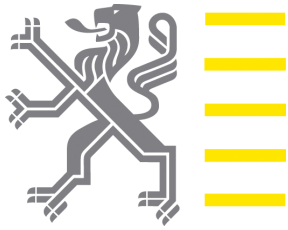

INTERNATIONAL HYDROLOGICAL PROGRAMME

UNESCO-Flanders Science Fund-In-Trust Project on Capacity Building and Training on Environmental Planning and Management in Palestine: Phase-II

Final Technical Report: Part 2
(Annexes: as is with no editing)

UNESCO Cairo Office Publication
December 2008

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Final Project Report (513RAB2041)
Published by UNESCO Regional Office in Cairo, 2008
UNESCO Publications EG/2008/SC/RP/01

Annexes

(Each Annex is included in separate folders)

1. ***The Project Brochure and Website***
2. ***Initial Project Workplan***
3. ***Sample of the Project SC Meeting***
4. ***Sample of the Project TNC Meeting***
5. ***Call for Research Proposals***
6. ***Future Research Project Document***
7. ***Future Capacity Building Project Document***
8. ***Selected Photos***
9. ***Letters from Stake Holders***
10. ***Final Report of the 21 Research Activities (Soft copy only)***
11. ***Final Report of the 6 Training Activities (Soft copy only)***
12. ***Conference Abstract Book (Soft copy only)***
13. ***Audio-Video Feedback (Soft copy only)***

ANNEX 1

THE PROJECT BROCHURE AND WEBSITE
(SOFT COPY ONLY)

ANNEX 2

INITIAL WORKPLAN OF THE PROJECT

UNESCO Cairo Office
UNESCO Flanders FIT Extra budgetary Project on Capacity Building and Training on Environmental Planning and Management in Palestine: Phase II (Budget Code 513RAB2041)
(Initial Workplan for the Project Life)

Budget Line	Project Component	(Year 1)	(Year 2)	(Year 3)	(Year 4)	Total
10	**Personnel and consultants**					
	Total Personnel and consultants	$38,000.00	$38,000.00	$38,000.00	$38,000.00	$152,000.00
30	**Workshops, Research and Training**					
	Total **Workshops, Research and Training**	$127,000.00	$164,500.00	$119,500.00	$97,000.00	$508,000.00
40	**Equipment and Publications**					
	Total Equipment and Publications	$45,000.00	$16,000.00	$16,000.00	$25,000.00	$102,000.00
50	**Miscellaneous**					
	Total Miscellaneous	$11,125.00	$11,125.00	$11,125.00	$14,148.81	$47,523.81
	Total Project Costs	**$221,125.00**	**$229,625.00**	**$184,625.00**	**$174,148.81**	**$809,523.81**
	Support Cost (5 % of the Project Cost)	$11,056.25	$11,481.25	$9,231.25	$8,707.44	$40,476.19
Total	**Budget (Project Cost + Support Cost)**	**$232,181.25**	**$241,106.25**	**$193,856.25**	**$182,856.25**	**$850,000.00**

REMARKS: Some budget revisions are done to ensure effective implementation of the project.
The project duration was extended to the end of 2008 without additional cost due to political conditions in the region

ANNEX 3

SAMPLE OF THE PROJECT STEERING COMMITTEE MEETINGS REPORTS

UNESCO CAIRO OFFICE
Capacity Building and Training on Environment Planning and Management: Phase-II (513RAB2041)
UNESCO-FLANDER FUND-IN-TRUST PROJECT
Second Steering Committee Meeting
20 April 2004

A. General Profile:

Date and Venue	The meeting will take place on 20 April 2004 in the Radisson SAS Hotel (5 stars), Al-Hussein Bin Ali Street, Shmaisani - 3rd Circle, Amman, Jordan, Tel: +962 6 5607100, Fax: +962 6 5663105, Email: shukri.ammouri@radissonsas.com.jo
Organizers	UNESCO Cairo Office in cooperation with UNESCO Amman Office.
Working Languages	English/Arabic
Participants	• Representatives of UNESCO Cairo Office (Dr. M.J. Abdulrazzak, Dr. R. Al-Weshah and Ms. D. Khalil). • Representative of UNESCO Amman Office. • Flemish Donors Representatives (Dr. R. Herman, Prof. W. Bauwens and Prof. D. Raes). • President of Al Azhar University (Dr. R. El Khoudary). • Representative of Palestine Water Authority (Mr. N. Sharif). • Representative of the Ministry of Higher Education in Palestine (Mr. A. M. Shalab). • Representatives of the Technical Network Commission (Dr. Youssef Abu Mayla from Gaza and Anan Jayyousi from West Bank). • Project Manager (Mr. Moustafa ElBaba). • Representatives of the Embassies of Belgium and Palestine in Amman.

B. Background Information:

Within the framework of the UNESCO/Flanders Project on "Capacity Building and Training on Environment Planning and Management" Phase-II, this Steering Committee meeting is organized once a year to review, adopt the project

expenditure and implemented activities for the year 2003, as well as to approve the activities for the year 2004 within the overall project workplan.

C. Objectives:

The main objective of this meeting is to:

1. Review and evaluate project activities in the year 2003.
2. Approve expenditure of year 2003 according to the project workplan.
3. Adopt and approve the workplan and list of activities for year 2004 per the recommendations of the Technical Network Commission.

D. Tentative Agenda:

Day 1 (20 April 2004):

- Introduction to the meeting.
- Presentation of year 2003 project activities by UNESCO Cairo Office.
- Presentations by the implementing agencies.
- Discussion.
- Adoption of year 2004 Workplan and list of activities.
- Conclusions and recommendations.

E. Expected Output

a. Approval of 2003 Workplan for the implemented activities supported by the project in the Palestinian Autonomous Territories.
b. Adoption of activities to be implemented in the year 2004 of the project and their tentative dates and venues.
c. A summary report on the main outcome of this meeting.

For further information please contact:

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Regional Hydrologist, UNESCO Cairo Office,

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Fax: 202- 7945296
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UNESCO Cairo Office

Summary Report of
The Fourth Steering Committee (SC)
UNESCO-FLANDER FUST Project on Capacity Building and Training on Environment Planning and Management in Palestine: Phase-II
5-6 December 2006
Amman, Jordan

A. Background

Within the framework of the UNESCO-FLANDERS FUST Project on Capacity Building and Training on Environment Planning and Management in Palestine: Phase-II, the Fourth Steering Committee Meeting was held in Amman, Jordan on 5-6 December 2006.

The Steering Committee meeting is organized once a year to review, adopt the project expenditure and implemented activities for the year 2006, as well as to approve the activities for the second phase additional year 2007 within the overall project workplan.

B. Objectives

The main objectives of the Steering Committee (SC) meeting are to:

1. Approve last year implemented technical activities (training & research)
2. Approve expenditure of year 2006 according to the project workplan.
3. Adopt and approve extending the project for an additional year and its workplan and list of activities per the recommendations of the Technical Network Commission.
4. Adopt exploring the possibility of extending the project to a third phase.
5. Approve the date and the organization plan of the project international conference.

C. Participants

The meeting was attended by the members of the SC as follows:

SC members:

- Mr. Rudy L. Herman, representative of the Flemish Government
- Mr. Radwan Al-Weshah, Project Director, Regional Hydrologist, UNESCO Cairo Office (UCO).
- Mr. Jawad Wadi, President, Al- Azhar University.
- Mr. Abedelsalam Shala'b, representative of the Ministry of Higher Education in Palestine.

- Mr. Yousef Awayyes, representing Eng. Rebhy Al-Sheikh, Deputy President, Palestinian Water Authority.
- Mr. Anan Jayyousi, An Najah University and TNC representative.
- Mr. Moustafa Elbaba, Project Manager, Gaza.

A complete list of participants with their correspondence details is given in **Annex (1)**.

D. Opening session:

The opening session of the meeting was addressed by Dr. Abdul Salam Shalaab, representative of Ministry of Higher Education in Palestine, Dr. Jawad Wadi Representative of Al-Azhar University in Gaza, Dr. Rudy Herman, Representative of the Flemish Counterparts and Dr. Radwan El-Weshah, Regional Hydrologist for the Arab States/Project Director, UNESCO Cairo Office.

All speakers acknowledged the generous contribution of the Flemish Community to support this project and the effort of the Flemish experts in implementing this project. They all expressed their appreciation to UNESCO Cairo Office for their notable execution of the project despite all constraints. They also pledge their support to help the all water sectors and institutions in Palestine.

The participants approved and adopted the agenda of the meeting. A copy of the agenda is shown in **Annex (2)**.

E. Proceedings of the meeting

- The report and recommendations of the Third Steering Committee meeting of the project were reviewed. The project director reported on the status of execution of last meeting recommendations. The participants highly appreciated UCO efforts in implementing the project activities taking into consideration the current political situation and security complexity in the West Bank and Gaza.

- A project overview including the implemented activities during the year 2006 were presented by Dr. Radwan Al-Weshah. The participants discussed the project achievements and outcomes of year 2006 and approved them.

- The SC approved the recommendation of the TNC for the extension of 5 research projects to an additional period of 6 months (namely, II-4, II-5, II-8, II-10 & II-11), deadline for submission of a new workplan is 15 January 2007.

- The SC discussed and approved recommendation of the TNC for implementing three training courses focusing on a) Sustainable management of groundwater resources in semi arid regions, to be led by the House of Water and Environment; b) Capacity building on environmental planning and management in shared water resources to be led by An-Najah University; and c) Practicalities

in water supply management in Palestine to be led by Palestinian Water Authority. The outline of these training workshops will be prepared by the leading institutions for each course.

- The SC discussed and approved the organization of the international project conference during August/September 2007 either in Jordan or Egypt. Themes of the conference were identified and conference committees (Organizational, Steering and Scientific) were selected. Keynote speakers are to be identified according to the conference themes.

- The SC meeting reviewed and discussed the expenditures and the workplan of year 2006 and approved it. The project director showed that the overall implementation rate of the project is about 70.5% in-spite of the persisting constraints of the security matters.

- The SC reviewed the overall workplan of year 2007. The SC members approved to transfer all funds of the unimplemented activities to year 2007 of the project. They recommended a budget revision to be submitted to UNESCO to reflect the required modification to year 2007 workplan. The project overall workplan and the revised 2007 workplan are shown in **Annex (3).**

- The SC approved contracting an international consultant to evaluate the project output and prepare pre-proposal for the project third phase.

- The SC identified the dates and venue of the coming SC & TNC meetings to be as side meetings to the project international conference in August/September 2007.

- Although the SC appreciated highly the efforts of the Palestinian National Commission, it was stressed that this commission has no operational or management role in the implementation of the project.

F. Conclusions and recommendations

Based on the detailed discussion within the Steering Committee members, the following recommendations are agreed upon:

1. The SC reviewed and approved the implemented workplan of year 2006.

2. The year 2006 expenditures were reviewed and approved. It was agreed to transfer all the remaining funds from year 2006 to year 2007 allocated budget.

3. The overall workplan and activities of year 2007 of the project and its allocated budget were reviewed and approved within the framework of the overall project workplan. UNESCO Cairo Office will take all necessary actions to reflect the required budget revisions according to the financial procedures of UNESCO.

4. The SC emphasized strongly on the importance that the project management in Palestine submits, to UNESCO Cairo Office, a quarterly, semi-annual and annual progress reports on the project activities for the approval of UNESCO Cairo Office. It should also keep active files and records of all project activities and maintain an updated website.

5. The SC adopted the TNC recommendation to take immediate actions concerning the organization of the project international conference planned on August/September 2007, in Egypt or Jordan. The SC approved the conference themes, committees (organizing, scientific and steering). Keynote speakers should be identified according to the conference themes.

6. The SC recommends that the coming SC to be held as a side meeting to the project international conference, August/September 2007.

7. The SC approved the recommendation of the TNC for the extension of 5 research projects to an additional period of 6 months (namely, II-4, II-5, II-8, II-10 & II-11). Deadline for submission of a new workplans is 15 January 2007.

8. The SC discussed and approved recommendation of the TNC for implementing three training courses focusing on a) Sustainable management of groundwater resources in semi arid regions, to be led by the House of Water and Environment; b) Capacity building on environmental planning and management in shared water resources to be led by An-Najah University; and c) Practicalities in water supply management in Palestine to be led by Palestinian Water Authority. The outline of these training workshops will be prepared by the leading institutions for each course

9. The SC approved contracting an international consultant to evaluate the project output and prepare pre-proposal for the project third phase.

10. The SC emphasized on the activation of the documentation centre and promotion of networking among the Palestinian institutions and universities working in the water field in Gaza and West Bank. The SC requested the Water Research Centre at Al-Azhar University to submit an action plan for activating the documentation centre.

11. The SC decided to limit the role of the Palestinian National Commission to act as an umbrella for coordinating the project overall workplan

R. Herman	**J. Wadi**	**A.Shala'b**
_____	_____	_____
Y. Awayyes	**A.Jayyousi**	**R. Al-Weshah**
_____	_____	_____

ANNEX 4

SAMPLE OF THE TECHNICAL COMMISSION MEETING REPORTS

UNESCO Cairo Office
Capacity Building and Training on Environment Planning and Management: Phase-II (513RAB2041)
UNESCO-FLANDER FUND-IN-TRUST PROJECT
Second Technical Network Commission Meeting
19 April 2004

F. General Profile:

Date and Venue	The meeting will take place on 19 April 2004 in the Radisson SAS Hotel (5 stars) Al-Hussein Bin Ali Street, Shmaisani - 3rd Circle, Amman, Jordan, Tel: +962 6 5607100, Fax: +962 6 5663105, Email: shukri.ammouri@radissonsas.com.jo
Organizers	UNESCO Cairo Office in cooperation with UNESCO Amman Office.
Working Languages	English/Arabic
Participants	• Representatives of UNESCO Cairo Office (Dr. M.J. Abdulrazzak, Dr. R. Al-Weshah and Ms. D. Khalil). • Representative of UNESCO Amman Office. • Flemish Donors Representatives (Dr. R. Herman, Prof. W. Bauwens and Prof. D. Raes). • President of Al-Azhar University (Dr. R. El-Khoudary). • Representative of Palestine Water Authority (Mr. N. Sharif). • Representative of the Ministry of Higher Education in Palestine (Mr. A. M. Shalab). • Members of the Technical Network Commission (see attached list). • Project Manager (Mr. Moustafa El-Baba).

G. Background Information:

Within the framework of the UNESCO/Flanders Project on "Capacity Building and Training on Environment Planning and Management" Phase-II a Technical Network Commission (TNC) has been formed, this TNC is an advisory committee to the Steering Committee (SC) and its meeting is organized once a year to discuss and review the technical activities of the project in year 2003 and

recommend to the SC activities for the year 2004 within the overall project workplan.

H. Objectives:

The main objective of this meeting is to:

1. Review and evaluate the technical activities implemented in year 2003 and prepare any recommendation for approval of the Steering Committee of the project.
2. Prepare a list of activities and work plan for year 2004 for the approval of the project SC based on the overall objectives of the project.

I. Tentative Agenda:

Day 1 (19 April 2004):

- Introduction to the meeting
- Presentation on the project activities
- Presentation by the research advisory committee
- Review of the year 2003 technical activities
- Recommendation of the workplan for year 2004 with a list of activities for the SC approval.

J. Expected Output

d. Recommendation on the progress of project activities in 2003.
e. Preparation of the list of main activities to be implemented in year 2004 and their tentative dates and venues.
f. Preparation of a summary report on the main outcome of this meeting.

For further information please contact:

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Project Director,

Regional Hydrologist, UNESCO Cairo Office,

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Summary Report of
The Third Technical Network Commission (TNC) Meeting of UNESCO-FLANDERS FUST Project on Capacity Building and Training on Environment Planning and Management in Palestine: Phase-II
8-9 July 2005
Amman, Jordan

G. Background

Within the framework of the UNESCO-FLANDER FUST Project on Capacity Building and Training on Environment Planning and Management in Palestine: Phase-II, the Second Technical Network Commission (TNC) meeting was held in Amman, Jordan, on 8-9 July 2005.

The Technical Network Commission (TNC) is an advisory committee to the Steering Committee (SC) and its meeting is organized once a year to discuss and review the technical activities of the project in year 2004 and recommend to the SC activities for the year 2005 within the overall project workplan.

H. Objectives

The main objectives of the Technical Network Commission (TNC) meeting are to:

3. Review and evaluate the technical activities implemented in year 2004 and prepare any recommendation for approval of the Steering Committee of the project.
4. Prepare a list of activities and work plan for year 2005 for the approval of the project SC based on the overall objectives of the project.

I. Participants

The TNC meeting was attended by the following TNC members:

TNC members:

- Dr. Yousef Abu Mayla, Chairman of TNC, Gaza
- Eng. Massoud Keshtah, Agricultural Development Association (NGO), Gaza
- Dr. Khalid Qahman, Environment Quality Authority, Gaza
- Mr. Mahmoud Abdel Latif, Purdue Project, PWA, representing Dr. Nahed Ghbn, Gaza, and GTZ/PWA project
- Eng. Dr. Rebhy El-Sheikh, PWA, Gaza
- Dr. Amer Sawalha, Al-Quds University, West Bank
- Dr. Hasan Shaban, Land Reclamaition Authority, Gaza

- Dr. Omar Zimmo, Berzeit University, West Bank
- Dr. Amjad Aleiwi, House of Water and Environment, West Bank
- Dr. Karen K. Assaf, Arab Scientific Institute for Research and Transfer of Technology-ASIR (NGO), West Bank
- Mr. Issam Nofal, Ministry of Agriculture – Ramallah, West Bank
- Dr. Yousef Abu-Mayla, Chairman of TNC
- Dr. Anan Jayyousi, An Najah University and TNC representative, West Bank
- Dr. Radwan Al-Weshah, Project Director, Regional Hydrologist, UNESCO Cairo Office (UCO)
- Eng. Moustafa Elbaba, Project Manager, Gaza

The following experts attended the TNC meeting:

- Dr. Mohamed Abdulrazzak, Director, UNESCO Cairo Office
- Mr. Ismail Khidr, Representative of Palestinian National Commission for UNESCO
- Dr. Maha Al-Sayegh Representatives of Palestinian Embassy in Amman
- Dr. Rudy Herman, Representative of the Flemish Counterparts, Belgium
- Dr. Dirk Raes, K.U. LEUVEN, Belgium

Apologies were received from 3 member of the TNC who were unable to participate due to previous commitments.

