It contains two main elements; tables and queries (views). A table is the basic unit to register and store data. It is

made of rows (files) and columns (fields). Step by step illustrations is given to create a table, to append a row, to update a row, or to delete a row. Query can be performed using Structured Query Language (SQL) orders or through a set of windows.

Geographic information systems are management systems of a data base that is used to collect, store, retrieve, process, and display data of a geographic attribute. GIS therefore is composed of maps, tables and analysis tools. Maps are presented either through a Raster or Vector systems. Digital maps can be produced by digitizers, scanning, field data collection and remote sensing. Several examples to illustrate the power of GIS in hydrologic and water resources studies are presented. The notes outline the constraints for the wide use of the technology including; 1) lack of necessary information and data, 2) high initial cost to establish the system and 3) unfamiliarity with practical applications. The system can be used to perform important queries; 1) retrieval of information around a given local (point, line or area) based on a set distance, 2) retrieval of information that has the same attribute. The information can be stored in several overlays. Given the flood zones of a river and maps that show villages and road networks, one can deduce flood prone villages and road reaches.

4.5 Water Quality and Pollution Control

Dr. Shaden Abdel Gawad, (Vice-Chairperson, National Water Research Center, MWRI)
[22 pages of workshop notes]

The following terms are briefly defined: the environment, environmental pollution, environmental degradation, environmental protection, environmental impact assessment, pollutants, water pollution, water quality, wastewater, domestic wastewater, water quality control, water quality monitoring, and water scarcity. There are three main elements to water quality; physical, chemical and micro-biological. Physical elements include: color, odor, taste, temperature, turbidity and PH. Chemical elements include: electric conductivity, cations, anions, heavy metals, nutrients, dissolved oxygen, biological oxygen demand, chemical oxygen demand and pesticides. Micro-biological elements include: bacteria, algae, viruses, fungi and Protozoa.

A review of water quality standards is given for irrigation, drinking purpose and domestic use. The notes outline the different sources of pollution for surface and groundwater including; domestic and industrial wastewater, agricultural drainage, navigation, garbage and solid waste. The notes discuss the self purification nature of running water through dilution, oxidation, sediment adsorption and fish and aquatic weed absorption and effect of the ultra violet rays. A review of the laws and legislations related to water quality protection and control is given. Ongoing efforts to preserve water quality in Egypt includes: monitoring programs of key parameters, pollution control, strict application of the relevant laws, training, users involvement in management and finally by increasing environmental awareness at all levels by providing relevant information and facts

4.6 Monitoring of Water Quantity and Quality

Eng. Gamal El-Shafie, (Undersecretary, Central Directorate for Water Distribution, Irrigation Sector, MWRI) and Dr. Mohamed Abdel Khalek, (Director, Water Quality Unit, MWRI)
[25 pages of workshop notes]

The notes emphasize the importance of having accurate measurements of the discharge for proper water distribution. The notes outline the precautions that should be considered in selecting the discharge measurement sites and list the required equipment to carry the job. Errors that are common in discharge measurements are outlined. The area- velocity method is described where the velocity is measured at two depths in several sections across the water way using a current meter. An average velocity for each strip is determined. The sum of the products of the average velocity within a strip and its area for all strips provides the flow rate through the waterway.

It is important to monitor the water quality as well. The design of a suitable water quality monitoring program depends on the answers to the following questions: What are the objectives of the monitoring program? Where are the measurement taken? What parameters are measured? How frequent (hourly, daily monthly or annually)? Which method is used (laboratory determinations using samples or in situ field methods)? Who is going to evaluate the results? The notes list the information that should be associated with each sample and discuss the different types of samples (grab, composite, and integrated). The most important water quality parameters are listed together with their acceptable range for different application and suggested measuring techniques.

Water quantity and quality measurements for surface water and groundwater were carried out by the participants of Workshops (3) and (4), engineers and technicians, near El-Kanater El-Khiera. Staff from the Drainage Research Institute and the Research Institute of Groundwater supervised these activities.

4.7 Groundwater Management: Conjunctive Use of Surface and Groundwater

Dr. Fatma Abdel Rahman, (Chairperson, Groundwater Sector, MWRI)
[44 pages of workshop notes]

Some 95% of the World's fresh water is groundwater. Groundwater is the main safe source of drinking water for millions of the World's inhabitants. Groundwater can play an important role in solving local and temporal problems associated with water management. For instance, in Egypt, water is usually available in large quantities in main canals. Branch canals may suffer deficiencies at their tail ends especially during periods of peak crop demands. Groundwater can augment available surface resources and help in resolving the shortage. When compared to surface water resources, groundwater is stored in large aquifers, suffers minimum evaporation losses, has very low velocity and is less susceptible to pollution.

The notes summarize data and information needed to develop and manage groundwater resources (aquifer boundaries and characteristics, safe yield, economics of discharge and recharge schemes, natural and man-made changes). Models are often used to study the response of the aquifer to variety of excitations. The notes outline different modes of

conjunctive use of surface and groundwater. The notes review the different groundwater basins in Egypt; their extent and their potential in meeting the increasing water demands of the country. The results of several studies involving conjunctive use of surface- groundwater in Egypt are presented. These include; 1) effect of groundwater pumping on drainage conditions and flexibility of the irrigation system in an area of 4200 feddans in the Minia Governorate, 2) managing groundwater to mitigate droughts in Egypt. The study was initiated by the severe drought in the Nile Basin over the period 1983-1989. Investigation has been carried out to increase groundwater pumping in several regions and for maximum number of years without violating a set of constraints (maximum regional drawdown is less than 3 m, changes in fresh water thickness is less than 10% of its original value and inland movement of the fresh-sea water interface is less than 10 km), and 3) vertical drainage and conjunctive use of surface- groundwater in El-Fashn area west of the Nile between Beni Suef and Menia. Short and long term solutions to water logging and salinity in the old lands due to reclamation activities at adjacent up- lands are outlined.

The participants of Workshop (3), field engineers, were given additional course notes on groundwater development and management prepared by Dr. Fatma Abdel Rahman. The notes which consist of 83 pages cover the following subjects; 1) occurrence and flow of groundwater, 2) well hydraulics, design and implementation, 3) groundwater quality and pollution, 4) groundwater protection, 5) planning and management, and 6) evaluation of groundwater development and management. The notes end by a glossary of common groundwater related terms.

4.8 Reuse of Drainage Water

Dr. Samia El-Guindy, (Director, Central Office of the Advisory Panel Project on Water Management, NWRC, MWRI) and Dr. Ragab Abdel Azim, (Central Directorate for Water Distribution, Irrigation Sector, MWRI)

[53 pages of workshop notes]

Two sets of notes have been prepared for this topic by two different instructors. Set (1) prepared by Dr. Samia El-Guindy covers historic development in reusing drainage water for irrigation in Egypt. It discusses the spatial and temporal variation of the drainage water quality depending on the quantity and quality of irrigation water, cropping pattern, climatic conditions, and proximity to the sea. The notes discuss the sources and the effect of the existence of the following substances in drainage water: salts, nutrients and pesticides. Environmental and health impacts of reusing drainage water in irrigation are presented. Ongoing efforts to preserve water quality and control pollution are outlined.

The second set of notes prepared by Dr. Ragab Abdel Azim is divided into three sections as follows; 1) standards and constraints for the reuse of wastewater (agricultural and domestic), 2) reuse of agricultural drainage water, and 3) reuse of domestic wastewater. Section (1) reviews concerns associated with the existence of five types of pollutants in wastewater; salts, heavy metals, (viruses, bacteria, protozoa, helminthes), organic compounds and nutrients. Standards are given for acceptable range of these elements in irrigation water. This

section reviews also several alternatives for the reuse of wastewater including; treatment, blending, cyclic application, and provision of leaching.

The second section reviews the available quantities of drainage water for reuse in Egypt. Currently 4 billion cubic meters per year (bcm/y) of drainage water are reused leaving 12 bcm/y as drainage outflow to the sea. Future expansion in irrigated lands depends on increasing the drainage water reuse to some 8 bcm/y reducing the outflow to the sea to 8 bcm/y. The notes review the current reuse policies. It discusses the constraints on expanding the reuse (need to direct a minimum flow to the northern lakes to preserve the lake environment, and to maintain a salt balance for the Delta, and because of the expected reduced generation of drainage quantities due to irrigation improvement projects in the Delta and reduced Nile diversions to the Delta because of reclamation activities in Upper Egypt). The notes present the merits of the intermediate reuse concept.

The third section of the notes is devoted to the reuse of domestic wastewater. It outlines current and future production levels of domestic wastewater and the quantities that are currently treated. It reviews current practices in reusing domestic wastewater and future reuse plans. In 2017, the quantity of wastewater receiving secondary treatment should reach 4.5 bcm/y.

