

4. ACTUAL IMPLEMENTATION SCHEDULE

Actual implementation of the Project activities specified by the Plan of Operation in PDM for each output are described in the Table with comparison of the planned schedule.

4.1 Output-1

4.1.1 Compilation of SOP

As for Activity 1.1.1, a base of SOP for the Basic Water Quality (BW) and Air Quality (AIR) was prepared in 2005 as planned schedule. The SOP for the Basic Water Quality was prepared in 2005 with little delay, but that for Air Quality was delayed several months due to delay of analysis equipment delivery by the supplier. Besides, that of the Chemical and Biological Water Quality (CB) and Heavy Metal (HM) was started from 2006 after providing analysis equipment to C/Ps. Since the first prepared SOP had been revised through daily analysis works by C/Ps themselves, the actual preparation schedule of SOP is prolonged up to December 2007. The capability of C/Ps to revise SOP by themselves is considered enough in the end of the Project.

4.1.2 Training in Theory

The theoretical training was conducted mostly as planned schedule except for Activity 1.2.1.

The Activity 1.2.1 was schedule to conduct 2 times in 2005 and 2006. The first basic training was conducted twice in Damascus in 2005 as planned schedule, but the second basic (group) training planned in 2006 was canceled because the JICA Expert Team introduced a round instruction training considering the current situation of the counterparts. The contents of the second basic (group) training were included in the training conducted by each Expert who carried out the round instruction training in DFEA.

4.1.3 Hands on Training

The hands on training were also carried out mostly as planned schedule except for Activity 1.3.1 and 1.3.3.

The Activity 1.3.1 was planned to conduct only in the beginning of the Project because all DFEAs except for the Homs DFEA had to construct their laboratories before starting the Project. However, the JICA Expert Team has been requested advices for the establishment of laboratories by DFEAs up to December 2007 because of additional expansion of laboratory area and reconstruction of laboratory in new building accompanied with movement of DFEAs. So, its actual implementation schedule is prolonged up to December 2007. As for the Activity 1.3.3, actual training of the Air Quality was started from the end of 2006 mainly due to a half year delay of equipment for air quality measurement.

4.1.4 On-site OJT

The on-site training was conducted as planned schedule without serious problems. This fully

depends on aggressive and cooperative attitude of the counterparts and directors.

4.2 Output-2

4.2.1 Compilation of the Laboratory O/M Manual

All activities were mostly carried out successfully as planned schedule. The prepared manuals should be actually used and revised continuously by the counterparts. Otherwise, the labs would not be functions well and it resulted in disruption and hindrance of the sustainability of the Project.

4.2.2 Hands on Training for Laboratory Management

All activities were mostly conducted as planned schedule only except for the lab wastewater treatment facility. An installation of lab wastewater treatment is described in the original PDM as one of Pre-conditions. However, it was introduced to Damascus DFEA by GCEA in the beginning of 2007. And it still now does not work well due to serious technical problems despite of advices and suggestions to the Technical Committee by the JICA Expert Team.

4.2.3 Preparation of Budget Plan for Environmental Monitoring

This Activity is planned to be started in 2005 because the budget is crucial for actual implementation of environmental monitoring. The JICA Expert Team assisted and advised for budget plan preparation of DFEA affording monitoring activities in 2006. Based on the experience on disbursement and deficit balance of expenses, DFEA prepared their budget plan for 2007. The Activity itself has been conducted as planned schedule taking strong commitment and support of the Minister of MOLAE.

4.3 Output-3

4.3.1 Design the Monitoring Record Formats

The Activities of 3.1.1 and 3.1.2 were conducted as the planned schedule. In addition to the original schedule, continuous revision of the prepared format was carried out by the counterparts based on the advices and suggestions of the JICA Expert Team.

4.3.2 Compile Monitoring Data in DFEA

This Activity was mostly carried out as the planned schedule. One of problems is how to protect files from attack by virus. Although, the JICA Expert Team provided anti-virus software to all DFEA in 2006, presentation materials prepared by DFEA are often suffered from virus at present. Since this kind of care is one of tasks for data management, several actions such as including some cost for up-dating anti-virus soft were in the budget plan suggested by the JICA Expert Team.

4.3.3 Sending Monitoring Data to GCEA

This Activity was also conducted as the planned schedule not only training to the counterpart by the JICA Expert Team but also providing necessary networking equipment by JICA for connection

DFEA and GCEA by intranet.

4.3.4 Publish Environmental Monitoring Annual Report of DFEA

The first trial of preparation of an annual monitoring report was conducted in the end of 2006. Its schedule was little behind than the planned one. The counterparts are required to prepare the annual report in 2007 by the end of the Syrian Fiscal Year of 2007 based on the comments and suggestions on the annual report in 2006.

4.4 Output-4

4.4.1 Pollution Source Inventory Survey

The Activities of 4.1.1 was conducted as the planned schedule by subcontracting works. Its main purposes are to prepare pollution source inventory and to plot identified pollution sources on a topographic map of scale one to 50,000 in order to clarify the current pollution source conditions and to reflect it for preparation of monitoring plan in each DFEA.

4.4.2 Specify Monitoring Sites and Parameters

The Activities consist of 4.2.1 for training on monitoring plan and 4.2.2 for support on preparation. These Activities were mostly conducted as the planned schedule. Due to close relation of these 2 Activities, the JICA Expert Team trained the counterparts both contents at one time in each DFEA.

4.4.3 Formulate Environmental Monitoring Plan

This Activity has close link with the Activity 4.2.1 and 4.2.2, so it was conducted at same time combined with the contents of Activity 4.2.1 and 4.2.2 as the planned schedule. The counterparts had an opportunity to formulate their monitoring plan twice in 2006 and 2007.

4.4.4 Preparation of Environmental Monitoring Guideline

The Activities of 4.4.1 and 4.4.2 were conducted as the planned schedule. Since the counterparts of DFEA had experiences of monitoring plan preparation twice in 2006 and 2007, the JICA Expert Team led them to prepare environmental monitoring guideline by themselves based on their actual experiences on monitoring plan preparation and implementation. For effective and efficient transfer of knowledge to the counterparts, the JICA Expert Team distributed an instructive guidance for preparation of the environmental monitoring guideline just showing key and important points on its preparation.

4.5 Output-5

4.5.1 Public Awareness Survey

The Activity 5.1.1 “Public Awareness Survey” was conducted as the planned schedule in 2004 and 2005 by subcontracting works. Its main purposes are to grip current concerns on environment of

the local people and to obtain directions for further activities related to the environmental education (E&E) and public awareness.

4.5.2 Formulation of Materials for Environmental Education and Public Awareness

The Activity 5.2.1 “Formulation of Materials for Environmental Education and Public Awareness” was also carried out as the planned schedule in 2005 and 2006 by subcontracting works. The materials prepared were used for seminars and workshops for promotion of environmental education and public awareness on environment. Based on the recommendations of the Mid-term Evaluation Mission in July 2006, the target stakeholders were changed to pollution sources (factories) in order to promote effective and active use of monitoring data for pollution source control by DFEA. It means that the actual monitoring data should be used for public awareness, and it is not necessary to prepare new materials.

4.5.3 Implementation of Seminars and Workshops

This Activity was mostly carried out as the planned schedule. However, the target stakeholders were shifted from pupils and NGOs in the original plan to pollution source workers and managers in accordance with the recommendations of the Mid-term Evaluation Mission. Therefore, the JICA Expert Team conducted seminars for the counterparts of the targeted priority DFEA (Damascus, Homs, Aleppo, and Lattakia) and workshops for the workers and managers of pollution sources (factories) through the Chamber of Industry (COI) of selected 4 Governorates.

4.5.4 Enhancing Cooperation among Organizations and Institutions

The Activities consist of 5.4.1 for recognizing current situation on environmental education and public awareness in Syria and 5.4.2 for organizing periodic network meeting. These Activities were mostly conducted as the planned schedule. In 2005, these activities were conducted mainly targeting pupils and NGOs. But in 2006 and 2007, the activities were focused on the pollution sources (factories) in accordance with the recommendations of the Mid-term Evaluation Mission.

4.5.5 Formulation of Action Plan on Public Awareness

This Activity was added newly based on the recommendations of the Mid-term Evaluation Mission in 2006, and it was mostly carried out as the planned schedule. GCEA already established the National Committee for Public Awareness and prepared national strategy for promotion of public awareness. DFEA are required for preparation of regional strategy and action plan by GCEA in accordance with this national strategy. Therefore, the JICA Expert Team required the counterparts for preparing an action plan for promotion of public awareness using monitoring data in line with preparation of their own regional action plan. For this purpose, the JICA Expert Team distributed an instructive guidance for preparation of the action plan of public awareness using monitoring data showing key and important points on its preparation.

Planned Schedule under the Plan of Operation and Actual Implementation for the Activities of Output 1 (1/2)

Output 1

Technical level of laboratory concerning to environmental sampling and analysis is improved.

Activities as per PDMe			Expected Results (as per PO of R/D)	Corresponding Activity of PO as per the Project	Schedule																	
					2004				2005				2006				2007				2008	
					IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
1.1 Compilation of the SOP for sampling, analysis, interpretation, evaluation, data filing and reporting	Standard Operation Procedure (SOP)	1.1.1 Preparation of the SOP (BW, CB, HM, AIR)	Planned																			
		Actual																				
1.2 Training in theory for making monitoring plans, samplings, analysis, interpretation, evaluation, data filing and reporting	Standard Operation Procedure (SOP)	1.2.1 Basic (group) training of environmental management for personnel of DFEAs	Planned																			
		Actual																				
	Standard Operation Procedure (SOP)	1.2.2 Training on data analysis and interpretation (BW, CB, HM, AIR)	Planned																			
		Actual																				
Standard Operation Procedure (SOP)	1.2.3 Round instruction training and OJT at DFEA, including "Training on data analysis and interpretation" and "Discussion and instruction at DFEA (BW, CB, HM)"	Planned																				
	Actual																					
Standard Operation Procedure (SOP)	1.2.4 Training on air quality analysis of DFEAs in DAM, ALP, HOM, including "Training on data analysis and interpretation" and "Discussion and instruction at DFEA (AIR)"	Planned																				
	Actual																					

■ Joint implementation between JICA Expert Team and Syrian counterpart

▲ Spot activity by JICA Expert Team

Planned Schedule under the Plan of Operation and Actual Implementation for the Activities of Output 1 (2/2)

Output 1

Technical level of laboratory concerning to environmental sampling and analysis is improved.

Activities as per PDMe			Expected Results (as per PO of R/D)	Corresponding Activity of PO as per the Project	Schedule																					
					2004				2005				2006				2007				2008					
					IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I								
1.3 Hands-on trainings in samplings, analysis, interpretation, evaluation, data filing and reporting	-Training materials -Number of training conducted -Number of participants	1.3.1 Advice to establish plan of laboratory of Damascus DFEA and other 13 DFEAs																								
		1.3.2 Round instruction training and OJT at DFEA, including "Training on data analysis and interpretation" and "Discussion and instruction at DFEA (BW, CB, HM)"																								
		1.3.3 Training on air quality analysis of DFEAs in DAM, ALP, HOM, including "Training on data analysis and interpretation" and "Discussion and instruction at DFEA (AIR)"																								
		1.3.4 Establishment of sample transport system to DFEA in Damascus from other DFEAs																								
1.4 On-site OJT in sampling, analysis, interpretation, evaluation, data filing and reporting	-Number of training conducted -Number of participants	1.4.1 Round instruction training and OJT at DFEA, including "Training on data analysis and interpretation" and "Discussion and instruction on the basic analysis of water quality at DFEA (WQ)"																								
		1.4.2 OJT on the analysis of ambient air of DFEAs in DAM, ALP, HOM, including "Training on data analysis and interpretation" and "Discussion and instruction at DFEA (AIR)"																								
		1.4.3 Recommendations for the training system about environmental management																								

Joint implementation between JICA Expert Team and Syrian counterpart

Spot activity by JICA Expert Team

Planned Schedule under the Plan of Operation and Actual Implementation for the Activities of Output 2

Output 2

Labs are properly managed by lab staff themselves.

Activities as per PDMe			Expected Results (as per PO of R/D)	Corresponding Activity of PO as per the Project	Schedule																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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2.1 Compilation of the laboratory O/M manual for equipment operation and maintenance, spare parts preparation, reagents storage and treatment, liquid and solid laboratory wastes treatment and others			O/M manual	2.1.1 Preparation of a laboratory O/M manual (BW, CB, HM, AIR)	Planned																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</

Joint implementation between JICA Expert Team and Syrian counterpart

Planned Schedule under the Plan of Operation and Actual Implementation for the Activities of Output 3

Output 3

Environmental analysis data is accumulated and properly managed.

Environmental analysis data is accumulated and properly managed.																				
Activities as per PDMe	Expected Results (as per PO of R/D)	Corresponding Activity of PO as per the Project	Schedule																	
			2004				2005				2006				2007				2008	
			IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II			
3.1 Design the monitoring record formats for laboratories and for the GCEA in the MOLAE	-Monitoring report format for Directorates	3.1.1 Situation of data management (DM) in MOLAE (DFEA)		■																
		Actual		■																
	-Monitoring report for GCEA	3.1.2 Preparation of format for environmental monitoring record			■		■									■				
		Actual			■		■									■			I	
3.2 Compile monitoring records in each Directorate	-Environmental monitoring records	3.2.1 Record of environmental monitoring in DFEAs			■		■									■				
		Actual			■		■									■				
	n/a	3.3.1 Set-up data concentrating system in MOLAE regarding environmental monitoring					■									■				
		Actual					■									■				
3.3 Send the monitoring records from Directorates to the GCEA in the MOLAE	n/a	3.4.1 Support for the preparation and publication of annual environmental reports by each DFEA					■									■				
		Actual					■									■				
	3.4 Publish environmental annual report in each Directorates	(additional activity of PDMe)					■									■				
		Actual					■									■				

Joint implementation between JICA Expert Team and Syrian counterpart

Planned Schedule under the Plan of Operation and Actual Implementation for the Activities of Output 4

Output 4

Lab staff is able to formulate an EMO plan (EMP) specifying parameters required.

Activities as per PDMe	Expected Results (as per PO of R/D)	Corresponding Activity of PO as per the Project	Schedule																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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4.1 Conduct preliminary pollution source inventory surveys	Report of surveys conducted	4.1.1 Preparatory survey for pollution source in each governorate																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</

Joint implementation between JICA Expert Team and Syrian counterpart

Planned Schedule under the Plan of Operation and Actual Implementation for the Activities of Output 5

Output 5

The results and data acquired by the Project is open to and shared with the citizens of the targeted Directorates. Staff of target Directorates is able to formulate its action plan for public awareness and environmental education.

Activities as per PDMe	Expected Results (as per PO of R/D)	Corresponding Activity of PO as per the Project	Schedule																	
			2004				2005				2006				2007				2008	
			IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II			
5.1.1 Conduct preliminary survey on activities regarding environmental education and public awareness in each governorates	Report of preliminary survey conducted	5.1.1 Public awareness (PA) survey in governorates																		
		Planned																		
5.2.1 Formulate textbooks, manuals, and pamphlets for environmental education	Textbooks, manuals and pamphlets made by the Project	5.2.1 Preparation of materials for activities for environmental education (E&E) in Arabic																		
		Planned																		
5.3.1 Implement seminars and workshops targeted for educational institutions and NGOs and so on.	Report of seminars and workshops implemented	5.3.1 Conduction of seminars and workshops for environmental education (E&E)																		
		Planned																		
5.4.1 Enhance the cooperation among organizations and/or institutions regarding environmental education in each governorates (ex. To implement periodical meeting)	Report of Meetings	5.4.1 Grasp of the current situation of environmental education (E&E) and public awareness (PA) in Syria																		
		Planned																		
5.5.1 To formulate an action plan on public awareness activities for industrial sector in target Directorates	Report of Action Plan	5.5.1 Preparation of action plan on how to use the monitoring plan effectively in accordance with the strategies given by the National Committee for the Public Awareness																		
		Planned																		

Joint implementation between JICA Expert Team and Syrian counterpart

5. ACTUAL INPUTS

5.1 Input by Japanese Side (Describe both Planned and Actual)

5.1.1 Dispatch of JICA Expert Team

The Japanese Experts in the field of water quality analysis, air quality analysis, environmental management, environmental education, and data management have been dispatched as planned in each Japanese Fiscal Year (JFY). In total, 5.50 M/M is increased compared with the original plan prepared December 2004 due to coping with additional training for the Chemical and Biological Analysis-2 in 2007 (4.5 M/M), project management by the Chief Advisor in 2006 (0.37 M/M), and additional training for the Air Quality Analysis in 2006 (0.63 M/M).

Dispatch of Japanese Expert Team by Japanese Fiscal Year

Technical Fields		JFY 2004 (Jan.-Mar. 2005)	JFY 2005	JFY 2006	JFY 2007	Total (M/M)
1	Chief Advisor/ Environmental management	1.67	8.00	4.87	3.00	17.54
2	Water quality (Basic analysis)	2.30	6.00	4.50	2.50	15.30
3	Water quality (Chemical and biological analysis-1)	0.00	7.40	7.00	5.60	20.00
4	Water quality (Chemical and biological analysis-2)	0.00	0.00	0.00	4.50	4.50
5	Water quality (Heavy metal)	0.00	1.50	4.00	4.80	10.30
6	Air quality analysis	0.00	3.50	3.63	2.90	10.03
7	Environmental education	1.00	2.50	1.50	1.50	6.50
8	Data management	0.00	2.00	2.00	2.00	6.00
9	Coordinator/ Procurement management	1.00	2.00	2.00	0.00	5.00
Total (M/M) (a) (Incl. coordinator at 5.00 M/M)		6.27	32.90	29.50	26.80	95.47
Planned Total (M/M) (b) (as of December 2004)		6.27	32.90	28.50	22.30	84.97
Balance Total (M/M) (a)-(b)		0.00	0.00	+1.00	+4.50	+5.50

Note: Japanese fiscal year is between April and March.

The above figure includes 0.30 M/M for home assignment in Japan.

5.1.2 Counterpart Training in Egypt

The Egyptian Environmental Affairs Agency (EEAA) has established the Cairo Central Center (CCC) in 1997 and achieved successful results in the same environmental monitoring field. Therefore, series of the following study tour and water quality monitoring training to EEAA in Egypt were planned to learn about the output of CCC and Regional Branch Offices (RBOs), and to exchange views on environmental monitoring between the staffs of Egyptian side and the counterparts of Syrian side. The principal objectives are as follows, and the schedule and contents of the study tours and water quality monitoring training are shown below.

- to learn plans, activities, and outputs of CCC as a reference lab.
- to experience an actual implementation of environmental monitoring and inspection in RBOs

- to discuss problems and constraints lessons with the staff in CCC and RBOs
- to share lessons and to exchange views on environmental monitoring

(1) Study Tour to EEAA in Egypt in 2005

1) Persons concerned

The Egyptian Environmental Affaires Agency (EEAA) received the C/Ps of the Project as a recipient agency in 2005. The personnel concerned are shown in the table below.

Concerned Person of the Study Tour

	Name	Organization	Position
I. Recipient: Egyptian Environmental Affaires Agency (EEAA), the Arab Republic of Egypt			
1	Dr. Ali Abou Sedera	General Secretary, Manager of Central Dept. for Branches Affaires	Coordination and management of RBOs
2	Dr. Mawaheb Abou El Azam	Director of Central Dept. for Quality of Air and Noise in EEAA, General Director of CCC	Coordination and management of CCC
II. Visitors: General Commission for Environmental Affaires (GCEA), Ministry of Local Administration and Environment (MOLAE), the Syrian Arab Republic			
1	Ms. Fathia Mohammad	Chief of the Project, Directorate of Laboratories, GCEA	Leader of trainees
2	Ms. Shamsa Aljasim	Director, DFEA in Rakka	trainee
3	Ms. Sanaa Al Mansour	Staff, DFEA in Homs	trainee
4	Mr. Nawaf Othman	Lab Chief, DFEA in Hasakeh	trainee
5	Mr. Mohammad Hariri	Lab Chief, DFEA in Dara'a	trainee
6	Mr. Senan Deeb	Staff, DFEA in Lattakia	trainee
7	Mr. Khaled Kasem	Lab Chief, DFEA in Damascus	trainee
8	Ms. Mouna Aljumaa	Lab Chief, DFEA in Damascus Countryside	trainee
9	Mr. Yoichi Iwai	Chief Advisor of the Project	JICA Expert Team
10	Mr. Mohammad Doubosh	Interpreter: Arabic-English	JICA Expert Team

2) Key Items for Discussion and Exchange Views with the Staff of EEAA

During the study tour, several regular meetings were held with CCC, Greater Cairo RBO, Suez RBO, and Mansoura RBO. Key discussion items were as follows;

- Capacity development of RBO staff and its training program,
- O/M and QA/QC of lab,
- Data management and communication among CCC and RBOs,
- Dealing with environmental complaints from citizens,
- Inspection of pollution sources,
- Public awareness,
- Annual budget preparation,
- Environmental management and monitoring plan formulation, and
- Further collaboration between CCC in Egypt and GCEA in Syria.

3) Schedule and Activities

The schedule and the activities of the study tour are shown below.

Schedule for the Study Tour to Egypt

Date	Activities		Stay
	AM	PM	
1. 28 Aug. (Sun)	-move to Cairo (08:00-RB201-09:30...10:30) -11:20-11:40: report to JICA Egypt -12:30-13:00: courtesy to EEAA and CCC, and orienting meeting	-13:00-16:30: Lab explanation by CCC staff -18:00: move to Hotel	Cairo (Flamenco)

Date	Activities		Stay
	AM	PM	
2. 29 Aug. (Mon)	-08:00-move to CCC-08:30, -08:45-11:30: visit CCC, meeting and discussion with staff of CCC, -11:40-move to GCRBO-12:20,	-12:30-16:00: GCRBO at Tamouh Giza Governorate, and explanatory meeting and discussion with staff of GCRBO, -17:00-21:00: move to Suez (by car)	Suez (Green House)
3. 30 Aug. (Tue)	-08:00-Suez RBO-08:30, -08:30-12:30: Suez RBO, and meeting and discussion with staff,	-12:30-16:00: field visit for sampling and inspection with staff of Suez RBO, -17:00-21:30: move to Mansoura (by car)	Mansoura (Hotel Mansoura)
4. 31 Aug. (Wed)	-08:00-Mansoura RBO-08:30, -08:30-12:30: Mansoura RBO (MSRRBO) , and meeting and discussion with staff,	-12:30-15:00: field visit and sampling with staff of MSRRBO -16:00-19:00: move to Cairo (by car)	Cairo (Flamenco)
5. 1 Sep. (Thr)	-08:00-move to CCC-08:30, -08:30-12:00: meeting and discussion with staff of CCC -12:00-12:50: move to JICA Egypt	-13:00-14:00: report to JICA Egypt (Resident Representative), - move to Damascus (21:00-RB206-22:30)	-

(2) Study Tour to EEAA in Egypt in 2006

1) Persons concerned

The Egyptian Environmental Affairs Agency (EEAA) received the C/Ps of the Project as a recipient agency in 2006. The personnel concerned are shown in the table below.

Concerned Person of the Study Tour

	Name	Organization	Position
I. Recipient: Egyptian Environmental Affairs Agency (EEAA), the Arab Republic of Egypt			
1	Dr. Ali Abou Sedera	Head of Central Dept. for Branches Affaires	Coordination and management of RBOs
2	Dr. Mawaheb Abou El Azam	Director of Central Dept. for Quality of Air and Noise in EEAA	Coordination and management of EEAA
3	Ms. Kawsar Hefny	General Director of CCC	Coordination and management of CCC
II. Visitors: General Commission for Environmental Affairs (GCEA), Ministry of Local Administration and Environment (MOLAE), the Syrian Arab Republic			
1	Ms. Khozama Abo Saab	Chief of the Project, Directorate of Laboratories, GCEA	Leader of trainees
2	Mr. Ahamad Mo'ala Ahmad	Staff, Aleppo DFEA	trainee
3	Mr. Saher Abdullah	Lab Chief, Deir ez Zor DFE	trainee
4	Ms. Reem Kanbar	Staff, Hama DFEA	trainee
5	Mr. Sameer Da'boul	Lab Chief, Idleb DFEA	trainee
6	Mr. Mr. Majed Zaitoun	Lab Chief, Quneitra DFEA	trainee
7	Ms. Omay'mah Al Sha'ar	Lab Chief, Sweida DFEA	trainee
8	Ms. Rowdaina Al Ali	Lab Chief, Tartous DFEA	trainee
9	Ms. Itidal Awad	Staff, Homs DFEA	JICA Expert Team
10	Ms. Omaira Younes	Staff, Damascus DFEA	JICA Expert Team
11	Mr. Ilia Wasel	Staff, Aleppo DFEA	trainee
12	Ms. Yumiko Honda	JICA Syria Office	observer
13	Ms. Marah Murad	JICA Syria Office	observer
14	Mr. Yoichi Iwai	Chief Advisor of the Project	JICA Expert Team
15	Mr. Mohammad Doubosh	Interpreter: Arabic-English	JICA Expert Team

2) Key Items for Discussion and Exchange Views with the Staff of EEAA

During this study tour, three regular meetings namely the discussion meeting at CCC on 10 September, at Suez RBO on 11 September, and at Mansoura RBO on 13 September were held. Key discussion items are as follows:

- Capacity Development and Capability of Frontline Staff of CCC and RBOs
- Training Program and its Plan
- Operation and Maintenance (O/M) of Laboratories and Constraints (inc. QA/QC)
- Data Management Conditions
- Communication among CCC and RBOs

- f) Dealing with Complaints from Citizens
- g) Activities and Difficulties related to Inspection of Pollution Sources
- h) Public Awareness and Environmental Education
- i) Activities of NGOs in Environment
- j) Annual Budget Preparation for Environmental Monitoring
- k) Environmental Management and Monitoring Plan Formulation
- l) Lessons learnt from JICA Environmental Monitoring Training Center Project
- m) Further Collaboration between CCC in Egypt and GCEA in Syria

3) Schedule and Activities

The schedule and the activities of the study tour are shown below.

Schedule for the Study Tour to Egypt

Date	Activities		Stay
	AM	PM	
1. 9 Sept. (Sat)	-	-move to Cairo (19:00-RB209-21:30...23:00) -23:30: Hotel check in	Cairo (Flamenco)
2. 10 Sept. (Sun)	-08:00 move to JICA, 08:30-09:00 courtesy to Mr. Okamoto, -09:00 move to EEAA, 10:00-12:00: courtesy to Dr. Ali Abou Sedera (Head of CDBA), Dr. Mawaheb Abou El Azm (Head of EQS), Ms. Kawser Hefny (General Director of CCC)	-12:00-14:00: explanation at CCC -14:30-18:00: move to Suez (by car) -18:00: Hotel check-in	Suez (Green House Hotel)
2. 11 Sept. (Mon)	-08:30-Suez RBO-09:00, -09:00-11:00: explanatory meeting and discussion with staff of Suez RBO	-11:30-15:00: field visit for sampling and inspection with staff of Suez RBO	Suez (Green House Hotel)
3. 12 Sept. (Tue)	-09:00-11:00: meeting and discussion with staff of Suez RBO	-11:00-17:00: move to Mansoura (by car) -18:30: Hotel check-in	Mansoura (Ramada Hotel)
4. 13 Sept. (Wed)	-08:30-Mansoura RBO-09:00, -09:00-11:00: explanatory meeting and discussion with staff of Mansoura RBO	-11:30-14:00: field visit for inspection with staff of Mansoura RBO -14:30-17:30: move to Cairo (by car) -17:30: Hotel check-in -18:00-20:00: Exchange views of the JICA REMIP Team at Hotel -20:00-21:30: reception (inviting Mr. Tanaka JICA Egypt)	Cairo (Flamenco)
5. 14 Sept. (Thr)	-09:20-10:00: move to CCC -10:00-11:30: wrap-up meeting and discussion with staff of CCC and JICA Expert Team, -11:30-12:20: move to JICA Egypt	-12:20-13:30: report to JICA Egypt (Mr. Okamoto, Resident Representative and Mr. Tanaka), -13:30-18:00: excursion, - move to Damascus (21:00-RB206-22:30)	-

(3) Study Tour to EEAA in Egypt in 2007

1) Persons concerned

The Egyptian Environmental Affairs Agency (EEAA) received the C/Ps of the Project as a recipient agency in 2007. The personnel concerned are shown in the table below.