A complete list of participants with their correspondence details is given in **Annex (I.1)**.

J. Proceedings of the meeting

- Dr. Radwan Al-Weshah addressed the TNC, the participants approved and adopted the agenda of the meeting. A copy of the agenda is shown in **Annex (I.2)**.

- TNC members selected Dr. Abu Mayla to replace Dr. El-Khoudary in Chairing the TNC meeting.

- Al-Azhar University nominated Eng. Mohamed Abu Jabal, Al-Azhar University to represent Al-Azhar University in Gaza the TNC meetings.

- The TNC elected Dr. Hasan Shaban to represent the TNC as a second member in the SC meetings from Gaza.

- A project overview including the overall implemented activities during the second year (2004) was presented by Dr. Radwan Al-Weshah. The participants discussed the project achievements and outcomes of year (2004) and highly appreciated the efforts of UNESCO in executing the project despite of all constraints.

- Representatives from the TNC briefed the meeting about progress of all ongoing research activities their reports. Also the meeting discussed possibility of integrating project activities with ongoing projects in Palestine. A presentation was given by Eng. Mahmoud Abdel Latif, GTZ project coordinator on possibility to link the GTZ training program with the UNESCO/Flanders project.

- The advisory panel has presented the work of each researcher of the first set of research projects and expressed its appreciation for the excellent implementation of each research (see **Annex I.3A).**

- The TNC identified the advisory panels for the ongoing second set of research projects presented feedback information concerning the research projects to the TNC (see **Annex I.3B)**.

- The TNC reviewed and adopted 2004 TNC recommendations versus achievements.

- Dr. Radwan Al-Weshah briefed the meeting about Dr. Willy Bauwens mission to West Bank and Gaza and the report was discussed in details. Issues raised in the report has been effectively addressed and resolved as the communication and training needs.

- The TNC expressed the importance of activating the focal points in Gaza and the West Bank to enhance the implementation of the project activities and to promote the linkage between Gaza and West Bank. These focal points will be identified as institutions rater than persons in coordination with the Palestinian National Commission for UNESCO.

- The TNC members discussed the need to activate training component as outlined in the project document, the participants formulated priority themes and training pre-proposals as shown in **Annex (I.4)**. An evaluation criteria has been developed for this purpose. It is recommended to link these training with similar trainings conducted by UNESCO in the region.

- The TNC was briefed on the preparation of the project website and project brochure as soon as possible, hard copies of the brochure will be produced soon. The TNC welcomed the suggestion to link the project website to UNESCO water portal and other water institutions and universities on the network.

- The TNC members appreciated the efforts of UNESCO Cairo Office and the K.U. LEUVEN in purchasing selected books for the library of the project documentation centre. They thanked UNESCO Cairo Office for purchasing the needed documents. List of books will be made available at the project website.

- The next Steering and Technical Network Commission is agreed to be in March/April 2006, the venue will be decided later preferably in the Palestinian territories based on the political situation in the region per UNESCO Cairo Office advice.

K. Conclusions and recommendations

Based on the detailed discussion among the TNC members, the following recommendations are agreed upon:

12. The Technical Network Commission (TNC) discussed in depth the progress in the technical activities, constraints and difficulties during year 2004. They reviewed the implemented workplan. They recognized the efforts of UNESCO Cairo Office and all implementing agencies in their efforts to implement the project despite all constraints.

13. The overall activities of year 2005 of the project and its allocated budget were reviewed by the TNC members within the framework of the overall project workplan. The TNC recommends assigning the project facilitation and focal points in Gaza and West Bank to institutions rather than persons in coordination with the Palestinian National Commission for UNESCO.

14. The TNC recommends implementing as soon as possible the training activities within the selected priorities and evaluation criteria. They recommend linking these training topics to UNESCO ongoing regional activities within the similar priorities, using training of trainers of modalities.

15. The TNC recommends that the project management to send a copy of the ongoing research project and work plan to the identified advisory panel. The TNC recommends the advisory panel to review and report on the progress of the research projects implementations maximum in a month time.

16. The TNC recommends for the research project coordinators to revisit the format of their completion report to follow the guidelines provided by UNESCO Cairo Office also to present a one page summary sheet for each research project. All to be camera ready for printing.

17. The TNC recommends the project website to be linked to UNESCO water portal and other water institutions and universities in the Palestinian Territories.

18. The TNC recommends taking necessary actions to realize the findings presented in the report of Prof. Willy Bauwens during his assessment mission to Gaza and West Bank. These actions include improving communication, urgently implement training components, activating the documentation centre and promoting networking among water experts.

19. The TNC recommends to UNESCO to purchase 3 PCs, one laptop and LCD projector to enhance the capabilities of the documentation centre.

3rd Technical Network Commission Meeting
Amman, Jordan
8-9 July 2005

No.	Name	Address	Country	Telephone	Fax	E-mail
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4.	Dr. Khalid Qahman	Environmental Quality Authority	Gaza Palestine	+970-8-2822000	+970-8-2839355	kqahman@gov.ps
5.	Dr. Rebhy El-Sheikh	Palestinian Water Authority	Gaza Palestine	+970-8-2822696	+970-8-2822697	ralsheikh@pwa-gaza.org
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		for UNESCO				
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UNESCO Cairo Office

Summary Report of
The Fourth Technical Network Commission (TNC) Meeting of UNESCO-FLANDERS FUST Project on Capacity Building and Training on Environment Planning and Management in Palestine: Phase-II
3-4 December 2006
Amman, Jordan

L. Background

Within the framework of the UNESCO-FLANDERS FUST Project on Capacity Building and Training on Environment Planning and Management in Palestine: Phase-II, the Fourth Technical Network Commission (TNC) meeting was held in Amman, Jordan, on 3-4 December 2006.

The Technical Network Commission (TNC) is an advisory committee to the Steering Committee (SC) and its meeting is organized once a year to discuss and review technical activities of the project in year 2006 and recommend to the SC activities for the year 2007 within the overall project workplan.

M. Objectives

The main objectives of the Technical Network Commission (TNC) meeting are to:

1. Review and evaluate the technical activities (training & research) implemented since the 3rd TNC meeting and prepare recommendations for approval of the Steering Committee of the project.
2. Prepare a list of activities and revised work plan for extending the current project duration for an additional year 2007 for the approval of the project SC based on the overall objectives of the project.
3. Discuss the plan for the organization of the project international conference.
4. Explore the possibility of the extension of the project to a third phase.

N. Participants

The TNC meeting was attended by the following TNC members:

TNC members:

- Mr. Jawad Wadi, President of Al-Azhar University, Gaza
- Mr. Massoud Keshtah, Agricultural Development Association (NGO), Gaza

- Mr. Yousef Awayes, PWA, West Bank
- Mr. Amjad Aliewi, House of Water and Environment (HWE), West Bank
- Mrs. Karen K. Assaf, Arab Scientific Institute for Research and Transfer of Technology-ASIR (NGO), West Bank
- Mr. Hazem Kittani, PWA, West Bank
- Mr. Rashed Al-Saed, Birzeit University, West Bank
- Mr. Issam Nofal, Ministry of Agriculture, amallah, West Bank
- Mr. Anan Jayyousi, An Najah University and TNC representative, West Bank
- Mr. Radwan Al-Weshah, Project Director, Regional Hydrologist, UNESCO Cairo Office (UCO)
- Mr. Moustafa Elbaba, Project Manager, Gaza

The following experts attended the TNC meeting:

- Mr. Rudy Herman, Representative of the Flemish Counterparts, Belgium

Apologies were received from the TNC members who were unable to participate due to the closure of boarders in Gaza and West Bank

A complete list of participants with their correspondence details is given in **Annex (1)**.

O. Opening session

The opening session of the meeting was inaugurated by the representative of H.E. the Minister of Water and Irrigation in Jordan, Mr. Adnan Al-Zoubi who pledged the government of Jordan support to Palestinian water sector and appreciate the effort of UNESCO Cairo Office in the Arab region, the meeting was also addressed by Dr. Abdul Salam Shalaab, representative of Ministry of Higher Education in Palestine, Dr. Jawad Wadi Representative of Al-Azhar University in Gaza, Dr. Rudy Herman, Representative of the Flemish Counterparts, Mrs. Ghada Al-Tall representing the Jordanian national commission for UNESCO and Dr. Radwan El-Weshah, Regional Hydrologist for the Arab States/Project Director, representing UNESCO Cairo Office.

All speakers acknowledged the generous contribution of the Flemish Community to support this project and the effort of the Flemish experts in implementing this project. They all expressed their appreciation to UNESCO Cairo Office for their notable execution of the project despite all constraints. They also pledge their support to help the all water sectors and institutions in Palestine.

P. Proceedings of the meeting

- Dr. Radwan Al-Weshah welcomed the TNC, the participants approved and adopted the agenda of the meeting. A copy of the agenda is shown in **Annex (2)**.

- A project overview including the overall implemented activities during the year (2006) was presented by Dr. Radwan Al-Weshah. The participants discussed the project achievements and outcomes of year (2006) and highly appreciated the efforts of UNESCO in executing the project despite of all constraints.

- The advisory panel has presented the work of each researcher of the first and second set of research projects as well as the training activities and expressed their comments on the implementation of each research and training (see **Annex 3).**

- The TNC members discussed the need to extend the project for an additional year of 2007.

- The TNC discussed extensively the project workplan and future activities for year 2007.

- The TNC expressed the need to identify 5 promising research projects to be extended for the duration of 6 months with the budget of max $6000.

- The TNC suggests organizing three major training courses focusing on a) Sustainable management of groundwater resources in semi arid regions, to be led by the House of Water and Environment; b) Capacity building on environmental planning and management in shared water resources to be led by An-Najah University; and c) Practicalities in water supply management in Palestine to be led by Palestinian Water Authority. These training courses will be conducted in West Bank and Gaza Strip.

- The SC discussed convening the project international conference during August/September 2007 in Jordan. Themes of the conference were identified and conference committees (Organizational, Steering and Scientific) were selected. Keynote speakers are to be identified according to the conference themes (see **Annex 4)**.

- The TNC members appreciated the efforts of UNESCO Cairo Office in purchasing requested equipments for the project documentation centre. They thanked UNESCO Cairo Office for purchasing the needed documents. List of books will be made available at the project website.

- The TNC members appreciated receiving from UNESCO Cairo Office the project progress report including a CD containing all research and training final report.

- The TNC suggests exploring the possibility of the project covering the nominal fees ($1000-$2000) for linking the documentation centre to other ongoing projects having subscriptions to e-journals and scientific periodicals.

- The next Steering and Technical Network Commission meeting is agreed to be in August/September 2007. The venue will be either in Jordan or in Egypt.

Q. Conclusions and recommendations

Based on the detailed discussion among the TNC members, the following recommendations are agreed upon:

20. The Technical Network Commission (TNC) discussed in depth the progress in the technical activities, constraints and difficulties during year 2006. They reviewed the implemented workplan. They recognized the efforts of UNESCO Cairo Office and all implementing agencies in their efforts to implement the project despite all constraints and recommends that all published research projects should acknowledge the UNESCO/Flanders project funding.

21. The overall activities of year 2006 of the project and its allocated budget were reviewed by the TNC members within the framework of the overall project workplan.

22. The TNC recommends the project website to be linked to UNESCO water portal and other water institutions and universities in the Palestinian Territories.

23. The TNC recommends exploring the possibility of the project covering the nominal fees ($1000-$2000) for linking the documentation centre to other ongoing projects having subscriptions to e-journals and periodicals.

24. The TNC members recommend preparing a workplan for the additional year of the project (2007). Future activities are to include extending 5 research projects to an additional period of six months in 2007 with a maximum budget of $6000.

25. The TNC recommends the organization of three training courses, with a maximum budget of $15000, focusing on: a) Sustainable management of groundwater resources in semi arid regions, to be led by the House of

Water and Environment; b) Capacity building on environmental planning and management in shared water resources to be led by An-Najah University; and c) Practicalities in water supply management in Palestine to be led by Palestinian Water Authority. These training courses will be conducted in West Bank and Gaza Strip.

26. The TNC recommends starting immediate actions concerning the organization of the project international conference planned on August/September 2007 in Amman.

27. The TNC recommends taking necessary actions to extend the project to a third phase.

ANNEX 6

CALL FOR RESEARCH PROPOSALS

UNESCO Cairo Office
UNESCO-FLANDER Fund-In-Trust Project
"Capacity Building and Training on Environment Planning and Management: Phase-II"
Call for Research Proposals

Within the Frame work of the UNESCO-Flanders Fund-In-Trust Project on "Capacity Building and Training on Environmental Planning and Management, Phase-II", a number of research priority areas have been identified by key Palestinian experts as follows:

- Contaminate Transport Models
- Water Resources Management
- Water Laws and Legislation
- Groundwater Protection and Management
- Surface Water and Flood Hydrology
- Socio-economic Aspects of Water Resources
- Climatic Data Collection and Processing
- Water Demand Assessment

There is limited number of grants (with a maximum amount of US$ 6,000) up to 18 months available to support research projects of the above-mentioned research areas in the Palestinian Autonomous Territories. All proposals will be initially reviewed and evaluated by UNESCO Cairo Office (UCO). Potential proposals will be selected by the Technical Network Committee of the project; priority will be given to joint proposals between institutions. The dead line of proposal submission is 10 April 2004. Decisions on the acceptance of selected proposals will be made by 15 May 2004.

Only proposals conforming to the following guidelines (see attached INFOPACK) will be considered. Six (6) copies of the following materials must be received by the deadline:

1. A concise description of the research (see Research Proposal Form, Appendix 2) including:
   - Statement of research objective
   - Review of relevant literature focusing on the previous researches in the Palestinian territories
   - Research design and Methodology
   - Workplan (up to 18 month time schedule)
   - Budget Breakdown
   - Expected results and deliverable outputs
   - How funds will be used to facilitate the implementation of the research
2. A detailed budget with justifications for all budget categories in relation to the proposed activities of the research. Please note that the maximum budget is $6,000. In addition, funds will not be awarded for personnel salaries and international conferences travels.

3. Brief CV's of researchers

Please Submit your proposals and queries to UCO as follows:

Dr. Radwan Al-Weshah,
Project Director and the Regional Advisor for Water Sciences,
UNESCO Cairo Office
8 Abdel Rahman Fahmy Street, Garden City, Cairo 11541, EGYPT.
Tel: 202-7945599 / 7943036, Fax: 202- 7945296,
E-mail: r.weshah@mail.unesco.org.eg

UNESCO/Flanders FIT project
Capacity building and training on environmental training and management

RESEARCH PROPOSAL FORM

1. SYNTHESIS OF PROJECT PROPOSAL

PROJECT TITLE	
COORDINATOR (Institution)	
PROPOSAL REFERENCE NUMBER	FIT-R2004- (given by UNESCO)

DURATION	12 months 18 months (select)	
STARTING DATE		
TEAMS INVOLVED (Institutions)	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
REQUESTED FUNDING	US$	

SUMMARY

2. TEAM IDENTIFICATION

(1 PAGE PER TEAM)

TEAM NUMBER	
ORGANISATION	
DEPARTMENT	
SUB-DEPARTMENT	
STREET NAME & No	
P.O.BOX	
POSTAL CODE	
CITY	
COUNTRY	
TELEPHONE	
FAX	
EMAIL	
HOMEPAGE	
TYPE OF ORGANISATION	UNIVERSITY – NGO – COMPANY – GOVERNMENT (select)
TEAM LEADER NAME	
TITLE	
POSITION	
RESEARCHERS INVOLVED IN PROJECT (names)	

3. WORK PROGRAMME

3.1 Title

Same as the project title in Proposal Identification

3.2 Objectives (maximum half a page)

List the scientific objectives of the project as precisely as possible, in phrases of the form "To determine, to investigate, etc.". Wherever possible, quantify the objectives.

Do not include information about the current state of the art or the capabilities or relevant experience of the proposers.

3.3 Background & justification for undertaking the project (maximum 2 pages)

Detail the current state of the art concerning the research topic(s) including important gaps in our knowledge.

Justify the proposed research, including possible applications (scientific, economic, social or other reasons). What place does the project occupy in the general development policy of the Palestinian Autonomous Regions? How does it fit in with the priorities of the Region? In which regard does the project fulfil a real need in the Palestinian Autonomous Regions?

If the proposal is part of or an extension of a larger national or international project, explain its precise role and how it will fit into the wider context.