4.9 Water Allocation: Matching Supply and Demand

Eng. Hussien Elwan, (Chairman, Egyptian Public Authority for Drainage Projects, MWRI), Eng. Maher El-Khodary, (Chairman, Irrigation Sector, MWRI) and Dr. Ragab Abdel Azim, (Central Directorate for Water Distribution, Irrigation Sector, MWRI)
[57 pages of workshop notes]

The workshop notes for this topic are prepared by three instructors. The manuscript prepared by Eng. Hussien Elwan concentrates on the requirements to complete matching of water supplies and demands. The notes review new challenges in the agriculture sector and other constraints related to the fixed quota of the Nile water, limitation of the storage capacity within the irrigation network and the extensive length of the irrigation network which requires long travel time from Aswan to the Delta canals. There is a need to know the cropping pattern two weeks ahead of diverting the required amounts at Aswan. This requires the existence of a mechanism that facilitates the exchange of information between MALR and MWRI at all levels both quickly and accurately. Executive steps required to complete the matching program between supply and demand are outlined. Currently the matching program is effective in 69 irrigation districts serving an area of 3 million feddans.

The second manuscript prepared by Eng. Maher El-Khodary discusses the operating rules of the High Aswan Dam (HAD) and existing challenges facing the management of water resources in Egypt. The manuscript discusses the canal water demand which includes agricultural, domestic, industrial demands and losses. The Nile water supply to the canal is the total canal demand minus drainage water reuse and groundwater supplies if available. The notes outline the need of water measurement and flow monitoring for proper water distribution.

The introductory part of the third manuscript prepared by Dr. Ragab Abdel Azim is very similar to that prepared by Eng. Elwan as it reviews new developments in the agricultural and irrigation systems and the need to match supply and demand. The notes then outline the components of the matching program; 1) agreement on the boundaries as irrigation and agricultural districts do not often match, 2) delineating the service area of each canal, 3) selecting the main crops to obtain their specific data, 4) preparation of the required forms to collect the current crop pattern and its expectation over the coming two weeks, 5) input the information to the data base, 6) use of special computer program to come up with canal demand, 7) use of electronic mail to send the data from the irrigation district to higher levels, 8) monitoring of canal water levels and flow rates. The notes present the required organization chart to transfer the data from the field level to the central directorate for water distribution. The notes review the calculations of the canal water demand based on calculating reference crop evapo-transpiration (Hargreeves and Samani Method) and the use of appropriate crop factors and irrigation efficiency. The notes outline also calculation of the irrigation intervals. A detailed example is given to come up with the water requirements of a given canal over 10 day intervals.

4.10 Participation in Irrigation System Management

Eng. Essam Barakat, (Undersecretary, Irrigation Advisory Service, MWRI) and Dr. Hussien El-Atfy, (Undersecretary, the Ministers' Office Affairs, MWRI)
[10 pages of workshop notes]

The notes review traditional as well as current practices on participatory irrigation water management in Egypt. Currently there are two models of participation; 1) use of private companies to provide given services with appropriate compensation either from MWRI or the user. This model is difficult to apply in the old lands although it is practiced through the holding companies in El-Salam and Toshka Projects, 2) delegate responsibilities to the users through water users associations on the mesqa level, subsurface drainage collector level or branch canal level. On the branch canal level there are three direction for implementation i) participation in decision making through active involvement of key stakeholders, ii) formation of water boards. The board plays an active role in improving communication links between MWRI and the users, effective mean for conflict resolution among the users and a mean to reduce encroachments and violations on the irrigation- drainage system, and iii) transfer of operations and maintenance activities to the water boards as an ultimate goal.

Cost recovery is a hot issue that concern both MWRI and the users. Currently, the cost of improving private mesqas is totally recovered from the users over 20 years without interest. Users carry all costs associated with operation and maintenance. Improvements on branch canals (Public ownership) are totally covered by the government (MWRI). There are still constraints on carrying operation and maintenance costs of branch canals by the relevant water boards because of legal aspects. The notes end by outlining MWRI future outlooks for participatory water management in old lands, newly reclaimed lands, mega scale reclamation projects and areas that depend solely on groundwater. The roles and responsibilities of the

different actors; district engineer, water boards and or water users associations and the irrigation advisory services should be clear and explicit.

4.11 Water Communication Unit

Dr. Hisham Moustafa, (Director for the Water Communication Unit, MWRI) and Dr. Hussien El-Atfy, (Undersecretary, the Ministers' Office Affairs, MWRI)
[52 pages of workshop notes]

The lecture notes includes copies of 52 slides that cover the Water communication Unit activities and responsibilities. The notes outline the Unit long term communication strategies, steps to design and implement messages and the achievements of the Unit. The organization structure of the unit is presented. Since its initiation the unit has conducted extended field research involving water users (farmers) and district engineers, produced several TV messages for water conservation and water quality protection, trained district engineers to improve their relationship with the water users, produced a TV series as well as several posters and printed materials to increase awareness of the value of water and the need to protect its resources.

The results of the two field studies are presented. The first field research involving district engineers covered the following aspects; background on the engineers and their districts, awareness of the communication unit activities, knowledge of Egypt's water resources, relationship of the district engineer with baharies and farmers, links to MWRI and their personal skills (abilities to conduct meetings, give a presentation, etc). The farmers field research focuses on the following aspects; knowledge that the Nile is the main source of water in Egypt, ten countries constitute the Nile Basin, Egypt has a fixed quota of the Nile water, Egypt is facing a water scarcity condition, Toshka and El-Salam reclamation projects, role of the water users associations, night irrigation saves water, rice consumes large amounts of water, some rice varieties consume less water, MWRI limits the area cultivated with rice etc.

5. IMPLEMENTATION PLAN PREPARATION

One of the objectives of the workshops was to let the participants actively indulge in preparing initial plans for the implementation of the IWMD concept in their own districts. Workshop participants were asked to prepare eight implementation plans, two plans per district. For each district managers and stakeholders prepared a joint plan and engineers and technicians prepared a second joint plan. The participants of workshops (1) and (2) for managers and stakeholders respectively spent two evening sessions and two morning sessions in the last day of the workshop (a total of four hours) to prepare their implementation plans. They presented their findings on the final session of the workshop. Participants of Workshop (3) and (4) for field engineers and technicians followed the same suit but had two extra evening sessions (a total of six hours) to put their implementation plans together.

The workshop participants were asked to bring some basic data regarding their districts to be utilized during the workshop. The list of items includes:

- District and general irrigation directorate names.
- District boundaries and overlap of the irrigation and drainage command areas
- District current and potential water resources (surface canal water, groundwater wells, drainage water reuse, rainfall harvesting).
- Schematic of the irrigation and drainage networks.
- Built up areas, wastewater treatment facilities and black spots for pollution.
- Location of existing groundwater wells, and reuse pumping stations.
- Water quality and flow in the irrigation and drainage systems.
- Current procedures for data handling.
- Cropping pattern.
- Water demand of all users (agriculture, urban and industrial).
- Problems associated with matching supply and demand
- Laws and their enforcements.
- District organization structure (number of employees and their responsibilities).
- Role of private sector, branch canal water users, water user associations and the water advisory service.

After presenting the current situation (status quo), the participants were asked to identify major problems and constraints and to come up with an action plan to improve the present situation. The outcome of the eight implementation plans that were produced in the four workshops is presented in Annex A5. They all lack the consideration of implementation timeline, budget and indicators of performance. As a follow up activity to the workshops, engineers from WPAU visited the four districts and worked extra hours with the IWMD directors to build up the implementation plans. The results of these endeavors for Ibrahimia IWMD and West Esna IWMD are given in Annex A6 which also includes a brief description of the four districts.

The consultants strongly feel that more time and emphasis should be given to outline what should be included in an implementation plan. Strategy implementation is the process by which strategies and policies are put into action through the development of programs, budgets and procedures. At a minimum an action plan states what actions are going to be taken, by whom, during what time frame and with what expected results. After programs have been developed, the budget process begins. Planning a budget is a real check on the feasibility of the policy. After the program and budget are approved, standard operating procedures must be developed. They typically detail the various activities that must be carried out to complete programs. Before plans can lead to actual performance, a corporation should be appropriately organized, programs should be adequately staffed and activities should be directed towards achieving desired objectives.

Wheelen and Hunger (1998) indicated that most people in an organization who are crucial to the successful strategy implementation probably have little to do with the development of the strategy. Therefore they might be entirely ignorant of the vast amount of data and work that went into the formulation process. Unless changes in strategies and policies and their

importance are communicated clearly to all operational managers, there can be a lot of resistance and foot dragging. Operational managers may hope to influence top managers into abandoning the new plans and returning to old ways.