Concerned Person of the Study Tour

	Name	Organization	Position
I. Recipient: Egyptian Environmental Affairs Agency (EEAA), the Arab Republic of Egypt			
1	Dr. Ali Abou Sedera	Head of Central Dept. for Branches Affaires	Coordination and management of RBOs
2	Ms. Kawsar Hefny	General Director of CCC	Coordination and management of CCC
II. Visitors: General Commission for Environmental Affairs (GCEA), Ministry of Local Administration and Environment (MOLAE), the Syrian Arab Republic			
1	Ms. Ms Manal Alsakka	Director, Directorate of Inspection and EIA, GCEA	Leader of trainees

	Name	Organization	Position
2	Ms Iman Sulayman	Staff, Damascus DFEA	trainee
3	Mr. Malek Soliman	Staff, Damascus Countryside DFEA	trainee
4	Ms Fathia Moience	Staff, Dier ez Zor DFEA	trainee
5	Mr. Human Abo Raid	Staff, Sweida DFEA	trainee
6	Ms Dalal Ibrahim	Staff, Tartous DFEA	trainee
7	Ms Donia Gharieb	Staff, Aleppo DFEA	trainee
8	Mr. Mohmoud Al Yousel	Staff, Homs DFEA	trainee
9	Mr. Shinsuke Sato	Chemical and Biological Water Quality Analysis	JICA Expert Team
10	Mr. Mohammad Doubosh	Interpreter: Arabic-English	JICA Expert Team

2) Key Items for Discussion and Exchange Views with the Staff of EEAA

During this study tour, discussion meetings and lectures were held at CCC and Suez RBO. Together with these meetings and lectures, Suez RBO conducted environmental factory inspections. Key discussion items and the major subjects of the lectures are as follows:

- Observation of the environmental analysis laboratories in CCC and Suez RBO,
- Operation and maintenance (O/M) of laboratories and their constraints including QA/QC,
- Data management conditions,
- Activities and difficulties related to the inspection of pollution sources,
- Further collaboration between CCC/RBO in Egypt and GCEA in Syria,
- Environmental monitoring activities,
- Environmental factory inspection

3) Schedule and Activities

The schedule and the activities of the study tour are shown below.

Schedule and Activities of the Study Tour

Date	Activities		Stay
	AM	PM	
1. 1 Sept. (Sat)		Leave Damascus and move to Cairo (20:15 – 21:45, RB209)	Cairo (Flamenco)
2. 2 Sept. (Sun)	<ul style="list-style-type: none"> Visit to EEAA/ CCC Explanation of activities of EEAA and CCC <ul style="list-style-type: none"> Water Quality Management, Environmental Air Quality Monitoring by EEAA, Measurement of Noise 	<ul style="list-style-type: none"> Observation of Lab. of CCC Questions and answers Move to Suez 	Suez (Green House Hotel)
3. 3 Sept. (Mon)	<ul style="list-style-type: none"> Visit to Suez RBO Lecture/Presentation by Suez RBO <ul style="list-style-type: none"> Activity of Suez RBO Environmental factory inspection Environmental monitoring Environmental management program in Suez RBO 	<ul style="list-style-type: none"> Visit to factory (MIGOP Oil Processing Company (Manufacturing of edible oil)) <ul style="list-style-type: none"> Explanation of the manufacturing process and the environmental protection measurement Observation of the factory Factory inspection (Measurement and collection of flue gases, Collection of wastewaters) Questions and answers 	Suez (Green House Hotel)
4. 4 Sept. (Tue)	<ul style="list-style-type: none"> Observation of Lab. of Suez RBO Visit to factory (Al EZZ FLAT Steel) (Steel manufacturing factory by Electric furnace) Explanation of the manufacturing process and the environmental protection measurement Observation of the factory 	<ul style="list-style-type: none"> Observation of the environmental protection measurement Implementation of factory inspection by the staff of Suez RBO and the factory staff Questions and answers 	Suez (Green House Hotel)

Date	Activities		Stay
	AM	PM	
5. 5 Sept. (Wed)	<ul style="list-style-type: none"> Lecture by Suez RBO <ul style="list-style-type: none"> Air Pollution/Method of Treatment Egyptian Regional Environmental Management Information System GIS 	<ul style="list-style-type: none"> Questions and answers Move to Cairo 	Cairo (Flamenco)
6. 6 Sept. (Thu)	<ul style="list-style-type: none"> Visit to EEAA/CCC Questions and answers Visit to Inspection Dept. of EEAA 	<ul style="list-style-type: none"> Report to JICA Cairo office Leave Cairo and move to Damascus (23:15 – 01:30, RB206) 	

(4) Water Quality Analysis Training to EEAA in Egypt

1) Persons concerned

The Egyptian Environmental Affairs Agency (EEAA) received the C/Ps of the Project as a recipient agency. The personnel concerned are shown in the table below.

Concerned Person of the Water Quality Analysis Training

	Name	Organization	Position
I. Recipient: Egyptian Environmental Affairs Agency (EEAA), the Arab Republic of Egypt			
1	Ms. Kawsar Hefny	Director of CCC	Coordination and management of CCC
2	Dr. Hanaa Sheltawy	Chief of CCC	Instructor
II. Visitors: General Commission for Environmental Affairs (GCEA), Ministry of Local Administration and Environment (MOLAE), the Syrian Arab Republic			
1	Ms. Riem Sadr Edin	Lab Chief, Damascus DFEA	trainee

2) Key Items for Water Quality Analysis Training by the Staff of EEAA

During this water quality analysis training, CCC trained the trainee from Syrian about field sampling in the Nile River, laboratory analysis method, operation and maintenance of laboratory, and inspection activity. Key discussion items and the major subjects of the lectures are as follows:

- Objectives and situation of environmental monitoring and management in Egypt,
- Implementation and system of inspection,
- Laboratory analysis from sampling to data management
- Operation and maintenance (O/M) of laboratories including QA/QC,
- Further collaboration between CCC/RBO in Egypt and GCEA in Syria,

3) Schedule and Activities

The schedule and the activities of the water quality analysis training are shown below.

Training Schedule

Period	Date	Training contents/ activity	Trainer
First week	19/11/2006	1) Acquaintance about the laboratory. - General idea about Environmental Monitoring in Egypt, (water & air) - Introduction about keeping samples and application of the law.	Dr. Mawaheb Dr. Kawthar Dr. Hanaa & Dr. Mohamed Izz
	20/11/2006	2) Chlorides.	Chemist Sameh
	21/11/2006	3) Ammonia.	Chemist M. Labib
	22/11/2006	4) Fluorides.	Chemist M. Labib
	23/11/2006	5) Detergents.	Chemist Abdullah
	26/11/2006	1) Sulphides.	Chemist Iyman

Period	Date	Training contents/ activity	Trainer
Second week	27/11/2006	2) Cyanide.	Chemist Abdullah
	28/11/2006	3) COD.	Chemist Rasha
	29/11/2006	4) Total and original phosphate.	Chemist Iyman
	30/11/2006	5) Bacteriology.	Chemist Iyman
Third week	03/12/2006	1) Nitrates.	Chemist Daleya
	04/12/2006	2) Monitoring the quality of Nile River in Cairo. Manner of sampling and keeping samples and field measurements.	Dr. Hanaa & Chemist Abdullah
	05/12/2006	3) SS	Mr. Yaser
	06/12/2006	4) Oil and grease	Mr. Yaser
	07/12/2006	5) Measuring solid sediments (volume)	Chemist Dalia
Fourth week	10/12/2006	- Manner of executing waste water treatment plant for the lab - Steps of doing lab measurements - Acquiring ideas about ISO system - The way of organizing and managing chemicals, equipment maintenance	Chemist Aziz Chemist Abdullah
	11/12/2006	Reviewing and collecting a sample from the lab wastewater with inspection (mustard).	Central Lab./ inspection
	12/12/2006	Reviewing and collecting a sample from the lab wastewater with inspection (mustard).	Central Lab./ inspection
	13/12/2006	-How to record and interpret results. -Introduction of air quality monitoring. - Test and evaluation of the Trainee.	Dr. Hanaa Chemist Aziz Chemist Labib
	14/12/2006	-Presentation (by the Trainee) and evaluating the training course and the Trainers. - Evaluation and discussions between Central lab and JICA.	Dr. Kawthar Dr. Hanaa

5.1.3 Counterpart Training in Japan

The training in Japan was conducted in March 2007. The trainee of the Syrian side is the Project Manager, Dr. Yasin Moa'alla (Director of Directorate of Laboratories, GCEA). Main objectives for the training were as follows.

- to have comprehensive understand on structure of the national environmental administration in Japan with administrative system and activities including effectiveness and issues
- to have a chance to deliberate the Syrian environmental administration by comparing with that in Japan.
- to examine direction and priority toward improvement of environmental administrative system in Syria
- to understand environmental administration and monitoring system at local governmental level in Japan
- to understand collaboration between local government and Ministry of Environment, and how to establish adequate relationship
- to understand pollution source control and measures

The schedule and the activities of the training in Japan from 10 March to 22 March 2007 are shown below.

Schedule and Activities of the Training in Japan

Date	AM /PM	Training Contents	Trainer and/or Responsible Body
10 Mar.		Leaving Syria (DAM-DBX--	
11 Mar.		--KIX-HND), 19:40: arriving at Japan (Haneda)	meet at HND airport by JICA
12 Mar.	AM	-09:00: JICA visit, -09:30-12:30: orientation, greeting to JICA HQ	-JICA
	PM	-14:00: Ministry of Environment (MOE), Bureau of Global Environment, -14:30-17:00: B. of Integrated Environmental Policy (environmental policy, planning, strategy, actions, projects/programs, public awareness, legal and institutional situation, including discussion)	-Director General of Bureau of Global Environment, -Director and/or General Manager of Bureau of Integrated Environmental Policy
13 Mar.	AM	-09:00: MOE, -09:15-13:00: Bureau of Water and Air Protection (planning, strategy, actions, projects/programs, public awareness for water and air protection, and environmental monitoring, including discussion)	-Director and/or General Manager of Bureau of Water and Air Protection
	PM	MOE14:00-16:30: Bureau of Environmental Health (strategy, actions, projects/programs, public awareness for POPs treaty, DXN, hazardous chemicals management, PRTR, and risk assessment, including discussion)	-Director and/or General Manager of Bureau of Environmental Health
14 Mar.	AM	-move to Yokkaichi	ICETT
	PM	-ICETT or Yokkaichi Municipal Government, Air and water pollution control in Yokkaichi	ICETT or Yokkaichi Municipal government
15 Mar.	AM	Water monitoring system and plant investigation	Mie Prefecture government
	PM	Lecture and field visit on air and water quality monitoring	Mie Prefecture government
16 Mar.	AM	Legal and institutional system for pollution control on water	ICETT
	PM	Field survey to thermal power plant	Chubu Denryoku (Chubu Electric Company)
17 Mar.	AM	-move to Tokyo	
	PM	ditto	
18 Mar.	AM	off	
	PM	off	
19 Mar.	AM	-09:00-14:00: Kawasaki Municipal Government, Bureau of Environment and Environmental Research Center (air and water pollution control, environmental monitoring focusing on soil pollution and its countermeasures) and field visit	Kawasaki Municipal government
	PM	-15:00: visit Nippon Koei Co. Ltd., 15:30-17:30: presentation of Egypt and Kazakhstan projects and discussion	Nippon Koei
20 Mar.	AM	10:00-12:00 visit to JICA	JICA
	PM	-evaluation and closing ceremony by JICA	JICA
21 Mar.		Leaving Japan (HND-KIX--	
22 Mar.		--DBX-DAM) Arriving at Syria	

5.1.4 Provision of Equipment

The equipment, which is equivalent to approximately JPY 139,262 thousand up to March 2007, has been provided for the implementation of the Project. Major equipment includes Portable Calorimeter Kits (14 sets), Portable EC and TDS Meters (14 sets), Portable DO Meters (14 sets), Portable Turbidity Meters (14 sets), COD Reactors (14 sets), Analytical Balances (14 sets), Incubators (14 sets), UV/VIS Spectrophotometers (1), High-Volume Air Samplers for TSP (12 sets), High-Volume Air Samplers for PM10 (12 sets), Low-Volume Air Samplers (12 sets), Atomic Absorption Spectrophotometer (AAS) set (1 set), Equipment for As, Sb and Hg (1 set), etc. Lists of the procured equipment for the Project are attached in Annex 3.1.

Cost for the Equipment Provided from Japanese Side

(Unit: 1,000 JPY)

Japanese Fiscal Year (Apr. – Mar.)		Equipment for Project	Equipment for Experts	Equipment Provided by JICA Expert Team	Total
2004	Procured in Syria	0	0	0	0
	Procured in Japan	58,705	0	0	58,705
2005	Procured in Syria	41,169	0	2,900	43,969
	Procured in Japan	13,516	2,075	0	15,591
2006	Procured in Syria	12,075	0	8,763	20,838
	Procured in Japan	0	59	0	59
Total	Procured in Syria	53,244	0	11,663	64,907
	Procured in Japan	72,221	2,134	0	74,355
Grand Total		125,465	2,134	11,663	139,262

(1) Basic Water Quality

The equipment listed below was procured by the JICA Syria Office for the Project by the local competition bidding (LCB) method in the fiscal year of 2004. Although a deadline of delivery date was the end of the fiscal year of 2004 (March 31), most equipment in the package 1 was considerably delayed and was finally delivered to each DFEA in the beginning of August, 2005 as shown in the table below. This delay resulted in postponement of the starting date of field training of the JICA Expert Team.

List of Equipment Procured

No .	Equipment	Usage	Quantity	Date of Arriving at DAM	Installation Place	Use State
Package 1						
1	Portable Colorimeter Kit (CEL/890)	pH, Temp., SS, Color, NO ₃ ⁻ -N, PO ₄ ³⁻ , NH ₃ -N	14	14 Jun., 2005	14 DFEAs (Delivered in the period of 19 Jun. to 3 Aug., 2005)	O
2	Portable EC and TDS Meter (sensION 5)	EC, TDS	14			
3	Portable DO Meter (sensION 6)	DO	14			
4	Portable Turbidity Meter (2100P)	Turbidity	14			
5	COD Reactor (DRB 200-1)	COD _{Cr}	14			
6	Digital Titrator (16900)	Cl ⁻	14			
7	pH standards	pH calibration	28			
8	Conductivity standards	EC&TDS calibration	14			
9	Standards for turbidity	Turbidity calibration	14			
10	Reagents for COD _{Cr}	COD _{Cr}	420			
11	Reagents for NO ₃ ⁻ -N	NO ₃ ⁻ -N	112			
12	Reagents for PO ₄ ³⁻	PO ₄ ³⁻	112			
13	Reagents for Cl ⁻	Cl ⁻	112			
14	Reagents for Ammonia-N	NH ₃ -N	210			
Package 2						
1	Analytical Balance (CP324S)	Reagents preparation	14	29 May, 2005	14 DFEAs (Delivered in the period of 19 Jun. to 3 Aug., 2005)	O
2	Table for Balance (YWT03)	For balance	14	29 Jun., 2005		
3	Incubator (TS 606/2i)	BOD	14	26 May, 2005		
4	Equipments for BOD Analysis (OxiTop IS12)	BOD	28	29 May, 2005		
5	Pure Water Unit (2001/4)	All of Parameters	14	29 May, 2005		
6	Special Pipette Containers		14			
7	Tank for Liquid	For transport and storage of hazardous liquid	28	Apr. 2005 ¹⁾		O
8	Ice Box (26 L)	Preservation of samples	28	15 June, 2005		
9	Nitrification Inhibitor	BOD	14			
10	BOD Nutrient Buffer Pillows	BOD	210			
11	BOD Seed Inoculum	BOD	100			
12	NaOH	BOD	14	Apr. 2005 ¹⁾		

No .	Equipment	Usage	Quantity	Date of Arriving at DAM	Installation Place	Use State
Package 3						
1	Glassware	All of Parameters	-	Apr. 2005 ¹⁾	14 DFEAs	O
Package 4						
1	Desktop Computer (for 14 DFEAs)	Data Analysis and Reporting etc.	14	Apr. 2005 ¹⁾	14 DFEAs (Delivered in the period of 5 to 9 Jun., 2005)	O
2	Printer (for 14 DFEAs)	Reporting etc.	14			
3	Digital Camera (for 14 DFEAs)	Sampling Record and Reporting	14			
4	Desktop Computer	Data Analysis and Reporting etc.	3			
5	Printer	Reporting etc.	2			
6	Printer	Reporting etc.	2			
7	Projector	Seminar and Training etc.	1			
8	Note PC for the Project	Seminar etc.	1			
Package 5						
	Vehicles	Field training etc.	2	9 Jul., 2005	GCEA	O

Note: 1): The equipment accepted by the JICA Syria Office.

2): O=Being used well; =Being used to a certain extent; X=Having not been used or others

Besides the equipment mentioned above, additional supplementary instruments mostly for field sampling and measurement, laboratory analysis and operation and maintenance (O/M) were procured by the JICA Expert Team. Major supplementary instruments are listed below.

Major Additional Instrument Procured by the JICA Expert Team

No.	Instrument	Usage	Quantity (set)	Arrival Date	Installation Place	Use State
1	Sampler, bucket, waterproof boots, meter and others	Sampling and analysis	14	Jun. 2005	14 DFEAs	O
2	White cloth, brush, trays, safety gloves, masks, and others	Laboratory safety	14			
3	pH paper, weight boats, distilled water tank, pipette stand and others	Laboratory operation and maintenance	14			
4	Rechargeable battery	Measurement equipment	420		(30 batteries/DFEA)	
5	Battery charger	Battery charger for rechargeable batteries	14		14 DFEAs	
6	Sulfuric acid	pH adjustment	1 liter x 14			
7	Formic acid	Cleaning of water still	1 liter x 14			
8	Acetic acid	Cleaning of water still	1 liter x 14			
9	Paper filter	Pretreatment of water sample	2,800 sheets		(200 sheets/DFEA)	

The details (list, cost, date of delivery, installation place, use state) of equipment purchased by the JICA Expert Team for 14 DFEAs are attached in Annex 3.1.

(2) Chemical and Biological Water Quality Analysis-1

The equipment for measurements of the parameters of Chemical and Biological Water Quality Analysis in the Damascus DFEA had procured by the JICA Syria Office by the local competition bidding method in the fiscal year of 2005. The detailed items of equipment are given in the list attached to Annex. The equipment consists of the following three kinds of packages:

i) Package 1: Laboratory equipment

ii) Package 2: Glassware, and

iii) Package 3: Reagents

The equipment had delivered in the Damascus DFEA by the end of March 2006. Part of the equipment had already delivered in February 2006. Due to the change of prices after the submission of quotations from suppliers, some of the items originally planned to purchase were deleted. The deleted items were selected taking into account the priority of equipment in analytical activities in the laboratory. The tables below show the deleted items.

Equipment Not Purchased up to March 2006 (Negative List) (Package 1)

Equipment etc.	Usage	Specifications	Q'ty
1-062	Draft chamber	Lab. Ventilation	
		Standard type, Dimension (approx.): 1200W(Max.) x 750D x 2,000H, Exhaust air: approx. 10m ³ /mini, Material: Steel with chemical resistant coating. Should equip the exhaust fan and ducts. Power supply: AC 220V	1
1-211	Auto-dry desiccators	Sample preparation	
		Cabinet type auto dry desiccators. Material: Plastic. Equipped with auto dry unit with hygrometer. Dimension (approx.): 260 x 320 x 470, Inner humidity: To be controlled automatically approx. 30 to 40 %.	1

Glassware Not Purchased up to March 2006 (Negative List) (Package 2)

No.	Name	Specifications	Q'ty
2-07	Volumetric Flasks	Borosilicate glass, A class, Color: amber, 50 ml , Tolerance: ± 0.06 mL or better, Accessory (standard ground joint and poly stopper)	2
		Borosilicate glass, A class, Color: amber, 100 ml , Tolerance: ± 0.1 mL or better, Accessory (standard ground joint and poly stopper)	4
		Borosilicate glass, A class, Color: amber, 500 ml , Tolerance: ± 0.15 mL or better, Accessory (standard ground joint and poly stopper)	1
		Borosilicate glass, A class, Color: amber, 1000 ml , Tolerance: ± 0.15 mL or better, Accessory (standard ground joint and poly stopper)	1
2-09	Kjeldahl Flasks	100 ml, Glass, Color: clear; Short neck	5
		300 ml, Glass, Color: clear; Short neck	10
2-10	Pear shape Flasks	50 ml, Glass, Color: clear; Short neck	10
		300 ml, Borosilicate glass, A class, Color: clear, with guard, Graduation: 2 ml or smaller, Tolerance: ± 1.0 ml or better	5
2-16	Watch Dish	$\phi 150$ mm	3
		$\phi 180$ mm	3
2-17	Separatory funnels	$\phi 300$ ml, glass	10
2-20	Automatic buret	Automatic buret 50 ml w/2L. Reservoir, Color: amber	2
2-23	Stainless Spoon	Stainless Spoon (middle size: 180 mm)5pc/box	5
2-24	Glass rods	Glass rods, 1500 (L) x 5(dia.)mm	2
2-33	Flow meter	Float type flow meter with needle valve, 0.05~0.5 L/min, Accuracy: FS $\pm 3\%$	1
		Float type flow meter with needle valve, 0.2~2.5 L/min, Accuracy: FS $\pm 3\%$	1
2-47	Silicon rubber tube	Silicon rubber tube ' $\phi 6 \times \phi 10$ mm, (10m/ Unit)	1
		Silicon rubber tube ' $\phi 8 \times \phi 10$ mm, (10m/ Unit)	1
2-53	Rotator taking out stick	Teflon coating, $\phi 3.0 \times 250$ mm	1
2-54	Weighing boat Plastic	Weighing Paper 500pcs/box, Large (Size: approx. 120 x 120 mm)	1
		Weighing Paper 500pcs/box, Small (Size: approx. 90 x 90 mm)	1
2-69	Stand for Separatory funnels	For 300 ml separatory funnels, 5 pcs set or more	2
2-74	Brush	For buret $\phi 30 \times 951$ mm	3
2-75	Draining Shelf (Shelf for the glass apparatus dryness)	Standard top board, Size: (W)800x(D)510x(H)1600 mm, With water receiving bat made of stainless steel., Vinyl curtain(Incombustibility), Net board (Resin coating): Mesh size 16~18 mmx2pcs ; 30~50 mmx1pc, 70~95 mmx1pc	1
2-76	Color comparison tubes	50 ml, with white graduated, With stopping	5
2-78	Pasteur Pipette	230 mm, 1000 pcs, Borosilicate	1
2-89	Rubber Bulb for Small Pipette	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	8

Reagents Not Purchased up to March 2006 (Negative List) (Package 3)

No.	Name	Unit	Q'ty
3- 26	Magnesium sulfate monohydrate	1kg	1
3- 62	Sodium sulfide nonhydrate	1kg	1

Besides the equipment mentioned above, additional reagents, chemicals, and consumables for laboratory analysis, operation and maintenance (O/M) were procured by the JICA Expert Team. These reagents and chemicals were to be used mainly:

- to determine lower concentrations of parameters (COD, NO₃-N, PO₄³⁻, NH₃-N),
- to conduct accuracy checks (standard solution method),
- to conduct the interference control, and
- to maintain the laboratory conditions properly including the correspondence to power failure of the laboratory.

The list below gives the reagents, chemicals, and consumables purchased by the end of February 2006.

Reagents

No	Parameter	Determination Method	Range	Reagent	Cat. No.	Unit	Required Unit	Note
1	COD	Reactor digestion method	0 to 1,500	Digestion reagent vial	#21259-51	25/pkg	2	Hach/MIMOSA
2	COD	Reactor digestion method	0 to 150	Digestion reagent vial	#21258-25	25/pkg	30	Hach/MIMOSA
3	NO ₃ ⁻ -N	Cadmium reduction method	0 to 30.0	NitraVer 5 Nitrate Reagent Powder Pillows	#21061-69	100/pkg	1	Hach/MIMOSA
4	NO ₃ ⁻ -N	Cadmium reduction method	0 to 5.0	NitraVer 5 Nitrate Reagent Powder Pillows	#21061-69	100/pkg	20	Hach/MIMOSA
5	PO ₄ ³⁻	Amino acid method	0 to 30.00	Amini acid reagent	#1934-32	100 ml	1	Hach/MIMOSA
6				Molybdate reagent	#2236-32	100 ml	1	Hach/MIMOSA
7	PO ₄ ³⁻	Ascorbic acid method	0 to 2.50	Phos Ver3 Phosphate Reagent Powder Pillows	#21060-69	100/pkg	20	Hach/MIMOSA
8	NH ₃ -N	Salicylate method	0 to 50	Am Ver Reagent Set for Nitrogen, Ammonia, High range TNT (50 tests)	#26069-45	(1 set)	1	Hach/MIMOSA
9	NH ₃ -N	Salicylate method	0 to 2.50	Am Ver Reagent Set for Nitrogen, Ammonia, Low range TNT (50 tests)	#26045-45	(1 set)	20	Hach/MIMOSA

Standard Solutions

No	Parameter	Concentration	Unit	Cat. No.	Required Unit	Supplier
1	COD	300 mg/L	200 mL	#12186-29	14	MIMOSA
2	COD	1000 mg/L	200 mL	#22539-29	14	MIMOSA
3	NO ₃ ⁻ -N	10.0 mg/L as NO ₃ ⁻ -N	500 mL	#307-49	14	MIMOSA
4	NO ₃ ⁻ -N	1.0 mg/L as NO ₃ ⁻ -N	500 mL	#2046-49	14	MIMOSA
5	NO ₃ ⁻ -N	100 mg/L as NO ₃ ⁻ -N	500 mL	#1947-49	14	MIMOSA
6	PO ₄ ³⁻	50 mg/L as PO ₄ ³⁻	500 mL	#171-49	14	MIMOSA
7	NH ₃ -N	10 mg/L as NH ₃ -N	500 mL	#153-49	14	MIMOSA
8	NH ₃ -N	50 mg/L as NH ₃ -N	10 mL/16 Voluette Amples	#14791-10	14	MIMOSA
9	BOD	300 mg/L Glucose plus Glutamic acid	10 mL/16 Voluette Amples	#14865-10	14	MIMOSA
10	BOD	3000 mg/L Glucose plus Glutamic acid	10 mL/16 Voluette Amples	#14866-10	14	MIMOSA
11	Cl ⁻	1,000 mg/L as Cl ⁻	500 mL	#183-49	14	MIMOSA

Chemicals for Interference Treatment

No	Chemicals	Unit	Cat. No.	Required Unit	Supplier
1	Bromine Water 30g/L	29 mL	#2211-20	14	MIMOSA
2	Phenol Solution	29 mL	#2112-20	14	MIMOSA
3	Sulfamic acid	113 g	#2344-14	14	MIMOSA
4	Phosphate Pretreatment Powder Pillows	100/pkg	#14501-99	14	MIMOSA
5	Hydrochloric Acid, ACS	500 mL	#134-49	14	MIMOSA
6	Sulfide Inhibitor Powder Pillows	100/pkg	#2418-99	14	MIMOSA
7	Mercuric Sulfate	28.3 g	#1915-20	14	MIMOSA
8	Hydrogen Peroxide, 30% ACS	500 mL	#144-11	14	MIMOSA

Chemicals & Spare Parts/Consumables

No	Chemicals, Spare parts/Consumables	Unit	Cat. No.	Required Unit	Supplier
1	Potassium Chloride Ref. Electrolyte Cartridge for pH electrode	2/pkg	#25469-02	28	MIMOSA
2	Delivery tube for Cl titration (180 mm)	5/pkg	-	28	MIMOSA
3	Filling solution for DO probe	59 mL	#27591-26	14	MIMOSA
4	Sample Cell, 10-20-25 mL, w/cap	6/pkg	#24019-06	24	MIMOSA
5	Tank for liquid, 20 L	1	-	28	MIMOSA
6	Sulfanilic acid	100g	-	3	MAN
7	N-(1-Naphthyl) ethylenediamine dihydrochloride	25g	-	3	MAN
8	Sodium nitrite	500g	-	3	MAN
9	Acetic acid	2.5 L	-	3	MAN
10	Ink cartridge for Hp Laser Jet 1010		-	15	-

Generator

Equipment	Specifications	Model	Required Unit	Supplier
Generator	Diesel generator Rated frequency: 50 Hz Rated current: 12.2 A Rated voltage: 220 V Rated output power: 2.8 kVA	Diesel generator 3GF-LDE/JUNDA	7	HIMOINSA

In order to implement the training smoothly and effectively, supplemental tools, apparatus, chemicals/reagents, and consumables had been purchased by the JICA Expert Team additionally. Table below summarizes major tools, apparatus, chemicals/reagents etc. purchased up the middle of February 2007.