3.4 Scientific/Technical Description (approximately 3-4 pages)

Break the proposed research down into individual tasks and sub-tasks, showing their relationship. When doing so do not repeat the explanations and justification for the proposed project given in 3.3. Instead present the information in the form normally seen in work programmes accompanying contracts and agreements. Thus, list each task, stating:

- task number and title,
- the objective,
- inputs (scientific starting point),
- outputs (expected results),
- work to be done including methodologies to be used,
- criteria against which success should be judged,

Task	*Teams*	*Coordinator*	*Months 1-6*	*Months 7-12*	*Months 13-18*
T1.1					
T1.3					
T1.4					
T2.1					

T3.1					
T3.2					
T3.3	*1, 3, 5*	*5*			

Add a table as shown above, showing the task distribution and schedule.

When explaining the technical feasibility of the proposal, indicate where there are risks of not achieving the objectives.

*3.5 Exploitation and dissemination of results and follow-up **(max. 1 page)***

Explain how the results and any tangible deliverables (computer programmes, equipment, etc.) will be used or otherwise be disseminated to different target groups (users, scientific, public awareness) and exploited.

Discuss possible spin-off and multiplying effects.

How will the continuity of the project be assured after completion? Are there any provisions for an extension or follow-up phase?

3.6 Description of the consortium (maximum 1 page per partner)

Explain the background and complementary nature of the research teams involved, making due reference to the tasks allocated to each of them. List the scientists to be involved in each team, the names of their institutes, title, function, diploma.

For each team give a **maximum** of 5 references of **relevant recent** publications, which best show the capability of the research team to perform the work proposed. Indicate the name of authors, title of the article, journal or other reference, date and place of issue, etc. (to be written in English).

3..7 Management (max. 1 page)

Describe how the management of the project and the co-operation between the participants will take place (e.g. co-ordination meetings, exchange of scientists, communication & exchange of results).

3.8 Resources (max 1 page + table)

3.8.1 Resources requested from the FIT project

Complete a cost table as shown below, giving an overall summary of the costs for each team. Add teams to the table if necessary.

Refer to §3.6 of the Information Package for a description of the allowable costs.

Note: All equipment to be purchased within the framework of the research should be described

3.8.2 Describe the own contribution from the team members (no budget)

- Personnel (number of personnel members made available, with job description)
- Infrastructure (buildings and rooms made available)
- Materials and equipment
- Contribution to the operating costs
- Other resources and/or facilities made available

3.8.3 Describe other contributions (with global budget)

COST TABLE (in US $)				
	Team 1	Team 2	Team 3	Subtotal
Travel and subsistence				
Travel within Palestine				
Travel of Palestinian to Other country				
Travel Foreigner to Palestine				
Subtotal				
Equipment				
Small laboratory equipment				
Microcomputers				
Communication equipment				
Subtotal				
Other costs				
Software licences				
Purchase of data				
Communication costs				
Consumables				
Subscription for training course				
Publication of results, handbooks,…				
Other (specify)				
Subtotal				
Total				

Research Proposals Evaluation Criteria

A. Relevance of the research project in view of the water resources priorities in Palestine (maximum number of points: 20)

1. Overall, how important is it to address this problem now from a scientific, economic and social
2. point of view? How well does it correspond to the research priorities set by the WRN?
3. Are the relevant end users involved?
4. Have appropriate measures been planned for the dissemination of results (including public awareness)?

B. Merit of the scientific objectives (maximum number of points: 20)

1. How well did the authors present the scientific state of the art?
2. How clearly are the scientific objectives described?
3. How novel and exciting is the proposed research (e.g. new fields of research or new approaches or inter-disciplinary research, etc.)?
4. Scientifically, what are the chances of success?

C. Merit of the scientific/technical programme (maximum number of points: 25)

1. How well targeted is the technical programme with regard to the scientific objectives? (Are important parts missing or is some of the planned work not necessary?)
2. How clearly are the methodological and technical aspects explained?
3. How clearly are the expected results (outputs) presented?
4. Technically, is the proposed research programme realistic?
5. Technically, what are the chances of success? Do the teams have access to the necessary technical resources? How realistic is the proposed schedule?

D. Merit of the consortium (maximum number of points: 15)

1. To what extent will the project lead to true research collaboration between the different team members?
2. Scientifically and technically, how well are the teams qualified to do the work?
3. Scientifically and technically, how well do the teams complement each other, especially in inter-disciplinary projects?

E. Merit of the project management (maximum number of points: 20)

1. How clearly are the management methods to be used to run the network explained?

2. Is the proposed division of tasks among the teams appropriate and does it indicate true collaborative research? I.e. do all the teams make a substantial interactive contribution to the project?
3. How appropriate is the requested funding (cost-benefit-ratio) and its proposed allocation to the different teams and cost categories?
4. How appropriate and well described are the plans for disseminating and exploiting the expected results ?

2. Eligibility criteria and general comments

	Proposal	1	2	3	4	5	6	7	8	9	10	11
GENERAL CRITERIA		See Infopack Par. 3.2										
a	Submission procedure	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
b	Deadline	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
c	Training priorities	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
d	Max duration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
e	Max. grants	?	?	OK	OK	OK	OK	OK	OK	OK	No	No
f	Partnership	OK	OK	OK	No	OK	No	OK	OK	OK	OK	No
g	Allowable costs	No	No	No	No	No	No	No	No	No	No	No
SPECIFIC CRITERIA		See Infopack Par. 3.3.1										
h	Objectives	OK	OK	No	OK	OK	OK	OK	OK	OK	OK	OK
l	Submitted by user	No	No	No	No	OK	No	No	No	OK	No	No
j	Trainers	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
k	Training of trainers	~	~	~	~	~	~	~	~	~	~	~
l	Evaluation	No	No		No	OK	OK	No	No	OK	OK	OK
m	Dissemination	~	~	~	~	~	~	~	~	~	~	~

Tab. 2: Eligibility

Most of the proposals are not in agreement with the objectives and the eligibility conditions, as mentioned in the Infopack:

- While it is stated in §1.4 that "The initiative for a training course is to be taken by a 'user' within the water and sanitation sector. The (principal) user will also be the co-ordinator (CO) of the project. Proposals for funding should be submitted jointly by the user(s) and by the provider(s). ", all the proposals – except 5 and 9 – are proposed and coordinated by the providers of the training courses (Tab.2, criterion l).

  The projects 4, 6 and 11 do not even mention a user in their consortium. It is therefore strongly recommended to require an extension of the partnership of these projects, before these proposals can be accepted. 9 (Tab.2, criterion f)

- While the infopack mentions that “The project focuses on the capacity building at the level of the providers of the training, in order to allow them to provide the training service …” it is unclear if the proposals will match this objective. In general, the proposals do not include a training component for those who will provide the training. The proposals instead consider the trainees to be future trainers, but as the selection criteria for the trainees and future dissemination plans are seldom provided, this cannot be properly assessed. (Table 2, criteria k and m).

  All proposals also lack integration in a strategic training plan of the user and/or the providers.

- According to the philosophy of the training projects for Strand A the ‘users’ of the training (PWA, Ministries, …) should pay the providers for the training. All the proposals foresee fees for the training, but the latter are requested by the FIT project and not by the user (Tab.3). This is also in contradiction with the fact that salaries cannot be paid by the FIT project.

- The requested fees range from 240 to 1417$ per training day. Considering the fact that the courses are not specifically tailored to the needs of the user (many courses are probably readily available) and that (except for proposal 7) only local experts are used for the training, these fees are considered as excessive.

- Proposal 11 exceeds the maximum budget of 100$ per day and per participant that is mentioned in the call. The latter cannot be checked for the proposals 1 and 2, as the number of participants is not mentioned in the proposal.

- The amounts requested by proposal 10 exceed the maximal amount of 20000$ stated in the call. For proposal 11, the amount of 3000$ for equipment exceeds the maximum stated in the call (1000$).

- The projects 5, 6, 8, 9 and 10 request an overhead, which is not allowed according to the infopack.

- Project 3 is not eligible, as it deals with the training of technicians and farmers (Tab.2, criterion h).

Proposal	Budget	Duration	Trainees	C x D	Travel & accomod.	Fees	Facilities	Consumables	Training material	Overhead	Allowance	Equipmen
	$	days			$	$	$	$	$	$	$	$

1	20000	6	0	0	8000	8500	2000	1500	0			
2	20000	6	0	0	12000	7000		1000				
3	20000	25	15	375	2225	18750	1250	1000	450			
4	19700	20	20	400	700	18000	1000					
5	20000	21	20	420	0	7000	3000	3000	1000	4000	2000	
6	14520	20	20	400	1500	4800	1000	4600	200	2420		
7	19965	21	17	357	3000	16065		900				
8	20000	26	12	312		12000	2600	2000	500	500	2400	
9	11375	12	15	180		5400	1200	2800	375	1600		
10	**24975**	25	15	375	450	9000	2200	7450	375	3500		2000
11	20000	9	20	180	9000	5100		1600	1300			**3000**

Proposal	Budget per day per part.				T&A per day	Fees per day		Consumables per partner per day				
	$				$	$		$				
1	**?**				**?**	1417		**?**				
2	**?**				**?**	1167		**?**				
3	53				5.9	750		2.7				
4	49				1.8	900		0.0				
5	48				0.0	333		7.1				
6	36				3.8	240		11.5				
7	56				8.4	765		2.5				
8	64				0.0	462		6.4				
9	63				0.0	450		15.6				
10	67				1.2	360		19.9				
11	**111**				50.0	567		8.9				

Tab.3: Costs

3. Evaluation

Considering the fact that the proposals were not submitted by the user of the training and the fact that the procedures for the training of trainers was often not clearly described in the proposals, the evaluation criteria mentioned in the infopack have been somewhat adapted. Table 4 shows the results.

Proposal		Max.	1	2	3	4	5	6	7	8	9	10	11
1	Relevance of project	20	15	20		20	20	15	20	10	20	15	10
2	Integration in strategic training plan of user	10	0	0		0	7	0	0	0	5	0	0
3	Integration in strategic training plan of training institutes	5	2	2		2	2	2	2	2	2	2	2
4	How well targetted is the selection of the trainees	5	3	3		3	4	3	3	3	3	3	4

5	How well targetted is the selection of the trainers	5	5	4		5	4	4	4	4	3	3	3
6	Clarity of methodological and technical aspects	5	5	5		5	5	3	4	3	5	4	4
7	How well targeted is the technical programme with regard to the objectives	10	8	8		8	10	8	10	6	8	6	6
8	Technically, is the proposed training programme realistic	5	3	4		5	5	4	5	3	5	4	4
9	Clarity of expected results	5	4	4		4	4	4	4	2	4	3	3
10	Evaluation of the training	5	0	0		0	3	3	0	0	3	3	3
11	Dissemination, multiplication	5	3	2		3	3	3	3	2	2	2	3
12	Clarity of management methods	5	3	3		3	3	3	4	3	3	2	3
13	Division of tasks	5	4	4		3	3	3	4	3	3	2	3
14	Fair retribution of the trainers	5	0	0		0	0	0	0	0	0	0	0
15	How appropriate is the requested funding (cost-benefit-ratio)	5	0	0		0	3	4	0	3	3	3	0
	Total	100	55	59	0	61	76	59	63	44	69	52	48

Tab.4: Evaluation

Note that all the project were given a 0 for criterion 14. This reflects the fact that the user of the training is not intervening in the cost of the training.

4. Summary

No.	Title	Coordinator	Eval. Score	Proposal Remarks	Budget
5	Integrated water project management training course	PWA Gaza	78	***Fund*** Overhead requested	20,000
9	Environmental Impact Assessment Training Course For Water Projects Activities "Methods and Practices"	PWA Gaza	69	**Fund** Overhead requested	11,375
7	Training course: Irrigation Water Management	Birzeit, WB	63	**Fund** Not submitted by user Excessive fees	19,965
4	Training course: Application of Integrated Water Resources Management	Birzeit, WB	61	**Fund** No users in consortium Not submitted by user Excessive fees	19,700

No.	Title	Coordinator	Eval. Score	Proposal Remarks	Budget
2	Training Course on Groundwater wells in the Northern Governorates in the West Bank	HWE	59	**Fund** Not submitted by user Excessive fees Number of trainees not mentioned	20,000
6	Spectroscopic and Chromatographic Instruments for Water Analysis"	Al Azhar U.	59	***Fund*** No users in consortium Not submitted by user Overhead requested	14,520
1	Training workshop on using GIS and GMS in developing groundwater flow models for the Palestinian aquifers	HWE	55	***No funding*** Not submitted by user Program too ambitious for duration No use is made of expertise that exists in Gaza Excessive fees Number of trainees not mentioned	20,000
10	Wastewater Monitoring Summer School	Al Azhar U.	52	**No funding** Program too basic Not submitted by user Budget > 20000$ Overhead requested	24,975
11	Environmental Auditing: Applications and Examples	Al Quds U	48	**No funding** Training needs doubtful, program fuzzy No users in consortium Not submitted by user > 100$/trainee/day 3000$ for equiment	20,000
8	Decision Support System Tools and Models for Water Resources Management	Al Azhar U.	44	***No funding*** Not submitted by user Program too general, lack of clear objectives Overhead requested	20,000
3	Adequate Management of Water and Sanitation Through Building the Capacity of Technicians	PHG	0	**No funding** Training of technicians Excessive fees	20,000

Tab.5: Summary

6. Concluding remarks

The technical quality of the project proposals that have been submitted is on average quite satisfactory, although relatively poor from the point of view of the management and the follow-up.

What is however most disappointing is the fact that the proposals do not take the general objectives of the second stage of the Palestine project into consideration: none of the projects reflects a strategic view on the training needs in Palestine as seen by the users of the training and by the providers of the training.

Also disappointing is the fact that many proposals do not take the requirements for the project proposals into account.

Strictly speaking, none of the projects is eligible if one considers that salaries – and thus the fees for the trainers – cannot be funded by the project. In my opinion, UNESCO could however be flexible with regard to this issue, considering the difficult financial situation in Palestine. Nevertheless the fact remains that the fees that are requested are not reasonable. It is therefore suggested that UNESCO limits the fees to a certain amount per training day.

It is also suggested that UNESCO requires the project coordinators to mend the other shortcomings of the projects that are related to the eligibility criteria before signing the contracts.

ANNEX 8

FUTURE PROPOSALS FOR RESEARCH PRIORITIES AND TOOLS FOR ENHANCEMENT IN THE WATER SECTOR IN PALESTINIAN OCCUPIED TERRITORIES

United Nations
Educational, Scientific and
Cultural Organization

منظمة الامم المتحدة للتربية والعلم والثقافة
مكتب اليونسكو الإقليمى بالقاهرة

UNESCO CAIRO OFFICE

Research Priorities and Tools for Enhancement in the Water Sector in Palestinian Occupied Territories

This document was commissioned by UNESCO and funded through the Flemish FUST Project on the Capacity Building and Training on Environmental Planning and Management: Phase – II

December 2008

Table of Contents

1. Introduction

As a semi arid area, the Palestinian Territory including West Bank and Gaza Strip face significant challenges with adequate water resources for Palestinian households. Communities in the Palestinian land face recurrent problems of water shortages, availability and access. Water Issues, coupled with environment,

economic and political factors, have afflicted many marginalized communities and caused greater food insecurity among the population.

The current water crisis in Palestinian Territory is not only a consequence of the water scarcity in the region, but also an inherent part of the general Palestinian-Israeli conflict; for instance, the Palestinians have yet to be granted their legal entitlements from the water resources they formally share with Israel. The agreements signed between Israel and the PLO in the 1990s have also failed to improve the situation as they provide only temporary solutions that are neither fair nor sustainable. Moreover, over the past fifteen years, Israel has continued to neglect the importance of engaging in serious negotiations relating to water.

In light of the above and based on the fact that the water issue is multidisciplinary in nature, which, coupled with the existing political problems, implies that any solution relating to the water situation will affect other fields, disciplines and issues, UNESCO – ICO attempted to identify the priority of the research areas in the water sector, pinpoint the crucial facts, and clarify the commonly used terminology. As a contribution to environmentally sound, sustainable development of the water resources in the region, this UNESCO project aims at ensuring the long term conservation of the water resources in the Palestinian Territories through building capacities and setting up a water resources network to foster the co-operation between the actors in the field, with respect to training, research and public awareness.
The project is financed by the Government of Flanders (Belgium) and executed by UNESCO, in the framework of the FIT. The Flemish contribution amounts to 850.000 $ for the period 2001-2005.

The immediate objectives are:

- To establish a Palestinian Water Resources Network, involving the institutions and research centers acting in the water sector in Palestine
- To establish a modern and comprehensive documentation centre, accessible by all players of the Palestinian water sector
- To strengthen the staff of the universities in Palestine, in view of its abilities to provide training to the Palestinian water sector on diverse water issues
- To enhance the research capacity of the universities in Palestine
- To link public awareness activities to the previous activities, to raise public concern and understanding for the conservation of the water resources in Palestine

This Report entails diagnoses of the current challenges in the water sector at the Palestinian Territories and anticipates the circumstances in the future. This will assist the funding agencies and international organizations to priotorize their efforts and assistance in the areas that are highly demanding. An essential component of the technical assistances of the international organizations is improving and funding the research in the different areas of the water sector.

This Report outlines how the Palestinians' inability to practice legal sovereignty over their indigenous resources and the absence of an agreement governing the utilization, development and management of the trans-boundary water resources affect their water use, planning and decision-making.

The UNESCO-Cairo office is well known for fostering the initiatives and taking the leads in the areas of improving capacitates and potentials in the Palestinian water sector. During the last ten years, the said organization implemented a number of workshops, scientific meetings, funding research proposals and projects, financing and organizing conferences related to the water sector and problems in Palestine.

This effort is a continuation of the long lasting interest of UNESCO in the direction of improving the functionality and performance of the water sector in Palestine and defines the list of priorities for the possible and potential areas of research in the water sector.