The consultants feel that a whole lot of the materials presented in WPAU report # 62 on “Integrated Water Management District: MWRI Plan for Pilot Implementation” should be incorporated in the workshop curriculum as it directly addresses implementation steps and issues.

6. WORKSHOP FINDINGS

At the end of each workshop the workshop participants filled a written questionnaire that consists of 20 questions and were encouraged to give their remarks on the workshops. Later on, the consultants held several meetings with the workshops instructors and participants of the four workshops were arranged to get a feed back from both sides.

6.1 Questionnaire Results

Table (3) summarizes the results of the four questionnaires conducted at the end of the four workshops. The following are the main findings as reported by the participants. The number given between the two prentices represents the % of the participants that agree with the statement made.

1. Overall opinion of the workshop is excellent (67%)
2. Participants benefited from attending the workshop (66.5%)
3. No difficulty in following (understanding) the workshop material (81%)
4. Workshop time was rather short, not enough (63%)
5. The participants have got a clear understanding of the concept of integrated water management as applied at the district level (89%)
6. There is a need to modify the content of the workshop (59%)
7. Excellent performance of the instructors (83%)
8. Presentations were clear (87%)
9. Lecture notes were excellent (79.5%)
10. Topics of the workshop are well thought of and selected (86%)
11. The discussions during the workshop were effective (89%)
12. Training sessions were effective (85%)
13. The duration of the workshop should increase (85%)
14. Number of lectures and trainings session per day should be reduced (71%)
15. Training place was not appropriate (57%)
16. Workshop management was adequate (77%)
17. There is no need to reduce the number of participant per workshop (82%)
18. There is necessity to invite other participants to the workshop (43%)
19. Other suggestions for workshop improvements (56%)
20. Other comments (33%)

The following remarks are given by one or more of the workshop participants

- Evening sessions should be canceled
- It is very important to visit the two districts implementing the IWMD concept.
- Increase the internet and computer training time
- Increase the time allocated to groundwater management and wells
- Increase the workshop duration
- Give more emphasis to IWMD. Lectures are rather general. Relationship between IWMD and Water Boards is not clear.
- Allow more time for discussions
- Add the following topics to the workshop: Surface and subsurface drainage, pumping stations, irrigation improvement
- Increase the per diem and travel allowance
- No need to separate managers and decision makers from stakeholders
- No need to separate engineers from technicians
- Allow more time between consecutive lectures and eliminate the very long lunch break.
- Increase the evening group discussion periods

Table 3. Questionnaire Results

Evaluation Question		Decision Makers			Stakeholders			Engineers			Technicians		
		26 Participants			27 Participants			29 Participants			31 Participants		
		Exc.	Avg.	Poor	Exc.	Avg.	Poor	Exc.	Avg.	Poor	Exc.	Avg.	Poor
1	How would you rate the Workshop?	69%	27%	4%	56%	15%	0%	66%	24%	10%	77%	6%	0%
2	How much benefit have you obtained by attending the workshop?	65%	31%	4%	81%	11%	0%	55%	41%	3%	65%	19%	0%
7	How would you rate teaching of the workshop instructors?	85%	12%	4%	89%	4%	0%	76%	24%	0%	81%	3%	0%
9	How would you rate the workshop notes?	81%	19%	0%	81%	11%	0%	79%	21%	0%	77%	6%	0%

Note: If the sum of % of the responses (answers) to a given question is less than 100%, the remaining is considered as no answer.

Table 3. Questionnaire Results (Continued)

Evaluation Question		Decision Makers		Stakeholders		Engineers		Technicians	
		26 Participants		27 Participants		29 Participants		31 Participants	
		Yes	No	Yes	No	Yes	No	Yes	No
3	Was the workshop material difficult to understand?	8%	92%	7%	85%	10%	86%	23%	61%
4	Was the workshop time enough to cover the different topics?	50%	50%	22%	70%	41%	59%	10%	74%
5	Did you develop a clear understanding of IWMD concept?	88%	12%	93%	0%	90%	10%	84%	0%
6	Would you recommend changes in the contents (topics) of the workshop?	69%	31%	59%	33%	55%	41%	52%	32%
8	Were the lectures clear?	92%	4%	78%	15%	93%	0%	84%	0%
10	Were the topics well thought of and prepared?	92%	8%	85%	7%	90%	10%	77%	6%
11	Were the discussions through the workshop effective?	96%	4%	85%	7%	97%	3%	77%	6%
12	Were the training sessions effective?	92%	8%	81%	11%	90%	10%	77%	3%
13	Would you prefer a longer duration of the workshop	58%	38%	67%	26%	69%	31%	81%	3%
14	Would you prefer less number of lecture hours per day?	62%	38%	52%	33%	86%	14%	84%	0%
15	Would you prefer different location for the workshop?	38%	62%	56%	26%	14%	79%	77%	6%
16	The workshop organization and management were adequate?	73%	12%	78%	7%	76%	7%	81%	3%
17	Would you prefer less number of participants in the workshop?	31%	69%	15%	74%	21%	76%	6%	77%
18	Would you recommend the invitation of others to the workshop?	54%	46%	59%	30%	48%	45%	10%	74%
19	Do you have other suggestions to improve the workshop?	54%	46%	48%	44%	72%	28%	48%	35%
20	Do you have other comments?	31%	69%	41%	37%	17%	59%	42%	42%

6.2 Participants Interviews:

Several meetings were conducted with the workshop participants to seek their feed back on the workshop set up and on ways to improve the effectiveness of the training. The following meetings were conducted:

June 24, 2003	Managers and decision makers, Sharkia General Irrigation Directorate, (4 persons)
June 24, 2003	Engineers and technicians, Ibrahimia IWMD, (10 persons)
June 27, 2003	Managers and decision makers, Gharbia General Irrigation Directorate, (3 persons)
June 27, 2003	Engineers and technicians, Zifta IWMD, (6 persons)
July 1, 2003	Stakeholders, Ibrahimia IWMD, (11 persons).
July 3, 2003	Stakeholders, West Zifta IWMD, (5 persons)
July 8, 2003	Engineers and technicians, W. Esna Irrigation District, (7 persons)
July 8, 2003	Stakeholders, W. Esna Irrigation District, (3 persons)
July 9, 2003	Engineers and technicians, Luxor Irrigation District, (4 persons)
July 9, 2003	Stakeholders, Luxor Irrigation District, (3 persons)

The comments of the participants can be grouped as follows:

General:

Presentations and lecture notes are excellent. It would be nice to have the lecture notes delivered to the participants before the workshop to provide an ample time for their review. It would also be nice to arrange visits to those districts implementing the IWMD concept. Participants should be combined in one group. Evening sessions should be eliminated. The evening should be spared for review of materials, rest or visits. There was a scatter of opinion regarding the location of the workshop. Incentives and per diem should be increased. This can be done by providing two meals per day only. Giving the equivalent of an air ticket but allowing the participants to use their own means of transportation.

Water Quality and Pollution Control:

Solid waste disposal and the discharge of domestic and sometimes industrial wastewater are real problems that necessitate proper and prompt collective actions. Tight enforcement of the laws, role of communication and information dissemination regarding the dangers associated with pollution, role of local authorities and water users associations, and finding innovative simple treatment facilities were brought. Merits and problems associated with waterway coverage within villages and or changing the alignment of the waterway outside the built up areas were also discussed.

Groundwater Wells:

Some eleven pumping wells are not operating in Ibrahimia Irrigation District because of contractual problems and delays. These wells can help in reducing water shortages during

periods of peak demand. There is a need for specialized training in groundwater. Lectures should be directed to handle local conditions.

Institutional Reform:

Lectures are too general. Engineers are worried about their future promotion and advancement as top management positions are being reduced. How is the IWMD concept going to be extended when problems do exist in pilot districts? The responsibilities and authorities of IWMD directors are not very clear. There is a need for more focus on the IWMD organization chart in relation to the MWRI overall organization chart. The roles of the branch canal water users, water users associations and the irrigation advisory service are not very clear. Who forms the water user organizations in an IWMD which has none?

Topics Related to Computers:

Participants who have limited or no previous experience with computers feel that the time is not enough and require separate training over longer time period. Engineers and some technicians who are versatile with computer usage consider the material trivial and shallow. Use of Data Base and Geographic Information Systems was not clear to most technicians. A point was made regarding the possibility of the MWRI to finance the purchase of personal computers to its employees following the steps of the Ministry of Education Programs to help students and teachers buying their own computers.

General and Specific Training:

There is a need to provide general introduction to the following subjects as they are related to IWMD; reuse pumping stations, subsurface drainage, irrigation improvement and basic management. There is also a need for more in depth training on the following topics; intermediate reuse of drainage water, use of data base to perform the IWMD responsibilities, use of the supply-demand matching programs, and groundwater management at the regional and local levels.