Major Tools, Apparatus, Chemicals/Reagents Purchased by the JICA Expert Team up to February 2007

Item/Specifications	Q'ty	Usage
Sample cell for Spectrophotometer/with stopper, square	1 set	Spectrophotometer
Tools for laboratory	1 set	General use
Drying oven/Temp.: - 250	1	SS, Microbiology, etc.
Desiccators/Glass made, 30cm dia.	1	Drying
Micropipette/Up to 300µl, adjustable	1	Preparation of standard etc.
Graduated cylinder with stopper/25 ml	3	Measuring
Volumetric flask/1,000 ml	2	Measurement
Volumetric flask/500 ml	2	Measurement
Volumetric flask/250 ml	10	Preparation of standard, etc.
Micro syringe/50 µl, glass made	1	Preparation of standard
Glass-fiber filter/Whatman., GF/C	3 boxes	Measurement of SS
Filter holder/Glass made, 47 cm dia.	1 set	Measurement of SS
Glass cylinder/10 cm dia. X 30 cm H	3	Measurement of Settleable solids
Liebig condenser/30 cm L	4	Measurement of COD
Mantle heater	2	Measurement of COD
Syringe/Glass made, 10 ml and 30 ml	1 set	Oil content meter
Teflon filter/water/oil separation	5 pcs	Oil content meter
Sterilized Petri-dish/Plastic made	200 pcs	Measurement of Coliform
Glacial acetic acid/2.5 l	1	Preparation of standard
Zinc acetic acid/500 g	1	Preservation of sample
Standard solution/T-Cr, 12.5 mg/L, 10 ml Ample, 16/pkg	1 pkg	Spectrophotometer
Standard solution/PO ₄ , 50 mg/L, 10 ml Ample, 16/pkg	1 pkg	Spectrophotometer
Standard solution/Detergent, 60 mg/L Las, 10 ml Ample, 16/pkg	1 pkg	Spectrophotometer
M-Endo medium	1 set	Measurement of Coliform
1, 10-phenanthroline monohydrate/100g	1	Measurement of COD
Ferrous ammonium sulfate/1 kg	1	Measurement of COD
Potassium hydrogen phthalate/250 g	1	Measurement of COD

(3) Chemical and Biological Water Quality Analysis-2

In order to carry out the trainings in three DFEAs, apparatus and reagents required for the analysis training of spectrophotometers and oil content meters were purchased by the JICA Expert Team prior to the commencement of the training. Apparatus and reagents purchased for 3 DFEAs are shown below. Detailed lists are given in Annex.

Apparatus and Consumables Procured by the JICA Expert Team

No.	Apparatus / Consumable	Unit	Required unit			
			Damascus C	Homs	Aleppo	Total
1	Sample Cells, 10-mL, w/cap	6/pkg	1	1	1	3
2	Hot plate, 4 inch dia., 240VAC	each	1	1	1	3
3	Sample Cells, 10-20-25 mL, w/cap	6/pkg	1	1	1	3
4	Water bath abd rack	each	1	1	1	3
5	Micropipette(100µL - 1,000µL, Adjustable)	each	1	1	1	3
6	Cylinder, 500-mL, graduated mixing	each	1	1	1	3
7	Cylinder, 100-mL, graduated mixing	each	1	1	1	3
8	Cylinder, 25-mL, graduated mixing	each	1	1	1	3
9	Cylinder, 50-mL, graduated mixing	each	1	1	1	3
10	Stopper for 18-mm tube	6/pkgf	1	1	1	3
11	Solvent reclaimer for Oil Content Meter	each	1	1	1	3
12	Water separation filter(Additional)	6pc/set	1	1	1	3

Reagents Procured by the JICA Expert Team

No.	Reagents	Unit	Required unit			
			Damascus C	Homs	Aleppo	Total
1	Chroma Ver 3 Chromium Reagent Powder Pillows (for 5•10 mL sample)	100/pkg	2	2	2	6
2	Chromium, Hexavalent, Standards Solution, 50-mg/L Cr ⁶⁺	100 ml	1	1	1	3
3	Chromium, Hexavalent, Standards Solution, 12.5-mg/L Cr ⁶⁺ (10-mL Voluette Ampule)	16/pkg	1	1	1	3
4	Chromium 1 Reagent Powder Pillows	100/pkg	2	2	2	6
5	Chromium 2 Reagent Powder Pillows	100/pkg	2	2	2	6
6	Chroma Ver 3 Chromium Reagents Powder Pillows (for 25 mL sample)	100/pkg	2	2	2	6
7	Acid Reagent Powder Pillows	100/pkg	2	2	2	6
8	Chromium, Hexavalent, Standards Solution, 50-mg/L Cr ³⁺	100 ml	1	1	1	3
9	Chromium, Hexavalent, Standards Solution, 12.5-mg/L Cr ³⁺ (10-mL Voluette Ampule)	16/pkg	1	1	1	3
10	Calcium and Magnesium Indicator Solution	100 ml	1	1	1	3
11	Alkali Solution for Calcium and Magnesium Test	100 ml	1	1	1	3
12	EDTA Solution, 1M	50 ml	1	1	1	3
13	EGTA Solution	50 ml	1	1	1	3
14	Nitra Ver 5 Nitrate Reagent Powder Pillows (for 10 mL sample)	100/pkg	2	2	2	6
15	Nitri Ver 3 Nitrite Reagent Powder Pillows	100/pkg	2	2	2	6
16	Sodium Nitrite, ACS	454 g	1	1	1	3
17	Mineral Stabilizer	50 ml	2	2	2	6
18	Polyvinyl Alcohol Dispersing Agent	50 ml	2	2	2	6
19	Nessler Reagent	500 ml	2	2	2	6
20	Nitrogen, Ammonia Solution, 1-mg/L NH ₃ -N	500 ml	1	1	1	3
21	Nitrogen, Ammonia Solution, 50-mg/L NH ₃ -N (10-mL Voluette Ampule)	16/pkg	1	1	1	3
22	Phos Ver 3 Phosphate Reagent Powder Pillows (for 10 mL sample)	100/pkg	2	2	2	6
23	Phosphate standard Solution, 50-mg/L as PO ₄ ³⁻ (10-mL Voluette Ampule)	500 ml	1	1	1	3
24	Sulfide 1 Reagent	100 ml	2	2	2	6
25	Sulfide 2 Reagent	100 ml	2	2	2	6
26	Buffer Solution, sulfate-type	500 ml	2	2	2	6
27	Detergent Reagent Powder Pillows	100/pkg	4	4	4	12
28	Benzen, ACS	2.5 L	1	1	1	3
29	Detergent standard Solution, 60-mg/L LAS (10-mL Voluette Ampule)	16/pkg	1	1	1	3
30	Solvent (S-316)	1L	4	4	4	12
31	Activated Charcoal	500g	2	2	2	6
32	Activated Aluminiumoxide (Al ₂ O ₃)	500 mL	1	1	1	1
33	Activated Carbon	500g/can	1	1	1	1

(4) Heavy Metal Analysis

Specifications for the equipment (Atomic Absorption Spectrophotometer (AAS) with all required accessories, apparatus for pretreatment and reagents) were fixed by the JICA Expert Team and the equipment had been purchased by the JICA Syria Office by the local competition bidding method. The equipment was installed at the Damascus DFEA from November 2006 until February 2007. It consisted of the following three kinds of packages:

Package 1: AAS and related accessories

The specification was fixed through consideration mentioned below.

- a) Current conditions of existing laboratories with AAS
- b) Values from standards of discharged and drinking water
- c) Quantification limits required by authorized testing methods including *The Standard Methods for the Examination of Water and Wastewater 20th Edition* (StM)
- d) Availability of agencies in Syria.

The specification also includes the clauses that have relevance to the periodical maintenance service for AAS shown as follows. The details are shown in the following table.

- Periodical maintenance service consists of regular maintenance (5 times per year)
- Periodical maintenance service is carried out by the supplier
- Period of the periodical maintenance service that is instructed in the specification is limited in one year after the delivery of AAS, however, the maintenance service is to be continued for 5 years in all.

Package 2: Apparatus (for pretreatments, mainly glassware) and Package 3: Reagents

The specifications for apparatus and reagents were fixed based on StM. Therefore, the analyses were to be carried out according to the selected methods mentioned in StM. Apparatus used for the AAS analysis were being separated from the apparatus used for other analysis in order to prevent them from contamination and to maintain in different ways because of high toxicity of several target metals. The specification also included apparatus and reagents for sampling. The specification for equipment is mentioned below.

Equipment Procured by the JICA Syria Office up to February 2007 (Package 1)

Equipment	Main Specifications	Q'ty
1-1 Atomic Absorption Spectrophotometer	<p>A complete atomic absorption spectrophotometer set</p> <p>Beam quantity : double</p> <p>Wavelength range : 190-900nm</p> <p>Background correction : Deuterium / Self Reverse</p> <p>Number of Hollow Cathode Lamps set in the main machine : 6</p> <p>Burner head : standard head for C₂H₂-air, Qty (1)</p> <p>Burner head : high temperature head for N₂O-C₂H₂, Qty (1)</p> <p>Nebulizer : Pt-Ir capillary with Teflon orifice, Qty (1)</p> <p>Chamber : polypropylene / polyethylene / Teflon, Qty (1)</p> <p>Positioning : Automatic flame - furnace switching and searching optimum alignment of burner or beam</p> <p>•Graphite furnace unit</p> <p>Drying : digital current control</p> <p>Ashing and atomization : digital temperature control</p> <p>Heating temperature : ambient to 2000</p> <p>Inner gas flow rate : 0 to 1.5 L/min or more</p> <p>Graphite tube : High-density Qty (15) / High-density Pyro-coated graphite tube, Qty (10), Platform tube, Qty (10)</p> <p>•Power source : AC220V 50Hz (single phase) C-type plug</p>	1 set
1-2 Auto sampler	<p>Automatic sampler</p> <p>Automatic sampler for flame and furnace system</p> <p>Functions</p> <p>Flame : auto rinse, random access</p> <p>Furnace : auto rinse, random access, auto dilution, auto reagent addition for calibration curve</p> <p>Max. positions : 60 positions for samples for both flame and furnace</p> <p>Vials for automatic samplers</p>	1 set
1-3 PC, etc	<p>PC set</p> <p>OS : Officially licensed MS-Windows XP (English version) , Qty (1)</p> <p>Monitor : 17 inch-size , Qty (1)</p> <p>Printer : A4 laser printer, Qty (1)</p> <p>On-line UPS for PC : working for 10 minute or more while electrical power failure, Qty (1)</p>	1 set
1-4 Equipment for As, Sb and Hg	<p>Special equipment for As, Sb and Hg</p> <p>Hydride vapor generator and Mercury vaporizer unit for analysis of : As, Sb and Hg</p>	1 set
1-5 Air compressor	Low Noise Air compressor	1 set
1-6 Cooling unit	Cooling water circulator	1 set
1-7 Lamp	Hollow cathode lamp for each element	1 set
1-8 Maintenance	Periodical maintenance for 5 years	-
1-9 Gas supply	Gas cylinder of C ₂ H ₂ , N ₂ O, Ar	2
	Heater for nitrous oxide	1
	Regulator	3
	Gas pipes	1 set
1-10 Fume food	A stainless fume food with ventilator	1 set
1-11 Standard solutions	Standards (1000mg/L, 500mL) for each elements	1 set
1-12 Matrix modifier	Matrix modifier ; La(NO ₃) ₃ , Mg(NO ₃) ₂	1 set

Equipment Procured by the JICA Syria Office up to February 2007 (Package 2)

No.	Name	Specification	Q'ty	Remarks
2-1	Beaker	Grass, Griffin squat form, 100mL	60	
		Grass, Griffin squat form, 150mL	30	
		PTFE, Griffin squat form, 100mL	40	
		Polypropylene, Griffin squat form, 500-600mL	10	
2-2	Bottle	HDPE, white, rectangle, with handle, 20L	4	for stock
		HDPE, white, screw closure (leak-proof), wide neck, 100mL	200	
		HDPE, white, screw closure (leak-proof), wide neck, 250mL	30	for DFEAs for acidification of samples
		HDPE, white, round-shaped, screw closure (leak-proof), 1000mL	500	for DFEAs for samples
2-3	Brush	HDPE, white, round-shaped, screw closure, 2L	20	for storage / washing / waste
		φ 10 to 12 mm	10	for tube
		φ 16 to 25 mm	10	for tube
2-4	Bucket	Polypropylene, with pouring spout and rigid handle	6	for waste

No.	Name	Specification	Q'ty	Remarks
2-5	Cylinder	Glass, spouted, 50mL, grads. 1mL, tolerance ± 0.25 mL	4	
		Glass, spouted, 100mL, grads. 1mL, tolerance ± 0.5 mL	4	
		Glass, joint and stopper, 100mL, grads. 1mL	40	
2-6	Eye protection	Polycarbonate, with clear lenses, brow guard and hinged sidearm, can be worn over spectacles, large	2	
		Polycarbonate, with clear lenses, brow guard and hinged sidearm, can be worn over spectacles, medium	3	
2-7	Face mask	Disposable, with metal nose piece, standard sized	200	
2-8	Filtration paper	Cellulose, pore size 2.7 μ m or similar, ϕ 90mm, hardened (high wet strength and chemical resistance), ashless (<0.01%ash), 100pcs/pack	4	for sample filtration
		Cellulose, pore size 8 μ m or similar, ϕ 90mm, hardened (high wet strength and chemical resistance), ashless (<0.01%ash), 100pcs/pack	2	for sample filtration
2-9	Flask	Glass, Erlenmeyer, wide neck, graduated, 250mL, clear	5	for Hg
		Glass, Erlenmeyer, narrow neck, graduated, 300mL, clear, stoppered	3	
		Glass, volumetric, 50mL, tolerance ± 0.06 mL, clear, joint and stopper	10	
		Glass, volumetric, 100mL, tolerance ± 0.1 mL, clear, joint and stopper	40	for standard stock
		Glass, volumetric, 200mL, tolerance ± 0.15 mL, clear, joint and stopper	6	
		Glass, volumetric, 500mL, tolerance ± 0.25 mL, clear, joint and stopper	10	
		Glass, volumetric, 1000mL, tolerance ± 0.4 mL, clear, joint and stopper	3	
		Polymethylpentane or polypropylene, volumetric, 100mL, limit of error 0.16mL, clear or half-clear, joint and stopper	40	
2-10	Funnel	Polypropylene, ϕ 60mm	30	
		Polypropylene, ϕ 150mm	5	for waste
2-11	Glove	Polyethylene, disposable, textured surface, non-sterile, medium, 100pcs/pack	3	
		Latex, disposable, examination, lightly powdered, non-sterile, medium, 100pcs/pack	5	
		Neoprene, long (elbow-length), acid resistant, abrasion and puncture resistant, large	2	
2-12	Hot plate	Ceramic, 200-250 * 200-250mm, with temperature control ambient to 300	3	
2-13	Indicator paper (pH)	Dispenser reel, 5m long * 6mm wide, with reference chart showing color changes. pH range 1-11	4	
2-14	Label tape	Paper, roll, self-adhesive, dimensions 24 * 12.5mm, 100pcs/pack	2,000	
2-15	Pipette	Polyethylene, graduated, Pasteur, capacity 3mL, 500pcs/pack	1	for acidification of samples
		Glass, graduated, 1mL, grads. 0.01mL, tolerance ± 0.006	4	
		Glass, graduated, 2mL, grads. 0.02mL, tolerance ± 0.01	6	
		Glass, graduated, 5mL, grads. 0.05mL, tolerance ± 0.03	6	
		Glass, graduated, 10mL, grads. 0.1mL, tolerance ± 0.05	6	
		Glass, graduated, 25mL, grads. 0.2mL, tolerance ± 0.1	4	
		Glass, one mark (whole), 1mL, tolerance ± 0.008 mL	6	
		Glass, one mark (whole), 2mL, tolerance ± 0.01 mL	4	
		Glass, one mark (whole), 5mL, tolerance ± 0.015 mL	4	
		Glass, one mark (whole), 10mL, tolerance ± 0.02 mL	4	
		Glass, one mark (whole), 20mL, tolerance ± 0.03 mL	4	
2-16	Pipette filler	Molded rubber bulb, approx. 60mL capacity, 3 glass ball valves, suitable for pipettes of 2-25mL	3	
		Plastic, capacity 0.5-2mL, standard release speed	2	
		Plastic, capacity 2-10mL, standard release speed	2	
		Plastic, capacity 10-25mL, standard release speed	2	
2-17	Pipette jar	Plastic, ϕ 80 height 420 (cylinder)	2	
2-18	Pipette stand	Plastic, horizontal, holding 10	4	
		Plastic, vertical, holding 20, for drying and storage	2	
2-19	Sealing film	width 100mm length 30m or longer, can be enlarged as much as 10 times the original area	2	Para film
2-20	Soak jar	Plastic container, acid resistant, 50L	1	
2-21	Tray	Plastic, shallow	10	
		Plastic, rigid	5	
2-22	Trolley	Plastic coated, two or more shelves, with casters	6	
2-23	Wash bottle	Polyethylene, narrow neck, leak-proof, with rinser tube, 1000mL	10	
2-24	Watch glass	Glass, 65mm	40	
		PTFE, 65mm	40	

Equipment Procured by the JICA Syria Office up to February 2007 (Package 3)

No.	Name	Specification	Quantity	Note
3-1	Nitric acid, HNO ₃	solution, conc (65%), trace analysis grade	500mL * 40 (20,000mL)	for digestion (13,000mL) and preservation (3,500mL)
3-2	Nitric acid, HNO ₃	solution, 60%,	30L	for soaking glass wares (5% 50L * 6)
3-3	Potassium permanganate, KMnO ₄	extra pure grade	500g * 2	for digestion (630g)
3-4	Potassium persulfate, K ₂ S ₂ O ₈	extra pure / trace analysis grade	500g	for digestion (340g)
3-5	Sodium chloride, NaCl	extra pure grade	500g * 3	for digestion (1500g)
3-6	Hydroxylamin sulfate (Hydroxylammonium sulfate), (NH ₂ OH) ₂ ·H ₂ SO ₄	analytical grade	500g * 3	for digestion (1500g)
3-7	Stannous chloride (Tin chloride), SnCl ₂	reagent pure grade	1,000g	for reaction (420g)
3-8	Stannous sulfate (Tin sulfate), SnSO ₄	reagent grade	1,000g	for reaction (460g)
3-9	Sulfuric acid, H ₂ SO ₄	solution, conc (95%), extra pure grade	500mL * 10 (5,000mL)	for digestion (4,200mL)
3-10	Magnesium perchlorate, Mg(ClO ₄) ₂	lowest grade	500g * 2	for drying
3-11	Hydrochloric acid, HCl	solution, conc (37%), extra pure grade	500mL * 15 (7,000mL)	for digestion (4,200mL) and reaction (2,100mL)
3-12	Sodium borohydride, NaBH ₄	analytical grade	1,000g	for reaction (60g)
3-13	Sodium hydroxide, NaOH	pellets, analytical grade	1,000g	for reaction (50g)
3-14	Sulfanilamide, C ₆ H ₈ N ₂ SO ₂	analytical grade	250g	for reaction (20g)

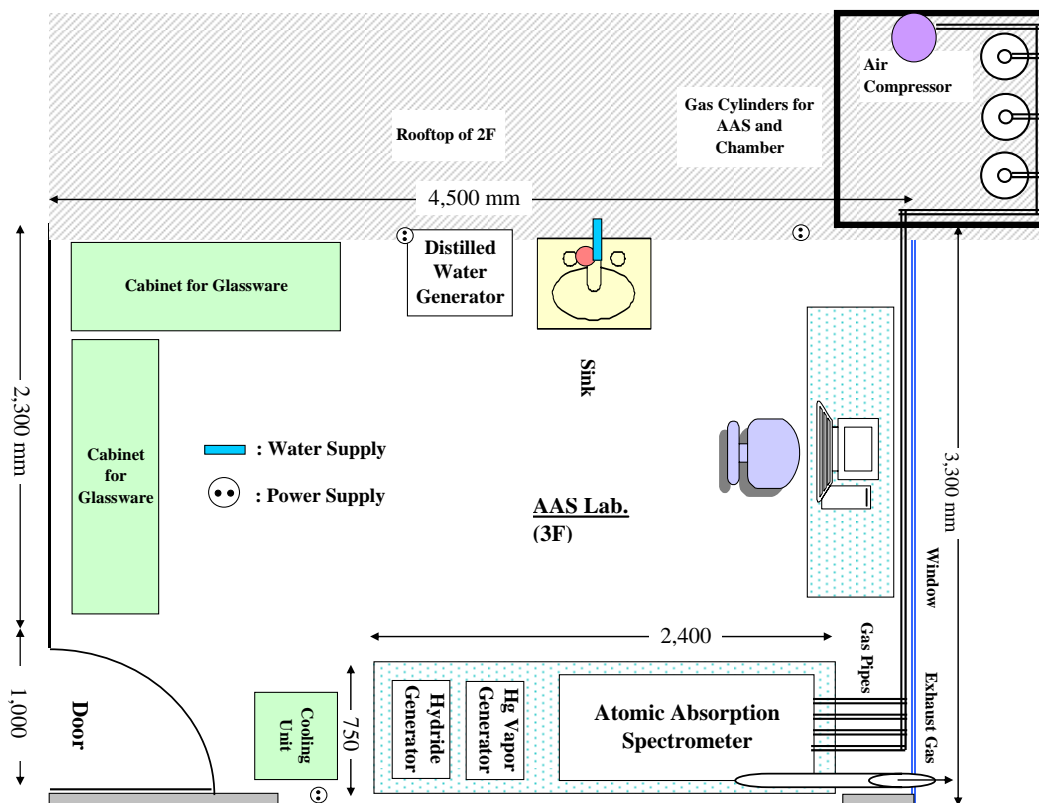
After the training was started, it had been found out that most of actual samples contained interfering substances with unexpectedly high concentrations. For this reason, additional consumables and reagents listed below were required to analyze those kinds of samples. Consumables and reagents for the heavy metals analysis procured by the JICA Expert Team had been delivered to Damascus DFEA by the end of February 2007, and the delivered items had been confirmed by the JICA Expert Team with C/Ps of the Damascus DFEA.

Equipment Procured by the JICA Expert Team up to February 2007

No.	Name	Specification	Quantity
4-1	Vapor Separator	For HVG	1
4-2	Reaction Coil Assembly	For HVG	1
4-3	Tube, Fluoro Rubber	1000mm	1
4-4	Graphite Cap	For GFA-EX	1
4-5	Graphite Holder	For GFA-EX	1
4-6	Nebulizer Assembly	-	1
4-7	D2 Lamp	-	1
4-8	High -Density Graphite Tube	For GFA-EX	2
4-9	Pyro-coated Graphite Tube	For GFA-EX	10
4-10	Acetylene	Cylinder	1
4-11	Electric Stabilizer	10KVA	1

Prior to start training for heavy metal analysis, AAS and accessories, apparatus and reagents procured by the JICA Syria Office had been confirmed by the JICA Expert Team with C/Ps of the Damascus DFEA. On the other hand, facilities for AAS (gas pipes, electric devices and a fume hood with a ventilator) had been installed. The installation of AAS had been completed at the end on 7 December 2007. The layout of the laboratory room is shown below.

Chamber of gas cylinders ⇒



AAS, Hg Vapor Generator,
Hydride Generator ⇒



Laboratory Layout of Damascus DFEA

(5) Air Quality

1) Equipment Procured by JICA

Although all equipment of air quality are planned to be procured by the end of March 2006, procurement was delayed beyond April 2006 due to the instructions of the JICA Headquarters. Therefore, only the simple air samplers were procured in Japan and provided to Damascus, Homs and Aleppo DFEAs. A list of the equipment procured within the fiscal year of 2005 is shown in the table below.

Procured Equipment before January 2006

Package No.	Equipment	Qty.			Procurement Time
		Damascus	Homs	Aleppo	
1 ¹⁾	Simple air sampler	120	120	120	December 2005
2 ¹⁾	Pararosaniline hydrochloride 25 g	1	1	1	
3	Sulfanilic acid 100 g	1	1	1	January 2006
4 ¹⁾	N-(1-Naphthyl) ethylenediamine dihydrochloride 25 g	1	1	1	
5	Sodium nitrite 500 g	1	1	1	
6	Acetic acid 2.5 L	1	1	1	

Note: 1) Procurement was done in Japan

Procured Equipment for Air Quality Analysis (Package 1 to 3) in 2006

NO	Equipment	Usage	Major Specifications	Qty.			Procurement Time
				Damascus	Homs	Aleppo	
1-1	TSP High Volume Air Sampler	Collection of TSP	Type: Open face (all-weather type), Suction flow rate: Approx. 500-1000 L/min, Accuracy: $\pm 2\%$ of integrated flow rate.	4	4	4	November 2006
2-1	PM10 High Volume Air Sampler	Collection of PM10	Type: Open face (all-weather type), Cut particles less than 10 μm diameter by rate of 50%, Suction flow rate: Approx. 1000 L/min, Accuracy: $\pm 2\%$ of integrated flow rate.	4	4	4	November 2006
2-2	PM10 Low Volume Air Sampler	Collection of PM10	Particle size classification: Gravitational separation or equivalent, Suction flow rate: 20 L/min or more,	4	4	4	May 2007
3-1	Handy Sampler	Collection of gaseous pollutants	Main unit: Suction flow rate: Max. 2.5 L/min, Suction pressure: Max. 1000 mm H ₂ O, Flow meter: Approx. 0 to 5 L/min.	4	4	4	August 2006

Procured Equipment for Air Quality Analysis (Package 4 and 5)

NO	Equipment	Usage	Major Specifications	Qty.			Procurement Time
				Damascus	Homs	Aleppo	
4	Weather station			3	3	3	
4-1	Wind Direction & Speed Meter	Analysis of data	Wind direction: 0 ~ 360°, Wind speed: 0 ~ 50 m/s (Starting wind velocity: <0.4m/s),	3	3	3	August 2006
4-2	Thermometer & Hygrometer	Analysis of data	(1) Thermometer: Measuring range: —50 ~ 50 °C, (2) Hygrometer: Sensor: Humidity measuring range: 0 to 100 RH%, Accuracy: ±2 RH%	3	3	3	August 2006
4-3	Solar radiation meter	Analysis of data	Sensor: Pyran thermocouple, Spectral range: Approx. 300 to 2800 nm, Measuring: 0 to 2000 W/m ²	3	3	3	August 2006
4-4	Photovoltaic power generation system	Supplies power to the meteorological instrument	The capacity of Solar power: 80 mA and 350 mA. Solar module, voltage regulator, casing, cabling and waterproof connectors	3	3	3	August 2006
5	Meteorological instrument (B)						
5-1	Asman ventilation psychrometer	Proofreading of temperature and humidity	Detection part: Mercury thermometer composed of two glass tubes, Measuring range: -10 ~ 60 °C, Minimum scale: 0.2 °C (1/5 scale)	1	1	1	July 2006

Procured Equipment for Air Quality Analysis (Package 6)

NO	Equipment	Usage	Specifications	Qty.			Procurement Time
				Damascus	Homs	Aleppo	
6-1	Micro Balance	For samples and reagents	Type: Suspended pan or top loading, Weight capacity: More than 200 g, Readability: Less than 0.1 mg, Linearity: Less than + 0.2 mg	1	1	1	August 2006
6-2	Refrigerator	For samples and reagents	Doors: Two, Defrosting: Automatic / frost free, Capacity: 350 L,	1	2	2	August 2006
6-3	Auto-dry desiccators	For samples and reagents	Capacity: 50 L, Shelf board material: SUS 430, Humidity control: Air-drying with silica gel Hygrometer: Range 10 to 90% RH or more,	1	1	1	November 2006
6-4	Locker for reagents	For reagents	Size: W1,200×D400×H1,800 (with drawer), Material: steel	1	2	2	August 2006
6-5	UV/VIS Spectrometer	Analysis of gaseous pollutants	Light source: Tungsten-Halogen and D2 lamp, Range: 0 to 125%T, 0.00 to 2.500 Abs, Wavelength range: Should cover 200 to 900 nm	1	1	1	August 2006

2) Equipment Procured by the JICA Expert Team

In addition to the equipment procured by the JICA Syria Office, the glassware and reagents of air quality analysis were procured by the JICA Expert Team in July and delivered to the Damascus, Homs and Aleppo DFEAs in August 2006. The glassware and reagents procured are summarized in the table below. A list of equipment procured by the JICA Expert Team is attached in Annex 3.1.