This report was stemmed and prepared based on the actual and current conditions of the water sector and the contacts with the related organizations in Palestine such as academic institutions, non profit organizations and consultants in the areas. Also it is worth mentioning that the Cairo office assisted remarkably in mobilizing the data and facilitating the contacts with the potential stakeholders in the research area.

2. Diagnosis and performance of the water sector in Palestine

2.1 Current Water sector conditions

The decline of the Palestinian economy triggered by the Second Intifada in 2000 and compounded by recent events has left per capita GDP at US$1,129 by the end of 2006, about a third less than its level of US$1,612 in the year1999. Since Israel's disengagement from Gaza in September 2005, its borders have been closed for extended periods, inhibiting trade and movement of people. The unemployment rate in Gaza reached 35% in 2006 compared to 18.6% in the West Bank for the same year. Since June 2007, Gaza and the closure became much tighter where trade and entry of goods became almost impossible.

The main features of the water and wastewater sector in Palestine has come a long way since 1995 which can be summarized as follows:

- A capable national institution, the Palestinian Water Authority (PWA), has been built;
- The foundations for policy and operational coordination with Israel have been established;
- Several existing municipal distribution networks have been rehabilitated, new networks developed, and supplies improved; and several new wells have been drilled and many rehabilitated;
- Backbone primary network of bulk-water carriers are under construction in the West Bank and ready to be launched in Gaza;

- In Gaza not only have municipal networks and systems have been significantly upgraded, under an internationally recruited management contractor, effective managerial and operational systems have been established;
- A new water law rationalizing the sector has been passed;
- Several studies have been undertaken to evaluate resource availability and quality, supply and demand, well and network conditions, tariffs, technical and financial management, and institutional options;
- A coherent national policy has been laid out and a national plan developed; and
- A “Coastal Utility” is being established in Gaza, in an attempt to consolidate the existing small and inefficient municipal water departments into a more efficient operating and service delivery unit.

2.2 Institutions involved in Palestinian water policies

The following are the institutions and entities who are involved currently with the water sector issues; planning, management, operation and construction.

- National Water Council (NWC)
- The Palestinian Water Authority is a governmental institution that was established in 1995 to be the regulatory body of the water and wastewater sector in Palestine. It is responsible of ensuring sustainable development of the water sector in Palestine.
- Ministry of Environmental Affairs is "setting up integrated sector policies fitting with the scarcity of land and water resources while focusing on confining the use rather than increasing the supply".
- Jerusalem Water Undertaking;
- Palestinian water company, responsible for the Ramallah District. It provides a lot of technical information on water distribution in the region, but also on water resources and management.

2.3 Organizations dealing with water resources

The following are the current non governmental organizations (NGOs) dealing with water issues:

- The Palestinian Hydrology Group is an NGO that protects and develops the water resources in Palestine, and which is actively involved in water policies.
- The Applied Research Institute Jerusalem has a Water & Environment Research Unit (WERU) and a whole list of publications on its website.
- ARIJ is an NGO that deals with research aspects related to water sector in Palestine.

2.4 Water regulations

- Water Law (old version, 1999) and updated in 2007.
- Environmental law (nr. 7), 1999.

2.5 Universities dealing with water research

- Al Azhar University in Gaza, through Institute of Water and Environment (IWE);
- An-Najah National University in Nablus-West Bank, through Water and Environmental Studies Institute (WESI);
- Ber Zet University in Ram Allah-West Bank through Institute of Environmental and Water Studies (IEWS);

3. Challenges and areas of shortcomings in the water sector

Despite the considerable efforts and many praiseworthy achievements, the structure and performance of the water supply and delivery system as a whole has not yet changed significantly. The following facts are the indictors for such retardation:

- Domestic water production and consumption, in Gaza, at 125 and 75 l/c/d respectively, remains low, well below comparators and Israel; critical water resources are still almost totally under Israeli control;
- Palestinian supply and demand in the West Bank is highly constrained by Israeli actions;
- Supply in Gaza, while somewhat less constrained than in the West Bank, is of highly variable quality (high salinity and nitrate contents); the Gaza aquifer remains degraded and at risk of irreversible damage;
- Adequate wastewater treatment and disposal are still lacking, and the potential for wastewater reuse is not effectively exploited;
- Adequate transmission networks and systems have yet to be developed;
- The new law and the proposed institutional reforms, while extremely positive developments have yet to be fully implemented;
- The institutional framework, while greatly improved, still needs further rationalization;
- Distribution institutions and systems are still inefficient, and in need of major reform and rehabilitation, and water losses are unacceptably high;
- Tariffs generally do not reflect the cost of operations or maintenance, much less development needs;

4. Defining the areas of Research in Palestine in the field of Water and Sanitation

4.1 Previous research in defining the areas of priorities in the water sector

Based on the findings of the previous research funded by UNESCO/Flanders FIT project for the Capacity building and training on environmental training and management in Palestine during the period 2002-2006. the priority fields were identified as follows:

- Contaminate Transport Models
- Water Resources Management
- Water Laws and Legislation
- Groundwater Protection and Management
- Water Demand Assessment
- Surface Water and Flood Hydrology
- Socio-economic Aspects of Water Resources
- Climatic Data Collection and Processing.

Contacting the decision makers at the official institutions in the water sector during the progress of this assignment resulted with defining the following priority areas:

<u>Research needs</u>

1. Climate Change Effects on water resources,
2. Groundwater quality, hydrochemistry and pollution control,
3. Water supply and sanitation,
4. Water resources management,
5. Water conservation and reuse,
6. Applications of GIS and remote sensing in water resources
7. Environment impact associated with water resources

8. Toxic Chemicals effect on water resources
9. Wastewater treatment and reuse in agriculture
10. Develop appropriate rainwater harvesting techniques including seepage and evaporation measures for storage

11. Impacts of Land Use on water resources
12. Water and irrigation (Water management for irrigation and crop water requirement

13. water demand management
14. Water poverty

15. Water treatment / Desalination

16. Water laws, rules and regulation,

Training needs

Priorities could deal with such topics as:

1. Integrated water resources management
2. Groundwater quality and hydrochemistry
3. GIS and remote sensing in water resources management.
4. Environmental Protection and Conservation of water resources
5. Water supply and sanitation
6. Wastewater treatment and reuse,
7. Groundwater quality and treatment,
8. Storm and rain water harvesting
9. Water Desalination (RO),
10. Advance wastewater treatment;
11. Shared and trans-boundary water resources management
12. Water economics- financing and cost recovery;
13. Groundwater modeling;
14. Modeling of Water distribution,
15. Crop Water Requirement
16. Water institutional, law and ethics;
17. Water awareness and education,

It can be seen that the list is long and the need is wide for almost most of the areas, but as mentioned earlier, due to the limited budget and the set criteria, it was necessary to scale down the list into a number of focal issues.

4.2 Progress of the funded projects and research studies by UNESCO/Flanders FIT

Due to the political situation in the Palestinian territories, the implementation of the project has not reached its optimal level as planned. The Steering Committee and the Technical Network Commission were established for the management of the project. The Steering Committee has slightly modified the work plan to ensure optimal implementation of the project given the external constraints to this project and decided to extend the current phase of the project for one additional year to end in December 2007.

Twenty one research projects were funded through competitive process and reached their completion stage by the middle of year 2006. The following table shows the research projects under fund.

Project No.	Title	Coordinator	Duration	Institutions involved	Requested Funds US$
1	Best practice management for reducing environmental impacts from electroplating industries and textile dyeing industries in Gaza	Environmental Quality Authority	24 months	1- Dr. Mohamed Abu Shammaleh 2- Dr. Farid Abu Shammala 3- Palestinian Industrial Union	10,000
2	The Effect of Wastewater Treatment Plant on Groundwater (Chemical Quality) in Gaza City	Public Health Laboratory, Water Quality Laboratory, Ministry of Health, PNA-Gaza	12 months	1- Public Health Laboratory, Ministry of Health, PNA-Gaza 2- Water Research Center, Al Azhar University, Gaza.	7,950
3	Hydro-geological Evaluation for the Impacts of the Proposed Philadelphia Moat on The Groundwater Resources in Rafah Area, Gaza Strip, Palestine	Ahmed Yakoubi, Palestinian Water Authority	12 months	1- Palestinian Water Authority, PWA 2- Palestinian Hydrology Group, PHG	7,900
4	Prospective Of Water Management In The Israeli Colonies In The Gaza Strip	Eng. Ashraf M. Mushtaha Eng. Jamal Y. Al-Dadah Dr. Amjad Aliewi	12 month	1- Palestinian water authority (PWA), planning department 2- Palestinian economic council for development and reconstruction" 3- House of water and environment	10,000
5	Studying Alternatives to Chlorination for Drinking Water Disinfection in Nablus City	Dr. Abdelrahim Abu-Safa (Chemical Engineering Department, An-Najah National Univ., Nablus)	12 months	1- Chemical Engineering Department, An-Najah National Univ., Nablus 2- Water and Environmental Studies Institute, An-Najah National Univ., Nablus 3- Department of Drinking water and Sanitation, Nablus Municipality, Nablus	9,600
6	Significant Savings in Potable Water by Recycle of Wastewater from Textile Washing Operations in the Nablus Area	Dr. Amer EL-Hamouz (Chemical Engineering Department, An-Najah	12 months	1- Chemical Engineering Department, An-Najah National Univ., Nablus 2- Water and Environmental Studies	7,980

Project No.	Title	Coordinator	Duration	Institutions involved	Requested Funds US$
		National Univ., Nablus)		Institute, An-Najah National Univ., Nablus	
7	Critical Improvements of the Drinking Water Disinfection System within the Nablus Municipality	Dr. Hassan Arafat (Chemical Engineering Department, An-Najah National Univ., Nablus)	18 months	1- Chemical Engineering Department, An-Najah National Univ., Nablus 2- Water and Environmental Studies Institute, An-Najah National Univ., Nablus 3- Department of Drinking water and Sanitation, Nablus Municipality, Nablus	9,700
8	Health effects of the desalinated water by the Reverse Osmosis units.	Eng. Riyad Juniena Palestinian Hydrology Group-Gaza	12 months	1- The Islamic University of Gaza 2- Palestinian Hydrology Group - Gaza	8,000
9	Development and valuation of local fixed film materials to reclaim the effluent of septic tank-natural treatment systems for irrigated agriculture	Institute for Water Studies (IWS)	18 months	1- Institute for Water Studies, Birzeit University 2- Department of Civil Engineering 3- Palestinian Hydrology Group	10,000
10	Regional assessment of groundwater vulnerability to contamination in Gaza strip	Dr. Mohammad N. Almasri (Water and Environmental Studies Institute, An-Najah National University, Nablus, Palestine)	12 months	1- Water and Envirnmental Studies Institute, An-Najah National University, Nablus, Palestine 2- Department of Civil Engineering, An-Najah National University 3- Environmental Quality Authority, Palestine	10,000
11	Optimal Management of Groundwater Resources in Rafah Governorate Gaza Strip, Palestine	Mazen Elbanna The Palestinian Water Authority	12 months	1- Palestinian Water Authority 2- Environmental and Rural Research Center (ERRC), Islamic University of Gaza,	8,000

Project No.	Title	Coordinator	Duration	Institutions involved	Requested Funds US$
				Palestine	
12	Screening of Pesticides in the Domestic Water Supply Systems in Gaza City	Dr. Mazen Hamada, Chemistry Department, Al Azhar University in Gaza	15 months	1- Chemistry Department, Al Azhar University, Gaza. 2- Water Research Centre, Al Azhar University, Gaza 3- Palestinian Water Authority, Gaza	
13	Application of a UASB-digester system for domestic sewage treatment in Palestine	Institute for Water Studies (IWS)/ Birzeit University (BZU)	18 months	1- Institute for Water Studies (IWS), Birzeit University (BZU) 2- Faculty of Science, Dept. of Chemistry, Birzeit University 3- Palestinian Wastewater Engineers Group (PWEG)	10,000
14	Health Risks from Microbial Growth and Biofilms in Drinking Water Distribution Systems in Palestine	Biology & Biochemistry Dept./ Birzeit University	18 months	1- Biology & Biochemistry/ Birzeit University 2- Institute for Water Studies (IWS) / Birzeit University 3- Medical Research Centre/ Al Quds University	10,000
15	Management Practices of Spring Discharges in Catchments Contributing to the Lower Jordan Basin	Anan Jayyousi, Water and Environmental Studies Institute (WESI)	24 months	1- Water and Environmental Studies Institute (WESI) 2- Ministry of Agriculture	10,000

4.3 Current Search for the priorities of research projects

After assessing the current funded projects and the areas that are covered under these researchers, the main objective was not to repeat same researchers and tries to investigate for new ideas and themes under the water sector.

The main guideline in setting the priorities for the research in water sector for the coming two years are as follows:

1. Serve the communities directly and indirectly from the social and economical point of view.
2. Comply with the definition of priorities that was stemmed from the decision makers in the water sector.
3. Have the theoretical and practical parts.
4. Assist in building the required capacity in the water sector in Palestine.
5. Maintain the sustainability and guarantee the future merits for the residents in Palestine.
6. Be within the budget of the funded program.
7. Can be monitored and organised by the steering committee.

Based on the surveyed areas of potential researches in the water sector, mentioned previously in section 4.1, the main clusters that were under evaluation are:

- Development of conventional water resources.
- Development of non conventional water resources.
- Integrated water resources management.
- Sanitation and reuse of treated wastewater.
- Water for irrigation purposes.
- Water policies and strategies.
- Capacity building related to the previous areas.

To narrow the circle of evaluation and based on the set selection criterion, the areas of urgent need for possible research in the water sector are the ones that may serve more than one objective and cross cutting with most of the clustered research areas mentioned previously.

The following are the main themes that were under evaluation and consideration in the water sector and were under the focal of assessment in this report.

- Development of non conventional water resources.
- Improving the efficiency in the water supply and sanitation networks.
- Institutional reform of the water industry and building the necessary capacities in the areas related to the utilization of the non conventional water resources.

More description about the selected areas of research can be elaborated as follows:

1. Improving the water resource, supply and sanitation networks (hardware components):

This can be achieved through introducing new water resources and mainly the non conventional water resources, or adopting a water management policies and reducing the losses. In terms of introducing new non conventional water

resources, there are two venues for discussing this issue; the first is the reuse of treated wastewater and the second is the reuse of gray water.
The reuse of treated wastewater is more attractive and feasible as long as the treatment plants are working well and the required infrastructure of the reuse are available. With the absence of proper reuse infrastructure and lack of controlling means, the second alternative became more attractive and feasible. The utilization of gray water at individual level is becoming a feasible option in many of the regional countries that are facing severe water shortages for the use in irrigation like the case in Jordan. The validity of such research projects will be reflected directly on the communities which are in bad need for any water resources alternative, and on the researchers working the field in development of non conventional water resources.

It is the belief of this report's author that the gray water utilization is a high priority area to be studied and researched.

The second venue in adding more quantities to the water system is through adopting management measures such as reducing the losses and rehabilitating the networks. The losses or unaccounted for water are becoming an increasingly economic problem for most of local communities in Palestine. The reason or reasons behind the high percentage of losses can be attributed to several factors, which are:

- Water leakage inside the pipes and fittings, and this is clear especially in the old networks and particularly, incase of poor maintenances.
- Illegal connections before the water meters, however, there is a strong debate on this particular issue. In one of the communities, they have the have a high percentage of water loss that exceeds in certain months 45%, and they doubted on illegal connections. Therefore, they tightened and controlled all connections; however, the results showed no clear change in the water loss was predicted. Actually, there is exaggeration by this reason, and people claim this reason when they have no clear explanation for such a high percentage. The main conclusions that this can be a minor reason, not as people think about it.
- Unregistered consumption, like the public connections that normally consumes large water quantities because of the absence of control, and water is free.
- Air entrained in the network form the source of water. This problem becomes clear in many sources which are water pumping exceeds the specific yield and the capacity of the aquifer. Air pockets go through the pipes and reach the main water meter before it enters the balancing tanks.
- Losses caused due to the limited accuracy of water meters. These amounts of water, are actually consumed, but not registered by the water meter.

The problem of water losses is one of the most essential problems that need to be studies, researched and solved in the Palestinian land.

In order to be more specific, breakdowns of the possible projects that can be proposed were developed. The following table shows the breakdown of the proposed water resources, water supply and sanitation networks that need to be tackled:

Table (1): Essential activities for improving the infrastructure of water and sanitation

Components	Rational
Introduce reuse of treated wastewater facilities close to the wastewater treatment plants	The reuse of treated wastewater will assist the PWA in managing the non conventional water resources and suffice the pressure on the fresh water
Introduce gray water reuse facilities at inhabitants level	The reuse of gray water will assist in reducing the need of fresh water for irrigation purposes.
Rehabilitation of existing wells, drilling of new wells	Wells are in poor conditions and require replacement as the water quality deteriorates due to and the demand increases.
Replacement of water and wastewater connections	Expansion of the services and more needs to replace the old connections.
Repair and replacement of water meters	Additional meters are needed to comply with the program of continuous meter replacement for the additional year.
Repair, maintenance and replacement of electromechanical equipment	Equipment became subject to more failures due to frequent power outages and overloading.
Purchase systems hardware and software	Extra need to purchase the software and hardware needed for the functionality of the CMWU

1. **2. Institutional Reform and Capacity Building Component (software components)**.