Water Allocation:

Participants stressed the role of the water users associations and branch canal users in observing and controlling the areas cultivated with rice or other excessive water consuming crops. Indicative crop pattern is not accurate. There is a claim that what is reported of the rice areas is not what is really on the ground. There is a need to inform the farmers with rice varieties that consumes less water. There is a need to improve the productivity of other crops to compete with rice. There is a need for more training on flow measurement based on discharge and not levels and on adopting the use of the supply-demand matching programs.

Water Communication:

The impact of the Water Communication Unit is not strongly felt in Upper Egypt. There is a communication center in each governorate that belongs to the Ministry of Communication that can be used to hold meetings to promote the messages of the water communication unit. The unit should direct its effort to increase awareness of the IWMD concept.

6.3 Instructor's Interviews:

Nine of the workshop instructors were interviewed at their offices to get their feed back regarding the workshop organization, workshop participants and what would they do different if the experience is to be repeated. The list of the instructors interviewed includes: Dr. F. Abdel Rahman, Dr. R. Abdel Azim, Dr. M El-Arabawy, Dr. S. El-Guindy, Eng. H. Elwan, Dr. H. Kandil, Dr. H. Moustafa, Dr. M. Ramy, and Eng. A. Shalaby. The workshop instructors shared the following views

The workshops have provided a good forum to introduce the integrated water management concept at the district level and to bring about issues related to its implementation. The workshop participants were enthusiastic and showed clear interest. Discussions were useful and effective and the overall experience was positive and productive.

At this stage of time, there are no clear cut answers to some of the raised questions. Pilots are still in their infancy and the experience will grow with time.

The flow of the workshop topics can be smoothed. The ensemble of course notes was put together in relatively short time. Some topics were covered by typed manuscripts while others are copies of the prepared overhead transparencies or of the Power Point slides.

The computer facilities at the workshop location were not the best (very slow internet connection). It is much better to conduct specialized training in other well equipped centers. The participants have different backgrounds and computer knowledge. Some are computer literate while others are already very good users

7. RECOMMENDATION

7.1 General Recommendations for Future Improvements of Materials and Presentations

Workshop notes should be reviewed to omit repetitions and some overlap. Special attention should be given to the following two groups of topics: 1) water quality and pollution control, reuse of drainage water, water monitoring including water quantity and quality (lecture notes prepared by Dr. S. El Guindy, Dr. R. Abdel Azim, Dr. M. Abdel Khalek and Dr. S. Abdel Gawad show an overlap in discussing water quality parameters and standards and the sources of pollution) and 2) water management, water allocation and matching supply and demand (Lecture notes prepared by Eng. H. Elwan, Eng. M. El-Khodary and Dr. R. Abdel Azim show clear overlap in discussing the matching of supply and demand).

Use interdisciplinary approach to integrate the training materials and lectures with emphasis on how to implement IWMD at the district level. Special attention to IWMD is recommended in the following topics: Integrated water management, institutional reform, user's participation and water communication.

Use examples from the existing IWMD to illustrate the IWMD concepts. Particular attention should be given to lecture notes and training sessions related to the following subjects: Conjunctive use of surface and groundwater, matching the supply and demand, reuse of

drainage water, organization charts of the IWMD to fulfill its duties, links and relationships between branch canal water users, water users associations, local units and IWMD, and the role of water communication in promoting water quality preservation, water use efficiency etc at the district level.

Visit one or two of the districts already implementing IWMD concept to interact with field staff and stakeholders and promote discussions on anticipated problems and ways to handle them.

For topics of general nature, it is appropriate to keep the four groups together (decision makers, stakeholders, engineers and technicians). This can enhance group discussion and reflect a pool of opinions. For specialized training, groups can be separated to suite their different backgrounds, expertise and interests.

A lecture on basic management should be added to the list of topics to introduce the participants to the meaning of action and implementation plans and what should be included in their preparation.

Provide specialized training for engineers on appropriate tools to support integrated data management at the district level (matching supply and demand, groundwater packages, data handling and transfer, etc) and provide more hands on field measurements exercises for technicians and engineers.

Use MWRI training center and or private firms in each region for basic computer training; word processing, spread sheets, data base, use of internet and electronic mail.

Eliminate the evening sessions, distribute the lectures, training sessions and discussions between 9:00 am and 5:00 pm allowing for a short break (11:00 to 11:30) and a lunch break (1:30 to 3:00) pm.

Lecture (1):	9:00 – 10:00
Lecture (2):	10:00 – 11:00
Break:	11:00 – 11:30
Lecture (3):	11:30 – 12:30
Lecture (4):	12:30 – 13:30
Lunch:	13:30 – 15:00
Lecture (5):	15:00 – 16:00
Lecture (6):	16:00 – 17:00

Workshop notes should be sent in advance to the participants to provide ample time for their review and self preparation.

7.2 Recommendations for Future Improvement of the Preparation of IWMD Implementation Plan

Despite the clear success of the workshops in introducing the concept of integrated water management, its merits and ingredients, the outcome of the eight preliminary implementation plans was more of a description to the current situation. This may be due to the following reasons:

- The time allocated to the group discussion leading to the implementation plans was rather short. Participants needed time to digest concepts and to return to their bases to get more data and information
- Participants needed more in depth exposure to what goes into the preparation of implementation plans. Detailed guidelines are needed.
- Feed back from the participants indicated that the relationship between the proposed organization structure of the IWMD and concerned ministerial bodies was not clear. The private sector role was also not clear and similarly the role of the IWMD in curbing pollution and water quality degradation.

For the next cycle of training workshops, attention should be given to the following subjects related to policy implementation

- Identification of district boundaries
- Identification of district current and potential water resources
- Study of the district water demands (area served, cropping pattern, municipal and industrial requirements).
- Maintenance plans for canals, drains, pumps and other service equipment
- Measurement of flow and water quality parameter
- Matching supply and demand and the use of data bases and information systems
- The relationship between the IWMD and different ministerial bodies with emphasis on the responsibilities and authorities of the IWMD director.
- Ties and links between branch canal water users and water users associations and the IWMD.
- Identification of staffing and training needs.
- Preparation of the required budget.

Enough time should be devoted to train the participants on how to prepare the implementation plans. A working group of managers, engineers, technicians and stakeholders should prepare the action plan for the district including IWMD boundaries, IWMD organization structure and IWMD needs in terms of manpower, equipment, training and budget. Details of the implementation plans should be worked out and finalized at the district with initial guidance and support of the WPAU, MWRI.

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ANNEX A.1 LIST OF PARTICIPANTS

IBRAHIMIA IWMD

(**) Participants interviewed by the consultants

1. Managers:

Eng. Abdel Haq Khatter	Chairman of the Central Department, Sharkia **
Eng. Gamil Abdel Halim Farahat	General Director for Irrigation, West Sharkia **
Eng. Abdel Fattah Ibrahim Attia	General Director for Drainage, South Sharkia **
Eng. Abdel Latif El-Said Ahmed	Director, Ibrahimia IWMD **
Eng. Hosny El-Zaher	Chairman of the Central Department for Drainage, East Delta **
Eng. Abdel Fattah Abdel Salam	General Director, Groundwater Department, Tanta

2. Stakeholders:

Eng. Mohamed Ahmed Morsy	Chairman, Ibrahimia City Council **
Eng. Abdel Aziz Saad	Deputy Chairman, Ibrahimia City Council **
Eng. Abdel Hamid	Director, NOPWASD, Ibrahimia **
Eng. Salim Nada	Director, Ibrahimia Agricultural Directorate **
Mr. Mohamed Shaki	Chairman, Bahr Elhossan Water Board **
Mr. Tarik Farag	El-Naseria Mayor **
Mr. Raouhy Mohamed Ahmed	Chairman, Ibrahimia Local Council **
Mr. Mohamed Abdel Kader	Director, Ibrahimia Agricultural Cooperative **

3. Engineers:

Eng. Ibrahim Ezzat Salim	Director of Works **
Eng. Mohamed Farid Abdallah	Assistant Director of Works
Eng. Hamada Mohamed Ahmed	Assistant Director of Works **
Eng. Ibrahim Mohamed Tolba	Maintenance Engineer **
Eng. Tamer Ibrahim Gomaa	Maintenance Engineer **
Eng. Mostafa Abdel Hamid	Water Distribution Engineer **
Eng. Ihab Mohamed Antar	Planning and Follow up Engineer
Eng. Maged Abdel Khalik Ali	Mechanical Engineer
Eng. Shehata Hamed Mahdy	Irrigation Advisory Service, Agricultural Eng.
Eng. Ashraf Mohamed El-Sayed	Engineer, General Dept. of Groundwater, Tanta