Glassware Procured by the JICA Expert Team in 2006

No.	Name	Specifications	Q'ty			Procurement Time
			Damascus	Homs	Aleppo	
1	Whole Pipettes (Germany)	Glass, 1 ml, 2 ml, 20 ml	3 each	3 each	3 each	July 2006
		Glass, 5 ml x 5pcs, 10 ml x 5pcs, 50 ml x 2pcs	1 set	1 set	1 set	
2	Graduated pipettes	Glass, 1 ml x 2pcs, 5 ml x 3pcs, 10 ml x 4pcs	1 set	1 set	1 set	
3	Pipette Fillers Germany) (Rubber Pippeter)	Applicable pipette's capacity: not more than 2mL	1	1	1	
		Capacity: 25mL	2	2	2	
4	Ceramic mortar	Size: 110-130mm	1	1	1	
5	Beakers (Glass)	50 ml, Glass	2	3	3	
		100 ml x 10pcs, 250 x 10pcs, 400 x 2pcs, 1000 ml x 2pcs	1 set	1 set	1 set	
		600 ml x 5pcs, 2000 ml x 1pc, Glass	1 set	1 set	1 set	
6	Volumetric Flasks (Germany)	25 ml, 200 ml, 500 ml, Borosilicate glass	2 each	2 each	2 each	
		50 ml x 2pcs, 100 ml x 10pcs, 1000 ml x 1pc	1 set	1 set	1 set	
11-1	Erlenmeyer Flasks	100 ml, 250 ml, 300 ml, Borosilicate glass, color: clear	5 each	5 each	5 each	
		500 ml x 2pcs, 1000 ml x 1pcBorosilicate glass	1 set	1 set	1 set	
11-2	Erlenmeyer Flasks (with graduation)	100 ml, 250 ml, 300 ml, glass, with graduation	5 each	5 each	5 each	
		500 ml, Borosilicate glass, color: clear, with graduation	2	2	2	
12	Graduated Cylinders (Germany)	50 ml, 100 ml, 250 ml, 500 ml, glass, Color: clear	2 each	2 each	2 each	
		1000 ml, Borosilicate glass, ditto.	1	1	1	
14	Watch Dish	φ65-75, φ90-100, φ125, φ150, φ180-200mm	2 each	2 each	2 each	
16	Wash Bottles (Local)	Capacity: 500 ml, 1000 ml	3 each	3 each	3 each	
17	Beaker with handle	Capacity: 1000 ml, Polypropylene	1	1	1	
20	Test Tube with stopper	Test tube, 18(dia.) x 180 (L) mm \$16, 100 pcs/case	1	1	1	
21	Stainless Spoon	Stainless Spoon (middle size: 180 mm)5pc/box	1	1	1	
22	Funnels	Soda-lime glass, Angle: 60°, φ70 mm, φ100 mm	5 each	5 each	5 each	
25	Stopcock	φ6×φ8mm, Fluoroplastic (PTFE) or equivalent	1	1	1	
26	Pinchcok	Pinchcok (Size M), Stainless steel	5	5	5	
27	Screw Cock	Screw Cock (Size M), Stainless steel	5	5	5	
28	Stopwatch	Manual rolling	1	1	1	
30	Micro pipet	2~20 µl, 10~100 µl	1 each	1 each	1 each	
31	Chip for micro pipet	0.5~10 µl, 1000 pcs/pac., 2~200 µl, 1000 pcs/pac.	1 each	1 each	1 each	
35	Thermometer	Mercury type cylinder shape thermometer, -20~100	2	2	2	
36	Beaker tongs	Tongs for flask	1	1	1	
39	Cork borer	Cork borer sets saw-shaped edge (No. of borers, 12)	1	1	1	
40	Muff	Clamp Holders, Horizontal stick	10	10	10	
41	Jumbo muff	Clamp Holders, Horizontal stick	5	5	5	
42	Clamps	Open diameter: 5~50 mm, 5~80 mm	5 each	5 each	5 each	
43	Tweezers	Odontology department tweezers	2	2	2	

No.	Name	Specifications	Q'ty			Procurement Time
			Damascus	Homs	Aleppo	
44	Vacuum hose	Vacuum hose $\phi 8 \times \phi 21$ mm (5 m/ Unit)	1	1	1	
45	Rubber tube	Rubber tube $\phi 6 \times \phi 9$ mm (10 m/ Unit)	1	1	1	
46	Silicon rubber tube	Silicon rubber tube $\phi 6 \times \phi 9$ mm, (10m/ Unit)	2	2	2	
46	Silicon rubber tube	Silicon rubber tube $\phi 8 \times \phi 10$ mm, (10m/ Unit)	1	1	1	
48	Tube joint (Glass)	$\phi 6 \times \phi 8$ mm, Straight, T type, Y type, (each 10 pcs)	1 each	1 each	1 each	
49	Support for test tubes	for 18(dia.) x 180 (L) test tube, No. of partitions: 5x10	1	1	1	
50	Stopper (silicon rubber)	$\phi 15$ mm, $\phi 20$ mm, $\phi 25$ mm, $\phi 30$ mm, $\phi 35$ mm, $\phi 40$ mm	2 each	2 each	2 each	
55	Vacuum Pump	Capacity: 1.0-1.3 liter/min, Ultimate vacuum: 440mmHg	1	1	1	
58	Glass fiber filter paper*1	$\phi 50$ mm, 100 pcs (Low gas absorption type)	2	2	2	
59-1	Quartz fiber filter paper*1	8'x10', 25 pcs	1	1	1	
59-2	Glass fiber filter paper*1	8'x10', 100 pcs	2	2	2	
60	Membrane filter	0.45 μ m, $\phi 47$ mm, 100 pcs cellulose	2	2	2	
61	pH Paper	pH paper: Roll type, 4 pcs/case	2	2	2	
65	Pipet container	Applox. 450 (W) x 300 (D) x 70 (H) mm	1	1	1	
66	Pipet support	Approx. 200x170x250 (H) mm, H tipe	1	1	1	
67	Stand for micro pipet	Number of sets of syringes : 5-6 psc	1	1	1	
69	Waste water container	Material: Polyethylene, Capacity: 5 L, 20 L	8 each	8 each	8 each	
71	Flask filtering	2000 ml, Borosilicate glass	1	1	1	
73	Seal tape	Made of teflon, Applox. 10mmx15 m	2	2	2	
No.	Name	Specifications	Q'ty			Procurement Time
			DAM	HOM	ALE	
74	Paraffin film	4" x 125 feet	2	2	2	July 2006
77	Brush	(small: No2), (middle: No5), (large: No10)	2 each	2 each	2 each	
78	Drying Shelf	Standard top board, Size: (W)800x(D)510x(H)1600	0	1	1	
79	Color comparison tubes	50 ml x 10pcs, 100 ml x 4pcs with white graduated	1 set	1 set	1 set	
80	Tube support	For 100ml color comparison tube x10 pcs	1	1	1	
81	Pasteur Pipette	150 mm, 1000 pcs, Borosilicate	1	1	1	
85	Dropping Bottle	50 ml x 2pcs, 100 ml x 1pc	1 set	1 set	1 set	
86	Crucible	Crucible, porcelain, 38 ml, 50ml	10 each	10 each	10 each	
87	Porcelain dish tongs	Porcelain dish tongs	1	1	1	
89	Standard Sieve	Applox. $\phi 200$ mm, mesh: 2mm	1	1	1	
91	Desiccator	Desiccator, glass, 180mm (dia.)	1	1	1	
92	Conical beaker	250 ml	10	10	10	
94	Bottle for sample collection	1000 ml, Polypropylene, with screw closure	20	20	20	
95	Rubber Bulb for Pipette	Vinyl-methyl Silicon rubber, (1ml), (5ml), (10ml)	2 each	2 each	2 each	
96	Cleaning Tissue	45 boxes of 200 tissues	1	1	1	
98	Goggles	Plastic, with side guard	2	2	2	
99	Cleaning Agent	Volume: 2 liters	1	1	1	
100	Burret	Burret 25 ml, 50 ml	2 each	2 each	2 each	
101	Burret stand	Double holder	1	1	1	
102	Dust jar	Standard metrology of US (APCA), Stand	8	8	8	

Reagents Procured by the JICA Expert Team in 2006

NO	Name	Specifications			Q'ty.			Procurement Time
		Usage	Grade	Amount	Damascus	Homs	Aleppo	
1	Acetic acid (CH_3COOH)	NO_2	G	2.5 L	1	1	1	Jury 2006
2	Sulfanilic acid ($\text{H}_2\text{NC}_6\text{H}_4\text{SO}_3\text{H}$)	NO_2	G	100 g	1	1	1	
3	N-(1-Naphthyl) ethylenediamine dihydrochloride For NO_x analysis ($\text{C}_{10}\text{H}_7\text{NHCH}_2\text{CH}_2\text{NH}_2 \cdot 2\text{H}_2\text{O}$)	NO_2	—	25 g	1	1	1	
4	Potassium permanganate For NO_x analysis (KMnO_4)	NO_2	—	1 kg	1	1	1	
5	Sulfuric acid (H_2SO_4)	NO_2 , F	G	2.5 L	1	1	1	
6	Sodium nitrite (NaNO_2)	NO_2	G	500 g	1	1	1	
7	Chloroform, certified (CHCl_3)	NO_2	UGR	2.5 L	1	1	1	
8	Barium hydroxide octahydrat ($\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$)	NO_2	G	500 g	1	1	1	
9	Triethanol amine ($\text{N}(\text{CH}_2\text{CH}_2\text{OH})_3$)	NO_2	G	500 mL	1	1	1	
10	Sodium azide (NaN_3)	SO_2	G	100 g	1	1	1	
12	Hydrochloric acid (HCL)	SO_2	G	2.5 L	1	1	1	
13	Formaldehyde	SO_2	G	2.5 L	1	1	1	
14	Sodium hydrogen sulfite 40% Solution(NaHSO_3)	SO_2	G	1.0 L	1	1	1	
15	Iodine (0.1 N)	SO_2, O_x	—	500 mL	1	1	1	
16	Sodium sulfate (Na_2SO_4)	SO_2	G	500 g	1	1	1	
17	Mercury (II) chloride (HgCl_2)	SO_2	G	500 g	1	1	1	
18	Sodium chloride (NaCl)	SO_2	G	1 kg	1	1	1	
19	Glycerin ($\text{HOCH}_2\text{CHOHCH}_2\text{OH}$)	SO_2	G	1 L	2	2	2	
20	Starch, soluble($\text{C}_6\text{H}_{10}\text{O}_5$) _n)	SO_2, O_x	1	1 kg	1	3	1	

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The Capacity Development of
Environmental Monitoring at Directorates

NO	Name	Specifications			Q'ty.			Procurement Time
		Usage	Grade	Amount	Damascus	Homs	Aleppo	
21	Mercury (II) iodide, red (HgI ₂)	SO ₂	G	100 g	1	0	0	
22	Sodium thiosulfate pentahydrate (Na ₂ S ₂ O ₃ ·5H ₂ O)	SO ₂ , O _x	Semi-G	1 kg	1	1	1	
23	Potassium iodate (KIO ₃)	SO ₂	G	100 g	1	1	1	
24	Potassium iodide (KI)	SO ₂	G	1 kg	1	1	1	
25	Hydrochloric acid (1N) (1N-HCL)	SO ₂	G	1 L	1	1	1	
26	Sodium fluorid (NaF)	F	G	500 g	2	2	2	
27	Lanthanum nitrate hexahydrate (La(NO ₃) ₃ ·6H ₂ O)	F	Semi-G	25 g	1	1	0	
28	Alizarin complexone dihydrate, indicator grade (C ₁₉ H ₁₅ NO ₈ ·2H ₂ O)	F	—	1 g	1	1	0	
29	Silicon dioxide (SiO ₂)	F	G	500 g	1	1	0	
30	Phosphoric acid (H ₃ PO ₄)	F	G	2.5 L	1	1	0	
31	Phenolphthalein (C ₂₀ H ₁₄ O ₄)	F	G	100 g	1	1	0	
32	Perchloric acid (HClO ₄)	F	G	1 L	1	1	0	
33	Sodium hydroxide, pellets (NaOH)	F	G	1 kg	1	1	0	
34	Ammonia solution, 25% (NH ₄ OH)	F	G	2.5 L	1	1	0	
35	Ammonium acetate, >98% (CH ₃ COONH ₄)	F	Semi-G	500 g	1	1	0	
36	Sodium acetate, trihydrate (CH ₃ COONa·3H ₂ O)	F	G	500 g	1	1	0	
37	Acetone (CH ₃ COCH ₃)	F	G	2.5 L	1	1	1	
38	Potassium dihydrogenphosphat, for O _x analysis (KH ₂ PO ₄)	O _x	—	500 g	1	1	0	
39	Disodium hydrogen phosphate-12water (Na ₂ HPO ₄ ·12H ₂ O)	O _x	G	1 kg	1	1	0	
40	Potassium iodide (KI)	O _x	G	1 kg	1	1	0	
41	Iodine (I)	O _x , SO ₂	G	500 g	1	1	0	
42	Nessler's reagent	NH ₃	-	500 mL	1	1	1	
43	Methylene blue	H ₂ S	G	100 g	1	1	1	
44	Phosphoric Acid (H ₃ PO ₄)	NO ₂	G	2.5 L	1	1	1	

Glassware and reagents for air quality analysis purchased by JET were finally delivered in November 2006 and January 2007. Procured glassware and reagents are summarized in the table below.

Glassware Procured by the JICA Expert Team

No.	Name	Specifications	Quantity			Procurement Time
			Damascus	Homs	Aleppo	
1	Volumetric Flask (Germany)	25 mL, Borosilicate glass, A class, Color: clear, Tolerance: ± 0.04 mL or better, joint and poly stopper	6	6	6	November 2006
		1000 mL, Borosilicate glass, A class, Color: clear, Tolerance: ± 0.15 mL or better, joint and poly stopper	3	3	3	
2	Filter paper	Ø 11 cm, 5A type, 5B type	1 each	1 each	1 each	
3	Glass rods	Glass rods, 750 (L) x Ø 8 mm	2	2	2	
		Glass tube, 750 (L) x Ø 6×Ø 8 mm	2	2	2	
4	Glass tube	Glass tube, 300 (L) x Ø12×Ø16 mm, 300 (L) x Ø 15 mm	4 each	4 each	4 each	
5	Porcelain funnels	Ø 11 cm, Porcelain	0	1	1	
7	Silicon stopper	Silicon stopper, for Ø 15 mm	8	8	8	
8	Stopwatch	Digital type	1	1	1	
9	Graduated cylinders	50 mL, Borosilicate glass, A class, Color: clear, with guard, Graduation: 1 mL, Tolerance: ±0.5 mL	5	5	5	January 2007
10	Dry oven	Capacity: 32 L, Max. temperature: 240	1	1	1	
11	Digital balance	Measurement range: 0 to 400 g, Sensitivity: 0.01 g	1	1	1	

Reagents Procured by the JICA Expert Team

No.	Name	Specifications			Quantity			Procurement Time
		Usage	Grade	Amount	Damascus	Homs	Aleppo	
1	Potassium hydroxide (KOH)	NH ₃	G	500 g	1	1	1	November 2006
2	Potassium sodium tartrate (COOKCHOH·CHOHCOONa·4H ₂ O)	NH ₃	G	500 g	1	1	1	
3	Boric acid (H ₃ BO ₃)	NH ₃	G	1 kg	1	1	1	

4	Ammonium sulfate ((NH ₄) ₂ SO ₄)	NH ₃	G	1 kg	1	1	1	
5	Trioxide Chromium (CrO ₃)	O _x	—	1 kg	1	1	1	

5.1.5 Sub-contract Works

(1) Pollution Source Survey

1) Objectives

The main objective of the Survey is to collect data and information related to pollution sources, and to obtain current water quality data useful for formulating an environmental monitoring plan in each Governorate. The survey includes the following major works.

- a) Work-1: Identification of air and water quality pollution sources of each Governorate,
- b) Work-2: Implementation of water quality sampling and analysis, and
- c) Work-3: Collection of environmental complaints from citizens

2) Survey Area

The survey area covers 14 Governorates for Work-1, 5 Governorates for Work-2, and 14 Governorates for Work-3 as shown in Table below.

Target Governorate of the Survey

Item	Work-1	Work-2	Work-3
Governorate	Identification of air and water quality pollution sources	Implementation of water quality sampling and analysis	Collection of environmental complaints from citizens
1. Damascus	○	○	○
2. Damascus Countryside	○	○	○
3. Aleppo	○	○	○
4. Homs	○	○	○
5. Hama	○	○	○
6. Latakia	○	-	○
7. Deir ez Zor	○	-	○
8. Idleb	○	-	○
9. Hasakeh	○	-	○
10. Rakka	○	-	○
11. Sweida	○	-	○
12. Dara'a	○	-	○
13. Tartous	○	-	○
14. Quneitra	○	-	○
Total	14	5	14

3) Contents of the Survey

- a) Work-1: Identification of air and water pollution sources of each Governorate

List of air and water pollution sources

A target of air and water pollution sources is all point sources such as public facilities and factories except for small scale cottage and home industries. Data and information to be collected and conceivable point sources are summarized below. These data should be obtained through the existing documents and statistics published or owned by the national and local government.

Data and Information to be Collected

Content	Item
1. General Information	1)Name of factories and facilities, kind of production, addresses, locations 2)Type (public, private), scale (production amount in kind , no. of employees, annual turnover) 3)Year of establishment, conditions of operation
2. Pollutants	1)Volume of wastewater (m3/day), exhausted gases (N m3/hr) 2)Quality and volume of major pollutants in kind 3)Place and area to discharge and exhaust 4)Treatment facilities of pollutants (presence, type, capacity, operation, plan of installation)
3. Relevant Information	1)Complaints from citizens 2)Other topics

List of Point Sources

Type	In Kind
1. Public Facilities	1)Thermal power plant (coal and oil) 2)Boiler, heat supply plant 3)Wastewater treatment plant (urban sewage, industrial wastewater) 4)Waste dumping sites 5)Mines such as oil, ores, minerals 6)Other major facilities (airport, port and harbor, hotels, markets)
2. Factories and Establishments	1)Oil refinery, Petrochemical industries 2)Synthetic and non-synthetic chemical products 3)Iron and non-iron industries 4)Machinery and manufacture, plating industry 5)Cement, glass, pottery, carbon industries 6)Fodder and feed, fertilizer 7)Fiber, textile, dye factory 8)Tannery 9)Paper and pulp industries 10)Food, food processing, agro-processing (olive oil) 11)Cattle houses, poultries, fisheries 12)Others

Location mapping

Based on the list mentioned above, locations of the listed pollution sources are to be plotted on the topographical maps scale on 1/50,000. In mapping, the serial number should be coincided that of in the list, and the location marks of the pollution sources be classified by type and kind in accordance with the list.

Collection of the existing air and water quality data, and plans for treatment works

The existing reports and documents related to air and water quality, and any plans for domestic and industrial wastewater treatment facilities should be collected and be described the current environmental conditions based on the collected data and information in each Governorate.

b) Work-2: Implementation of water quality sampling and analysis

Implementation of sampling and analysis

Targets for the Work-2 are five (5) Governorates (Damascus, Damascus Countryside, Aleppo, Homs, and Hama). Possible sampling points should be selected around four (4) points in water bodies (rivers, lakes, and reservoirs) in each target Governorate. Analysis substances shall cover 1)Water discharge, 2)Air and water temperature, 3)Electric Conductivity (EC), 4)Color, 5)Turbidity, 6)pH, 7)BOD, 8)COD, 9)DO, 10)Coliform numbers, 11)SS, 12)NH₄-N, 13)NO₂-N, 14)NO₃-N, 15)T-N, 16)PO₄-P, 17)T-P and other chemical substances such as Pb, CN, Cr, As, Hg, in principle.

Description of current water quality and pollution load conditions

Based on the existing data and information collected in the Work-1 and the results of water quality analysis in the Work-2, the Contractor shall prepare a report describing current water quality and pollution load conditions in the five (5) selected Governorates by using maps effectively. The description items are shown below, but it is not limited in this table.

Description Items

Content	Item
1. Conditions of Water Bodies	1)List of name and location of water bodies (map) 2)Mean discharge with clarification of wadi 3)Purpose of water use and location of intake
2. Water Quality and Pollution Load	1)Volume of wastewater (m3/day) 2)Water quality and pollution load conditions 3)Place of wastewater discharge points 4)Future plans for wastewater treatment works
3. Preliminary Analysis of Water Quality for Environmental Monitoring	1)Classification of water bodies (by grade of water quality pollution, by importance of water use) 2)Possible alternative water quality monitoring stations with map 3)Other topics

c) Work-3: Collection of environmental complaints from citizens

Clarification of environmental complaint receiving system

The information related to environmental complaints receiving system and its current conditions are to be collected in the survey. The items to be collected and clarified are shown below.

Information to be Collected and Clarified

Content	Item
1. General	1)General work flow of receiving environmental complaints from citizens including necessary days 2)Member list of the Environmental Committee, established year, organization chart, meeting period, frequency, and time 3)Name agency for secretary work 4)Channels for receiving environmental complaints from citizens 5)Roles of DFEA
2. Receiving and Dealing System	1)Forms for receiving complaints 2)Information reporting system 3)Record management system 4)Public Information of the complaint receiving system

Collection of actual records of environmental complaints and preparation of a list

Actual records of environmental complaints of each Governorate in the recent one year are to be collected in the survey. The description items including trends of environmental complaints, activities to deal with, effects and constraints of the complaint receiving systems are shown below.

Information to be Collected

Content	Item
1. Collection Period	1)Recent 1 year (e.g. Jan. - Dec. 2004)
2. Number of Environmental Complaints	1)Number of received complaints by month, by kind (air, water, noise, odor, etc.) 2)Profile of citizens complained (age, sex, address, job, etc.) 3)Trend and characteristics
3. Contents of Complaints	1)Contents 2)Location 3)Causes and damages (quantity in kind), duration of damage and nuisance 4)Representative or individual
4. Dealing with Activities	1)Days the action be taken 2)Method for solution and cost 3)Duration in total for settle down (days) 4)Letters by the Governor
5. Effects	1)Solution level (good, fair, no change) 2)Satisfaction level of citizens complained (good, fair, bad) 3)Items to be improved, what, why, who, when, where, and how especially for DFEA

4) Survey Schedule

The Survey schedule including regular meeting with the JICA Expert Team is shown below.

Survey Schedule

Work Item	2005						note
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	
1. Plan of Operation (P/O)	■						
2. Work-1							
2.1 Data collection		■					Base maps scale on 1/50,000
2.2 Mapping		■					
2.3 Description and report preparation			■	■			
3. Work-2							
3.1 Selection of sampling points and analysis substances	■						To be discussed with JICA Expert Team
3.2 Sampling and water quality analysis		■					
3.3 Description and report preparation			■	■			
4. Work-3							
4.1 Clarification of complaint system		■					Data to be collected at same time with Work-1
4.2 Collection of complaint records		■					
4.3 Description and report preparation				■			
5. Reporting							
5.1 Inception Report (IC/R)	■						To be prepared in English and Arabic
5.2 Progress Report (P/R)			■				
5.3 Draft Final Report (DF/R)					■		
5.4 Final Report (F/R)						■	

5) Results of Pollution Source Survey

The objective of this Survey is to collect data and information related to pollution sources, and to obtain complaint data from citizens useful for formulating an environmental monitoring plan in each Governorate.

The total numbers of major pollution sources are around 1,100. It is mostly concentrated in Aleppo and Homs as shown in Table below. An inventory of these pollution sources is compiled in the report including location map. This output is delivered to all DFEAs with hard copy and CD, and it should be used for preparation of an environmental monitoring plan.

Number of Pollution Sources

Governorate	Public Facilities			Private Enterprises					Total
	Power plant	Others	Sub total	Oil refinery	Cement & glass	Agro & food processing	Others	Sub total	
1.Damascus	2	0	2	1	3	5	13	22	24
2. Damas C-side	1	19	20	4	8	14	26	52	72
3. Aleppo	0	1	1	21	173	61	201	456	457
4. Homs	2	115	117	9	28	22	37	96	213
5. Hama	2	9	11	1	2	4	4	11	22
6. Lattakia	1	1	2	2	3	5	9	19	21
7. Deir ez Zor	0	6	6	1	1	3	4	9	15
8. Idleb	1	6	7	17	2	33	13	65	72
9. Hasakeh	0	10	10	1	1	9	8	17	27
10.Rakka	0	3	3	1	1	3	1	6	9
11.Sweida	0	3	3	8	2	9	4	23	26
12.Dara'a	5	4	9	11	0	6	4	21	30
13. Tartous	1	13	14	34	1	30	9	74	88
14.Quneitra	0	2	2	10	10	0	0	20	22
Total	15	192	207	121	235	204	331	891	1,098

The environmental complaints received in DFEAs are summarized in Table below. The DFEAs received around 500 complaints from citizens in 2004. Major complaints are concentrated in air, noise, and water environment.

Number of Complaints Received in 2004

Governorate	Registered Nos.	Numbers of Complaints (note 1)						Total
		Air	Water	Soil	Health	Noise	Others	
1. Damascus	50	30	3	1	0	21	17	72
2. Damas C-side	0	0	0	0	0	0	0	0
3. Aleppo	45	41	44	2	0	0	0	87
4. Homs	15	11	3	2	6	1	8	31
5. Hama	36	29	6	12	2	7	12	68
6. Lattakia	14	11	4	0	0	2	7	24
7. Deir ez Zor	7	6	5	0	4	1	0	16
8. Idleb	25	24	1	1	0	1	1	28
9. Hasakeh	14	11	10	1	1	2	1	26
10.Rakka	13	13	3	2	3	2	2	25
11.Sweida	30	28	6	5	17	8	2	66
12.Dara'a	14	10	3	0	5	1	3	22
13.Tartous	15	11	3	2	1	2	4	23
14.Quneitra	4	3	0	0	2	2	0	7
Total	294	233	97	28	44	114	60	516

Note: 1) One registered person could bring several complaints.

2) DFEA in Damascus Countryside did not receive complaints in 2004 because it was established in the end of 2004.

(2) Environmental Consciousness Survey

1) Objectives

The main objective of the Environmental Consciousness Survey is to collect information and data useful for formulating a strategy of public awareness on environment in the Syrian Arab Republic. The survey includes the following major items.

- a) General level of understanding on the knowledge on environmental issues
- b) Cognition around the environment, and
- c) People's awareness of the environmental conservation, and their intention to participate in conservation activities

2) Survey Area and Period

The survey area covers 7 governorates, namely Damascus, Damascus Countryside, Aleppo, Homs, Tartous, Rakka, and Sweida governorates. The environmental consciousness survey in Damascus, Damascus Countryside, and Aleppo governorates was conducted from January to February in 2005, and the survey in Homs, Tartous, Rakka, and Sweida governorates was from June to July in 2005.

3) Contents of Survey

The survey should be made by questionnaires targeting inhabitants in each governorate. The total numbers of questionnaires to be collected are at least 719 based on statistical calculation of the multistage sampling method and the stratified sampling method. The survey is carried out by direct interview using a questionnaire to be filled out by the interviewers. The main survey items are shown as follows.

Minimum Number of Sample Size to be Collected at the Survey

Governorates	Number of Respondent
Damascus	167
Damascus Countryside	231
Aleppo	381
Homs	152
Tartous	70
Rakka	31
Sweida	68
Total	719

Survey Item

Content	Item
1. Attributes of Interviewee	Name, Sex, Age, Education level, Occupation, Family Structure, Duration dwelling
2. Cognition on Environment	Attitude towards environmental issues, Pressing issues, Status on the environment near the residence, Cause of the environmental degradation.
3. Information and Media Selection	Media to obtain environmental information Degree to use a internet media literacy
4. Others	Opinions, Request, Suggestion, etc.

(3) Project Evaluation Survey

1) Objectives

The main objective of the Project Evaluation Work (the Survey) is to collect data and information related to evaluation index in order to evaluate progress and achievement of the Project year by year, and to provide basic materials for feedback to the Project. The Survey includes the following major works.

- a) Preparation of Plan of Operation (P/O) of the Survey,
- b) Collection of actual data and records of activities concerning to the environmental monitoring,
- c) Implementation of interview survey for evaluation to each technical counterpart (C/P),

- d) Collection of evaluation results conducted by the directors in GCEA and 14 DFEAs, the JICA Expert Team,
- e) General statistic analysis of evaluation results obtained from the self-evaluation by C/Ps, and the evaluation made by the directors of DFEAs and the JICA Expert Team,
- f) Holding an evaluation meeting for explanation and discussion of the evaluation survey results, and
- g) Preparation of the evaluation survey report including all survey results based on the comments arisen in the evaluation meeting.

2) Target of the Survey

The targets of the Survey are the technical C/Ps in GCEA and 14 DFEAs, and the directors of 14 DFEAs as summarize in Table below.

Numbers of the Survey (up to Sept. 21, 2005)

Category	Director	Technical C/Ps				Total
		1) Water Quality Analysis	2) Air Quality Analysis	3) Data Management	4) Public Awareness	
GCEA(D. of Laboratories)	1	2	1	1	1	5
1.Damascus	1	8	4	1	3	16
2. Damascus Countryside	1	4	0	(1)	1	5
3. Aleppo	1	3	2	(2)	1	6
4. Homs	1	2	2	1	1	6
5. Hama	1	5	0	1	(1)	6
6. Lattakia	1	3	0	1	1	5
7. Deir ez Zor	1	3	0	((1))	((1))	3
8. Idleb	1	4	0	1	(1)	5
9. Hasakeh	1	3	0	1	1	5
10.Rakka	1	5	0	(1)	(1)	5
11.Sweida	1	7	0	1	2	10
12.Dara'a	1	4	0	1	1	6
13.Tartous	1	6	0	1	3	10
14.Quneitra	1	3	0	(1)	(1)	3
Total	15	62	9	10(4)	14(4)	96

Note:() shows numbers who concur another one duty, and (()) shows numbers who concur another two duties.