2. This component entails the strengthening of Palestinian Water Authority and other semi Governmental and non Governmental agencies to perform operations related to planning and management of the water supply and sanitation systems. The main performance targets are summarized as:

a. Strengthening the capacity building utilities by implementing the necessary training courses to improve human resource management and strengthening the capital investment and planning systems.

b. Improving the capacities in the areas that are related to the development and utilization of non conventional water resources such as gray water and treated wastewater. This can be tackled from the technical and legislative point of view.

c. Improving the capacities in the areas of improving the water quantity by reducing water losses and increasing the supply capacity.

d. Improving the management systems of the water and wastewater services with emphasis on operation and maintenance systems, financial management, customer services, billing and collection, human resources development.

e. Introducing the necessary technical and legal set up for the reuse of treated wastewater and gray water at inhabitant's levels in the towns and villages.

3. This component needs to be financed in line with the adaptation of the preferable / potential research project that are related to the hardware component. For example, the adaptation of the gray water introduction will require a capacity building program for the targeted group and the technical team that will follow up the implementation of this program and make the necessary assessment.

Other software venues for research could be valid but has no priority under the criteria that was set for this search report. The development of the Palestinian Water vision for the coming 25 years and development of Palestinian water strategy and policies are two examples that could be proposed, but have no priority in the coming two years.

5. Results and Recommendations

5.1 Potentials concerning sanitation and reuse sector

Based on the assessment that was carried out in the previous chapters, the following are the main potentials in relation to the sanitation and reuse sector in Palestine:

- Development of alternative wastewater treatment like gray water treatment and reuse concepts like toilet flushing with treated grey water, etc.
- Development of sound basis for the selection of the proper wastewater treatment technologies. This includes aerobic, anaerobic, onsite, off site, etc. also socio-economic aspects.
- Assessment of existing wastewater treatment technologies and the lessons learned from this experience considering our climatic conditions and wastewater characteristics.
- Development of innovative wastewater treatment technologies which are capable of removing N, 'P', and faecal coliform at the lowest possible cost
- Conducting a specialized training courses for the engineers and technical staff in the following areas:

- wastewater collection system design and monitoring systems.
- Advanced course on technologies of wastewater treatment plants.
- Applications and potentiality of reuse of treated waste water and gray water for irrigation purposes.

- Development and updating the current wastewater and sanitation legislations in Palestine and comparison with the cases in the MENA region.

5.2 Potentials concerning water supply sector

The following are the main potential research areas with respect to the water supply sector in Palestine:

- Strengthening the capacity building utilities by implementing the new payroll system, improving human resource management and strengthening the capital investment and planning systems.
- Improving water quantity by reducing water losses and increasing the supply capacity.
- Improving water quality via the maintenance and upgrade of the existing disinfection program including improving the performance of the existing wastewater works.
- Improving the management systems of the water and wastewater services with emphasis on operation and maintenance systems, financial management, customer services, billing and collection, human resources development.
- Conducting a specialized training courses for the engineers and technical staff in the following areas:
  - Water supply and distribution networks using the advanced computer – aided design methods.
  - Water resources development and investigation the potentiality of the non conventional water resources.
  - Application of decision support system in the areas of water allocation and management of available water resources. This will be supported by actual projects and studies in the MENA region.
  - Public awareness campaigns in the area of water rationality.

5.3 Selected Research Project

The “reuse” of treated wastewater and/ or reuse of “gray water” are the cross cut issues that serve the following points:

- Non conventional water resources.
- Component of the IWRM.
- Serve the objectives of sanitation and reuse.
- Serve the issue of water for irrigation.
- Part of the water policy towards utilization all the resources.
- May entail a capacity building components.

To be more practical and realistic, and cope with the limited budgets for research funding, it was evident that the “reuse of gray water” was the preferred option for further search and study by this report.

This preferred “selected research area” can be divided into software and hardware components. The software is the components related to capacity building and institutional reform. The hardware component is related to the physical implementation on the ground as physical components.

The following chapter will discuss in details the possible components of the proposed research project.

5.4 Tips for the implementation of the proposed research

A number of recommendations are necessary before the implementation of the research project. These include:

1. The local expertise need to be encouraged and involved in the process of the development of the water sector as much as possible.
2. Private sector can play an important role in developing the water sector. Among other factors, the political stability can hinder the implementation and changes in the implementation arrangement should be expected.
3. In a situation similar to Gaza, close and frequent supervision missions are necessary to follow the dynamic changes and to be able to adjust within the framework of the project document.
4. The competent PMU is the key for the success of the implementation of the project.
5. Institutional reform is a very tedious and lengthy process but a challenging one. It requires resources and determination.
6. Despite the success in improving the level of service, there is an urgent need to address the more serious water resource issues, i.e., water resources protection, development and enhancement.
7. The full cooperation and law enforcement are important to cut the commercial water losses and increase the willingness to pay.
8. Other donors’ contribution deemed necessary. This can be achieved through the continuous discussion, share of information with the donors and increasing the credibility of the PMU as service provider.
9. For basic and graduating training to provide the sector with the young qualified professionals it needs so much,
10. For permanent and continuous training of the present personnel’s in order that they achieve a real professional qualification which generally remains insufficient - even non-existent - and to permit the development of their careers in order to motivate them.
11. Refresh the knowledge of agents and familiarize them with modern methods of economic management, new technologies, relations with the users,
12. Give them the possibility of progressing in their career, which is essential for their motivation. As motivation and competence are guarantees of their efficiency.

6. Description of the Selected Research project

After consulting the concerned parties, Government and non-Government organizations and the key researchers in the academic institutions, it was recommended to select the project of introducing the gray water reuse at local community level. The gray water reuse project is a dual purpose assignment that will enable the citizens of reusing this water for restricted irrigation purposes instead of the fresh water and a way of improving the sanitation facilities at local level.

The research project will have horizon implementation duration of two years and will entail the following:

1. Start twenty demonstration "pilot projects" at two selected villages – preferably with severe water conditions for irrigation purposes. The two villages could be one in the West Bank, one of Ramallah Governorate villages, and the other in Gaza Strip. Due to the conditions in Gaza, more flexibility can be offered to select two villages in the West Bank.
2. Work closely with the local communities and PWA in demonstrating the idea among the citizens and disseminate the results.
3. Provide the necessary technical support and public awareness to the beneficiary groups.
4. Considering the gender in selecting the beneficiary groups from this project.
5. Disseminating the results of utilizing the gray water for restricted irrigation purposes at the backyards and gardens of the residents. This could be done every six months.
6. Provide the necessary training for operation and maintenance for such schemes.
7. Conduct a workshop after one year of the project to publicize the idea among the other villages.

6.1 Rationality of Gray water reuse

Any wastewater generated in the home, except water from toilets, is called gray water. Dish, shower, sink, and laundry grey water comprise 50–80% of residential "wastewater." Grey water may be reused for other purposes, especially landscape irrigation.

Contaminated or difficult-to-handle grey water, such as solids-laden kitchen sink water or water used to launder diapers, "dark grey water"; most regulators consider these as black water. However, the level of pathogens in even the darkest grey water is a small fraction of that in black water.

Wastewater without added solids, such as warm-up water from the hot water faucet, reverse-osmosis purifier drain water, or refrigerator compressor drip, is called clear water. Grey water reuse for garden irrigation to both conserve water and to reduce wastewater discharge makes good sense.

Grey water contains oils, fats, detergents, soaps, nutrients, salt and particles of food hair and lint etc that can quickly clog a grey water irrigation system. Whilst grey water from the kitchen contributes least to the total grey water volume it

accounts for the bulk of fats, oils and food particles, which are the primary components that cause this clogging. In contrast, grey water from the bathroom and laundry accounts for the majority of the grey water volume but generally contributes least to the components that clog an irrigation system and requires only removal of suspended particles such as lint and hair.

Grey water contains contaminants, which vary in their effect from beneficial to detrimental for irrigation of plants. These contaminants include nitrogen, phosphorous and potassium, which in most cases are beneficial to plants. Grey water also generally has a slightly alkaline pH making it preferable not to use grey water to irrigate acid loving plants, unless pH is managed by digging soil conditioners such as peat or compost into the soil.

Some strong household products such as caustic soda (drain cleaner) can be detrimental to plant growth and when used the grey water can be diverted to the sewer or where possible by simply disposing this wastewater to a fixture not connected to the grey water system such as the toilet.

When grey water is being reused for garden irrigation users simply need to think about what is being sent to the grey water system and to not use excessive amounts of household cleaners and detergents to minimize any impact on plants and simply because overuse is wasteful.

Unlike many ecological stopgap measures, grey water use is part of the fundamental solution to many ecological problems. It will probably remain an essentially unchanged feature of ecological houses in the distant future. The benefits of grey water recycling include:

- ***Reduced use of freshwater***—Grey water can replace freshwater for some uses. This saves money and increases the effective water supply, especially in regions where irrigation is needed. Residential water use, on average, is almost evenly split between indoors and outdoors. Most water used indoors can be reused outdoors for irrigation, achieving the same result with less water diverted from nature.
- ***Less strain on septic tanks or treatment plants***—Grey water, which comprises the majority of the wastewater stream, contains vastly fewer pathogens than black water and 90% less nitrogen (a nutrient that is a problematic water pollutant). Reducing a septic system's flow by getting grey water out greatly extends its service life and capacity. For municipal treatment systems, decreased flow means higher treatment effectiveness and lower costs.
- ***More effective purification***—Grey water is purified to a spectacularly high degree in the upper, most biologically active region of the soil. This protects the quality of natural surface and groundwater. Topsoil is a purification engine many times more powerful than engineered treatment plants, or even in septic systems, which discharge wastewater deeper into the subsoil.3

- ***Feasibility for sites unsuitable for a septic tank***—For sites with slow soil percolation or other problems, a grey water system can partially or completely substitute for a costly, over-engineered septic system. (In extreme cases this can enable otherwise undeveloped lots to be built on—a double-edged sword environmentally.)
- ***Reduced use of energy and chemicals***—Due to the reduced amount of freshwater and wastewater that needs pumping and treatment. If you provide your own water or electricity, you'll benefit directly from lessening this burden. Also, processing wastewater in the soil under your fruit trees definitely encourages you to dump fewer toxins down the drain.
- ***Groundwater recharge***—Grey water application in excess of plant needs recharges the natural store of water in the ground. Abundant groundwater keeps springs flowing and trees growing in intervals between rains.
- ***Plant growth***—Grey water can support a flourishing landscape where irrigation water might otherwise not be available.
- ***Reclamation of nutrients***—Loss of nutrients through wastewater disposal in rivers or oceans is a subtle but highly significant form of erosion. Reclaiming otherwise wasted nutrients in grey water helps to maintain the land's fertility.
- ***Increased awareness of, and sensitivity, to natural cycles***—The grey water user, by having a reason to pay more attention to the annual progression of the seasons, the circulation of water between the Earth and the sky, and the needs of plants, benefits intangibly but greatly by participating directly in the wise husbandry of vital global nutrient and water cycles.

6.2 Expected Costs and Benefits of the proposed Research Project

Financial Components of the Project

Total Project Costs

The total project cost entailed the capital cost of installing and commission twenty units of gray water treatment system and the irrigation network. In addition to the operational cost which includes the cost of utilities requirements such as, energy, fuel, etc, as well as maintenance cost. The capital cost will be financed through this research project, while the operation cost will be covered by the beneficiary.

The capital (investment) cost which will be financed by UNESCO- Cairo Office was calculated in real term-constant prices of the year 2008/2009, as it is expected to be the same prices as the base year. Table 2 shows the breakdown of the actual capital investments for the two types of treatment; confined trenches and the 4-barrals systems. The total cost of the confined trenches system is 500 US$ and 450 US$ for the 4-barrals system.

Based on similar projects in Jordan, The average annual O&M costs per unit is around 100-150 US$ which is affordable by the low income or average income citizen.

The Project Benefits

There could be three types of benefits for such a project, these are: financial, economic and environmental benefits. The benefit stream may appear in the 1st year after construction and continues to the end of the project. More details are shown below:

- **Financial Benefit**

The financial benefits are the benefits that have direct market values; these are: (1) the additional water (excluding the existing water supply) that will be used by beneficiary groups. The water bills for household will be considered to determine the savings in water consumption, (2) the incremental quantities of the products that are irrigated by this water like olives and (3) the savings due to minimizing the quantities of black water that need to be discharged from the septic tanks.

Table 2: Capital costs of the treatment technologies in US$

Item	Confined Trench (US$)	4-Barel Kit (US$)	Comments
A) Labor costs			
1) Grey water separation inside the household	**30**	**30**	Same for both systems
2) Site preparation	**30**	**20**	CT needs more digging
3) Grey water system installation	**50**	**40**	Technician cost including electrical wiring and drip irrigation
B) Market cost of materials			
1) 3" PVC pipes and joints	**30**	**30**	
2) Rubber seals	**10**	**10**	4B includes more rubber rings than CT
3) Plastic Barrels	**25**	**40**	
4) PE sheet (4x6 m)	**30**	**0.0**	Needed only for CT
4) Submersible pump and wiring	**200**	**200**	
5) Gravel media	**25**	**20**	
6) Drip irrigation system for 2000 m^2/50 olive trees	**40**	**40**	Same for both systems
7) Other costs (transportation etc.)	**30**	**20**	
Total cost	**500**	**450**	

- **Economical Benefits**

There are many economical benefits which may result form the project, but these benefits do not have direct market values. These are:

(1) The usage of grey water for garden irrigation would relief part of the fresh water that was used previously for the same purpose,
(2) Usage of grey water in irrigation will reduce the quantities of black water that need to be discharged and treated at the central wastewater treatment plant.
(3) Reduction in the capital investment in cesspools and empting them with septic tanks. It is expected that the new houses will not invest in large cesspools and all the current houses using cesspools will no longer need to empty the cesspools on regular basis.
(4) The change in property value is another indirect benefit of the project. It is anticipated that the increase in irrigation will result in more green areas around the houses which will cause raising the value of the property.

- **Environmental Benefits**

The environmental benefits form the project will be in the form of reducing the risk of contaminating the ground water due to possible seepage of black water from the septic tanks. It is difficult to quantify the impact of the project on ground water resources as a result of utilizing 80-85% of the generated wastewater and eliminating the cesspools system to infiltrate to ground water resources. Other environmental impact is the reduction of house flies and malaria incidences.

- **Expected Total Cost of the Project**

The expected capital costs of the project can be shown in table 3.

Table (3): The Anticipated Costs of the Project

Item	Number / unit	Cost per unit (US$)	Total cost (US$)
Installation of the treatment system and irrigation network	20	500	10000
Technical team – technicians	5 man month	1000	5000
Project Coordinator - supervisor	3 man months	9000	9000
Advisory committee	4 members with 0.5 man month each	5000	10000
Logistical costs and transportation	NA	4000	4000
Capacity building – one Ph.D. and one Masters Degree candidates in the area of non conventional water resources (preferably in the Universities at MENA Region)	2	20,000	40,000
Total costs			**68,000**

The total cost of the proposed research project is 68,000 US$ which will be implemented during two years period. It is expected that the installation of the gray water systems will be implemented within the first three months of the project. This will be followed by the technical monitoring and supervision. Public awareness programs and dissemination of knowledge will be implemented along the horizon of the project. The Client of this project will be UNESCO – Cairo office in coordination with the PWA and the local community representatives. Other stakeholders like Beizeit University or Al Azhar University could be part of the advisory committee of the project. The work plan of implementing the selected research project and project organization can be presented as shown in the following section.

7. Project organization, main inputs and institutional arrangements

The Palestinian Water Authority (PWA) will be acting as an implementing agency, with UNESCO Cairo Office (UCO) acting as the executing agency. Each institution will be required to designate a focal point (member of the steering committee) whose responsibility will be to liaise with PWA and the consultant during the project period. The focal point will participate in all workshops/seminars organized in the context of the project and will assist in the transfer of knowledge and technology to the target beneficiaries.

UCO, as an executing agency, will make available the following facilities:

- Communication facilities
- Assisting staff
- Technical staff necessary for the execution of the project and convening the Steering Committee activities.

Palestinian contribution

- Project coordinator who will be responsible for coordination among concerned institutions and for promoting collaboration among scientific and technical personnel and international and Arab water sector institutions.
- Technical and scientific staff from relevant institutions, duly qualified, to carry out or contribute to the project activities
- Assisting staff, transportation.
- Provisions to host and provide logistic support to the training courses and workshops programmed in the project.
-

External support agency contribution

- Project coordinator, who will be instrumental in promoting collaboration among Palestinian institutions and effective coordination with regional and international organizations.
- Administrative assistance, secretaries.
- Short-term consultants form national and international sources, for implementation of the project scientific and technical activities.
- Duty travel expenses.
- Special compensation to specialists and support personnel , and to promote extension activities.
- Funds for sub-contracting if required
- Equipments and logistical requirements. The final list will be proposed by the Steering Committee.
- Miscellaneous expenses for reporting, operation and maintenance and sundries.

7.1 Modalities of implementation

The Steering Committee (ST) of the project will be formed from UCO and representatives of funding, implementing and co-sponsoring partners. The Steering Committee will supervise the project, make decisions on policy issues and act as a top management entity of the project. The organization of the Palestinian Water Sector envisages a distinct separation between policy formulation, regulation and service delivery functions.

The Steering Committee should cooperate closely with the National Water Council (NWC), the policy making body, whereas planning and implementation of project activities need to be coordinated and supported by the Palestinian Water Authority (PWA). For the case of implementing the pilot projects in Gaza, the Institute of water and environment of Al Azhar University can be a potential partner. Other water departments and entities in the Palestinian territories should have access to information about the project's activities and should be involved in relevant training activities.