4. Technicians:

Mr. Mohamed Abdel Rahman	Technician **
Mr. Helmy Abdallah	Technician **
Mr. Adel Hassaneen	Technician
Mr. Abdel Hafiz Mohamed	Technician
Ms. Abeer Abdel Majeed	Technician **
Mr. Yehia Abdel Rahman	Technician

Mr. Mohamed Abdallah	Technician
Mr. Ahmed Khalil	Technician
Mr. Kamel Mohamed Hafiz	Technician **
Mr. Mahmoud Abdel Rahman	Technician

ZIFTA IWMD

(**) Participants interviewed by the consultants

1. Managers:

Eng. Hassab El-Nabi Mohamed	Chairman of the Central Department, Gharbia **
Eng. Antar Abu El-Fotouh	Chairman of the Central Department for Drainage, Tanta **
Eng. Nazez Anwar Moustafa	Chairman of the Central Mechanical & Electrical Department, Tanta
Eng. Abdel Salam El-Deeb	General Director for Irrigation, Zifta **
Eng. Makram Louis Ibrahim	General Director, Mechanical & Electrical Dept, Kafr El-Shiekh
Eng. Mohamed Samir Hamed	Director, Zifta IWMD **

2. Stakeholders:

Mr. Mahmoud El-Sebai El-Dakak	Chairman, Local Unit, Zifta **
Mr. Atta Ali Gaweesh	Deputy Chairman, Local Unit, Zifta **
Eng. Sabry Hammad	Director, Zifta Agricultural Directorate **
Mr. El-Hasaneen Mohamed	Chairman, Zifta Local Council **
Eng. Hassan Mahmoud Shehatta	Director, Agricultural Cooperative, Zifta **

3. Engineers

Eng. Gamal Girgis Rizk	Director of Works, Zifta IWMD
Eng. Fatma Abdel Aziz Behery	Director of Works, Zifta IWMD
Eng. Mohamed Omar	Director of Mechanical Works, Zifta IWMD **
Eng. Mohamed El-Sayed Khodier	Director of Works, Zifta IWMD
Eng. Azza Abdel Hamid Ahmed	Engineer, Zifta IWMD **
Eng. Manal Michil Abdel Maseeh	Engineer, Zifta IWMD
Eng. Abeer Mohamed Badr	Engineer, Zifta IWMD **

4. Technicians:

Mr. Mohamed Gaber Amin	Technician **
Mr. Safwat Mohamed Ezzat	Technician
Mr. Maher Fathy El Rouny	Technician
Mr. Aly Yehia El-Korashy	Technician
Mr. Nasr El-Raai El-Sadani	Technician
Mr. Shenouda El-Shahat Girgis	Technician **
Mr. Abdel Fattah Youssef Baraka	Technician
Mr. Mohamed Imam	Technician

WEST ESNA IWMD

(**) Participants interviewed by the consultants

1. Managers:

Eng. Mohamed Hassan A. Karim	Chairman of the Central Department for Water Resources and Irrigation, Qena
Eng. Sayed Mohamed Hassan	Chairman of the Central Department for Drainage, Upper Egypt
Eng. Ahmed Fouad El-Sayed	General Director for Irrigation , Qena
Eng. Louis Saleeb Nour	General Director for Water Distribution, Upper Egypt
Eng. Nagwa El-Khashab	General Director, Irrigation Advisory Service, Upper Egypt
Eng. Mohamed A. Latif Hamid	Drainage Inspector, Esna
Eng. Abdel Raouf Abdallah	General Director, Pumping Stations, Upper Egypt
Eng. Abdel Salam Nagati	General Director, Groundwater Department

2. Stakeholders:

Mr. Mohamed El Shafi Abbas	Chairman, Esna Local Council
Mr. Abdel Sabour Abdel Hamid	Director, Esna Agricultural Directorate
Mr. Abbas Bahgat Mohamed	Farmer, West Esna **
Mr. Abdel Hamid Dardeer	Basin Supervisor **
Mr. Al-Amir Abdel Aziz	Director, Wadi Halfa Cooperative **
Mr. Moslem Abdallah Omran	Farmer, Branch# 3
Mr. Kenawi Hussien Mabrouk	Farmer, Improved Irrigation Systems

3. Engineers:

Eng. Atef Abdel Shafi Mohamed	Director of Works, West Esna Inspectorate
Eng. Ayaat M. El-Shabrawy	Director, Water Distribution, Qena Irrigation Directorate
Eng. Ramadan Abdallah Ahmed	Irrigation Engineer, West Esna **
Eng. Abdel Hamid El-Amir	Drainage Engineer, West Esna **
Eng. Nassef Abdel Rahim Aly	Pump stations Engineer, West Esna
Eng. Tarik Mohamed Ibrahim	Irrigation Advisory Service, Esna and Luxor **
Eng. Walid Sayed Saleh	Engineer, Groundwater Department
Eng. Yehia Mohamed Youssef	Irrigation Improvement Engineer **

4. Technicians:

Mr. Youssef Ahmed Goma	Technician
Mr. Mohamed Abdel Wahed	Technician
Mr. Eissa Nagieb Girgis	Technician **
Mr. Mohamed Fouad Ismail	Technician **
Mr. Ahmed Ibrahim Ahmed	Technician **
Mr. Saleh Eida Gabr	Technician
Mr. Mohamed M. El-Sharawi	Technician

LUXOR IWMD

(**) Participants interviewed by the consultants

1. Managers:

Eng. Wageh Rizk	Chairman, Central Department for Water Resources and Irrigation, Upper Egypt
Eng. Ezz El-Arab Badry	Drainage General Director
Eng. Hassan Mohamed El-Amir	General Director, Upper Egypt Pump Stations, North
Eng. Hamed Mohamed Ali	Inspector, Upper Egypt Pump Stations, North
Eng. Rafaat Helmy Barsoum	Irrigation Inspector, Esna
Eng. Kamel Sayed Hasaneen	Inspector, Upper Egypt Pump Stations, South

2. Stakeholders:

Mr. Fawzy Bassounni	Chairman, Luxor Local Council **
Mr. Mohamed Awad Allah	General Director, Agriculture Dept., Luxor **
Mr. Salah El-Din Ahmed Ramadan	General Director, Soil and Water Department
Mr. Abdel Hakim Khalil	Director, NOPWASD
Mr. Hamdy Ahmed Abdel Galil	General Inspector of Archeology, Luxor **
Mr. Nashaat Mleek Beshara	Director, Inland Navigation, Luxor
Mr. Mohamed Abdallah	Chairman, Salameeh Water Board

3. Engineers:

Eng. El-Sayed Wahba El-Sayed	Deputy General Director for Irrigation, Qena
Eng. Ibrahim Aly Mahmoud	Director of the Technical Office for the Central Department, Qena
Eng. Ayman Abdel Rahman	Irrigation Engineer, Luxor
Eng. Badawy Sayed Mahmoud	Drainage Engineer, Luxor **
Eng. Medhat Kamel Girgis	Pump station Engineer, Luxor

4. Technicians:

Mr. Saber Mohamed Abdallah	Flow Measurements
Mr. Rafaat Rizk Faltas	Technician
Mr. Nasr El-Din El-Khodary	Technician **
Mr. Sayed Ahmed Moustafa	Technician **
Mr. Ahmed Hassan Mohamed	Technician **
Mr. Rafaat El-Sayed Soliman	Technician

(**) Participants interviewed by the consultants

ANNEX A.2 LIST OF INSTRUCTORS

Dr. Abdel Gawad, Shaden.	Vice-Chairperson, National Water Research Center, NWRC, MWRI.
Dr. Abdel Rahman, Fatma.	Chairperson, Groundwater Sector, MWRI. **
Dr. Abdel Azim, Ragab.	Central Directorate for Water Distribution, Irrigation Sector, MWRI. **
Eng. Barakat, Essam.	Undersecretary, Irrigation Advisory Service, MWRI.
Eng. El-Amir, Mohamed.	Chairman, Irrigation Department, MWRI.
Dr. El-Atfy, Hussien.	Undersecretary, The Ministers' Office Affairs, MWRI.
Dr. El-Arabawy, Mohsen.	Deputy Director, The Institutional Reform Unit. **
Dr. El-Guindy, Samia.	Director, Central Office of the Advisory Panel Project on Water Management, NWRC, MWRI. **
Eng. El-Khodary, Maher.	Chairman, Irrigation Sector, MWRI.
Eng. El-Shafie, Gamal	Undersecretary, Central Directorate for Water Distribution, Irrigation Sector, MWRI.
Eng. Elwan, Hussien.	Chairman, Egyptian Public Authority for Drainage Projects, MWRI. **
Dr. Hassan, Hatem.	Specialist, Consultation office of Integrated Systems
Dr. Kandil, Hisham.	Director for Technology and Information, Ministers' Office, MWRI. **
Dr. Moustafa, Hisham.	Director for the Water Communication Unit, MWRI. **
Dr. Ramy, Mohamed.	Director, Main Information Center, MWRI. **
Eng. Shalaby, Abdel Rahman.	Advisor of the Ministers' Office, MWRI. **