3) Time Schedule

The time schedule of the Survey is as shown below.

Survey Frame

Work Item	2006						note
	Jan(Mid)	Jan(End)	Feb(Beg.)	Feb(Mid)	Feb(End)	Mar(Beg)	
1.Plan of Operation (P/O)	■						
2.Survey Item							
2.1 Collection of actual data and records of activities		■	■	■	■		
2.2 Implementation of interview survey		■	■	■	■		
2.3 Collection of evaluation results				■	■		
2.4 General statistic analysis of evaluation results					■	■	
2.5 Evaluation meeting						■	
2.6 Preparation of the evaluation survey report					■	■	
3.Reporting							
3.1 Inception Report (IC/R)	■						
3.2 Draft Final Report (DF/R)					■		
3.3 Final Report (F/R)						■	
							To be prepared in English and Arabic

(4) Material Preparation Work of Environmental Education

1) Objectives

The objective of the Material Preparation Work of Environmental Education (the Work) is to prepare teaching and disseminating materials for promotion of public awareness and environmental education activities of GCEA and DFEAs.

2) Materials Prepared

The following materials should be prepared for environmental education and public awareness activities.

Material Prepared

Item	Specifications and Works	Numbers
1) Demonstration CD of “the Japanese Experience on Environmental Pollution” in Arabic Version	1) Editing the current CD to be suitable for the Project 2) Translating into Arabic language 3) Preparing a basic disc for printing and copying 4) Preparing an explanatory document in Arabic 5) Preparing full-set for dissemination	Around 2,000 sets
2) Full-set of the Eco-Plant Game”	1) Preparing a proto-type of the game 2) Translating into Arabic language 3) Preparing a basic disc for printing and copying 4) Preparing an explanatory document 5) Preparing full-set for dissemination	Around 200 sets
3) Brochures and Pamphlets for Demonstration and Dissemination Purpose	1) Preparing articles and pictures 2) Translating into Arabic language 3) Preparing a layout plan 4) Printing for dissemination	Around 3,000 sets
4) Demonstration DVDs of “The History of Pollution and Environmental Restoration in Yokkaichi” in Arabic Version	a) Editing the original video program to be suitable for the Project b) Translating into Arabic language c) Preparing a basic disc for printing and copying d) Preparing an explanatory document in Arabic e) Preparing full-set for lending	300 sets (= (GCEA + 14 DFEAs) x 20 sets)
5) Demonstration DVDs of “Water Treatment Technology in Japan” in Arabic Version	a) Editing the original video program to be suitable for the Project b) Translating into Arabic language c) Preparing a basic disc for printing and copying d) Preparing an explanatory document in Arabic e) Preparing full-set for lending	300 sets (= (GCEA + 14 DFEAs) x 20 sets)
6) Environmental Work Manual	a) Re-printing for dissemination	Arabic: 2,000 sets
7) Humat Beia Newsletter No.3	a) Editing the design and layout of newsletter based on original draft b) Printing for dissemination	1,500 sets
8) Humat Beia Newsletter No.4	a) Editing the design and layout of newsletter based on original draft b) Printing for dissemination	2,000 sets
9) Special Issue of the Humat Beia Newsletter on Study Tour in Egypt*	a) Editing the design and layout of newsletter based on original draft b) Printing for dissemination	English: 50 sets Arabic: 150 sets

5.1.6 Expenses for Project Implementation

(1) Expense for Procurement of Equipment, Glassware, Reagent, and Networking Instrument

The local expenses for procurement of equipment, glassware, reagent, and networking instrument spent in Syria by the Fiscal Year of Japan (April-March) is summarized in the Table below. In total, around \$492,000 has been input for the Project, but this is only total amount of input which was spent through the JICA Expert Team. Detailed list of equipment procured is shown in Annex 3.1 with its break down including price.

Expenses for Procurement of Equipment and Others by the JICA Expert Team (unit US\$)

Year (JFY)	2004	2005	2006	2007	Total
1. Basic Water Quality (BW)	0	15,000	321,000	0	336,000
2. Chemical & Biological Water Quality (CB)	0	0	70,000	35,000	105,000
3. Heavy Metal Analysis (HM)	0	15,000	4,600	0	15,000
4. Air Quality (AQ)	0	30,000	31,300	0	491,900
5. Data Management (DM)	0	10,000	0	0	10,000
Total	0	25,000	426,900	35,000	486,900

(2) Sub-contract Work

The local expenses for the sub-contract works spent in Syria by the Fiscal Year of Japan (April-March) are summarized in the Table below. In total, around JPY 16,300,000 (about \$148,000, in 1\$=110JPY) has been input for the Project.

Expenses for Sub-contract Works by the JICA Expert Team (unit JPY)

Sub-contract Work	Contents	2004	2005	2006	2007	Total
1. Public awareness survey to 7 DFEA	- Interview survey to 4 Governorate (2004) and 3 Governorate (2005)	800,000	600,000	0	0	1,400,000
2. Preparation of E&E materials	- Eco-plant game preparation & printing - Video DVD preparation & copy - Manual and guidebook preparation & printing	0	1,200,000	1,100,000	0	2,300,000
3. Project evaluation	- Interview survey to all CP for project evaluation	0	5,600,000	0	0	5,600,000
4. Pollution source survey	- Preparation of pollution source inventory and location map	0	7,000,000	0	0	7,000,000
Total		800,000	14,400,000	1,100,000	0	16,300,000

(3) Miscellaneous Local Expense

The other miscellaneous local expenses such as for study tour to Egypt, round instruction training, and seminar and workshop, spent in Syria by the Fiscal Year of Japan (April-March) is summarized in the Table below. In total, around JPY 47,000,000 (about \$427,000, in 1\$=110JPY) has been input for the Project.

Expenses for Other Miscellaneous Local Expense by the JICA Expert Team (unit JPY)

Year (JFY)	Expense (JPY)	Major expense item	
		Item	Details
2004	3,230,000	-	-
2005	13,020,000	1) Study tour to Egypt	- 1 time (visit EEAA, CCC, G Cairo, Suez, Tanta RBO)
		2) Round instruction training	- 14 DFEA (BW, DM, PA), 3 DFEA (AQ)
2006	17,492,000	1) Study tour to Egypt	- 1 time (visit EEAA, CCC, Suez, Tanta RBO)
		2) Round instruction training	- 14 DFEA (BW, DM), 3 DFEA (AQ), 4 DFEA (PA)
		3) Seminar and workshop	- 4 times (PA training in 4 DFEA)
2007	13,276,000	1) Study tour to Egypt	- 1 time (visit EEAA, CCC, Suez RBO)
		2) Round instruction training	- 14 DFEA (BW, DM), 3 DFEA (AQ), 4 DFEA (PA)
		3) Seminar and workshop	- 4 times (PA training in 4 DFEA)
Total	47,018,000	-	-

5.2 Input by the Syrian Side

5.2.1 Counterpart Personnel

As per the plan, the C/P personnel consists of two categories, namely administrative C/P and technical C/P. The administrative management C/P has been assigned 21 staff in GCEA and DFEAs as shown in the table below.

Assignment of Project Administrative Management C/P

	Position in the Project	#	Position in MOLAE
1	Project Director	1	General Director of GCEA
2	Project Manager	1	Director of Directorate for Laboratories
3	Director for basic analysis for water quality	1	Director of Directorate for EIA
4	Director for chemical and biological analysis	1	Director of Directorate for Chemical Safety
5	Director for air quality analysis	1	Director of for Air Safety
6	Director for environmental education	1	Director of Awareness and Environmental Information
7	Director for data management	1	Director of Information and System
8	Sub-site Directors	14	Director of 14 Target DFEAs

As for the technical C/Ps, 122 persons are assigned to the Project as technical C/P in total as of December 2007. Almost all of them are the laboratory staff. But in some cases, the Director or Deputy Director is also included. Details are described in Chapter 1.5.

5.2.2 Facilities

The land and building for the project were made available by Syrian side at the beginning of the Project. In 2007, several laboratories of DFEAs moved to new buildings and some others are planning to move in future as summarized below.

Summary of Movement of Laboratories of DFEAs

Timing of Movement	Number and Name of DFEAS
Laboratories which have moved to new buildings	5 DFEAs (ALP: May 2007, HOM: Jan. 2007, HAM: Mar. 2007, DAR: Apr. 2007, QNT: Jan. 2007)
Laboratories which plan to move to new buildings	7 DFEAs (DAMC: 2007 or 2008 (not yet), LTK: 2008, IDL: 2007 (not yet), HSK: 2008, RAK: unknown, SWD: 2009, TAR: 2007 (not yet))

Facilities for proper water and electricity supply, drainage, and ventilation, equipment and machinery such as air condition (AC), generator and automatic voltage regulator (AVR), and shelves and tables are considered as necessary items for the laboratory works in Syria. Available facilities at the target 14 DFEAs are summarized in the table below.

Summary of Laboratory Facilities at DFEAs

Facilities and Equipment	Provision by Syrian Side
Electricity supply	- Provided to all labs in DFEAs but unstable in ALP
Water supply	- Provided to all labs in DFEAs
Drainage system	- Provided to all labs in DFEAs - In the case of ALP, where lab is currently located in the basement, drainpipes are placed on the ceilings. Furthermore, a drain ditch is located in the basement, which has caused flooding of discharged water. There is a plan to establish a new lab on the land adjacent to the current building by the end of 2008.
AC	- Provided 10 labs (DAM, HAM, LTK, DZR, IDL, HSK, SWD, DAR, TAR) - Not provided to 4 labs (DAMC, ALP, HOM and QNT)
AVR	- Provided to 8 labs (DAM, DAMC, ALP, HOM, HAM, HSK, DAR, QNT) - Not provided to 6 labs (LTK, DZR, IDL, RAK, SWD, and QNT)
Generator	- Provided to 1 lab (HOM) (In Mar. 2006,, the Japanese side provided 7 generators to 7 labs (ALP, HOM, LTK, DZR, RAK, SWD, and TAR) - Not available in 6 labs (DAM, ALP, HAM, IDL, HSK, DAR, QNT) -
Shelves and tables	- Provided to all DFEAs

5.2.3 Budget Allocation

Throughout the project period, total of 10,538,000 SP has been allocated for running expenses for the Project Activities at DFEAs as shown in the table below. This is a planned figure, and an actual amount expenses are controlled by the Governor Office.

Allocation of Running Expenses for the Project Implementation at each DFEA by Syrian Fiscal Year (SFY)

Directorates		(Unit: Syrian Pound)	
		SFY 2006 (SP)	SFY 2007 (SP)
1	Damascus	n/a	n/a
2	Damascus Countryside	n/a	600,000
3	Aleppo	n/a	600,000
4	Homs	n/a	500,000
5	Hama	n/a	500,000
6	Lattakia	n/a	500,000
7	Deir ez Zor	n/a	400,000
8	Idleb	n/a	200,000
9	Hasakeh	n/a	300,000
10	Rakka	n/a	200,000
11	Sweida	n/a	300,000
12	Dara'a	n/a	200,000
13	Tartous	n/a	500,000
14	Quneitra	n/a	200,000
GCEA		n/a	n/a
Total		n/a	5,000,000

Note: In 2007, DAM DFEA includes the Basic and Chemical & Bio, but other 13 DFEAs are the Basic only. Expenses for Chemical & Bio for DAMC, HOM, and ALP DFEAs, Heavy Metal for DAM DFEA, and Air Quality for DAM, HOM, and ALP DFEAs will be from 2008.

6. TOPICS AND ISSUES ON PROJECT MANAGEMENT AND IMPLEMENTATION

6.1 Difficulties and Applied Countermeasures to the Project

(1) Staff Leaving

The Project Design Matrix (PDM) explicitly stated the Important Assumption as follows;

“Laboratory staffs trained by the project stay in laboratories and keep working on the environmental monitoring”.

Totally 184 counterparts have been assigned for the Project. Around 62 staff, however, left the Project and only 122 counterparts remain as of December 2007. It means about 10% of counterparts are leaving the Project annually mainly due to military service, maternity, and salary reasons. This was one of major obstacles for achieving project purpose and it resulted in about 20% of achievement of Level-A class staff though targeting 50% in PDM.

Applied countermeasures for this issue are as follows;

- 1) Reporting to the Steering Committee for recognition of the Minister of MOLAE and for taking quick action against this matter including incentives such as allowance and compensation to lab staff,
- 2) Asking the Governors to supplement enough staff quickly through GCEA and DFEA, and
- 3) Shifting trainer’s training by the JICA Expert Team.

This issue could be generally common in similar projects and includes something unavoidable reasons. So, the Project Director and the JICA Expert Team took actions for getting quick approval of the decision makers in order to supplement enough number of staff urgently. This top management approach is very effective for solution of various issues and problems of the Project. Consequently, the JICA Expert Team conducted training activities without any discontinuation and took subsequent actions of the trainer’s training. Shifting to the trainer’s training brought about broad responsibility among trained counterparts especially for the lab chief.

(2) Procurement of Equipment and Chemicals

The Project Design Matrix (PDM) also stated the Important Assumption as follows;

“Agents/ manufactures timely provided spare parts for the equipment”.

Mainly due to economic sanctions to the Syrian Arab Republic, actual procurement of equip and chemicals are confronted difficulties on selection and delivery. In fact, the market of Syria can be said “seller’s market”, so the following difficulties come out during the Project period;

- 1) No competitive conditions for bidding,

- 2) Frequent and sudden change of unit price even though after bidding,
- 3) No dealing for small amount of goods by suppliers,
- 4) Long waiting time for delivery, and
- 5) Lack of compliance mind in suppliers such as deadline and replacement.

This issue contains some political and cultural matters, so applied countermeasures are very limited. One thing is advised to GCEA that GCEA should arrange these procurements asking actual demand to all DFEA in advance. This issue might be critical obstacle for similar projects in future.

(3) Chemical Background

The Project Design Matrix (PDM) stated in its Pre-conditions as follows;

“Appropriate number of laboratory staff who have chemical background are assigned in the target DFEA”.

This issue is more serious for the JICA Expert Team because it causes difficulties on technology transfer of lab analysis and data interpretation. More than half of the counterparts assigned do not have enough chemical background. For example, lack of knowledge of “molecular” and “oxidation and reduction” cause difficulties for dilution of samples and calibration, and for understanding analysis principle of electrode equip. This compelled another burden to the JICA Expert Team in lecture and hands on training.

Applied countermeasures for this issue are as follows;

- 1) Asking the Minister of MOLAE and GCEA to adopt employment policy of MOLAE staff with chemical background and assign them to labs, and
- 2) Training from elementary level by the JICA Expert Team.

To understand analysis principle using equipment is inevitable as a chemical analyst of lab. Since there is no choice for selection of counterparts, the JICA Expert Team conducted lecture training from elementary level. Through the top management activities, MOLAE and GCEA understood this situation well and promised to employ new staff with chemical background regularly. So, this issue will be solved year by year.

(4) Training in Damascus

In the beginning of the Project, lecture and hand on training was planned to be carried out in Damascus calling target counterparts from DFEA. However, it is very hard for DFEA mainly due to budget constraint for transportation and accommodation especially for the first year of the Project. Therefore, the JICA Expert Team adopted round instruction training and OJT at DFEA for the Basic Water Quality and Air Quality. This round training is resulted in very effective for counterparts because;

- to conduct training considering regional and site specific environment and pollution

source conditions,

- to target small number of counterparts taking care of their understanding,
- to grip up-dated conditions of counterparts and labs in DFEA,
- to keep closer relationship with counterparts especially for lab chief,
- to discuss and share progress and problems of the Project with directors of DFEA, and
- to carry out trouble shooting activities related to environmental monitoring on site.

However, it should be noted that this round training brought about unexpected load to the JICA Expert Team and about shortage of actual training period especially for air quality. To conduct training in several key DFEA participating counterparts from nearby DFEA could be one of alternatives for future projects.

6.2 Results of Capacity Development

In general, the capacity development framework consists of three layers namely individual level, organizational level, and institutional/ social level, and these are interconnected in a systematic way. In order to quantify the impact on capacity development caused by the Project, a change of achievement and improvement level (%) between before the Project and after the Project is described below based on the results of questionnaire survey to the counterparts and directors of DFEA conducted in the course of the Project.

6.2.1 Individual Level

Regarding to the impact on individual level, typical 15 questions are selected in the questionnaire sheet for the counterparts of the Basic Water Quality and Air Quality. Quantitative change is estimated by the average of all DFEA in Basic Water Quality and 3 DFEA in Air Quality. The results are shown in the following pages. All questions show great change for improvement in individual level from before to after, such as budget plan and monitoring plan preparation, calibration and O/M of equip in the Basic Water Quality. Also it shows fairly difference in the Air Quality though its change is not so clear compared with the Basic Water Quality. Therefore, it can be said that the capacity development in individual level is well developed and achieved its target mostly.

6.2.2 Organizational Level

It is very difficult to measure the change degree in organizational level directly. So, the questionnaire results of Directors of DFEA are focused on measuring change from before to after the Project. Since Directors are actual managers of DFEA, their questionnaire results could indirectly reflect the change on organizational level by the Project. Therefore, 6 typical questions related to the Project Management, and 4 questions related to the support conditions by Director and GCEA to the counterparts in the Basic Water Quality and the Air Quality are selected from the questionnaire sheet for Directors of DFEA. The results are shown in the following pages.

Although the change is rather gradual, some differences can be found in all questions. The impact on organization level could not be clear as that of individual level. It should be noted that the supporting activities by the Directors and GCEA have been activated through the Project especially for the Basic Water Quality.

6.2.3 Institutional and Social Level

No quantified data and indicators are available for measuring the impact on institutional and social level at present. However, the following several facts could be pointed out as relevant impacts by the Project.

(1) Increasing Environmental Concerns among Citizens

After the Project started, the numbers of complaints and consultations by citizens have increased rapidly in all DFEA especially for Damascus, Homs, and Aleppo DFEA. In typical cases, the citizens often bring their own wastewater samples and ask DFEA to analyze them. DFEA is now dealing with complaints attaching analysis data to the Governorate Office, so DFEA needs to allocate additional budget to respond their requests. This could be a fact that the citizens have recognized DFEA's capability of lab analysis and they put higher reliability on DFEA more than before.

(2) Collaboration and Cooperation with other Organizations

For all DFEA, ensuring QA/QC is crucial matter on water and air quality. Therefore, most DFEA are conducting cross sampling and analysis with other labs such as the General Commission for Water Resources under the Ministry of Irrigation. This kind of activities could provide new opportunity to start collaboration and cooperation with other ministries for environmental protection and management. At present, most DFEA are able to show accurate and reliable analysis data based on the comparison results.

(3) Impacts on Environmental Administration

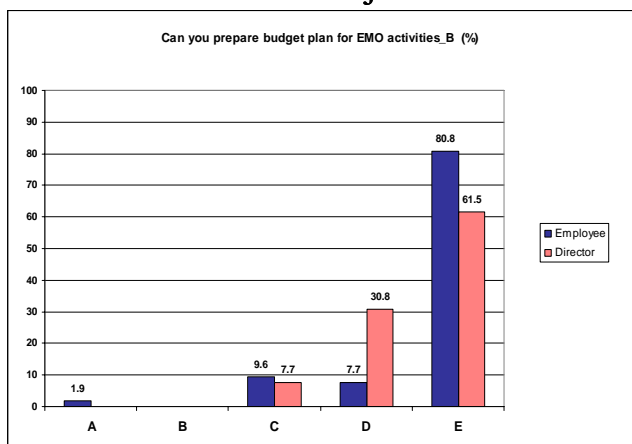
The GCEA used the Project as the important and effective tool for implementation of actual activities stated in the 10th 5-years Plan. Furthermore, GCEA has started to prepare new regulations and guidelines related to inspection, fine and penalty system against violation, and environmental impact analysis (EIA). Such kind of actual and aggressive activities for pollution control of GCEA could be one of impacts on environmental administration by the Project.

(4) Effects on Public Awareness

As described in the paragraph (1) above, DFEA has increased its presence in all DFEA among citizens. It may depend on the strong leadership of GCEA establishing the National Committee for Public Awareness and developing public awareness in regional level in accordance with the national strategy. But, in parallel, the actual capacity development on lab analysis of DFEA surely contributed for promotion of public awareness among local people.

Impact on Individual Level (1/8)

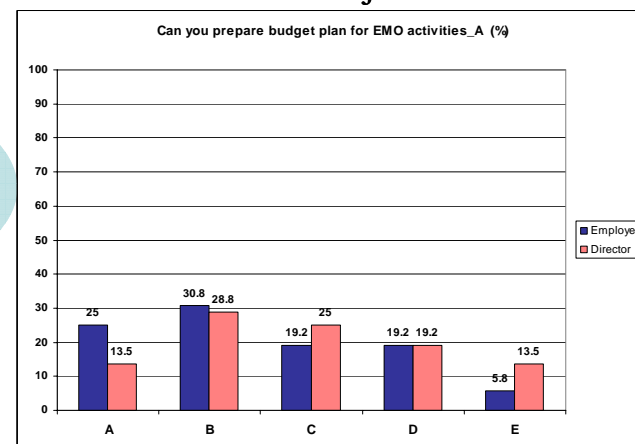
Before the Project



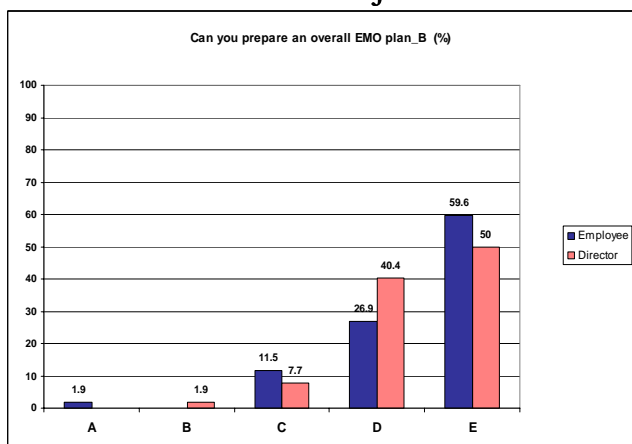
Basic Water Quality

Can you prepare budget plan for EMO activities?

After the Project



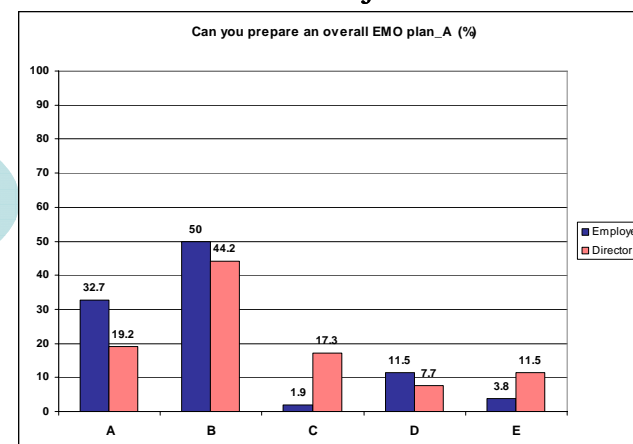
Before the Project



Basic Water Quality

Can you prepare an overall EMO plan?

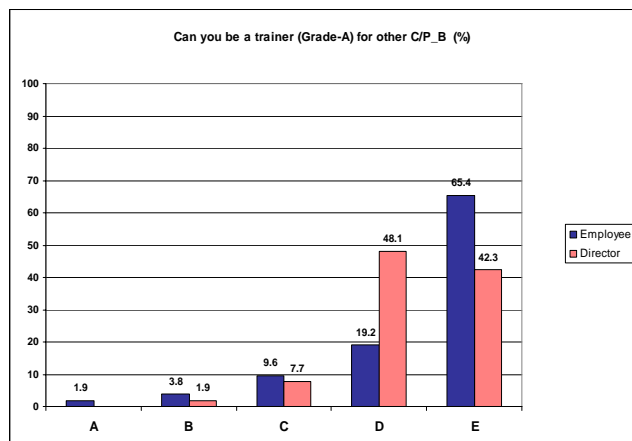
After the Project



A: achieving/improving more than 80%, B: 80-60%, C: 60-40%, D: 40-20%, E: less than 20%.

Impact on Individual Level (2/8)

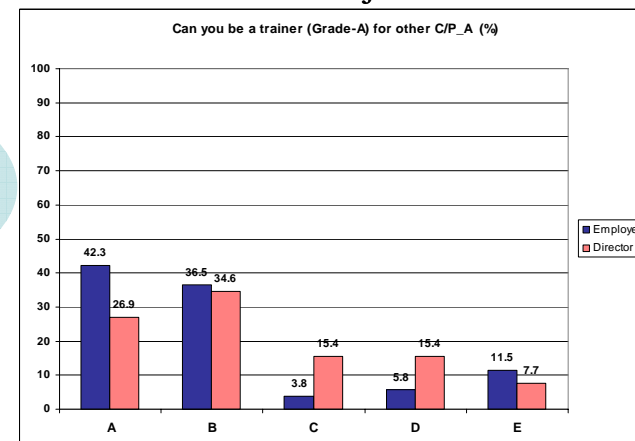
Before the Project



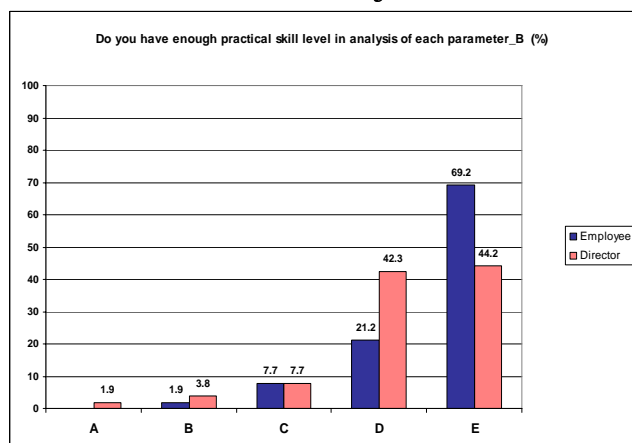
Basic Water Quality

Can you be a trainer (Grade-A) for other C/P?

After the Project



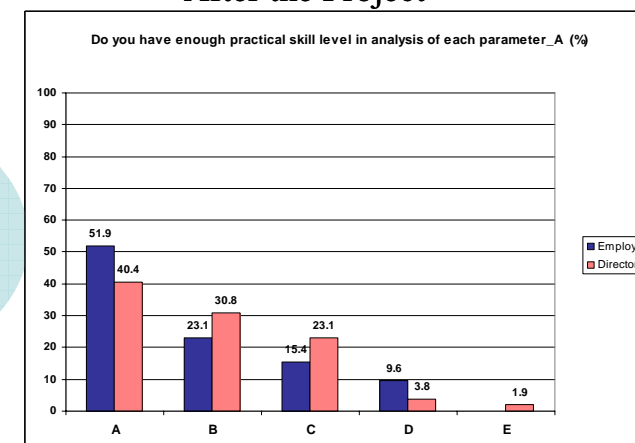
Before the Project



Basic Water Quality

Do you have enough practical skill level in analysis of each parameter?