Indicators:

Objective/Output	Indicator
Implementation of the gray water units	A total of twenty units should be constructed during the duration of the project (2 years)
Public awareness of the beneficiary groups	At least two public awareness campaigns should be organized during the duration of the project
Dissemination of knowledge	Two workshops will be organized at the end of first year and the second year to disseminate the knowledge
Success of the project and generating benefits to the beneficiary groups	Monitoring of the implementation and proper operation of the system by PWA and UCO

7.2 Implementing partners and institutional setup

The UNESCO Cairo Office will act as an executing agency and the implementation of the project will be through water institutions in the West Bank and Gaza.

UNESCO will promote national and regional knowledge networks. The aim is to stimulate cooperation with Palestinian institutions in research, education and training, to increase scientific outputs, improve capabilities and develop methodologies to cope with water scarcity in the project areas. These networks not only inter-connect the participating institutions, but also create an efficient framework to connect to UNESCO and other global networks.

The overall co-ordination of administrative, financial and auditing responsibilities for project's activities will be assumed by UNESCO Cairo Office as an executing agency.
UCO will host the project implementation secretariat which will coordinate the project's activities in close cooperation with the implementing entities of participating institutions.

7.3 Risks and constraints

- Delay in the recruitment of consultants and training staff.
- The required project consultants are unavailable or unwilling to be available for the necessary length of time.
- Restrictions or delay in travel arrangements of trainees from the West Bank and Gaza, especially when training is implemented abroad.
- Insufficient language capability of trainees or assigned counterpart staff.
- Not enough response from the communities to adopt the system at their dwellings.

7.4 Project monitoring, reviews, reporting and evaluation

1. The project will be subject to tripartite review at least once every six months, the first such meeting will be held within the first six months from the start of the full implementation. The project coordinator shall prepare and submit to each tripartite review meeting a project Performance Evaluation Report (PPER). Additional PPERs may be requested if necessary, during the project.
2. A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review technical clearance by the executing agency at least four months prior to the terminal tripartite review.
3. The project shall be subject to evaluation end of project (twenty-four months) after the start of all full implementation.

7.5 WORK PLAN

The schedule of implementation of the project is shown in table 4. The table shows all the necessary activities with the required time duration and type of deliverables.

Task	*Coordination & supervision*	*Months 1-6*	*Months 7-12*	*Months 13-18*	*Months 19-24*
Mobilization of the project	*1 + 2*				
Implementing the gray water	*2 + 3 + 4*				
Submittal of the first year	*2+3*				
Monitoring of the implemented	*2 + 3*				
Public awareness campaigns	*1 + 2*				
Dissemination of knowledge	*1 + 2 + 3*				
Preparation and organizing Assessment and lessons learned workshop	*1 + 2 + 3 + 4*				
One Ph.D. and one Masters Degree Candidates in the areas of non conventional water resources	*1 + 2 + 3*				
Preparation of the progress Report and the Final report	*2 + 3*				

1. UNESCO
2. PWA
3. Academic Institution / outside consultant
4. Local Community parties

List of References

1. Water conservation in Palestine: an integrated approach towards Palestinian water resources management, Center for engineering and planning, 1994. This report provides a review of the existing water resource sector including the natural resources, the institutions and human resources and the infrastructure devoted to the sector. The potential water conservation measures and practices applicable to Palestine.
2. Palestine Academy for Science and Technology. Toward the Promotion of Adequate Water and Wastewater Research in Palestine: Gaps, Problems and Opportunities. Ramallah: Palestine Academy Press. Unpublished.
3. A study of Palestinian water supply and demand Isaac, J., M Haddad, N. Mizied, T. Nasser Harvard, ARIJ, PHG, WERC, PCG1996 This study outlines the West Bank and Gaza Strip water supply, the cost of this water supply, and its quantity. The study contains baseline estimates and projections of the population, the per capita income, and water consumption.
4. Published news and reports at the PWA website.
5. NSW Department of Energy, Utilities and Sustainability websites, Sydney, Australia.
6. **Art Ludwig**, The New "*Create an Oasis with Grey water*", Choosing, Building and Using Grey water Systems — Includes Branched Drains Revised and Expanded 5th Edition.
7. **Publications by INWRDAM** and partners on grey water related issues, "Guidelines for grey water treatment and use in rural areas, Policy, Feasibility and Health impacts".
8. Personal feedback of a number of decision makers in the water sector in the West bank and Gaza.

ANNEX 9

FUTURE PROPOSALS FOR CAPACITY BUILDING OF WATER INSTITUTIONS IN THE PALESTINIAN TERRITORIES

United Nations
Educational, Scientific and
Cultural Organization

منظمة الامم المتحدة للتربية والعلم والثقافة
مكتب اليونسكو الإقليمى بالقاهرة

UNESCO CAIRO OFFICE

Capacity Building of Water Institutions in the Palestinian Territories

Project Document

This document was commissioned by UNESCO and funded through the capacity Building ……

Cairo,
November 2008

PROJECT DOCUMENT

Title: Capacity Building of Water Institutions in the Palestinian Territories

Duration: 5 Years

Project site: Palestinian Territories

Executing agency: UNESCO Cairo Office (UCO)

Implementing agency: Institute of Water & Environment of Al Azhar University in Gaza

Estimated starting date: January 2010 (tentative)

Brief Description

The project will endeavor to assist in capacity building of water institutions in the Palestinian Territories to contribute to better management of their limited and vulnerable water resources, through training of staff personnel at various levels including managers and decision makers. Planning and Management of the Capacity Building project is a joint initiative between UNCO and Palestinian water institutions.

TABLE OF CONTENT

1. Background

Building capacity is essential for any long-term strategy for sustainable development. Capacity building is the sum of efforts to develop, enhance and utilize the skills and capabilities of people and institutions at all levels so that they can better progress towards sustainable development. At the basic conceptual level, building capacity is about empowering people and institutions to solve their problems. When capacity building is successful, the result is more effective people and institutions better able to provide products and services on a sustainable basis. In arid and semi-arid areas such as the West Bank and Gaza Strip, water institutions should receive special attention because water is of vital importance to all socio-economic sectors.

Water sector assessment is an instrument for capacity building at the local, regional and national level. The assessment includes, in addition to examination of existing water policies and human resources development, study of customary law and practices, review of legislation and implementation and enforcement of laws. Due attention must be given to the legal and institutional arrangements needed to address the development.

The concept of capacity building (CB) was articulated during the first UNDP symposium "A Strategy for Water Sector Capacity Building" held at the IHE in Delft, the Netherlands in May 1991, as:

- Creation of enabling environment including appropriate policy, legal and regulatory frameworks.

- Institutional development, including community participation (women in particular).

- Human resources development and the strengthening of managerial systems.

The Second UNDP Water sector Symposium held at the IHE in December 1996 confirmed the relevance of the original concept and summarized the lessons learned as follows:

- Capacity building is both a concept and a process leading to specific products.
- Sustainability of investment projects in the sector is a direct function of the capacities of the individuals and the institutions.
- Policies, laws and regulations need to be changed in order to create an environment conducive to water resources management and the provision of water services in a sustainable manner. For this change process to be successful the principal stakeholders need to be consulted, ranging from government ministers, provincial authorities and city mayors to industries, farmer associations, and village well caretakers.
- Policies, legal and institutional frameworks conducive to new sources of funding would need to be developed. Measures to be

considered could include the use of loan guarantees, issuance of bonds, tax write-offs for banks, creation of water and sanitation banks..

- Institutions need to be reformed in order to deal effectively with decentralization of functions and contracting with private sector entrepreneurs. This process can be described as a transformation of the role of government from "provider" of services to "enabler".
- The river basin is the unit of choice for planning and implementing water management activities involving all the stakeholders who have a direct interest in having sufficient quantities of water of good quality for their social and economic well being. In arid zones aquifer systems are considered management units.
- Collecting and sharing information are fundamental in planning and negotiation processes. Awareness raising among the general public as well as at the highest levels of decision making requires active communication systems.
- Pollution of surface and underground water needs to be tackled through numerous approaches including legislation, fiscal and economic incentives, reduction of pollution at the source (limiting the use of fertilizers, pesticides, industrial chemicals and effluents), reuse of water (circular instead of linear approach) and awareness-raising.

Among the many challenges identified the following are priority areas:

- Institutional reform and management of institutions.
- Human resources development. Among the measures to be considered are the inclusion of contemporary notions and experiences in water resources management and capacity building in the curricula of education and training courses.
- The creation of a network for capacity builders. This will allow the sharing of information and expertise and also will become proactive in synthesizing experience and lessons learned, identify research areas and encourage virtual exchange of views.

Water scarcity, unpredictability and variability of water resources present some of the gravest problems in the West Bank and Gaza strip. Assessment of water resources and possible water supplies indicate that water scarcity will increase during the next decade. Water use in the coming decades is going to be shaped by several driving forces. Such forces; internal and external could adversely influence the vulnerable water situation. Natural and human factors may increase the vulnerability of water resources and increasingly affect human activities and sustainability.

Increasing scarcity necessitates more effective management of water resources, policy review and institutional reform, establishing more effective structures and strengthening the capacity of institutions to cope with existing and emerging problems

Groundwater is an important source of water supply in Palestinian Territories. The West Bank aquifer system, has three major drainage basins:

- the Western Basin.
- the Northeastern Basin.

• the Eastern Basin.

Furthermore, Palestinians are prevented from fully utilizing the West Bank's underground Water resources. Rigorous water quotas are imposed on Palestinians. Supply is often restricted, leaving communities without Water for considerable periods.

Most of the water from springs is used for irrigation, while only small amount is used for domestic consumption. There are four major wadis in the West Bank. They are of seasonal type. Some wadi systems flow to the west reaching towards the Mediterranean Sea, while others flow to the east and may reach the Jordan River. These are: Wadi Fara'a, Qilt, Malih and Auja. In addition to these wadis, there are seasonal lakes in the West Bank such as Marj Sanur These "lakes" can provide the West Bank with additional water annually.

In general, surface water bodies, whether wadis or seasonal lakes, have not yet been studied in detail. There is a need for more detailed studies in order to have more reliable estimate of their resources and improve the management and use of such resources.

Cisterns are of major importance in the West Bank. They are widely distributed throughout the area, even though the attention paid to them is different from one place to another . The waters of the cisterns are used mainly for domestic purposes. A common type of these cisterns collects water from the roofs of the buildings in the winter season and store it underground in "wells" in most of cases. Cisterns act as a major source of domestic water supply in the localities that do not have water supply networks. In localities where water networks exist, cisterns still act as another "good" source of domestic water supply. The reuse of wastewater has been thoroughly investigated in many studies performed for the water sector in Palestine.

The Gaza Strip aquifer is part of the coastal aquifer. It has been continuously over-pumped for quite some time in large part to serve the large population. Groundwater has been pumped far below the recharge rate, and there is evidence of deteriorated water quality of the aquifer. The aquifer is in need for more studies and research to have more information about water quantities and qualities relating it to protection and conservation.

The Gaza aquifer and some potential sources from the eastern aquifer in the West Bank suffer from a high salinity rate. Most of their waters need to be desalinated.

The overall objective of any integrated water resources management plan is to satisfy the needs for sustainable development. To achieve this Palestinian water sector should obtain about three times the available supply at present. Such an amount is not higher than the Palestinian water rights from the renewable water resources.

The principal objective of capacity building for sustainable water resources management is to improve the quality of decision-making, sector efficiency, and managerial performance in the planning and implementation of programmes and projects. More specifically, capacity building for sustainable water resources management is designed to improve the capabilities of assessing water resources; facilitate better planning in the context of national

development planning; and promote financially and environmentally sustainable, more efficient delivery of water services.

A broad range of stakeholders must be supported in playing their rightful and necessary role in managing water resources sustainably. New capabilities must be built for water planners to adequately carry out least-cost planning analyses that place demand management alternatives on an equal footing with the traditional supply-side options. The capacity of community groups must be enhanced to better deal with government agencies. Institutions must be built or strengthened at the community level if sound community-based water management is to succeed.

2. Project justification

The project will assist the Palestinians in the Gaza Strip and the West Bank in protecting their precious water resources, through awareness raising and improved management. Recharge to groundwater in the Palestinian territories is limited and variable in time and space. Over-development and insufficient protection measures have adverse impacts on water resources in terms of quality and quantity. The resource base is threatened by pollution and intrusion of saline water in coastal area of the Gaza Strip. The project will address technical as well institutional issues, emphasizing capacity building in priority areas such as monitoring surface and groundwater quality, rainfall water management, pollution control, water conservation and development of non-conventional water resources.

The per capita water availability in the Gaza Strip and the West Bank is among the lowest in the world. It is difficult to quantify such water availability precisely because Palestinians do not have complete control of their resources. Even at the Arab regional level they rank extremely low. Applying the water stress index- The ratio of water withdrawal to water availability – Adopted by the United Nations System and CSD as an indicator to water availability, it can be shown that the Palestinian Territories have reached a high degree of water stress.

Palestinian territories are situated in a relatively dry environment, subject to drought and water shortages. Many countries in the Arab region, where aridity is the prevailing natural condition, invested heavily in the water sector in the past decades, to address water- related problems imposed by the arid and semi-arid climate. The sharing of experience is a fundamental need to draw lessons and benefit from successes and failures of a variety of techniques that have been applied under different socio-economic conditions.

Envisaged capacity building programmes should utilize and reflect such experiences. This could be realized by holding courses and implementing seminars and other capacity building activities in different countries and selecting trainers with wide experience in tackling water-related problems under varying degrees of aridity. Focus should be always on groundwater, surface water and non-conventional water.

3. Previous and ongoing similar projects and initiatives

UNESCO-Flanders Science Fund-In-Trust Project on Capacity Building and Training on Environmental Planning and Management in Palestine: Phase-II Was started in 2003 and completed in December 2008.

It is funded by Flemish In Trust Cooperation Government of Belgium through the UNESCO-Flanders Science Fund. The Executing Agency is UNESCO Cairo Office and implementing partners are institutions, universities, research centers and NGOs working in the field of water resources and environment in the West bank and the Gaza Strip.

The project aims at ensuring the long term conservation of the water resources in the Palestinian Territories through building capacities and setting up a water resources network to foster the cooperation between the actors in the field, with respect to training, research and public awareness.

A capacity building initiative for the Gaza Strip and the West Bank: a two-year project in the area of water resources management, was developed in the year 2000 and was implemented in 2001 and 2002, by Gaza Strip and the West Bank Universities and Purdue University in the USA, within the framework of U.S.-Palestinian Linkages (UPLINK) Programme, The Purdue University and its Gaza Strip and the West Bank partners (Islamic University of Gaza; An-Najah National University; Bethlehem University) proposed to address the water resource management needs in the region by establishing a formal jointly-administered Program in Water Resources Management at the Islamic University of Gaza (IU/Gaza). The mission of the Program will be to provide needed expertise and training to optimize water use and to manage the water resources in the region. In addition to the university partners, the Palestinian Water Authority (PWA) was a public sector partner in this effort. Inclusion of the PWA in the project will insure that the proposed program in water resources management is responsive to critical needs in Gaza Strip and the West Bank.

4. Overview of major capacity building projects:

The Norwegian and Dutch Government have provided since 1995 technical and financial assistance to the PWA through the *Budget Support Program* in order to strengthen the institution and its regulatory role. The Ministry of Foreign Affairs of Finland provides technical assistance and operational funds for the PMUs (Project Management Units) in the West Bank and Gaza, since Phase I started in 1998. The PMUs are responsible for the design, procurement and implementation of several donor-funded projects such as SAWSIP, EWP and other smaller packages. Phase II of the *West Bank & Gaza Water& Sanitation Project* ran from mid 2004 to mid 2007,. GTZ is also supporting at the national level efforts to coordinate water training in the water/wastewater sector.

Training Coordination Units (TCUs) were set up in 2005 and deal with coordinating and promoting training needs, material and workshops at all levels in the Palestinian water and wastewater sector. The objective is that training in the Palestinian Water Sector is carried out in a coordinated way which is systematic, demand-oriented and uses local, regional and international training resources cost-effectively. However, not enough resources have been allocated to the training program for preparation and

implementation of practical training workshops, which address urgent water problems in the West Bank and the Gaza Strip.

5. Development objective

The main development objective is capacity building of the water sector in the Palestinian Territories, to contribute to better management of their limited water resources and improve the quality of decision making, sector efficiency and contribute to human resources development.

6. Immediate objectives, outputs and activities

1. Immediate objective 1

Organizational development (OD)

1.1 Output 1

Management effectiveness upgraded

1.1.1 Activity 1

Assessment of weakness, operational deficiencies and managerial performance in the planning and implementation of water sector programmes.

1.1.2 Activity 2

Identification of principal pathways to Operational Development

1.1.3 Activity 3

Development of the OD process with the full involvement of the staff so that the process is “owned” by the institutions.

1.2 Output 2

OD intervention at the start and during the implementation of the project

1.2.1 Activity 1

Development of a new strategy for water sector capacity building.

1.2.2 Activity 2

Developing improved policy, legal framework and institutional framework required for planning and management of water resources.

1.2.3 Activity 3

Management Development: Intervention through a series of interconnecting levels. The basic strategy is to actively follow up the formal training courses with day-to-day coaching by the resident Technical Assistance Team.

1.2.4 Activity 4

Senior Management Training: An intense series of surveys will be conducted to clarify needs assessments, to identify management problems and secure the involvement of the staff in the design of the training events

1.2.5 Activity 5

Conducting training simultaneously at all levels, applying novel training methods, introducing integrated water resources management (IWRM)

1.2.6 Activity 6

Involving universities, training and education institutes in the implementation of the capacity building initiative and in promoting the IWRM concept.