(**) Instructors interviewed by the consultants

ANNEX A.3 WORKSHOP TIMETABLES

Time-table for IWRM Training Workshop # 1 (MWRI Managers)

Day	1	2	3	4		5	6		7
	9:00 – 10:00	10:00 - 11:00	11:00 – 12:00	12:30 – 1:00	1:00 - 1:30	1:30 – 2:30	2:30 - 3:30	3:30	8:00 - 9:00 evening
May 20 Tuesday	Integrated Water Resources Management Eng. A . Shalaby	Groundwater Dr. Fatma Abdel-Rahman	Reuse of Drainage Water Dr. S. El-Guindy	Groundwater & Drainage Reuse (P) Dr. Abdel Rahman & Dr. El Guindy	Coffee Break	Pollution & Water Quality Dr. S. Abdel Gawad	Water Management & Distribution Eng. M. El-Khodary	Lunch	Implementation Plan
May 21 Wednesday	Data & Models Dr. M. Ramy & Dr. H. Hassan	Measurements and Monitoring Eng. G. El-Shafi	Water Communication Dr. H. Moustafa	Water Communication Dr. H Moustafa		Institutional Reform Dr. H. Kandil & Dr. El-Arabawy	Institutional Reform Dr. H. Kandil & Dr. El-Arabawy		
May 22 Thursday	Introduction to Computer (P) Dr. M. Ramy & Dr. H. Hassan	Introduction to Computer (P) Dr. M. Ramy & Dr. H. Hassan	Private Sector Eng. E. Barakat & Dr. H. El-Atfy	Workshop (Working Group) Dr. F. Abdel Rahman		Workshop (Working Group) Dr. F. Abdel Rahman	Workshop (Discussions) Dr. F. Abdel Rahman & Dr. El-Atfy		

Time-table for IWRM Training Workshop # 2 (Stakeholders)

Day	1	2	3	4		5	6		7
	9:00 – 10:00	10:00 - 11:00	11:00 - 12:00	12:30 - 1:00	1:00 - 1:30	1:30 - 2:30	2:30 - 3:30	3:30	8:00 - 9:00 evening
May 20 Tuesday	Integrated Water Resources Management Eng. A . Shalaby	Reuse of Drainage Water Dr. S. El-Guindy	Groundwater Dr. Fatma Abdel-Rahman	Pollution & Water Quality Dr. S. Abdel Gawad	Coffee Break	Groundwater & Drainage Reuse (P) Dr. Abdel Rahman & Dr. El Guindy	Introduction to Computer (P) Dr. M. Ramy & Dr. H. Hassan	Lunch	Implementation Plan
May 21 Wednesday	Water Communication Dr. H. Moustafa	Water Communication Dr. H. Moustafa	Measurements and Monitoring Eng. G. El-Shafi	Private Sector Eng. E. Barakat & Dr. H. El-Atfy		Private Sector Eng. E. Barakat & Dr. H. El-Atfy	Water Management & Distribution Eng. Elwan		
May 22 Thursday	Institutional Reform Dr. H. Kandil & Dr. El-Arabawy	Institutional Reform Dr. H. Kandil & Dr. El-Arabawy	Workshop (Working Group) Dr. F. Abdel Rahman	Workshop (Working Group) Dr. F. Abdel Rahman		Workshop (Discussions) Dr. F. Abdel Rahman & Dr. El-Atfy			

Time-table for IWRM Training Workshop # 3 (MWRI Field Engineers)

Day	1	2	3	4		5	6	7	4:30	8
	9:00 – 10:00	10:00 - 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 1:30	1:30 – 2:30	2:30 – 3:30	3:30 – 4:30		9:00-10:00 evening
May 24 Saturday	Integrated Water Resources Management Eng. A. Shalaby	Integrated Water Resources Management Eng. A. Shalaby	Water Communication Dr. H. Moustafa	Water Communication Dr. H. Moustafa	Break	Private Sector Eng. E. Barakat	Groundwater Dr. F. Abdel-Rahman	Groundwater Dr. F. Abdel-Rahman	Lunch	Implementation Plan
May 25 Sunday	Measurements & Monitoring Eng. G. El Shafi	Data & Models Dr. M. Ramy	Data & Models Dr. M. Ramy	Introduction to Computers Dr. H. Hassan		Introduction to Computers (P) Dr. H. Hassan	Introduction to Computers (P) Dr. H. Hassan	Introduction to Computers (P) Dr. H. Hassan		
May 26 Monday	Water Management & Distribution Eng. El-Khodary	Water Management & Distribution (P) Dr. R. A-Azim	Water Management & Distribution (P) Dr. R. A-Azim	Field Measurements & Monitoring Staff from (DRI) and (RIGW)						
May 27 Tuesday	Pollution & Water Quality Dr. S. Abdel Gawad	Pollution & Water Quality Dr. S. Abdel Gawad	Groundwater Database (RIGW)	Drainage Water Reuse Dr. R. Abdel-Azim	Break	Drainage Water Reuse Dr. R. Abdel-Azim	Drainage Water Reuse (P) Dr. R. Abdel-Azim	Groundwater (P) Dr. F. Abdel-Rahman		
May 28 Wednesday	Institutional Reform Dr. Arabawy	Institutional Reform Dr. Arabawy	Working Groups Dr. F. Abdel-Rahman	Working Groups Dr. F. Abdel-Rahman		(Discussions) Dr. F. Abdel Rahman & Dr. El-Atfy				

Time-table for IWRM Training Workshop # 4 (MWRI Field Technicians)

Day	1	2	3	4		5	6	7	4:30	8
	9:00 – 10:00	10:00 - 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 1:30	1:30 – 2:30	2:30 – 3:30	3:30 – 4:30		9:00-10:00 evening
May 24 Saturday	Integrated Water Resources Management Eng. A. Shalaby	Institutional Reform Dr. Arabawy	Pollution & Water Quality Dr. S. Abdel Gawad	Pollution & Water Quality Dr. S. Abdel Gawad	Break	Water Communication Dr. H. Moustafa	Water Communication Dr. H. Moustafa	Groundwater Database (RIGW)	Lunch	Implementation Plan
May 25 Sunday	Groundwater Dr. F. Abdel Rahman	Groundwater Dr. F. Abdel Rahman	Reuse Dr. R. Abdel-Azim	Private Sector Eng. E. Barakat		Measurements & Monitoring Eng. G. El Shafi	Data & Models Dr. M. Ramy	Data & Models Dr. M. Ramy		
May 26 Monday	Introduction to Computers Dr. M. Ramy & Dr. H. Hassan	Introduction to Computers Dr. M. Ramy & Dr. H. Hassan	Introduction to Computers Dr. M. Ramy & Dr. H. Hassan	Introduction to Computers Dr. M. Ramy & Dr. H. Hassan		Introduction to Computers Dr. M. Ramy & Dr. H. Hassan	Introduction to Computers Dr. M. Ramy & Dr. H. Hassan	Introduction to Computers Dr. M. Ramy & Dr. H. Hassan		
May 27 Tuesday	Water Management & Distribution Eng. H. Elwan	Water Management & Distribution (P) Dr. R. A-Azim	Water Management & Distribution (P) Dr. R. A-Azim	Field Measurements & Monitoring Staff from (DRI) and (RIGW)						
May 28 Wednesday	Working Groups Dr. F. Abdel-Rahman	Working Groups Dr. F. Abdel-Rahman		(Discussions) Dr. F. Abdel Rahman & Dr. El-Atfy						

ANNEX A.4 WORKSHOP QUESTIONNAIRE

Following is an English translation of the workshop questionnaire that was distributed to the workshop participants at the end of each workshop. Participants were asked to mark the response that best reflect their opinion about the given statement or question.