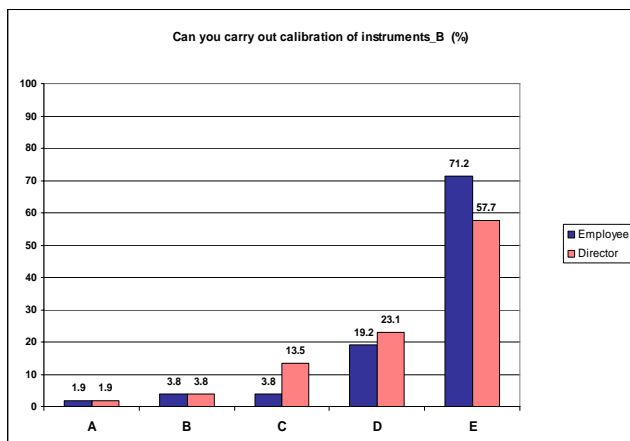
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Individual Level (3/8)

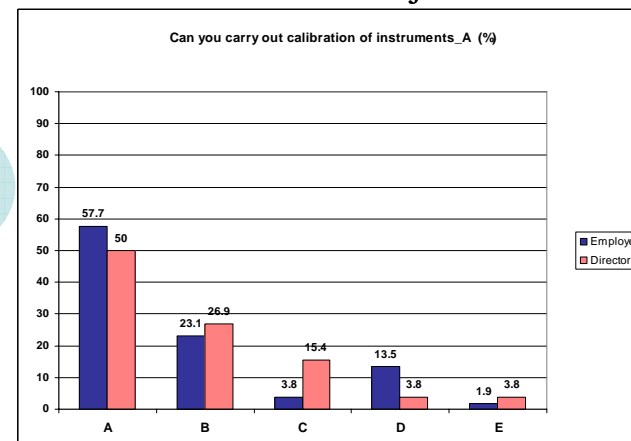
Before the Project



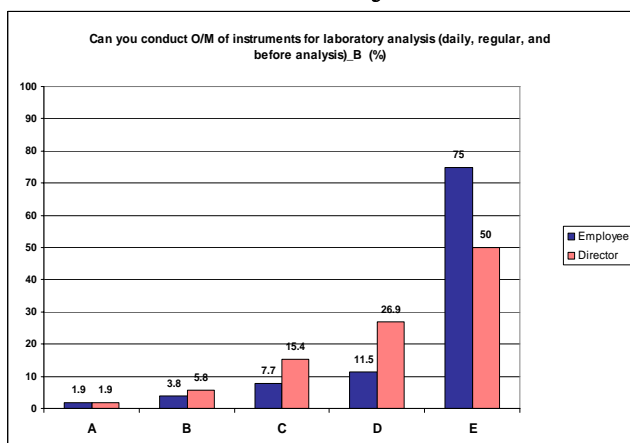
Basic Water Quality

Can you carry out calibration of instruments?

After the Project



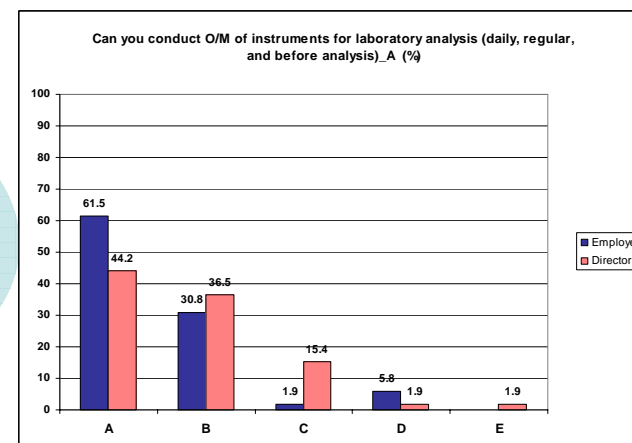
Before the Project



Basic Water Quality

Can you conduct O/M of instruments for laboratory analysis (daily, regular, and before analysis)?

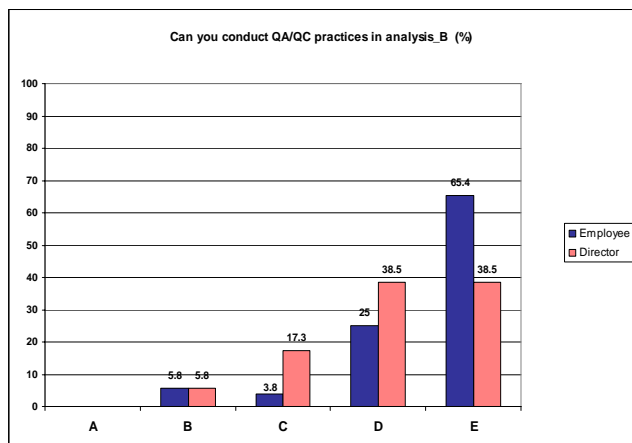
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Individual Level (4/8)

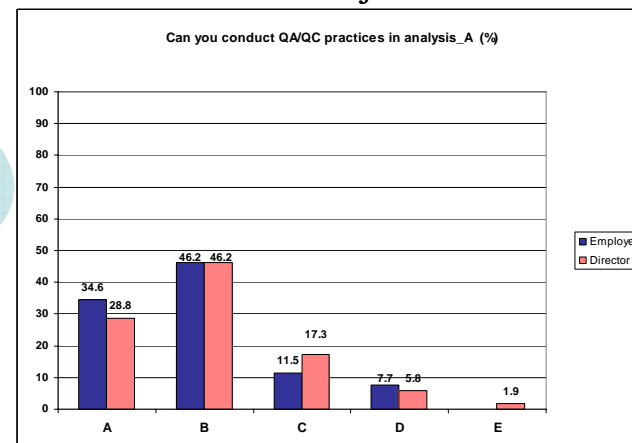
Before the Project



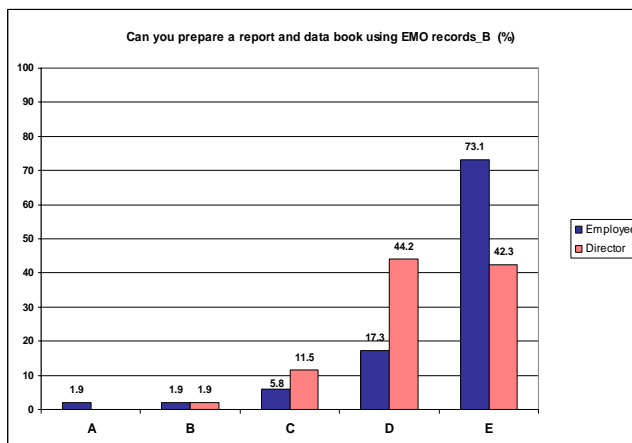
Basic Water Quality

Can you conduct
QA/QC practices in
analysis?

After the Project



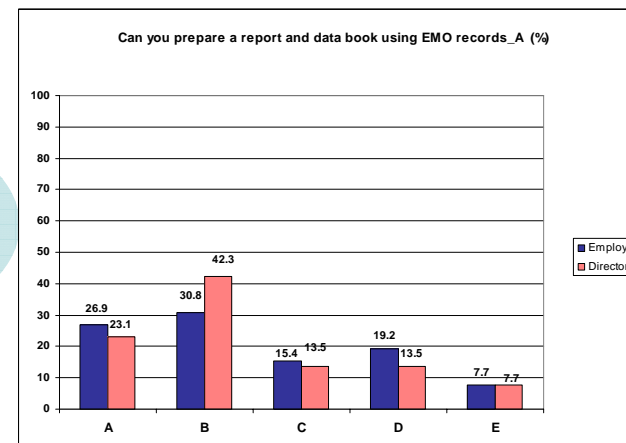
Before the Project



Basic Water Quality

Can you prepare a
report and data book
using EMO records?

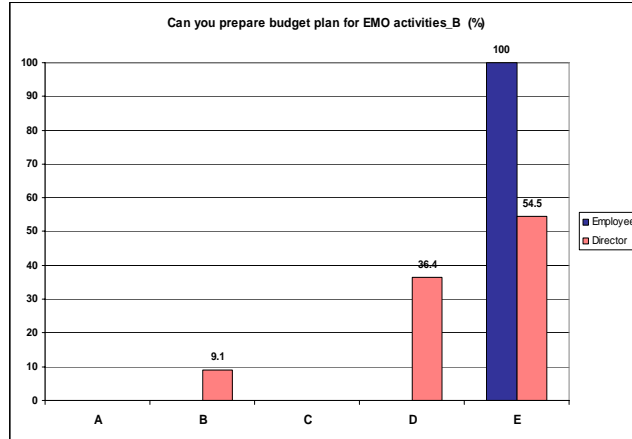
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Individual Level (5/8)

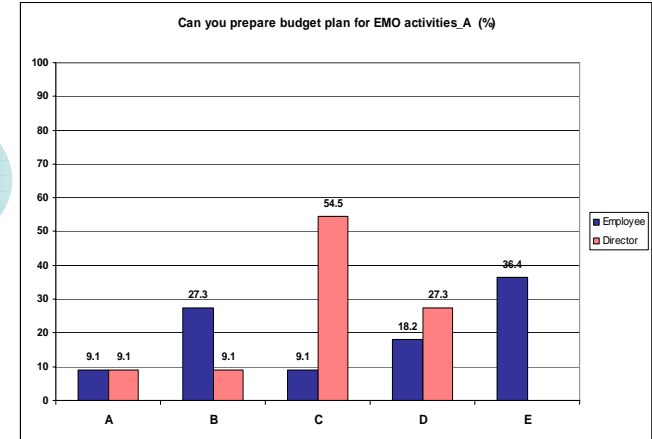
Before the Project



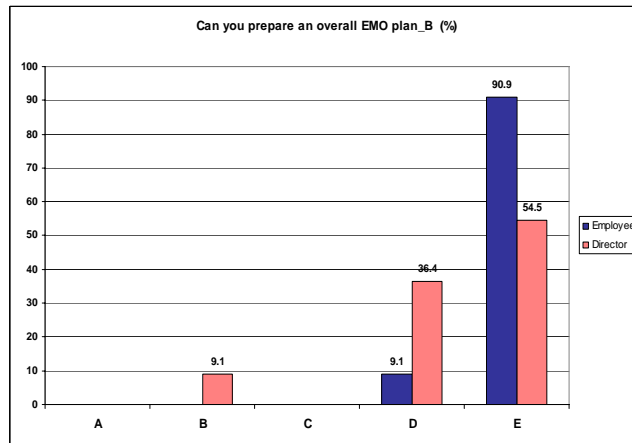
Air Quality

Can you prepare budget plan for EMO activities?

After the Project



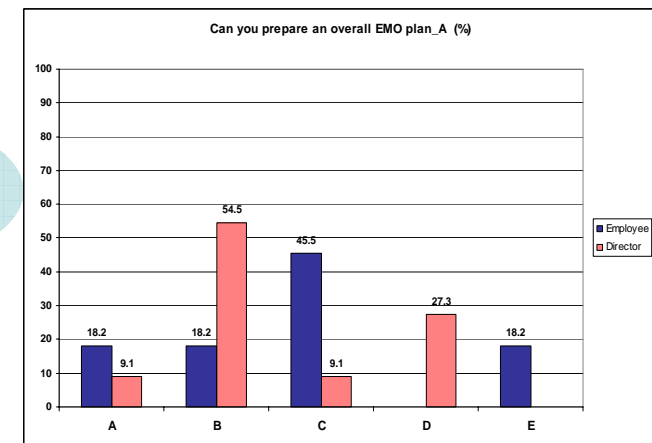
Before the Project



Air Quality

Can you prepare an overall EMO plan?

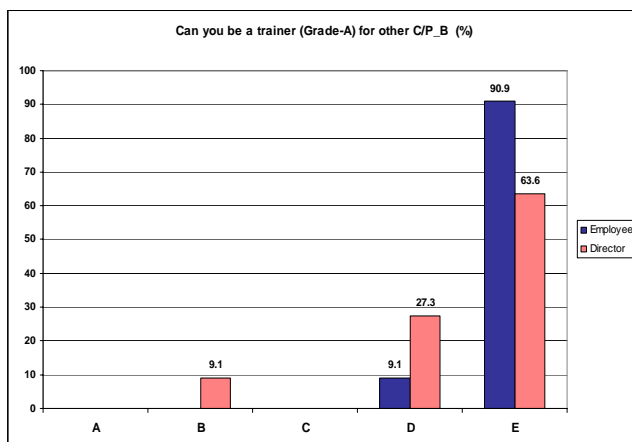
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Individual Level (6/8)

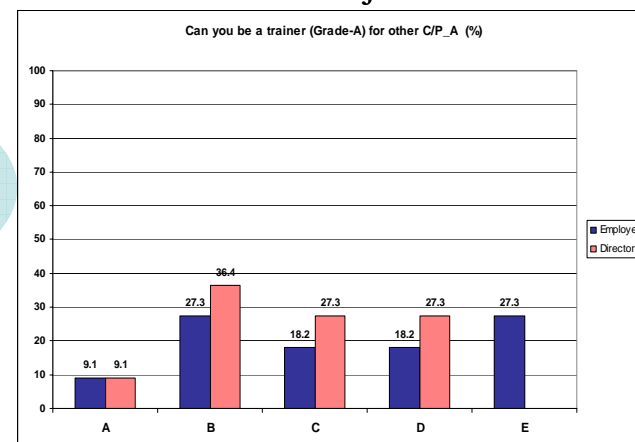
Before the Project



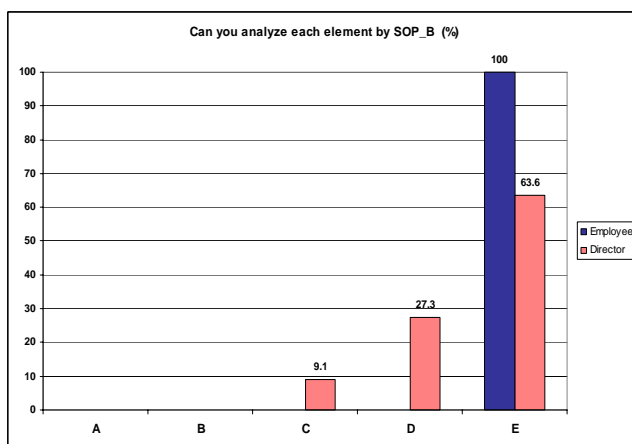
Air Quality

Can you be a trainer
(Grade-A) for other
C/P?

After the Project



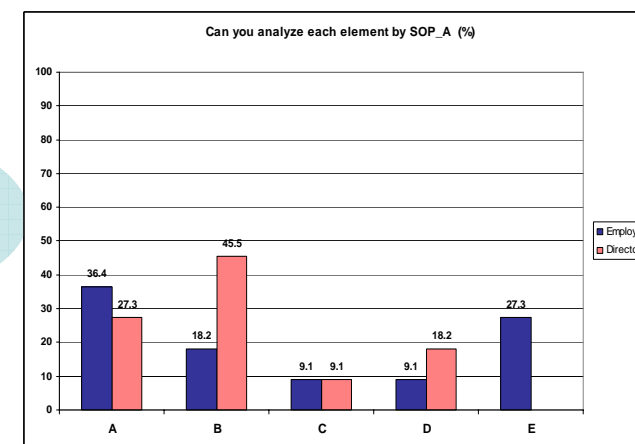
Before the Project



Air Quality

Can you analyze each
element by SOP?

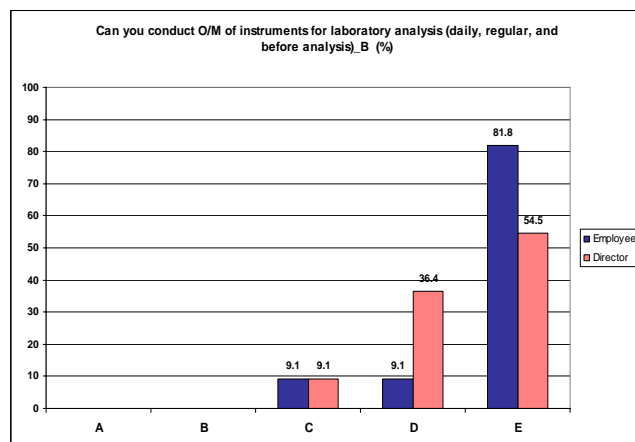
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Individual Level (7/8)

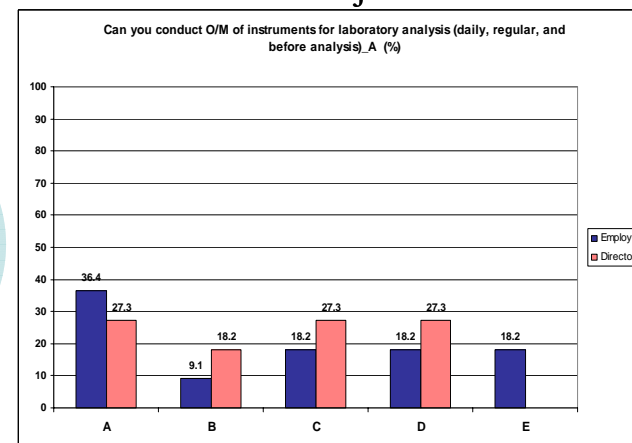
Before the Project



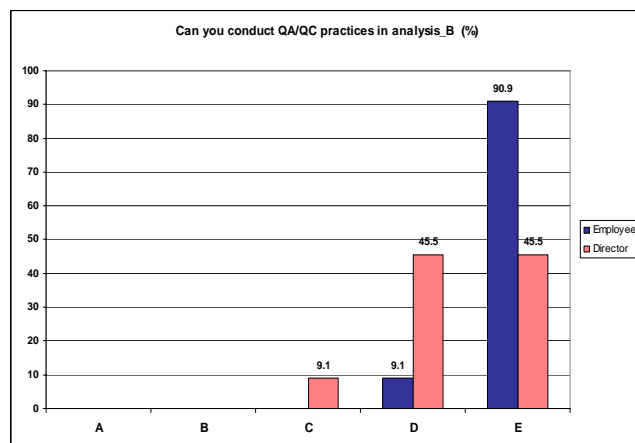
Air Quality

Can you conduct O/M of instruments for laboratory analysis (daily, regular, and before analysis)?

After the Project



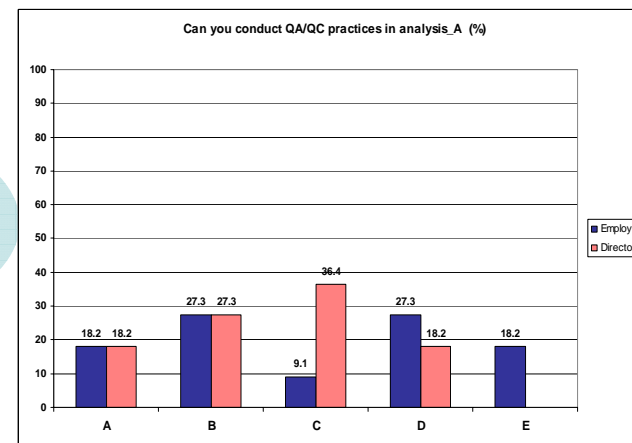
Before the Project



Air Quality

Can you conduct QA/QC practices in analysis?

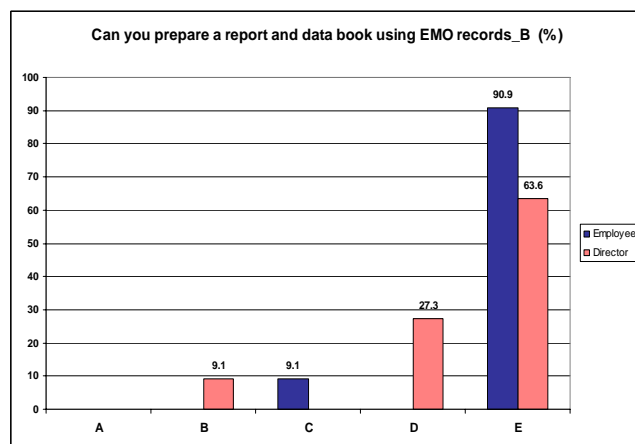
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Individual Level (8/8)

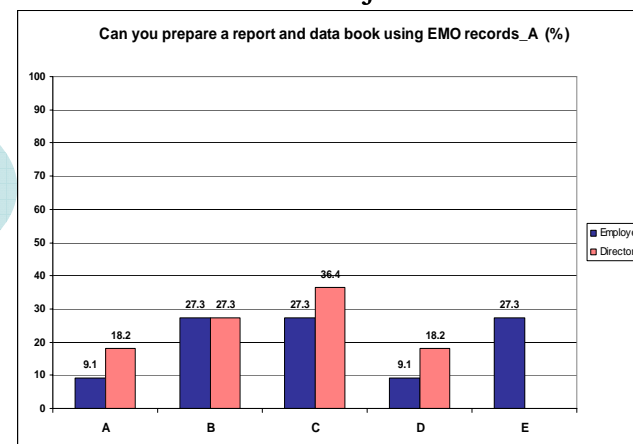
Before the Project



Air Quality

Can you prepare a report and data book using EMO records?

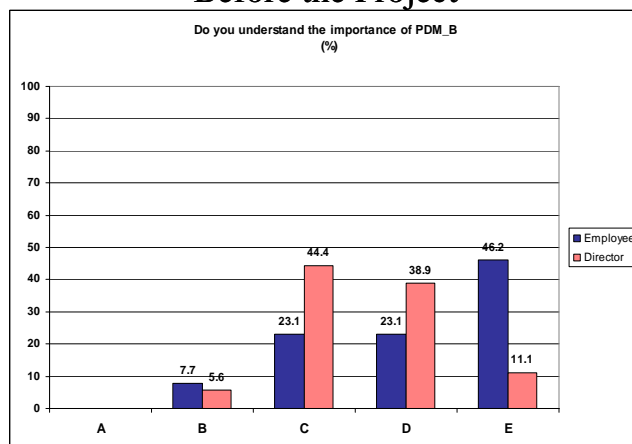
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Organizational Level (1/5)

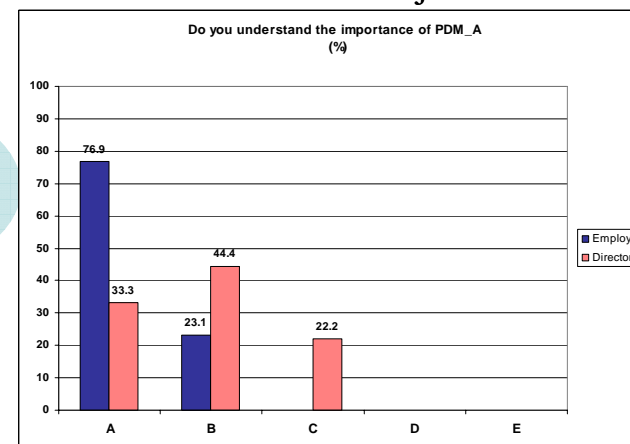
Before the Project



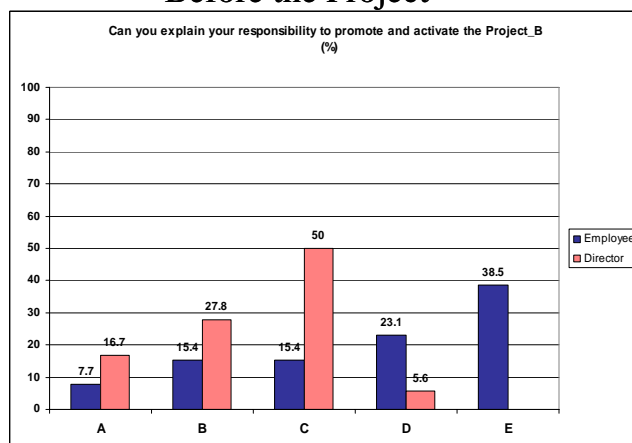
Project Management

Do you understand the importance of PDM?

After the Project



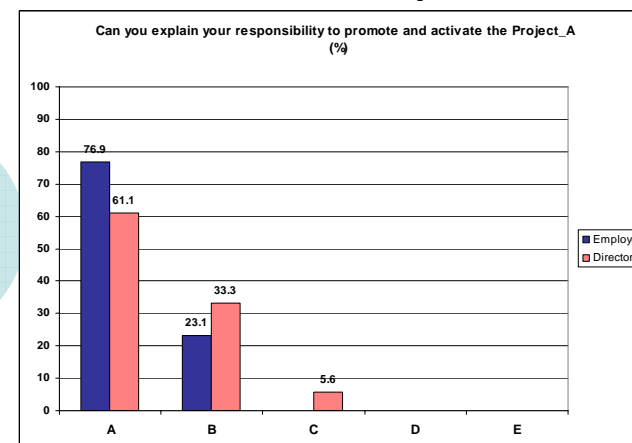
Before the Project



Project Management

Can you explain your responsibility to promote and activate the Project?

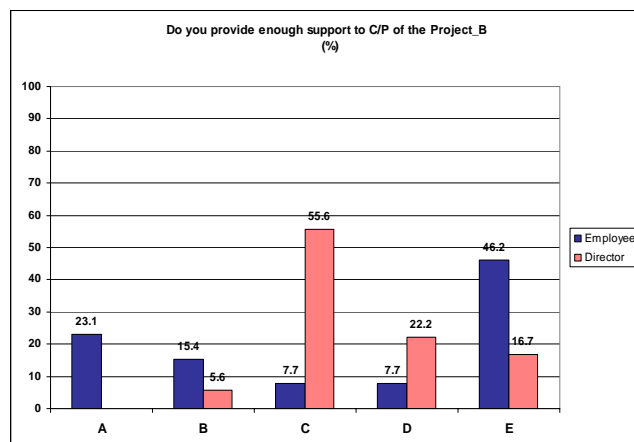
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Organizational Level (2/5)

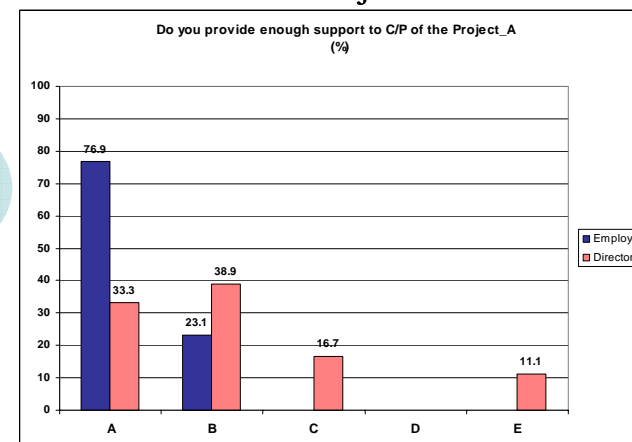
Before the Project



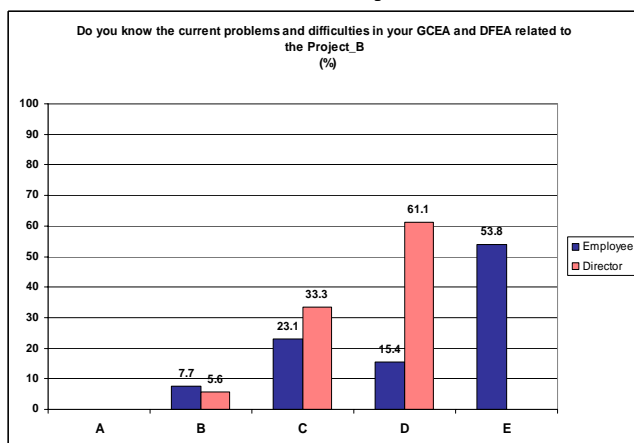
Project Management

Do you provide enough support to C/P of the Project?

After the Project



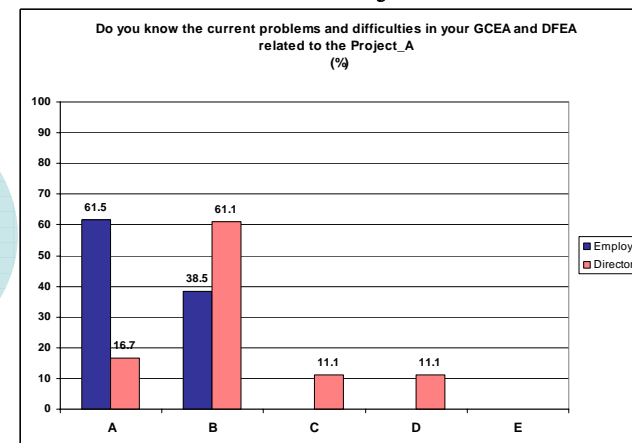
Before the Project



Project Management

Do you know the current problems and difficulties in your GCEA and DFEA related to the Project?

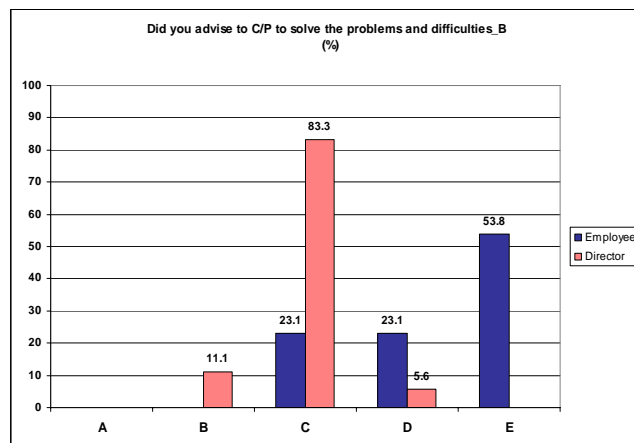
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Organizational Level (3/5)

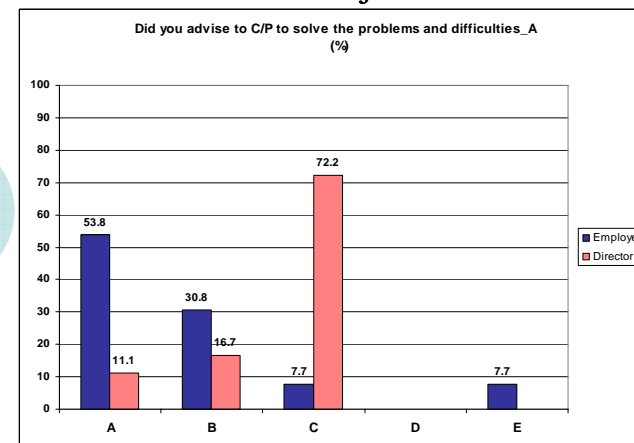
Before the Project



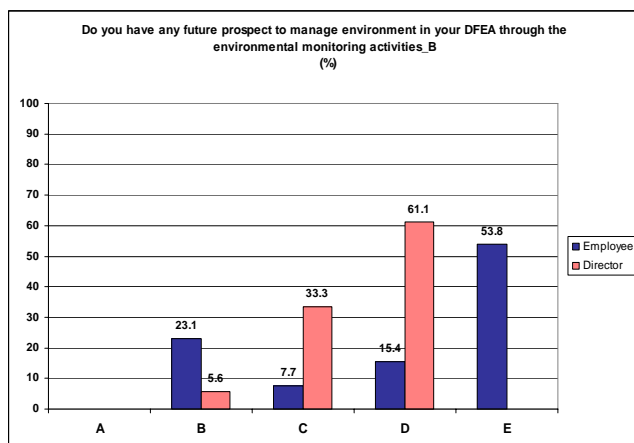
Project Management

Did you advise to C/P to solve the problems and difficulties?