1.2.7 Activity 7

Introduction of novel training methods and concepts on water resources assessment, development and management in the education curricula for related professionals in the water sector, especially at the level of university education.

1.2.8 Activity 8

Establishing a participatory in-house corporate planning capability.

1.3 Output 3

Improved Water Governance

1.3.1 Activity 1

Design of a an improved/new architecture of governance based on greater participation, more cohesion and more transparency.

1.3.2 Activity 2

Conducting policy review based on critical sustainability issues and quantified pressures on the water system.

1.3.3 Activity 3

Establishment of a comprehensive water code to streamline water legislation and consolidate and update respective enactments.

1.3.4 Activity 4

Application of decision support systems (DSS) for IWRM and interactive groundwater modeling

1.3.5 Activity 5

Development of the ethical value of the environment and adoption of water ethics as a substitute for over-regulation of scarce water resources by “command and control” or “economic instruments”.

2 Immediate objective 2

Institutional development (ID): Development of institutional capabilities

2.1 Output 1

Water-related institutions assessed and institutional arrangements reviewed

2.1.1 Activity 1

Conduct a systematic assessment of water-related institutions in order to provide better understanding of broad strategic choices, particularly regarding decentralization, empowerment of beneficiaries and privatization, especially with regard the functions that can be delegated to private enterprises.

2.1.2 Activity 2

Review institutional arrangements, means of communication among agencies involved in water-related activities, planning and coordination functions

2.1.3 Activity 3

Establish a mechanism for bringing key stakeholders into dialogue which can lead to urgent action on innovation and practical approaches, through conferences on water, the environment, irrigation and other water-related activities

2.1.4 Activity 4

Promote institutions engaged in top-down delivery of polices to learn from and engage with bottom-up initiatives for resource management and conservation.

2.2 Output 2

Application of Integrated Water Resources Management (IWRM)

2.2.1 Activity 1

Revision of existing institutional structures and introducing economic incentives to encourage sustainable water management and meet the requirements of IWRM.

2.2.2 Activity 2

Promotion of integrated water resources management (IWRM) as an instrument for achieving sustainable development of water resources.

2.2.3 Activity 3

Take into account, in applying IWRM, the impacts of water activities on the ecosystems and the precautionary principle; “where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”.

2.3 Output 3

Institutional performance enhanced

2.3.1 Activity 1

Enhance the organizational capacity of institutions and upgrade their staff skills

2.3.2 Activity 2

Strengthen sector and sub-sector level institutions with due attention to the development of their structure.

2.3.3 Activity 3

Assess the impact of interest groups on the development and workings of institutions, and look into administrative issues arising from possible resistance to reforms on the political and bureaucratic fronts. Conduct risk assessment associated with the institutional reforms.

2.4 Output 4

Enhancement of higher education in water sector

2.4.1 Activity 1

Assessment of status of available institutions in the Palestinian Universities involved in higher education in the water sector.

2.4.2 Activity 2

Identifying skills on the University Staff involved for water sector.

2.4.3 Activity 3

Upgrading training and higher education in Palestinian Universities

2.4.4 Activity 4

Enhancement of libraries / documentation centers located in the Universities.

2.4.5 Activity 5

Establishing water information network between universities.

2.4.6 Activity 6

Supporting higher education studies in Gaza Strip.

3 Immediate objective 3

Improving water information systems

3.1 Output 1

A Hydrological Cycle Observing System (HYCOS) established

3.1.1 Activity 1

Reinforcing the conventional system with modern technology and equipment.

3.1.2 Activity 2

Collection, storing, processing and Dissemination of data via the information system linked to both the public and private sector.

3.1.3 Activity 3

Training on GIS data capture and data automation. Building a geographic information system (GIS), and using a computerized GIS that follows logical steps:

GIS Workflow: Collecting GIS data → Maintaining and editing GIS data

→ Analyzing GIS data → Presenting GIS data

This entails using relevant spatial data management product specially designed for GIS workflows. It should blend new data with legacy data.

3.1.4 Activity 4

Evaluation of existing hydrometeorological networks and assessment of needs for rehabilitation and upgrading of the networks.

3.1.5 activity 5

Institutional development and human resources development through carefully tailored training programmes in the area of HYCOS to make agencies more dynamic and product-oriented to serve the needs of water managers.

4. Immediate objective 4

Human resources development (HRD)

4.1 Output 1

Approaches towards capacity building, through education and training, developed

4.1.1 Activity 1

Promote the concept of continuing education and training and develop a long-term programme to achieve this goal

4.1.2 Activity 2

Conduct an assessment of the requirements of manpower in the professional, sub-professional, senior and junior categories of personnel.

4.1.3 Activity 3

Implement short-term training and long-term training in a generic course with trainees from different institutions or countries. This offers high educational value (because of the broad interactions and the opportunity for “lateral thinking), but a lower training value (because less specifically related to the job).

4.1.4 Activity 4

Conduct integrated and complementary training for different levels of professionals (decision makers, managers and technical managers). This approach prepares the complete organization for the application of new ideas and methods.

4.2 Output 2

An expanded training competence developed

4.2.1 Activity 1

Establish a strategy for training of trainers (TOT) comprising on-the-job training (OJT), training courses and fellowships.

4.2.2 Activity 2

Upgrade the basic management competence of supervisors and middle managers.

4.2.3 Activity 3

Arrange study tours to water authorities to developed and less developed countries.

4.2.4 Activity 4

Review the curricula of existing training centres and institutions.

7. Project organization, main inputs and institutional arrangements

Institute of Water & Environment of Al Azhar University in Gaza (IWE-AUG) will be acting as an implementing agency, with UNESCO Cairo Office (UCO) acting as the executing agency. The UNDP will contribute to the project.

Each institution will be required to designate a focal point whose responsibility will be to liaise with IWE-AUG and the consultant during the project period. The focal point will participate in all workshops/seminars or courses organized in the context of the project and will assist in the transfer of knowledge and technology to the target beneficiaries.

UCO, as an executing agency, will make available the following facilities:

- Communication facilities
- Assisting staff

-Technical staff necessary for the execution of the project and convening the Steering Committee activities.

Palestinian contribution

- Project coordinator who will be responsible for coordination among concerned institutions and for promoting collaboration among scientific and technical personnel and international and Arab water sector institutions.
- Technical and scientific staff from relevant institutions, duly qualified, to carry out or contribute to the project activities
- Trainees, and trainers (if possible).
- Assisting staff, transportation.
- Provisions to host and provide logistic support to the training courses and workshops programmed in the project.

External support agency contribution

- Project coordinator, who will be instrumental in promoting collaboration among Palestinian institutions and effective coordination with regional and international organizations.

- Administrative assistance, secretaries.

- Short-term consultants form national and international sources, for implementation of the project scientific and technical activities.

- Duty travel expenses.

- Special compensation to specialists and support personnel , and to promote extension activities.

- Funds for sub-contracting if required

- Training including study tours, group training and on-the-job training.

- Equipment, vehicles, computer hardware and software, office equipment. The final list will be proposed by the Steering Committee.

- Miscellaneous expenses for reporting, operation and maintenance and sundries.

8. Modalities of implementation

The present capacity building project will complements previous training initiatives, and will satisfy emerging needs. UNESCO has promoted the concept of continuous education. Similarly capacity building should be considered a continuous process, and reflected in a “strategy for water sector capacity building” (SWSCB).

Since the SWSCB is revised continuously or periodically to accommodate new requirements and changing needs, development of a revised operating system and procedures for needs assessment is required. Such assessments must cover areas of applied research, information as well as training. The capacity building programmes will adapted to meet identified needs.

Implementation of the water sector capacity building strategy is based on the development of training modules to be implemented within the framework of 5-year plans.

Master degree programme in Water and Environmental Science to be supported and implemented at the Institute of Water & Environment of Al Azhar University in Gaza.

Training module will be implemented within one year. The actual training period lasts several months. Training courses will be organized at three levels; for technical, professional and decision-making personnel. They will be held simultaneously.

Course material and detailed training programmes will be developed by consultants in the remaining part of the year. Planning, development and implementation of training activities will be undertaken at the Institute of Water & Environment of Al Azhar University in close cooperation with Palestinian water institutions and relevant departments in other Palestinian universities.

Research priorities, suggested by the Institute of Water & Environment of Al Azhar University includes the following topics and themes:

1. Climate Change Effects on water resources,
2. Groundwater quality, hydrochemistry and pollution control,
3. Water supply and sanitation,
4. Water resources management,
5. Water conservation and reuse,
6. Applications of GIS and remote sensing in water resources
7. Environment impact associated with water resources
8. Toxic Chemicals effect on water resources
9. Wastewater treatment and reuse in agriculture
10. Develop appropriate rainwater harvesting techniques including seepage and evaporation measures for storage
11. Impacts of Land Use on water resources
12. Water and irrigation (Water mangement for irrigation and crop water requirement
13. water demand management
14. Water poverty
15. Water treatment / Desalination
16. Water laws, rules and regulation,

As regards training needs, it has been suggested that it is necessary to take into consideration the requirements of both *graduating training* and *continuous training of* present personnel in order to familiarize them with modern methods of economic management, new technologies and relations with users, and to permit the development of their careers in order to motivate them, as motivation and competence are guarantees of their efficiencies.

Training priorities, suggested by the Institute of Water & Environment of Al Azhar University includes the following topics and themes:

1. Integrated water resources management
2. Groundwater quality and hydrochemistry
3. GIS and remote sensing in water resources management.
4. Environmental Protection and Conservation of water resources
5. Water supply and sanitation
6. Wastewater treatment and reuse
7. Groundwater quality and treatmeny
8. Storm and rain water harvesting
9. Water Desalination (RO)
10. Advance wastewater treatment

11. Shared and transboundary water resources management
12. Water economics- financing and cost recovery
13. Groundwater modeling
14. Modeling of Water distribution
15. Crop Water Requirement
16. Water institutional, law and ethics
17. Water awareness and education
18. Coastal zone management .

A Steering Committee (ST) will be formed from UCO, and representatives of funding, IWE-AUG and co-sponsoring partners. The Steering Committee will supervise the project, make decisions on policy issues and act as a top management entity of the project. The organization of the Palestinian Water Sector envisages a distinct separation between policy formulation, regulation and service delivery functions.

The Steering Committee should cooperate closely with the Palestinian National Water Council (NWC), the policy making body, whereas planning and implementation of capacity building activities need to be supported by the Palestinian Water Authority (PWA). Other water departments and entities in the Palestinian territories should have access to information about the project's activities and should be involved in relevant training activities.

Indicators:

Objective/Output	Indicator
Organizational Development (OD),	At least 2 planners from each institution completed a series of training courses on fundamentals of integrated water planning
Management effectiveness upgraded	At least 2 managers from each water institution trained on modern approaches of resource management
Development of institutional capabilities	Continuing education courses developed to respond to institutional needs
Improving water information system	Information services enhanced and are operating in response to institutions needs
Human resources development: training needs	In all programme areas procedures for needs assessment or programme development, implementation, evaluation and feedback have been established
Human resources development (HRD)	Adaptation of programmes in education, training, research and consultancies to meet identified needs

9. Implementing partners and institutional setup

The UNESCO Cairo Office will act as an executing agency and the implementation of the project will be through Institute of Water & Environment of Al Azhar University in Gaza. Cooperative parties consist of water institutions in the Gaza and the West Bank will be formed as a national network.

Capacity building involves acquiring knowledge and capability primarily through education, research, training and experience. Cooperative partners must include, therefore, academic as well as government institutions. The latter would promote on-the-job training whereas the former can host special

training courses designed to meet needs, defined in water sector assessments.

UNESCO in coordination with IWE-AUG will promote the national and regional knowledge networks. The aim is to stimulate cooperation with Palestimean institutons in research, education and training, to increase scientific outputs, improve capabilities and develop methodologies to cope with water scarcity in the project areas. These networks not only inter-connect the participating institutions, but also create an efficient framework to connect to UNESCO and other global networks.

The overall co-ordination of administrative, financial and auditing responsibilitiea for project's activities will be assumed by UNESCO Cairo Office as an executing agency.

UCO will host the project implementation secretariat which will coordinate the project's activities in close cooperation with the IWE-AUG.

10. Risks and constraints

- A delay in the approval of the major contributor (UNDP).
- Delay in the recruitment of consultants and training staff.
- The required CP consultants are unavailable or unwilling to be available for the necessary length of time.
- Restrictions or delay in travel arrangements of trainees from the West Bank and the Gaza Strip, especially when training is implemented abroad.
- Insufficient language capability of trainees or assigned counterpart staff.

11. Project monitoring, reviews, reporting and evaluation

1. The project will be subject to tripartite review at least once every twelve months, the first such meeting will be held within the first twelve months from the start of the full implementation. The project coordinator shall prepare and submit to each tripartite review meeting a project Performance Evaluation Report (PPER). Additional PPERs may be requested if necessary, during the project.
2. A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review technical clearance by the executing agency at least four months prior to the terminal tripartite review.
3. The project shall be subject to evaluation twenty-four months after the start of all full implementation (twelve months prior to scheduled termination). The organization's terms of reference and timing will be decided after consultation between the parties to the project document.

12. BUDGET (US DOLLARS)

	$	Year 1 m/m $	Year 2 m/m $	Year 3 m/m $	Year 4 m/m $	Year 5 m/m $
1.PROJECT PERSONNEL						
1.1 Consultants	200000	10 100000	5 25000	5 25000	5 25000	5 25000
1.2 Experts	75000	3 15000	3 15000	3 15000	3 15000	3 15000
1.3 Sub-Total	**275000**	**13 115000**	**8 40000**	**8 40000**	**8 40000**	**8 40000**
1.4 Coordinator	180000	12 36000	12 36000	12 36000	12 36000	12 36000
1.5 Management	150000	12 30000	12 30000	12 30000	12 30000	12 30000
1.6 Technical staff	200000	20 40000	20 40000	20 40000	20 40000	20 40000
1.7 Sub-Total	**530000**	**44 106000**	**44 106000**	**44 106000**	**44 106000**	**44 106000**
1.8 Support staff	240000	24 48000	24 48000	24 48000	24 48000	24 48000
1.9 Labour	50000	10000	10000	10000	10000	10000
1.10 Sub-Total	**290000**	**58000**	**58000**	**58000**	**58000**	**58000**
1.11 Duty travel	200000	40000	40000	40000	40000	40000
1.12 Mission costs	100000	20000	20000	20000	20000	20000
1.13 Sub-Total	**300000**	**60000**	**60000**	**60000**	**60000**	**60000**
TOTAL	**1395000**	**339000**	**264000**	**264000**	**264000**	**264000**

2. TRAINING						
2.1 Group training	340000	40000	60000	80000	80000	80000
2.2 Study tours	240000	20000	40000	60000	60000	60000
2.3 In-service tr.	100000	20000	20000	20000	20000	20000
2.4 Sub-total	**680000**	**80000**	**120000**	**1600000**	**160000**	**160000**
3. EQUIPMENT						
3.1 Expendable	200000	100000	25000	25000	25000	25000
3.2 Non-expendable	100000	50000	20000	10000	10000	10000
3.3 Sub-total	**300000**	**150000**	**45000**	**35000**	**35000**	**35000**
4. SUBCONTRACTS	**60000**	**20000**	**10000**	**10000**	**10000**	**10000**
5. MISCELLANEOUS						
5.1 O&M	80000	10000	10000	20000	20000	20000
5.2 Reports costs	70000	10000	10000	10000	20000	20000
5.3 Sundries	100000	20000	20000	20000	40000	40000
5.4 Sub-total	**160000**	**40000**	**40000**	**50000**	**80000**	**80000**
5.5 Total	**1200000**	**290000**	**215000**	**255000**	**285000**	**285000**
6. G. TOTAL	**2595000**	**629000**	**479000**	**519000**	**549000**	**549000**

13. Table connecting goals with related activities and outputs

GOAL	ACTIVITIES	OUTPUT
1.Organizational Development (OD)	1.1.1 Assessment of managerial performance 1.1.2 Identification of principal pathways to OD 1.1.3 Development of the OD process	**1.1Upgraded Management**
	1.2.1 Developing new strategy for water sector capacity building(CB) 1.2.2 Developing improved policy, legal and institutional framework 1.2.3 Developing management through a series of interconnecting levels 1.2.4 Senior management training 1.2.5 Applying novel training methods and introducing IWRM 1.2.6 Involving universities and training and education institutes in CB 1.2.7 Introducing novel training concepts on water resources assessment, and management in curricula of universities 1.2.8 Establishing a participatory in-house corporate planning capability	**1.2. OD intervention**
	1.3.1 Design of an improved architecture of governance 1.3.2 Conducting policy review based on critical sustainability issues and quantified pressure on the water system 1.3.3 Establishment of a comprehensive water code 1.3.4 Application of DSS for IWRM and interactive groundwater modeling 1.3.5 Development of the ethical value of the	**1.1 Improved water governance**