- | | | | | |
|-----|---|-----------|---------|------|
| 1. | How would you rate the workshop? | Excellent | Average | Poor |
| 2. | How much benefit have you obtained by attending the workshop? | Excellent | Average | Poor |
| 3. | Was the workshop material difficult to understand? | Yes | No | |
| 4. | Was the workshop time enough to cover the different topics? | Yes | No | |
| 5. | Did you develop clear understanding of the IWMD concept? | Yes | No | |
| 6. | Would recommend changes in the contents (topics) of the workshop? | Yes | No | |
| 7. | How would you rate the teaching of the workshop instructors? | Excellent | Average | Poor |
| 8. | Were the lectures (presentations) clear? | Yes | No | |
| 9. | How would you rate the workshop notes? | Excellent | Average | Poor |
| 10. | Were the workshop topics well thought of and prepared? | Yes | No | |
| 11. | Were the workshop discussions effective? | Yes | No | |

- | | | | |
|-----|---|-----|----|
| 12. | Were the training sessions effective? | Yes | No |
| 13. | Would you prefer a longer duration of the workshop? | Yes | No |
| 14. | Would you prefer less lecture hours per day? | Yes | No |
| 15. | Would you prefer a different location for the workshop? | Yes | No |
| 16. | The workshop organization and management were adequate? | Yes | No |
| 17. | Would you prefer less number of participants? | Yes | No |
| 18. | Would you recommend the invitation of other participants to the workshop? | Yes | No |
| 19. | Do you have other suggestions for improvements? | Yes | No |
| 20. | Do you have other remarks? | Yes | No |

Additional Comments and Thoughts:

ANNEX A.5 ORIGINAL IMPLEMENTATION PLANS

By the end of the four workshops, eight preliminary IWMD implementation plans were put together. For each district (Ibrahimia, West Zifta, West Esna and Luxor) two implementation plans were devised, one by the managers and stakeholders and the other by field engineers and technicians of that specific district.

PRELIMINARY ACTION PLAN IBRAHIMIA INTEGRATED WATER MANAGEMENT DISTRICT

I. Action Plan by Managers and Stakeholders

Problem	Action	Responsibility
Increase in the area of rice cultivation	Introduction of users (stakeholders) participation and cooperation with the MWRI	MWRI, Ministry of Agriculture and Land Reclamation, and Ministry of Interior.
Water Pollution	Designating places for waste discharge and or disposal away from water courses, completing sanitation projects in the area, and enforcing water laws (Law 12, 48).	NOPWASD, Ministry of Housing and Urban Communities, Local Councils, MWRI, and Ministry of Interior
Sudden obstruction of water flow in branch canals	Quick daily surveillance, and maintenance, availability of required equipment and availability of skilled staff.	MWRI relevant departments.
Low on-farm irrigation efficiency	Mesqa improvement and land leveling.	Irrigation Improvement Sector (MWRI), and National Water Research Center.
Increase of users' complaints regarding private mesqas	Increase farmer's awareness, and define responsibilities between MWRI and farmers.	MWRI, Local Councils, Water User Associations, and Water Boards.
Institutional reform	Institutional reform is needed for all MWRI levels, but it should be cautious regarding promotion and employment situation.	MWRI

II. Action Plan by District Engineers and Technicians

A. Short-term Actions

- Completion of the installation and utilization of Ground water wells (eleven groundwater well) within the district.
- Expand the formation of user's organizations on the branch canal level and main canals with bed width less than 2 meters.
- Increase the coordination between both the Irrigation Advisory Service (IAS) and the Water Communication Unit (WCU) and the district to increase awareness within the district (Quarterly annual plans).
- Providing the district with the needed equipment (from EPADP).
- Providing the district with needed field measurement tools (water quantity and quality measurements).
- Providing the district with needed furniture and office stationary.
- Conducting an intensive training program for both engineers and technicians within the district.
- Finding ways for providing the IWMD staff with the appropriate incentives.

B. Long-term Actions

- Adjusting all canals cross sections within the district to the original design sections.
- Study and plan for the implementation of mesqa improvements for all private mesqas in the district.
- Lining all canals that exist near the drainage channels.
- Changing the water distribution system from rotation to continuous flow.
- Replacing or rehabilitating groundwater wells that are not working, and implementing the proposed ones.

PRELIMINARY ACTION PLAN ZIFTA INTEGRATED WATER MANAGEMENT DISTRICT

I. Action Plan by Managers and Stakeholders

Suggestions to overcome the current problems and improve the district:

- Provide the district with needed equipment (in reliable conditions) to face emergencies.
- Training courses for the engineers and the technicians.
- The financial department must be located in Gharbeia Central Directorate.
- Incentives for the temporary employees.
- Periodical meetings between representatives of MWRI, MALR, local authorities, EEAA, and the MOI. The aims of these meetings are to find alternatives to solve the problem of throwing the wastes in the waterways and to prevent dumping the wastewater into the waterways.

- Improving the private mesqas.
- Reform the law so that the penalty for planting rice is jail plus the fine.
- During the rehabilitation of East Monefya Pump Station, a treatment planet unit must be included.
- Informing the district of any study that takes place within its domain if not involving the district in the study.

II. Action Plan by District Engineers and Technicians

- Budget preparation (budget from the second and third chapters). A survey must be done to find out what are the jobs that should be executed in the district under the second and third chapters of the budget to estimate the required budget for the year. A detailed plan for the previous jobs should include the items and the estimated budget for each item. The required budgets coming from different sources (irrigation, drainage, and electrical/mechanical authority) must be available for the district at the beginning of the year, only for new or emergency work a separate budget will be submitted by the time of the occurrence. The finance of the district must have only one department. It is preferable to be in the Gharbia General Irrigation Directorate. The previous (agreed on) budget is allocated to the district and shall be controlled by the director of the integrated water management district.
- East Monofeya drainage reuse station must be merged into the integrated water management district as it is located within the district boundaries. It plays a very important function in collecting the drainage water. It requires rehabilitation as it was built in 1947.
- Prompt completion of the construction of El-Magd and Sief pump station. The station should fall under the authority of the IWMD.
- The IWMD well department serves three districts; Berkat EL Sabaa, Kowesna, and West Zefta Irrigation District. It is required that the head of the well department and two of the mechanical and electrical engineers to join the IWMD. About one third of the permanent and temporary employees (nominated by the head of the well department) should join the IWMD.
- Incentives and compensations for the employees of the IWMD must be unified.
- Temporary employees should gradually be turned into permanent ones (to substitute retired personnel) in accordance to the work load and upon the recommendations of the IWMD director.
- Transferring the wells and the pump stations located out of the IWMD limits to the authority of Shibin-EL-Kom Pump Station Department (Mechanical and Electrical Department).
- Construct a separate building for the IWMD, a workshop provided with all the necessary equipment and a storage place.
- Prepare a training program for the districts' employees (engineers and technicians). These programs must include: local training (water quality monitoring, flow rate measurement, survey, languages, and computer) as well as overseas training to visit other countries that implement IWMD.
- A workshop must be held every three months as a follow up on IWMD activities

PRELIMINARY ACTION PLAN WEST ESNA INTEGRATED WATER MANAGEMENT DISTRICT

I. Action Plan by Managers and Stakeholders

- Design a framework for cooperation between the district and the stakeholders through Water Users Associations, Branch Canal Water Users Associations, Water Boards and the Irrigation Advisory Service.
- Modify the geographic boundaries of the IWMD to include both districts of East and
- Redefine IWMD water resources based on the new defined boundaries.
- Study the rehabilitation of the district's drainage system.
- Survey the current situation of the operation and maintenance of the district's reuse pump stations and construct new "Waseet" pump station.
- Complete irrigation improvement works.
- Conduct a geo-electrical survey and hydro-geologic study for groundwater availability.
- Design and operate a network of monitoring wells to detect changes in the groundwater aquifer (levels and water quality).

II. Action Plan by District Engineers and Technicians

- Revise policy for sugar cane cultivation within the district.
- Complete the irrigation improvement works.
- Activate the program of matching irrigation supply and demand (MISD).
- Study the possibility of shifting from rotational to continuous flow system.
- Survey and put into operation thirty nine vertical drainage wells to resolve irrigation and drainage problem in the district.
- Conduct a complete survey for the longitudinal and cross sections of the district's drains.
- Establish a drainage maintenance center on the district level.
- Design and implement a program for surface water measurements including flow and water quality parameters.
- Establish a water board on West Esna Canal as that on "El-Sahel2" Canal.
- Link and coordinate with the telemetry system to strengthen water monitoring and radio communications.

PRELIMINARY ACTION PLAN LUXOR INTEGRATED WATER MANAGEMENT DISTRICT

I. Action Plan by Managers and Stakeholders

The generated plan is based on phased implementation of the integrated water resources management at the district level as follows:

Phase 1 (one year):

- Identify the administrative boundaries of the new IWMD in Luxor based on hydrologic criteria and match the agricultural boundaries within the district.
- Select the new IWMD staff including district director, engineers and technicians.
- Train the selected staff.
- Provide the district with the needed communication and coordination links with higher officials.
- Issue the Luxor IWMD initiation decree and associated decrees.

Phase 2 (one year):

- Execute the initiation decree by designation and allocation of the IWMD staff representing different ministry departments.
- Provide the district with needed resources (building, offices, equipment, and transportation facilities).
- Adjust and assure the coincidence and inclusion of different water resources and irrigation related departments within the district boundaries and issuance of needed ministerial decrees.