After the Project



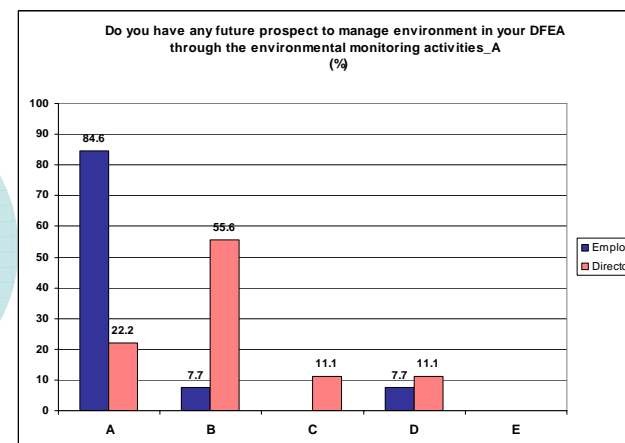
Before the Project



Project Management

Do you have any future prospect to manage environment in your DFEA through the environmental monitoring activities?

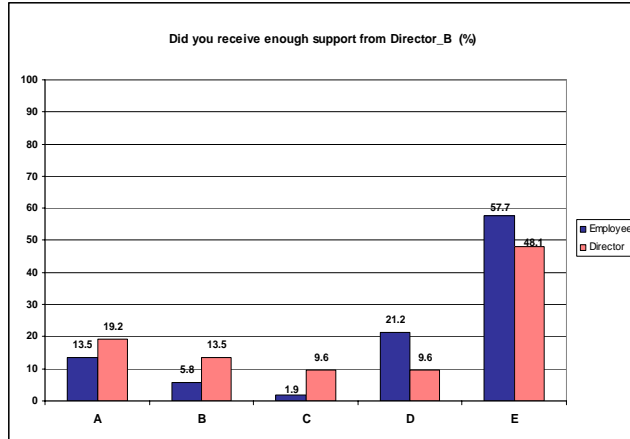
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Organizational Level (4/5)

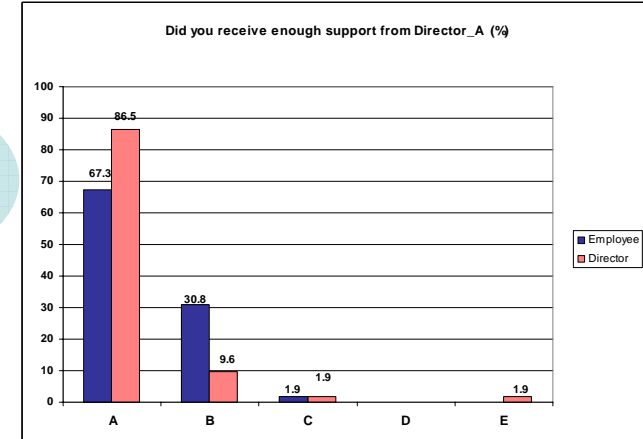
Before the Project



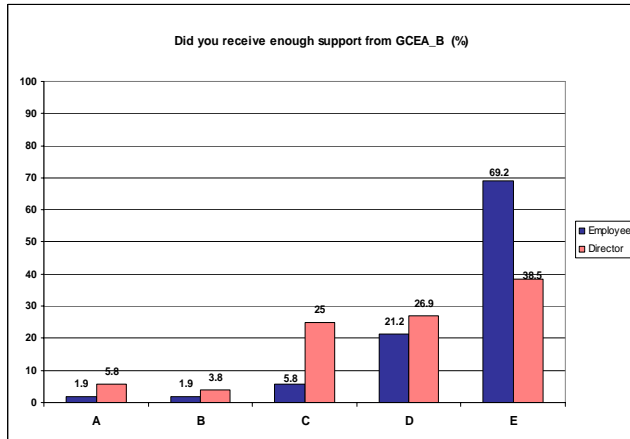
Basic Water Quality

Did you receive enough support from Director?

After the Project



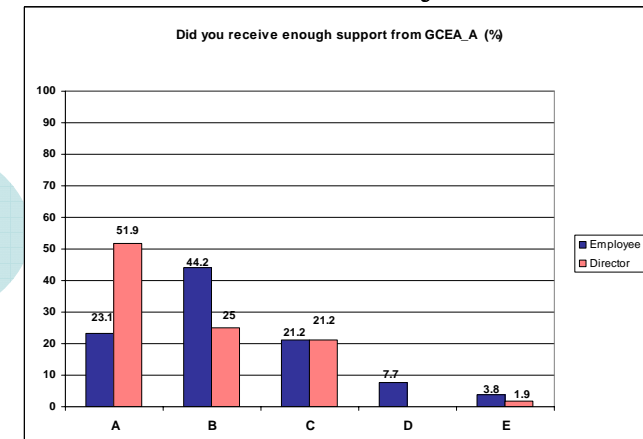
Before the Project



Basic Water Quality

Did you receive enough support from GCEA?

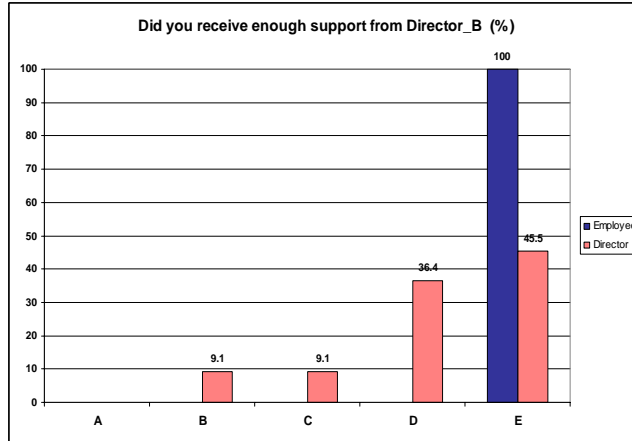
After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

Impact on Organizational Level (5/5)

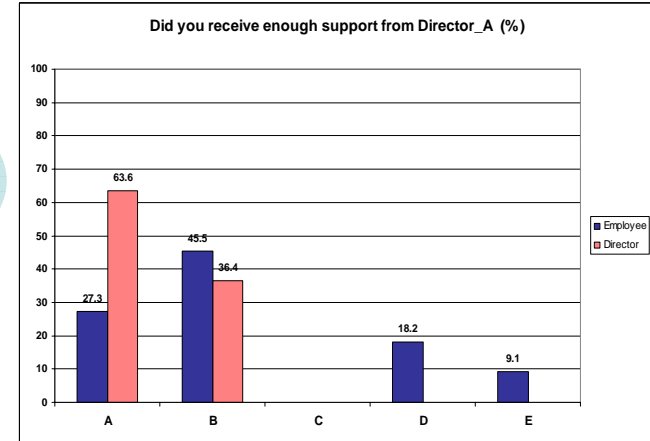
Before the Project



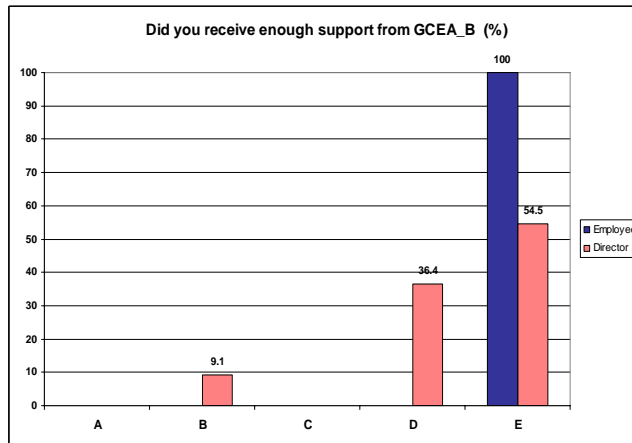
Air Quality

Did you receive enough support from Director?

After the Project



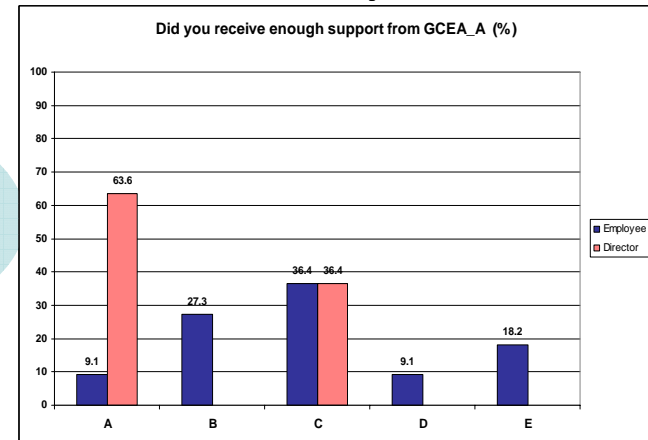
Before the Project



Air Quality

Did you receive enough support from GCEA?

After the Project



A: achieving/improving more than 80%, **B:** 80-60%, **C:** 60-40%, **D:** 40-20%, **E:** less than 20%.

6.3 Lessons Learned for Future Projects

(1) Importance of the Top Management

Although DFEA is an organization under GCEA officially, it is usually required for contribution to regional administrative activities on environment by close contact with the Governorate Office. This fact revealed that the roles and mandates of DFEA are directory linked with both GCEA and the local administrative bodies such as Governorate and Municipality. For example, DFEA is one of core members of the Environmental Committee in Governorate for dealing with environmental issues and problems in the Governorate territory, and the actual budget delivery for DFEA is fully under management of the Governorate Office. It means that a double focused administrative organization flow should be considered for the actual project management. Fortunately, both GCEA and Governorate are the organizations under MOLAE and their final decision maker is the Minister of MOLAE. Considering this administrative situation, a top management approach is substantial for the Project as described in Chapter 3.8 Advisory Activities.

(2) Clarification of Analysis Method

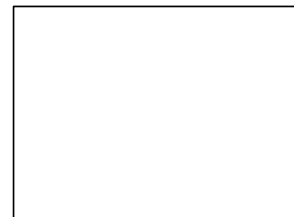
A selection of analysis method is crucial for technical training, and procurement of equipment and instruments. Although a methodology using equipment such as spectrophotometer and AAS is described in TOR given by the JICA Headquarters, an analysis method is not clearly mentioned in the Preliminary Evaluation Report of the Project. Since there is no public analysis method authorized by the Syrian Government, it brought about some confusion and problems especially for selection of equipment, accessories, reagents and chemicals. It is recommended to discuss and decide this matter with the Syrian side counterpart personnel in advance by the Preliminary Evaluation Mission.

(3) Disclosure and QA/QC of Monitoring Data

One of difficulties for achievement of objectives in PDM is publication and disclosure of monitoring data obtained by DFEA, because it closely linked with QA/QC level of lab analysis. Moreover, there is no national QA system in Syria guaranteeing traceability of analysis data. Normally, it is very difficult to publish and disclose actual monitoring data for lab before getting accreditation from authorized organization by the Government. Although the JICA Expert Team introduced several internal and external activities for ensuring QA/QC of lab analysis, it is the first trial of lab analysis for almost all counterparts. Therefore, it is recommended to set accreditation as the first project target and then to proceed publication and disclosure avoiding some abruptness.

(4) Grip Counterpart Information

Counterpart personnel are key and essential actors for capacity development project. From starting time of the Project, the JICA Expert Team tried to grip information of the counterpart and to up-date it timely by preparation of a personnel information sheet for all counterparts as shown below. This information is useful for periodic management and evaluation activities of the Project.

A- Personal Profile**Re.No.001-01-001 (up dated : Day/ Month/ Year)****Photograph****Data Sheet of C/P**

1. Personal Data			
(1-1) Name	Given name - Sir name	(1-2) Sex (Male / Female)	(1-3) Date of Birth Day/ Month/ Year (Age)
(1-4-1) Language	(1-4-2) Qualification Level (check current level)	(1-5) Specialty (Experienced years)	(1-6) Qualification (register No) and Association belonged
1)English	-Reading & Writing: A-B-C-D-E, -Listening & Speaking: A-B-C-D-E		
(1-7) Education Final	(1-7-1) Name of Facility / Faculty/ Major (month/year --month/year)	(1-7-2) Qualification	(1-7-3) Title of Major
(1-8) Current Occupation	(1-8-1) Current Organization	(1-8-2) Current Position	(1-8-3) Appointment Period (month/year-month/year)
(1-9) Career Description	(1-9-1) Organization	(1-9-2) Position	(1-9-3) Appointment Period (month/year-month/year)
2. Assignment of the Project as C/P Personnel			
(2-1) Field	(2-2) Role and Period (month/ year-month/year)	(2-3) Position	(2-4) Current Situation (month/ year)
(2-5) Record of Trainings and Seminars	(2-5-1) Title of Trainings and Seminars (month/ year- month/year)	(2-5-2) Place and Organization	(2-5-3)Contents of Trainings
3. Field of Interest and Personal Objective to the Project			
(3-1) Field	(3-2) Aspect	(3-3) Items	(3-4) Details and Remarks
4. Personal Objective to the Project			
(3-1) Objective	(3-2) Field and Aspect	(3-3) Items	(3-4) Details and Remarks

B- Record of Training and Environmental Monitoring Activities

Re.No.001-01-001 **Mr. / Ms.** _____
(Date : _____ **)**

1. Personal Training Records

Lecture Training				
No.	Contents of Training	Place & Period d/m/y – d/m/y	Org'n	Items Learnt / Self-reliability Level (A-B-C-D-E)
. OJT and Hand-on Field Training				
I. Seminar and Workshop				
/ Training and Study Tour outside Syria				
. Other Training related to Environmental Monitoring				

2. Personal Activity Records of Environmental Monitoring

No.	Description of Activities	Period (m/y – m/y) & total days	Place	Self-reliability (A-B-C-D-E)	Note
Environmental Monitoring Activities (Water Quality)					
. Environmental Monitoring Activities (Air Quality)					
I. Data Management Activities					
I. Public Awareness and Environmental Education Activities					
. Other Activities related to Environmental Monitoring					

(5) Assignment of Laboratory Chief

Except for Homs DFEA, other 13 DFEA have not conducted regular base environmental monitoring by themselves. Considering this situation, the JICA Expert Team proposed to GCEA and DFEA to assign a lab chief for each DFEA in order to clarify responsibility of technology transfer, to motivate as a group leader of counterparts in DFEA, and to manage lab O/M keeping close communication with Director of DFEA. The lab chief is the first target for Level-A. Based on the agreement with GCEA, Director of DFEA nominated a lab chief.

The assignment of lab chief works well and effectively contributes achievement of target of the Project. Almost all lab chief remained in a position throughout of the Project period and have shown strong commitment to fulfill their duties. Thus, it is recommended that the lab chief should be an official position in DFEA in charge for lab analysis and environmental monitoring activities in DFEA.

7. REVISION OF PROJECT DESIGN MATRIX (PDM)

7.1 Mid-term Evaluation

The JICA Headquarters dispatched a mission headed by Mr. Mitsuo Yoshida for mid-term evaluation of the Project. The evaluation was conducted jointly with the Syrian side from 6 August to 24 August 2006. The Joint Evaluation Team collected the information through questionnaires and a series of interviews with the Syrian C/P personnel and the JICA Expert Team at GCEA and the target DFEAs. The Joint Evaluation Team also conducted a field observation in the Damascus, Aleppo, Lattakia, Idleb, and Tartous DFEAs. The Joint Evaluation Team prepared a draft evaluation report and finalized it through a series of discussions on 21 August, 2006. The results of the mid-term evaluation was presented and discussed in the 5th Steering Committee held on 23 August 2006.

(1) Revision of PDM

The revision of PDM was not carried out at the Mid-term Evaluation though minor changes of items and wordings such as “Environmental Monitoring Plan”, “Environmental Monitoring Guideline”, and “the Laboratory O/M manual” were corrected. The PDM agreed in the Mid-term Evaluation which was attached with the Minutes of Meeting signed on 21 August, 2006, is shown in the next pages.

I Revised Project Design Matrices

Project Name: Capacity Development on Environmental Monitoring of Directorates for Environmental Affairs in Governorates in Syrian Arab Republic
 Target Area: 14 Governorates (different target level is targeted) Target Group: -115 staffs of the Directorates and MOLAE
 Date of Issuing: 22 August 2006
 -all the staff of the Directorates and MOLAE
 -attendants for seminars and workshops held by the Directorates
 -17 million inhabitants of Syria,
 especially 9.2 million inhabitants of Damascus, Aleppo, and Homs Governorates

Project Duration: from January 2005 to January 2008 (3 years)		Version No.: for Mid-term Evaluation	
Narrative Summary		Objectively Verifiable Indicators	Means of Verification
Overall Goal Environmental monitoring system and publication of the monitoring results are introduced at and spread to all the Directorates.	1. All the Directorates conduct monitoring of air on regular basis according to the monitoring plan formulated by themselves by five years after the completion of the project 2. Roles for the national monitoring system are properly allocated among the Directorates. (reference system) 3. Results of the monitoring is continuously issued and opened to the public as an annual report at all Governorates. 4. Results of the monitoring is issued and opened to the public as an annual report at the national level.	1. Monitoring records kept by the GCEA, MOLAE. 2. Annual report issued by all Directorates. 3. Annual report issued by the GCEA, MOLAE.	The Syrian government keeps its policy support for environmental protection. The Syrian government keeps its policy support to provide staff, equipment and budget to the rest of the Directorates
	Project Purpose The target Directorates for Environmental Affairs in Governorates are capable to introduce and conduct regular monitoring of required parameters for water and air quality according to the monitoring plan formulated by the Directorates themselves and to implement activities for public awareness including publication of the monitoring results.	1. Analysis technology level to be targeted is as follows: ■ Damascus : (water) chemical and biological analysis level ■ Aleppo and Homs : (water) basic analysis level, ■ other 11 Directorates: (water) manual sampling level 2. The target Directorates conduct monitoring of water and air on regular basis according to the monitoring plan formulated by themselves 3. Activities for public awareness are implemented in four (4) Directorates at least out of fourteen (14) Directorates. 4. Monitoring results are issued and continuously opened to the public as an annual report at Governorate level.	1. Monitoring records kept by the target Directorates and GCEA. 2. Annual report issued by the target Directorates.
Outputs In the target Directorates: 1. Technical level of laboratory staff concerning environmental sampling and analysis is improved.		1-1 All laboratory staff conduct environmental monitoring according to the SOP compiled by the project by three years after the commencement of the project. 1-2 All laboratory staff reach the grade B* level on monitoring items in charge by three years after the commencement of the project. 1-3 50%* of laboratory staff reach the grade A* level on monitoring items in charge by three years after the commencement of the project.	1-1 Environmental monitoring records 1-2 Training record 1-3 Training record
			Execution instructions are promulgated.

PDM Revised in the Mid-Term Evaluation (Revised on 22 August 2006) (1/3)

2. Laboratories are properly managed by laboratory staff themselves.	2-1 Equipment in laboratories are properly operated and maintained according to the o/m manual compiled by the laboratory staff by three years after the commencement of the project. 2-2 Spare parts and consumable materials management system is established by three years after the commencement of the project. 2-3 Chemical reagents are properly stored and cared according to the o/m manual by three years after the commencement of the project. 2-4 Liquid and solid wastes from laboratory are properly treated according to the o/m manual by three years after the commencement of the project. 2-5 Each Directorate prepares its budget plan for regular monitoring.	2-1 O/m record 2-2 Spare parts & suppliers list 2-3 O/m record 2-4 O/m record 2-5 Annual budget of Directorates	
3. Environmental analysis data is accumulated and properly managed.	3-1 Monitoring data collected and analyzed are accumulated in the monitoring records by three years after the commencement of the project.	3-1 Data file management record	
4. Laboratory staff is able to formulate an environmental monitoring plan specifying parameters required.	4-1 Environmental monitoring plan specifying parameters and monitoring sites is formulated in respective laboratory by one year after the commencement of the project. 4-2 environmental monitoring guideline is introduced into a standard for all laboratories by three years after the commencement of the project.	4-1 Monitoring guideline 4-2 Laboratory operation and maintenance manual (o/m manual)	
5. The results and data acquired by the Project is open to and shared with the citizens of the target Directorates. Staff of target Directorates is able to formulate its action plan for public awareness and environmental education.	5-1 Preliminary condition on public awareness is comprehended by each governorates and shared among the organizations concerned. 5-2 Materials for activities for public awareness, such as textbooks, manuals, and pamphlets are prepared. 5-3 Seminars and workshops targeted for educational institutions and so forth are conducted. 5-4 Periodical network meeting among organization and/or institutions regarding to environmental education in each governorate are organized.	5-1 Report of preliminary survey at each governorate 5-2 List of activity materials 5-3 Report of seminars and workshops 5-4 Report or minutes of meeting	

Activities	Narrative Summary	Inputs	Important Assumptions
1.1 Compilation of the SOP for samplings, analysis, interpretation, evaluation, data filing and reporting. 1.2 Training in theory for making monitoring plans, samplings, analysis, interpretation, evaluation, data filing and reporting. 1.3 Hands-on trainings in sampling, pretreatment, analysis, interpretation, evaluation, data filing and reporting. 1.4 On-site OJT in sampling, analysis, interpretation, evaluation, data filing and reporting.	<u>Syrian Side Inputs</u> (1) Land, building, laboratories, office space and other necessary facilities for the project. (2) Assignment of counterparts and administrative personnel. (3) Running expenses for the implementation of the project. <u>Japanese Side Inputs</u> (1) Dispatch of experts team (2) Provision of equipment		Laboratory staffs trained by the project stay in laboratories and keep working on the environmental monitoring. Agents/manufactures timely provide spare parts for the equipment.

PDM Revised in the Mid-Term Evaluation (Revised on 22 August 2006) (2/3)

<p>2.1 <u>Compilation of the laboratory eim manual for equipment operation and maintenance, spare parts preparation, reagents storage and treatment, liquid and solid laboratory wastes treatment and others.</u></p> <p>2.2 <u>Hands-on trainings at equipment operation and maintenance, reagents storage and treatment, liquid and solid laboratory wastes treatment and others.</u></p> <p>2.3 <u>Provide necessary assistance and guidance to prepare Directorates' budget plan for regular monitoring.</u></p>	<p>3.1 <u>Design the monitoring record formats for laboratories and for the GCEA in the MOLAE.</u></p> <p>3.2 <u>Complete monitoring records in each Directorate.</u></p> <p>3.3 <u>Send the monitoring records from Directorates to the GCEA in the MOLAE.</u></p>	<p>4.1 <u>Conduct preliminary pollution source inventory surveys.</u></p> <p>4.2 <u>Specify monitoring sites and their parameters.</u></p> <p>4.3 <u>Formulate the environmental monitoring plan specifying parameters and monitoring sites in respective laboratory.</u></p> <p>4.4 <u>Provide necessary assistance and guidance to introduce the environmental monitoring guideline into a standard for all laboratories.</u></p>	<p>5.1 <u>To conduct preliminary survey on activities regarding to environmental education and public awareness in each governorate</u></p> <p>5.2 <u>To formulate textbooks, manuals, and pamphlets for environmental education.</u></p> <p>5.3 <u>To implement seminars and workshops targeted for educational institutions and NGOs and so forth.</u></p> <p>5.4 <u>To enhance the cooperation among organizations and/or institutions regarding to environmental education in each governorate (ex. to implement periodical meeting)</u></p>	<p>Pre-conditions</p> <p>1. Appropriate number of laboratory staff who have chemical background are assigned in the target Directorates for Environmental Affairs in Governorates.</p> <p>2. Laboratory spaces are prepared in the target Directorates for Environmental Affairs in Governorates.</p> <p>3. Adequate waste water treatment plants shall be prepared before starting laboratory chemical analysis training in the target Directorates for Environmental Affairs in Governorates.</p>
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Note: 1. *Grade A: be able to analyze samples, evaluate the data, and determine them on his/her own.
2. *Grade B: be able to analyze samples and work out the data, but need decision by the superior to evaluate and determine the data.

Abbreviations: MOLAE: the Ministry of Local Administration and Environment
Directorate: Directorate for Environmental Affairs in Governorate
GCEA: General Council for Environmental Affairs, MOLAE
SOP: Standard Operation Procedures
oim: operation and maintenance
OJT: On-the-Job Training

PDM Revised in the Mid-Term Evaluation (Revised on 22 August 2006) (3/3)

(2) Results of Evaluation

The following evaluations were made by the mid-term evaluation, which were described in the Minutes of Meeting for the mid-term evaluation on 21 August, 2006.