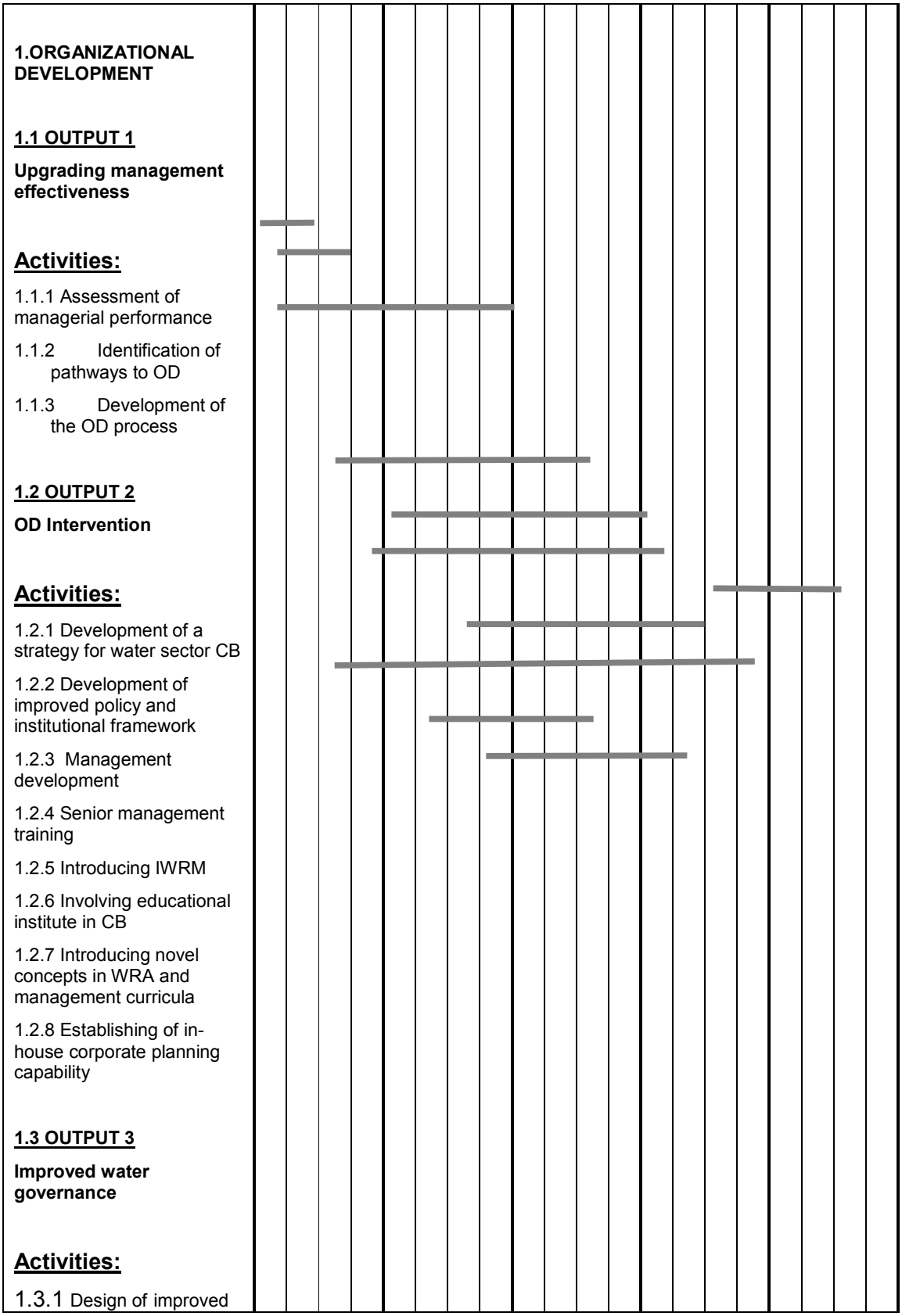
2. Institutional Development (ID)	environment and adoption of water ethics as a substitute for over-regulation of scarce water resources 2.1.1 Conducting a systematic assessment of water institution 2.1.2 Review of institutional arrangements 2.1.3 Establishment of a mechanism for bringing key stakeholders into dialogue which can lead to urgent action on innovation and practical approaches 2.1.4 Promoting institutions engaged in top-down delivery of policies to engage with bottom-up initiatives for resource management	**2.1 Assessment of water-related institutions**
	2.2.1 Revision of existing institutional structures and introducing economic incentives to meet requirements of IWRM 2.2.2 Promotion of IWRM as an instrument for achieving sustainable development of water resources 2.2.3 Taking into account, in applying IWRM, the impacts of water activities on the ecosystems and the precautionary principle	
	2.3.1 Enhancing the organizational capacity of institutions and upgrading their staff skills 2.3.2 Strengthening sector level institutions and development of their structures 2.3.3 Conducting risk assessment associated with institutional reforms and assessment of administrative issues arising from possible resistance to reforms	**2.2 Application of IWRM**
	2.4.1 Assessment of the status of institutions in the Palestinian universities involved in higher education in the water sector 2.4.2 Identification of skills in the university staff involved in water-related activities 2.4.3 Upgrading higher education in	

	Palestinian universities 2.4.4 enhancement of documentation centers/libraries in Palestinian universities 2.4.5 Establishment of a water information network among universities 2.4.6 Supporting higher education in the Gaza Strip	**2.3 Enhanced institutional performance**
3. Improving water information systems	3.1.1 Reinforcing HYCOS with modern technology and equipments 3.1.2 Building a geographic information system(GIS) 3.1.3 Conducting a training programme on GIS data capture and automation with special application in the water field 3.1.4 Conducting training on GIS workflow and other typical work flows: manual digitizing, scanned maps, aerial and satellite imagery, CAD and attribute data and legacy GIS data. 3.1.5 Collection, storing, processing and dissemination of data via the information system linked to both public and private sector 3.1.6 Evaluation of existing hydrometeorological networks and assessment of needs for rehabilitation and upgrading the networks 3.1.7 Institutional development and human resources development through carefully tailored training programmes in the area of HYCOS to meet the needs of water managers	**2.4 Enhanced higher education in the water sector** **3.1 Hydrological Cycle Observing System (HYCOS) established**
	4.1.1 Promoting the concept of continuing education and developing a long-term programme to achieve this goal 4.1.2 Conducting an assessment of the requirements of manpower in the professional, sub-professional, senior and junior categories of personnel 4.1.3 Implementing short-term and long-term training in a generic course with trainees from different institutions or countries 4.1.4 Conducting integrated and complementary training for different levels of	

4. Human Resources Development(HRD)	professionals: decision makers, managers and technical managers 4.2.1 Establishment of a strategy for training of trainers (TOT) comprising on-the-job training, (OJT), training courses and fellowships 4.2.2 Upgrading the basic management competence of supervisors and middle managers 4.2.3 Arranging study tours for water authorities staff to developed and less developed countries 4.2.4 Reviewing the curricula of existing training centres and institutes	**4.1 Approaches towards capacity building developed** **4.2 Expanded training competence developed**

14. WORK PLAN

	Year 1				Year 2				Year 3				Year 4				Year 5			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4


1.ORGANIZATIONAL DEVELOPMENT
1.1 OUTPUT 1
Upgrading management effectiveness
Activities:
1.1.1 Assessment of managerial performance
1.1.2 Identification of pathways to OD
1.1.3 Development of the OD process
1.2 OUTPUT 2
OD Intervention
Activities:
1.2.1 Development of a strategy for water sector CB
1.2.2 Development of improved policy and institutional framework
1.2.3 Management development
1.2.4 Senior management training
1.2.5 Introducing IWRM
1.2.6 Involving educational institute in CB
1.2.7 Introducing novel concepts in WRA and management curricula
1.2.8 Establishing of in-house corporate planning capability
1.3 OUTPUT 3
Improved water governance
Activities:
1.3.1 Design of improved

architecture of governance

1.3.2 Policy review based on quantified pressure on the water system

1.3.3 Establishment of water code

1.3.4 Application of DSS

1.3.5 Development of the ethical value of the environment

2. INSTITUTIONAL DEVLOPMENT (ID)

2.1 OUTPUT 1

Assessment of water-related institutions

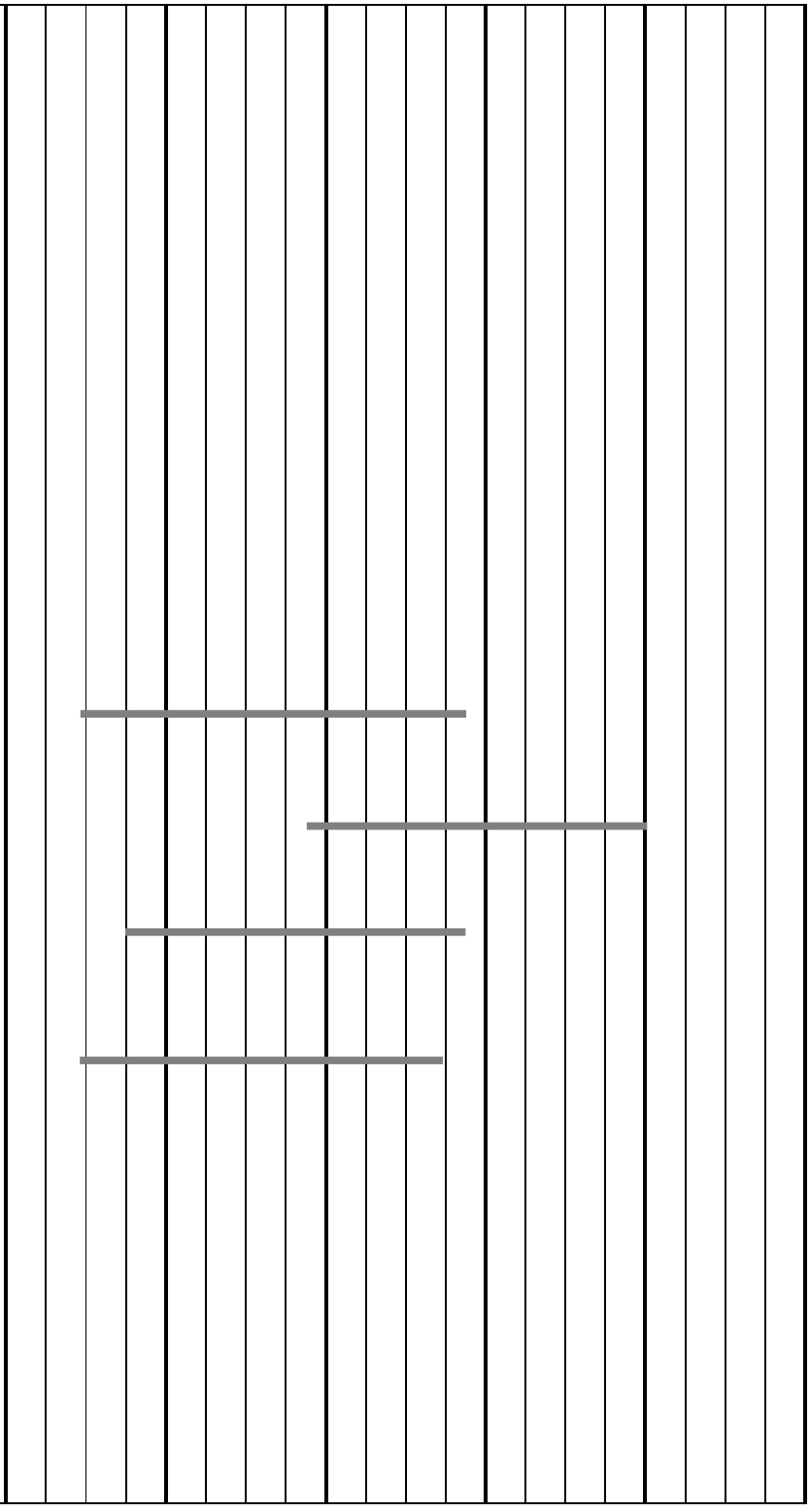
Activities:

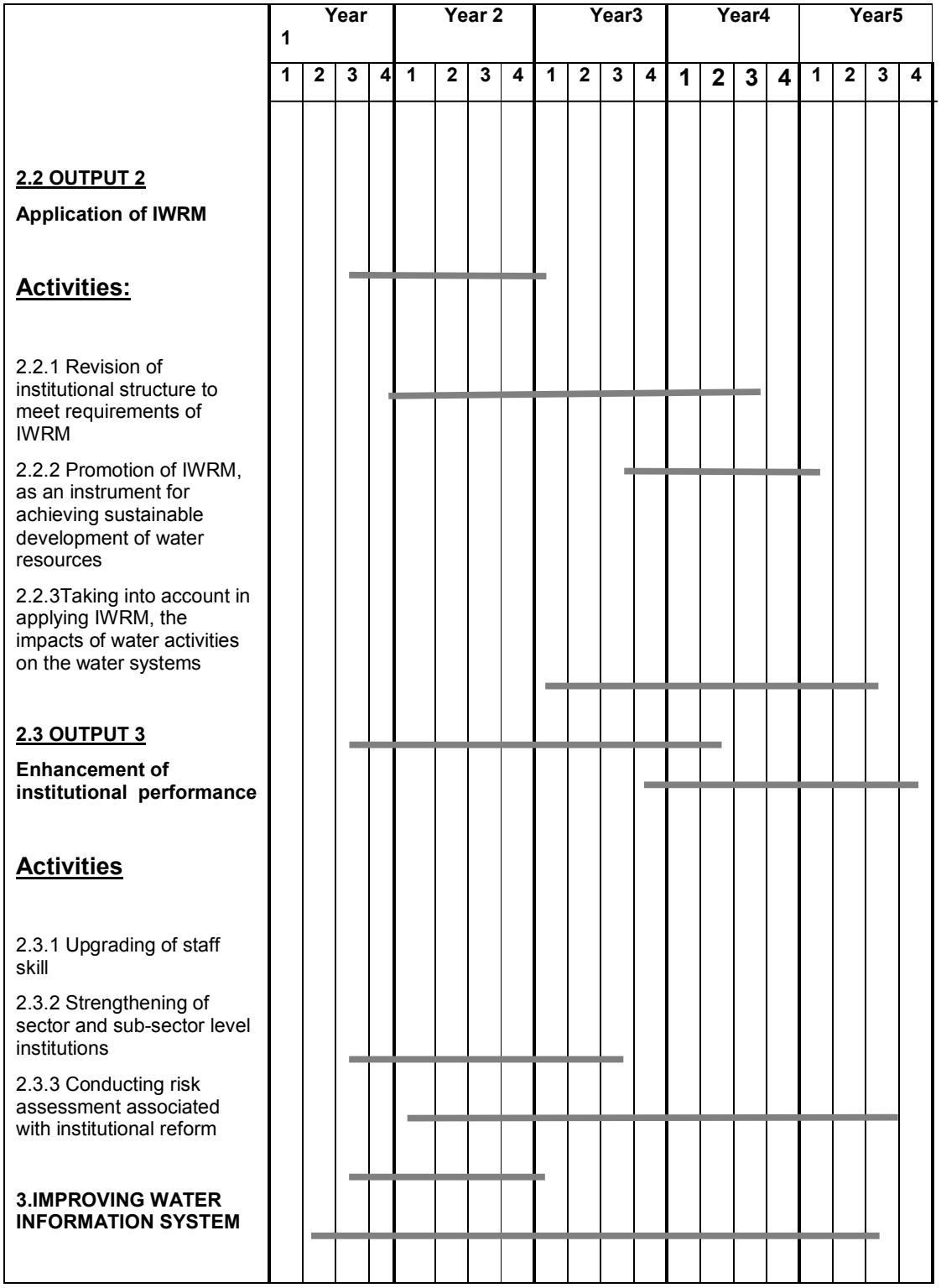
2.1.1 Systematic assessment of water – related institutions

2.1.2 Review of institutional arrangements, planning and coordination

2.1.3 Establishment of a mechanism to develop practical approaches to water related-activities

2.1.4 Encouraging institutions to learn from bottom-up initiatives for resource management




Year 1
Year 2
Year3
Year4
Year5
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
2.2 OUTPUT 2
Application of IWRM
Activities:
2.2.1 Revision of institutional structure to meet requirements of IWRM
2.2.2 Promotion of IWRM, as an instrument for achieving sustainable development of water resources
2.2.3Taking into account in applying IWRM, the impacts of water activities on the water systems
2.3 OUTPUT 3
Enhancement of institutional performance
Activities
2.3.1 Upgrading of staff skill
2.3.2 Strengthening of sector and sub-sector level institutions
2.3.3 Conducting risk assessment associated with institutional reform
3.IMPROVING WATER INFORMATION SYSTEM

3.1 OUTPUT 1 **Establishment of HYCOS** **Activities** 3.1.1 Reinforcing HYCOS system 3.1.2 Collection, processing and dissemination of data via the information system 3.1.3 Evaluation of hydrometeorological networks and assessment of needs 3.1.4 Institutional and HRD in the areas of HYCOS																			

	Year 1	Year 2	Year 3	Year 4	Year 5


1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
4. HUMAN RESOURCES DEVELOPMENT
4.1 OUTPUT 1
Approaches towards CP
Activities
1. Promotion of the concept of continuing education
2. Assessment of manpower requirement
3. I Implementation of training courses
4. Conducting of training of decision makers and managers
4.2 OUTPUT 2
Development of an expanding training competence
Activities
1. Establishment of a strategy for training of trainers and on-the- job training
2. Upgrading of basic management competence of supervisors
3. Study tours to developed and less developed countries
4. Review of curricula of training centres

ANNEX 7
SELECTED PHOTOS

Steering Committee Meeting

Training Activities

Training Activities

ANNEX 8
LETTERS FROM THE STAKEHOLDERS

ANNEX 10

FINAL REPORT OF THE 21 RESEARCH ACTIVITIES (SOFT COPY ONLY)

ANNEX 11

FINAL REPORT OF THE 6 TRAINING ACTIVITIES (SOFT COPY ONLY)

ANNEX 12

CONFERENCE ABSTRACT BOOK (SOFT COPY ONLY)

ANNEX 13
AUDIO-VIDEO FEED BACK FROM THE STAKEHOLDERS
(SOFT COPY ONLY)