II. Action Plan by District Engineers and Technicians

The generated plan was based on specific actions needed to improve work conditions and performance in the integrated water management district.

- Completion of the IWMD staff designation and allocation in all district sections.
- Identification of the district new water requirements based on the modified boundaries.
- Modification of the district boundaries by adding an area of 11573 feddans from Armant and Nakadah irrigation districts and the corresponding drainage service area from Armant drainage district. The total area of the IWMD becomes 54413 feddans.
- Replacement and renewal of El-Gabal pump station (modify suction and pumping head).
- Construction of four water mixing station for drainage water reuse in canal tail reaches (Provision of East Karnak Canal, East Luxor canal, West Karnak Ganabia, East Karnak Ganabia from El-Gabal main drain).
- Construction of four artesian wells for ground water use in canals tail reaches (El-Moala Canal, El-Wateia Canal, New El-Alia Canal and East El-Gabal Canal).
- Improving irrigation conditions by performing periodic maintenance schemes that include all water resources infrastructures within the district.
- Providing the district with the needed equipment (Two-cabine cars, Trucks, 20 ton crane, loader, excavator, motor cycles, etc)
- Providing the district with the required communication tools (wireless telephone sets, etc).

ANNEX A.6 REVISITED IMPLEMENTATION PLANS

Ibrahimia Integrated Water Management District

District Description

District Name: Ibrahimia IWMD.

Directorate Name: General Directorate of Irrigation in West Sharkia.

Area Served:

- Irrigation district: 59214 feddans.
- Drainage district: 62000 feddans.

Water Resources:

- Surface Water: Most of the surface water comes from Bahr Moueis canal, and there are three intakes on this canal as follows:
Intake of Daleel Bahr Mashtool at Km. 32.00 left side;
Intake of Oum El-Reesh canal at Km. 51.00 left side;
Intake of El-Awaied canal at Km. 53.00 left side.
- Ground Water:
There are about 11 artesian wells that will serve the area. These wells are under construction under the authority of the Groundwater Directorate in Tanta.

System Network:

- The system network consists of about 64 canals with a length of about 235 kilometers.
- There are 60 mesqas in the district with a length of about 100 kilometers.
- There are 13 main drains in the district with a length of about 151 kilometers.
- The district is fully served by tile drainage network.
- There is no operational water mixing plant, but there is a proposal of constructing four plants within the district to serve canals tail reaches.

Irrigation Methods: Most of the areas in the district use flood irrigation.

Water Quality: Water quality is generally not monitored or measured within the system. The surface water is polluted by sewage, solid wastes, and agricultural drainage disposals.

Water Demands: Agriculture and domestic.

Crop Patterns: The main crop in the district is Rice, and the district suffers from increasing rice cultivation beyond the designated areas.

Zifta Integrated Water Management District

District Description

Zefta IWMD is located in new Zifta directorate. The district follows four different Markaz as follows: Zifta (88%), El-Santa (7 %), Berket El Sabee (2.5 %) and Qesna (2.5 %)

The area served by the district is as follows:

- Irrigation District 39650 Feddans.
- Drainage District 41000 Feddans.

Sources of water in the district are divided into two main sources, surface water 90 %, and ground water 10 %. On the average basis irrigation consumes around 272 million cubic meters per year.

There are three main canals that carry the water to the district.

- El Sahel canal, with an average length of 21.65 Km, that serves about 14605 feddans.
- El Khodrawia canal, with an average length of 20.98 Km that serves about 10980 feddans.
- El Atf canal, with an average length of 13.2 Km that serves about 9000 feddans.

In additional to the previous main canals there are some small canals.

There is a drainage network which serves 6000 feddans. Almost all the drains in the district are covered

There are 10 working wells in the district in addition to 18 wells that are under construction.

There is only one drainage reuse location (East Menufia Pumping Station) where drainage water from El-Karneen Drain is lifted to El-Abbassi Canal. There are seven additional reuse locations that are proposed by the district.

West Esna Integrated Water Management District

District Description

District Name: West Esna IWMD.

Directorate Name: General Directorate of Irrigation in Qena.

Area Served:

- Irrigation district: 4555 feddans of old lands and 15351 feddans of newly reclaimed lands, with a total area served of 20906 feddans.

- Drainage district: 3500 feddans that coincide with only 4555 feddans of the irrigation district and the rest of the area lies in East Esna irrigation district.

Water Resources:

- Surface Water: Most of the surface water comes from Oum Ads canal with a discharge of about one million cubic meters per day.
- Ground Water:
 - There are about 234 private artesian wells serving the area with no official records,
 - There are 39 governmental vertical drainage wells that should serve the area, but they are not working in the time being.

System Network:

- The system network consists of about 59 kilometers of canals and about 62 kilometers of drains (only 31 kilometers of which are serving West Esna district)
- The vertical drainage wells are placed on the partition line between the high and low level lands in the area. The private artesian wells are scattered all over the cultivated areas.
- There is no operational water mixing plant, but there is a proposed one on Kouair drain at kilometer 0.100 to discharge its water with a quantity of about 4 m³/s in the first reach canal.

Irrigation Methods: Most of the areas in the district uses flood irrigation, where it should be used only in the old lands (4555 feddans).

Water Quality: Water quality is generally good, but there is no monitoring or measuring system in this regard.

Water Demands: All water demands in the district are strictly for irrigation.

Crop Patterns: The main crop in the district is Sugarcane (11,000 feddans) and other different crops are cultivated in the rest of the area (9906 feddans).

Luxor Integrated Water Management District

District Description

District Name: Luxor

Directorate Name: General Directorate of Irrigation in Qena

Area Served:

- Irrigation District 43850 feddans (some 1000 feddans are irrigated by groundwater)
- Drainage District 29600 feddans (22000 feddans are provided with tile drainage)

Water Resources:

Surface water from the Nile River through El Kelabia Canal, right bank upstream Esna Barrage in the reach from km 20 to km 68 with a total length of 48 km. There are two regulators on Kelabia Canal.

Reuse Pumping Stations:

Currently there are none in the district but there are four proposed mixing plants to serve canal tail reaches that suffer water shortages.

System Network

- Canal network: Total number of main and secondary canals is 39 with a total length of 304 km.
- Drain network: Total number of main and secondary drains is 11 with a total length of 77495 km.
- Artesian wells: Total number of wells is 77 wells with area served 1000 feddans.

Water quality in canals, drains and wells is good, and the district suggests having modern monitoring and analysis instruments for water quality.

Water Demands: The district water demands are for both Agriculture and domestic uses.

ANNEX A.7

PLAN OF MEETINGS AND FIELD TRIPS

Dr. A. Bazarraa and Eng. S. Yacoub

Saturday, June 21	
Sunday, June 22	Meeting with Principal Technical Coordinator
Monday, June 23	Review Background Materials: Workshop Training Manual
Tuesday, June 24	Field Trip: Meeting with Management staff and engineers (Undersecretary of State Office, Sharkia), Meeting with engineers and technicians (Ibrahimia Irrigation District)
Wednesday, June 25	Preparation of plan of Meetings and Visits
Thursday, June 26	Meeting with USAID staff
Friday, June 27	Review of Background Reports
Saturday, June 28	Field Trip: Meeting with Management staff and engineers (Undersecretary of State Office, Gharbia), Meeting with engineers and technicians (Zifta Irrigation District)
Sunday, June 29	Meetings with Workshop Instructors MWRI (Dr. H. Kandil, Dr. M. Rami, Dr. H. Moustafa, Eng. M. El-Khoudari, and Dr. F. Abdel Rahman)
Monday, June 30	Meeting with Zifta Stakeholders
Tuesday, July 1	Meeting with Ibrahimia Stakeholders
Wednesday, July 2	Reporting- Summary of Materials Presented
Thursday, July 3	Reporting- Feed back and Comments on Ibrahimia and Zifta Districts
Friday, July 4	Review
Saturday, July 5	Review and Reporting
Sunday, July 6	Review and Reporting
Monday, July 7	Review and Reporting
Tuesday, July 8	Field Trip: Meeting with Management staff, engineers and Stakeholders of Luxor and West Esna
Wednesday, July 9	Field Trip: Continued
Thursday, July 10	Field Trip: Continued
Friday, July 11	Review
Saturday, July 12	Reporting
Sunday, July 13	Meeting with Workshop Instructors, MWRI
Monday, July 14	Reporting
Tuesday, July 15	Reporting
Wednesday, July 16	Submit Draft Final Report
Thursday, July 17	Brief WPAU and USAID
Friday, July 18	Review
Saturday, July 19	Reporting
Sunday, July 20	Reporting
Monday, July 21	Submit Final