Evaluation Results in the Mid-Term Evaluation

Evaluation
<p>1) Implementation Process</p> <p><u>Communication among project members</u> Various kinds of Communication tools have been applied in the first half period of the Project. The first, Steering Committee and Technical Committee are key coordination bodies which are responsible for administrative and technical coordination respectively between the Japanese and Syrian sides. Second, weekly regular meeting between GCEA and the JICA Expert Team (JET) introduced since June 2006 chaired by General Director of GCEA is a crucial communication tool. The meeting provided opportunities for keeping in mind of the project progress and for mutual coordination. There are some others such as Project News Letter named Humat Beia and networking among GCEA and DFEAs. The networking is in progress and some has done.</p> <p><u>Counterpart assignment</u> A total number of counterparts are now 115 (staffs for basic water quality analysis;88), which is more than two times larger than initial stage, however, approximately 20% of laboratory staff has been changed since the Project commenced, and their background and quality are rather unpractical for application of chemical analysis. In Aleppo DFEA, a lack of laboratory staff is still major obstacle to operate regular environmental monitoring activity.</p> <p>Language problem was found in the communication between JET and the counterparts. In particular, in the case of the Damascus DFEA, Arabic-English interpretation was rather poor for good understanding of technical matters by counterparts. In addition, English language skill of the counterparts has been gradually improving during the first half period of the Project, but it is still insufficient for technical communication in the course of training by JET.</p>
<p>2) Relevance</p> <p><u>Conformity with Syrian National Policy, Legal System, and Needs</u></p> <p><u>National Development Policy:</u> In terms of Syrian national policy represented by Five-Year National Development Plan currently issued 10th version (2006-2010), environmental sector is described in Chapter 18 Environment and Disaster Management. For the Environmental sector plans that 1) consistency of implementation of environmental policy, 2) capacity development of environmental sector, 3) understanding of environmental conditions in Syria are stipulated as the target. An enhancement of environmental institutional setup, organizational strengthening and establishment of national environmental monitoring network are measures to be taken for the achievement of the plan which are partly proposed outputs and purpose of the project. Hence, the Project contributes for implementing the National Development Policy in different manners.</p> <p><u>Legal Framework</u> The legal framework for environmental management in Syria is as follows: -1987, the State Ministry of Environmental Affairs was established. -1991, the General Commission for Environmental Affairs (GCEA) was established. -2002, the Environmental Protection Law (No.50) was issued. -2003, the GCEA merged with the Ministry of Local Administration. -2004, the Executive Instruction for Environmental Protection Law (No.50, 2002) were enacted, which include inspection system based on monitoring data. Accordingly, the Project does not contradict with the legal framework but it has conformity especially in regards to establishing function environmental monitoring system.</p> <p><u>Local needs:</u> Environmental conditions were unclear due to a lack of environmental monitoring system even after Directorate for Environmental Affairs (DFEA) were established in each governorate. All 14 directorates were set in the beginning of 2004 while in Governorates environmental awareness were arose only in line with number of claims by citizens, thus it had been strong needs to have appropriate measures to monitor the environment. The project is catering to the needs through the capacity development of environmental monitoring.</p> <p><u>Conformity with Japan's ODA (Official Development Assistance) Policy</u> Four major fields of cooperation in Syrian which are 1) modernization of socio-economic system, 2) water resource management and effective utilizations, 3) improvement of social services, 4) environmental protection are important measures by Japan's ODA policy. The Project belongs to the environmental protection and Japan's has accumulates past experiences in environmental management.</p> <p><u>Appropriateness of Target Group</u> All DFEAs (14) were targeted in different monitoring levels and parameters. There were no DFEA which could carry out regular environmental monitoring. Only the Homs DFEA had processed on their way and Lattakia DFEA had not</p>

Evaluation	
functional before the commencement of the Project. In this regard, it was appropriate measure to facilitate environmental monitoring system in all DFEAs in order to extent effective environmental administration in all over Syria.	
3) Effectiveness	<p><u>Establishment of Laboratories at DFEAs</u></p> <p>Under the efforts by both sides, laboratory in each DFEA has established with necessary analytical equipments and environmental sampling in basic water quality has been carried out by themselves based on Environmental Monitoring Plan, then the samples were analyzed in accordance with SOP. The establishment of functional laboratories, one of the most important output in the first half period of them, has created the effective grounds to achieve the Project purpose in the mid point of the Project.</p> <p><u>Authorization of Laboratory</u></p> <p>In order to publish the environmental monitoring data analyzed at DFEAs laboratories, GCEA has a policy to disclose them to the public through the annual report and the GCEA web site. However, DFEA laboratories have not yet authorized laboratories so that the monitoring data could not be published.</p>
4) Efficiency	<p><u>Timing, Quantity and Quality of Inputs</u></p> <p>Syrian side made larger efforts to provide laboratory space, counterpart personnel, on the other, Japanese side supplied necessary equipment and assigned JET.</p> <p>Equipment:</p> <p>It did not meet the timing between JET assignment and equipment supply at beginning stage, so that the project implementation had been facing some difficulties and limitations. However, currently equipment supply is smooth even it takes time to procure them.</p> <p>Concerning the chemical waste water disposal plant, it was not installed before starting the training of chemical analysis. The plant will be installed in coming last half period.</p> <p><u>Target Group (14 DFEAs were targeted)</u></p> <p>All DFEAs (14) were selected for the target group and training for basics water quality analysis covers all DFEAs. On-site training at each DFEA was quite effective for achieving good technology transfer rather than a group training at a certain DFEA such as Damascus.</p> <p><u>Third –country training (Training in Egypt)</u></p> <p>In cooperation with JICA's project in Egypt, a study tour to EEAA and CCC in Egypt was done for showing an example of established environmental monitoring system to Syrian counterpart in the first half period. The study tour was efficient because it was designed for Arabic language spoken country where similar project is implemented by JICA.</p>
5) Impact	<p><u>Mobile Laboratory provided by GCEA</u></p> <p>GCEA has procured six (6) mobile laboratories including analytical equipments which cover air and water quality analyses (Oil Content Meter, UV/VIS Spectrophotometer, VOC measurement tools, Dust/Aerosol measurement tool, working environmental measurement equipment) by own budget. It is great efforts for enhancing monitoring capacity of DFEAs, however, it is undefined purposes. It is necessary to clarify the purpose of procurements in accordance with environmental monitoring plan and existing capacity in DFEAs.</p> <p><u>Reference Laboratory System</u></p> <p>A reference laboratory system is becoming realistic needs for GCEA and DFEAs in order to secure their monitoring quality. There are two ways for having reference system; one is to develop one of DFEA as a central laboratory, which may play a leading role in analysis.</p> <p>The other is quality control management using standard samples supplied by third party. GCEA has been trying to have authorization of laboratory and coordinated with Atomic Energy Commission (AEC). In this regards, DFEA laboratories would be better to attend and to follow up the National Program for Chemical Analysis and Quality Control by AEC.</p>
6) Sustainability	<p><u>Environmental Institutional Aspect</u></p> <p>Executive Instruction for Law No.50 (2002), Dec.2004 which described Environmental Inspection System in the Article Seven. However, the contents of the Executive Instruction can be considered as a legal framework of the environmental management in Syria. The implementation of the Project leads to strengthening of the institutional framework and organizations in charge.</p> <p><u>Organizational Aspect</u></p> <p>Communication among GCEA and DFEAs were accelerated by the project implementation. Series of meeting such as Steering Committee, Technical Committee which consist of directors of DFEA and GCEA officials contributed to mutual communication. As the result, organizational capacity was more or less enhanced at GCEA and DFEAs by the Project as a catalyst.</p> <p><u>Human Resources Aspect</u></p> <p>In most DFEAs, the laboratory staff number has increased past 18 months to secure the sustainability of their laboratories.</p> <p><u>Financial Aspect</u></p> <p>Economic tools, e.g. Environmental Fund shall be considered for financial stability for environmental monitoring in accordance with legal instruments. Currently some DFEAs have faced difficulties to get fuel for sampling car due to a lack of budget.</p> <p>National Committee for public Awareness and Environmental Media</p> <p>The Committee chaired by GCEA was established after the project commencement and environmental monitoring information from DFEA laboratories would be utilized for arising public awareness especially in industrial sector.</p>

Evaluation
<u>Water Quality Information</u> Based on legal framework, GCEA manages discharge water quality standard and Environmental Inspection as Executive Instruction of Law No.50 (2002). In this regard, GCEA could improve their administrative capacity using basic water quality monitoring data.

(3) Recommendations

The following recommendations were made by the mid-term evaluation, which were described in the Minutes of Meeting for the mid-term evaluation on 21 August, 2006.

1) Environmental monitoring data should be utilized for effective environmental management, such as characterization, assessment and enforcement. As mentioned above, it is rather limited for GCEA and DFEAs before the lab authorization. However, it is possible to use the monitored data for the risk communication with the industrial firm (polluters) as a kind of public awareness activity. It is recommended to intensify such public awareness activities in selected DFEAs having industrial pollution sources. It may contribute to establish an effective environmental protection based on environmental monitoring data.

2) Safety management of DFEA laboratory in one of the important issues to be consider in coming last half period of the project term. There are various types of chemicals including toxic and hazardous materials in DFEA laboratories. The laboratory manager should pay enough attention to the toxic and hazardous chemicals and strictly control them using looking cabinet and log book/inventory.

3) It is indispensable to assess the development of individual capacity in the course of project implementation. The directors of DFEAs and GCEA are recommended to make personnel evaluation of their laboratory staff in cooperation with the JICA Expert Team.

4) The total number of DFEAs and GCEA staffs are now 115, which is more than two times larger than initial stage, however, approximately 20% of laboratory staffs has been replaced since the Project commenced. It is strongly recommended to bring up new lab staffs through internal training and technology transfer programme by experienced staffs in each DFEA. Such internal efforts by the Syrian side secure the sustainable operation and maintenance of DFEA laboratories.

5) In the first half period of the Project term, GCEA introduced a variety of analytical instruments for DFEAs as mobile lab which involves several water and air monitoring tools. It was indeed great self-efforts for developing the monitoring capacity of DFEAs by the Syrian side, which is closely related for accessing to the Project Overall Goal. It is recommended to make necessary communication between GCEA and the JICA Expert Team on such matters prior to introduce equipment in order to coordinate current capacity development activities by DFEAs and the JICA Expert Team. It is also emphasized that the JICA Expert Team cannot afford to accommodate sudden

request operation training for such equipment which has not been agree in advance between Syria and Japanese sides.

6) From the view point of public awareness in environment, the result of environmental monitoring acquired by the Project should be shared with the public. The Project shall focus the public awareness activities on industrial sector in coming last half period. It is recommended to formulate an action plan on public awareness activities for industrial sector in target DFEAs, at least 4 DFEAs out of 14 DFEAs.

7) It is recommended to accelerate the authorization process of the DFEA laboratory in order to activate legal inspection and enforcement to polluters. The authorization also makes possible to publish all environmental monitoring data analyzed by the laboratory for the public. It is recommended for the JICA Expert Team to make a preliminary assessment of the analytical capacity of each DFEA laboratory for the authorization during the quality control training given in coming period.

8) A smooth communication among project members, in particular among GCEA, DFEAs and the JICA Expert Team, is a key factor for successful implementation of the Project. It is highly recommended to organize weekly Regular Meeting as held since June 2006. Periodical meeting of Technical Committee is also very important opportunity to exchange the idea among GCEA, DFEAs and the JICA Expert Team. In order to share actual project implementation, more frequent distribution of internal circular such as Project Newsletter is recommended.

9) It is recommended to intensify mutual consultation and coordination prior to plan an activity by the Syrian and Japanese sides respectively. The Project shall be implemented in bilateral manner under mutual understanding.

10) It is recommended to correct the following part of the Project Design Matrix (PDM) agreed by R/D, September 2004. Because the word 'Existing' Environmental Monitoring Guideline is not correct, the Environmental Monitoring Guideline shall be prepare and introduced. The underlined parts are proposed words for revisions;

1)"Objectively Verifiable Indicator" 4.2

Environmental monitoring guideline is introduced into a standard for all laboratories by three years after the commencement of the Project.

2)"Narrative Summary" 4.5

Provide necessary advice and guidance to introduce environmental monitoring guideline into a standard for all laboratories.

7.2 Terminal Evaluation

The JICA Headquarters dispatched a mission headed by Mr. Kenichi Tanaka for terminal evaluation of the Project. The evaluation was conducted jointly with the Syrian side from 22 July to 9 August 2007. The Joint Evaluation Team collected the information through questionnaires and a series of interviews with the Syrian C/P personnel and the JICA Expert Team at GCEA and the target DFEAs. The Joint Evaluation Team also conducted a field observation in the Damascus, Damascus Countryside, Aleppo, Homs, Tartous, Sweida, and Dara'a DFEAs. The Joint Evaluation Team prepared a draft evaluation report and finalized it through a series of discussions on 7 August, 2007. The results of the terminal evaluation was presented and discussed in the 7th Steering Committee held on 9 August 2007.

(1) Revision of PDM

The revision of PDM was not carried out at the Terminal Evaluation. The latest PDM agreed in the Terminal Evaluation which was attached with the Minutes of Meeting signed on 8 August 2007, is shown in the next pages.

Annex 1 The latest Project Design Matrix (page 1/3)

Project Name: Capacity Development on Environmental Monitoring of Directorates for Environmental Affairs in Governorates in Syrian Arab Republic
Target Area: 14 Governorates (different target level is targeted) **Target Group:** -115 staffs of the Directorates and MOLAE
 -all the staff of the Directorates and MOLAE
 -attendants for seminars and workshops held by the Directorates
 -17 million inhabitants of Syria,
 especially 9.2 million inhabitants of Damascus, Aleppo, and Homs Governorates

Project Duration: from January 2005 to January 2008 (3 years)

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Environmental monitoring system and publication of the monitoring results are introduced at and spread to all the Directorates.	<ol style="list-style-type: none">All the Directorates conduct monitoring of air on regular basis according to the monitoring plan formulated by themselves by five years after the completion of the projectRoles for the national monitoring system are properly allocated among the Directorates. (reference system)Results of the monitoring is continuously issued and opened to the public as an annual report at all Governorates.Results of the monitoring is issued and opened to the public as an annual report at the national level.	<ol style="list-style-type: none">Monitoring records kept by the GCEA, MOLAE.Annual report issued by all Directorates.Annual report issued by the GCEA, MOLAE.	The Syrian government keeps it's policy support for environmental protection.	
Project Purpose The target Directorates for Environmental Affairs in Governorates are capable to introduce and conduct regular monitoring of required parameters for water and air quality according to the monitoring plan formulated by the Directorates themselves and to implement activities for public awareness including publication of the monitoring results.	<ol style="list-style-type: none">Analysis technology level to be targeted is as follows:<ul style="list-style-type: none">■Damascus : (water)chemical and biological analysis level (air) basic sampling level (manual)■Aleppo and Homs : (water) basic analysis level, (air) basic sampling level (manual)■other 11 Directorates: (water) manual sampling level (air) not included to the projectThe target Directorates conduct monitoring of water and air on regular basis according to the monitoring plan formulated by themselvesActivities for public awareness are implemented in four (4) Directorates at least out of fourteen (14) Directorates.Monitoring results are issued and continuously opened to the public as an annual report at Governorate level.	<ol style="list-style-type: none">Monitoring records kept by the target Directorates and GCEA.Annual report issued by the target Directorates.	The Syrian government keeps it's policy support to provide staff, equipment and budget to the rest of the Directorates	

Abbreviations: MOLAE: the Ministry of Local Administration and Environment
 GCEA: General Council for Environmental Affairs. MOLAE
 a/m: operation and maintenance
 Directorate: Directorate for Environmental Affairs in Governorate
 SOP: Standard Operation Procedures
 OJT: On-the-Job Training

Latest PDM in the Terminal Evaluation (1/3)

Annex 1 The latest Project Design Matrix (page 2/3)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>Outputs</p> <p>In the target Directorates:</p> <p>1. Technical level of laboratory staff concerning environmental sampling and analysis is improved.</p>	<p>1-1 All laboratory staff conduct environmental monitoring according to the SOP compiled by the project by three years after the commencement of the project.</p> <p>1-2 All laboratory staff reach the grade B* level on monitoring items in charge by three years after the commencement of the project.</p> <p>1-3 50% of laboratory staff reach the grade A* level on monitoring items in charge by three years after the commencement of the project.</p>	<p>1-1 Environmental monitoring records</p> <p>1-2 Training record</p> <p>1-3 Training record</p>	Execution instructions are promulgated.
<p>2. Laboratories are properly managed by laboratory staff themselves.</p>	<p>2-1 Equipment in laboratories are properly operated and maintained according to the o/m manual compiled by the laboratory staff by three years after the commencement of the project.</p> <p>2-2 Spare parts and consumable materials management system is established by three years after the commencement of the project.</p> <p>2-3 Chemical reagents are properly stored and cared according to the o/m manual by three years after the commencement of the project.</p> <p>2-4 Liquid and solid wastes from laboratory are properly treated according to the o/m manual by three years after the commencement of the project.</p> <p>2-5 Each Directorate prepares its budget plan for regular monitoring.</p> <p>3. Environmental analysis data is accumulated and properly managed.</p>	<p>2-1 O/m record</p> <p>2-2 Spare parts & suppliers list</p> <p>2-3 O/m record</p> <p>2-4 O/m record</p> <p>2-5 Annual budget of Directorates</p>	
<p>4. Laboratory staff is able to formulate an environmental monitoring plan specifying parameters required.</p>	<p>4-1 Environmental monitoring plan specifying parameters and monitoring sites is formulated in respective laboratory by one year after the commencement of the project.</p> <p>4.2 Environmental monitoring guideline is introduced into a standard for all laboratories by three years after the commencement of the project.</p>	<p>3-1 Data file management record</p> <p>4-1 Monitoring guideline</p> <p>4-2 Laboratory operation and maintenance manual (o/m manual)</p>	
<p>5. The results and data acquired by the Project is open to and shared with the citizens of the target Directorates. Staff of target Directorates is able to formulate its action plan for public awareness and environmental education.</p>	<p>5-1 Preliminary condition on public awareness is comprehended by each governorates and shared among the organizations concerned.</p> <p>5.2 Materials for activities for public awareness, such as textbooks, manuals, and pamphlets are prepared</p> <p>5.3 Seminars and workshops targeted for educational institutions and so forth are conducted</p> <p>5.4 Periodical network meeting among organization and/or institutions regarding to environmental education in each governorate</p>	<p>5-1 Report of preliminary survey at each governorate</p> <p>5-2 List of activity materials</p> <p>5-3 Report of seminars and workshops</p> <p>5-4 Report or minutes of meeting</p>	

Note: 1. "Grade A": be able to analyze samples, evaluate the data, and determine them on his/her own.
 2. "Grade B": be able to analyze samples and work out the data, but need decision by the superior to evaluate and determine the data.

Latest PDM in the Terminal Evaluation (2/3)

Annex 1 The latest Project Design Matrix (page 3/3)

Activities	Narrative Summary	Inputs	Important Assumptions
1.1 1.2 1.3 1.4 2.1 2.2 2.3 3.1 3.2 3.3 4.1 4.2 4.3 4.4 5.1 5.2 5.3 5.4	Compilation of the SOP for samplings, analysis, interpretation, evaluation, data filing and reporting. Training in theory for making monitoring plans, samplings, analysis, interpretation, evaluation, data filing and reporting. Hands-on trainings in sampling, pretreatment, analysis, interpretation, evaluation, data filing and reporting. On-site OJT in sampling, analysis, interpretation, evaluation, data filing and reporting. Completion of the laboratory o/m manual for equipment operation and maintenance, spare parts preparation, reagents storage and treatment, liquid and solid laboratory wastes treatment and others. Hands-on trainings at equipment operation and maintenance, reagents storage and treatment, liquid and solid laboratory wastes treatment and others. Provide necessary assistance and guidance to prepare Directorates' budget plan for regular monitoring. Design the monitoring record formats for laboratories and for the GCEA in the MOLAE. Compile monitoring records in each Directorate. Send the monitoring records from Directorates to the GCEA in the MOLAE. Conduct preliminary pollution source inventory surveys. Specify monitoring sites and their parameters. Formulate the environmental monitoring plan specifying parameters and monitoring sites in respective laboratory. Provide necessary assistance and guidance to introduce the environmental monitoring guideline into a standard for all laboratories. To conduct preliminary survey on activities regarding to environmental education and public awareness in each governorate To formulate textbooks, manuals, and pamphlets for environmental education. To implement seminars and workshops targeted for educational institutions and NGOs and so forth. To enhance the cooperation among organizations and/or institutions regarding to environmental education in each governorate (ex. to implement periodical meeting)	<u>Syrian Side Inputs</u> (1) Land, building, laboratories, office space and other necessary facilities for the project. (2) Assignment of counterparts and administrative personnel. (3) Running expenses for the implementation of the project. <u>Japanese Side Inputs</u> (1) Dispatch of experts team (2) Provision of equipment	Laboratory staffs trained by the project stay in laboratories and keep working on the environmental monitoring. Agents/manufactures timely provide spare parts for the equipment. <u>Pre-conditions</u> 1. Appropriate number of laboratory staff who have chemical background are assigned in the target Directorates for Environmental Affairs in Governorates. 2. Laboratory spaces are prepared in the target Directorates for Environmental Affairs in Governorates. 3. Adequate waste water treatment plants shall be prepared before starting laboratory chemical analysis training in the target Directorates for Environmental Affairs in Governorates.

Latest PDM in the Terminal Evaluation (3/3)

(2) Results of Evaluation

The following evaluations were made by the terminal evaluation, which were described in the Minutes of Meeting for the terminal evaluation on 8 August, 2007.

1) Relevance

Item	Evaluation (as of Aug. 7, 2007)
1.1 Necessity	
(1) Relevance with the needs of Syria	<p>The Overall Goal (“Environmental monitoring system and publication of the monitoring results are introduced at and spread to all the Directorates”) is considered to be still relevant with the needs of Syria.</p> <ul style="list-style-type: none"> Over the 20 years since the 1980’s, the industrialization of Syria has demonstrated steady growth including thermal power plants, oil refinery, and cement plants. Fertilizer mills or small and medium scale metal and dye factories have spread into the suburbs of large cities. At the same time, environmental problems caused by sewage, exhaust and dust from factories have become visible. In 1991, the Syrian government passed the Basic Law of Environment (Decree No. 11). Moreover, the Emission Standards to Industrial Wastewater and Exhaust Gas were promulgated in May 2002 and Environmental Protection Law (Law No. 50, 2002), which stipulates punitive regulations, was brought into effect in July 2002. There is a need for environmental monitoring system and publication of the monitoring results which can be utilized for enforcement of the relevant laws and regulations in order to address these issues.
(2) Relevance with the needs of the target group	<p>The Project Purpose (“The target Directorates for Environmental Affairs in Governorates are capable to introduce and conduct regular monitoring of required parameters for water and air quality according to the monitoring plan formulated by the Directorates themselves and to implement activities for public awareness including publication of the monitoring results.”) is relevant with needs of the DFEAs and the GCEA/MOLAE.</p> <ul style="list-style-type: none"> In order to respond to the above mentioned environmental problems, the Ministry of Local Administration and Environment (MOLAE) was established in September 2003. In January 2004, the establishment of DFEAs was ordered through a notification by the Minister of the MOLAE, and currently the DFEAs are established in all of the 15 governorates. The DFEAs are mainly responsible for the environmental administration and environmental monitoring in each region.
1.2 Priority	
(1) Relevance with development policies of Syria	<p>The Overall Goal is considered to be relevant with the national development plan of Syria.</p> <ul style="list-style-type: none"> “The 10th Five-Year National Development Plan” (2006-2010) is the country’s long-term development plan. And there is a part which describes importance of 1) consistency of implementation of environmental policy, 2) capacity development of environmental sector, and 3) understanding of environmental conditions in Syria.
(2) Relevance with ODA policies of Japan	<p>The Overall Goal and the Project Purpose are still consistent with ODA policies of Japan that prioritize “environmental sector”, as one of the 6 priority issues. According to the latest “JICA Country Programme for Syria” (2006), environment is one of the 4 priority areas.</p>
1.3 Adequacy as means	
(1) Project Design	<p>On the whole, the design of the Project is considered appropriate in order to achieve the Project Purpose. It would have been more appropriate if regional peculiarities had been taken into account when identifying and selecting analytical fields and/or parameters for some of the DFEAs. For examples, air pollution is a problem for DAMC and some other DFEAs, but they are not included in the target DFEAs for AQA. The major pollution sources for water in HAM and IDL are olive oil producers but “grease and oil” is not included in the parameters they get trained. In the case of SWD, the major pollution source is drinking water but the parameters covered by the Project are mainly for industrial wastewater.</p>
(2) Technological Advantage of Japan	<ul style="list-style-type: none"> Air pollution and water contamination were serious problems in 1960’s in Japan. The government succeeded in beating such grave pollution with appropriate promulgation of control laws and environmental technologies based on the monitoring results. technology transfer aiming to strengthen water quality and air quality monitoring capacity, including the analytical technology of the DFEA’s laboratory and monitoring carried out in 14 governorates of Syria – the target area – is a relevant strategy. This can be attributed to the fact that training water quality and air quality

Item	Evaluation (as of Aug. 7, 2007)
	monitoring technicians with an emphasis on this particular technical capacity is expected to have the most spillover effect in enhancing the capacity to manage environmental regulations. This, in turn, is because the selection of the Syrian Hot Spots, which suffers the most severe air pollution and water contamination, as the target area means that the transferred technology can be used directly and indirectly.

2) Effectiveness

Item	Evaluation (as of Aug. 7, 2007)
2.1 Achievement level of the Project Purpose	So far, most of the Objectively Verifiable Indicators of the Project Purpose have been mostly achieved except for publication of monitoring results. As confirmed at the time of the Mid-term Evaluation, "GCEA has a policy to disclose all the environmental data obtained through DFEA laboratories to the public through the annual report and the Web site". For the publication of monitoring results, the laboratories need to be authorized by either Syrian Government or a third laboratory such as Atomic Energy Commission (AEC) of Syria. To date, none of the DFEA laboratories have been authorized yet though some of the laboratories of the DFEAs have participated in a program of AEC titled "Program for Quality Control of Laboratory Analysis". In addition, the achievement in the field of Air Quality Analysis is behind the schedule due to delay of procurement and delivery of the major equipments and subsequent reduction in the training period. Except for publication of monitoring results, it is expected that the Project Purpose would be mostly achieved by the end of the Project on the whole. Further efforts are necessary to improve quality assurance and quality control on the analytical process as well as interpretation and evaluation of the analyzed data in the remaining period.
2.2 Contribution of the Outputs to the Project Purpose	Development of capacity in sampling and analysis techniques, laboratory management, data management, formulation of monitoring plan, as well as data publication is essential for achievement of the Project Purpose. All of the Outputs have contributed to the achievement of the Project Purpose.
2.3 Important Assumptions	The important Assumption ("Executive instructions are promulgated") has been satisfied. The Executive Instructions for Environmental Protection Law (No. 50, 2002) was promulgated in September 2005.
2.4 Other promoting/ hampering factors	As described in 2.1 above, in order for the DFEAs/GCEA to publish monitoring data analyzed by their respective laboratories, authorization of either Syrian government or a third laboratory such as AEC is regarded as a prerequisite because the DFEAs would find it difficult to defend themselves with the published data analyzed by their unauthorized laboratories in case any enterprise or individual go to court to file a complaint against them.

3) Efficiency

Item	Evaluation (as of Aug. 7, 2007)
3.1 Achievement level of the Outputs	<p>Overall: The Outputs of the Project have been mostly achieved so far and are likely to be mostly or fully achieved by the end of the Project.</p> <p>1. Output 1:</p> <ul style="list-style-type: none"> Standard operation procedures (SOPs) have been elaborated for most of the parameters. Most of the present C/P has become able to conduct environmental monitoring according to the SOP and to analyze and work out the data under supervision of the superior in evaluating and determination the data. In addition, approximately 20% of the C/P is able to analyze, evaluate the data and determine the parameters by themselves. It is expected that approximately one third of the C/P will be able to reach the foresaid level by the end of the Project. On the whole, Output 1 is likely to be mostly achieved by the end of the Project though achievement level in the field of AQA is behind the schedule due to a serious delay in procurement procedures and delivery of the major equipment. <p>2. Output 2:</p> <ul style="list-style-type: none"> Achievement of Output 2 is steady. In general, equipment in labs are properly operated and maintained according to the O/M manual compiled by the staff. In addition, most of the lab staff is able to operate the equipment according to the O/M manuals. O/M sheets for spare parts and chemical reagents were prepared at all DFEAs in June 2006. The O/M sheets for spare parts have been updated as appropriate. As for chemical reagents, O/M sheets are planned to be updated quarterly. While most of DFEAs update the sheets according to the plan, 2 DFEAs have not been able to do so because of serious staff shortage, etc. In most of the

Item	Evaluation (as of Aug. 7, 2007)
	<p>DFEAs, chemical reagents are properly stored and cared. The Team has observed a case where reagents that need to be kept under certain temperature are stored outside the refrigerator in a lab room without air conditioner (A/C). Director of the DFEA plans to provide A/C to lab shortly so that adverse effects on the reagents are expected to be solved. As for treatment of liquid wastes from labs, preparation of “(a) adequate waste water treatment ... before starting laboratory chemical analysis training” is one of the pre-conditions of the Project. This has not been fully satisfied yet. The GCEA has purchased wastewater treatment facilities for DAM DFEA, expecting wastewater from all labs to be treated there. The facilities have not been operational, however, due to technical troubles that the supplier has not been able to fix. It is necessary to solve this problem as possible by the end of the Project so that wastewater can be treated properly. On the whole, Output 2 is likely to be mostly achieved by the end of the Project.</p> <p>3. Output 3:</p> <ul style="list-style-type: none"> Achievement level of Output 3 is as planned. Environmental monitoring data of BWQA, HMA, and AQA have been accumulated in the form of electronic data at the relevant DFEAs. As for CBA, entering the data is planned to start in November-December 2007 before the end of the Project. In addition, establishment of data concentration system regarding environmental monitoring is underway. Networking system connecting the GCEA and the DFEAs has been developed though only a few DFEAs have been able to send the electric data to GCEA on regular basis due to connection problems. As an alternative, sending CDs is being considered. It is likely that Output 3 will be fully achieved by the end of the Project. <p>4. Output 4:</p> <ul style="list-style-type: none"> Achievement level of Output 4 is steady now. First environmental monitoring plans for water quality (i.e. BWQA) and air quality, specifying parameters and monitoring sites, have been prepared by all of the DFEAs as planned. Environmental monitoring guidelines are planned to be prepared in August 2007. Output 4 is expected to be achieved fully by the end of the Project. <p>5. Output 5:</p> <ul style="list-style-type: none"> The statement of Output 5 is “The results and data acquired by the Project is open to and shared with the citizens of the target Directorates” and “Staff of target Directorates is able to formulate its action plan for public awareness and environmental education”. It was found hard to assess the current level of achievement of Output 5 with the Objectively Verifiable Indicators because neither of them is directly related to publication of monitoring results and data as well as formulation of action plans. The following are separate assessment of achievement of the Objectively Verifiable Indicators as well as the statement of Output 5. Objectively Verifiable Indicators: They have been mostly achieved. Preliminary survey on condition of public awareness was conducted in 2004 and 2005 in 7 governorates (i.e. DAM, DAMC, ALP, HOM, HSK, SWD, and TAR) as planned. Method and the results were presented in the National Committee for Public Awareness in February 2006. Materials for activities for public awareness, such as textbook, manuals, etc. have been prepared by GCEA and the priority DFEA. In total 12 workshops, targeting Chamber of Industries, etc., have been conducted by 4 priority DFEAs though workshops were not organized during the last assignment period. As for the periodical network meetings among the organizations related to environmental education, the National Committee for Public Awareness was established under the MOLAE decision No. 2051 dated on October 3, 2005. A sub-committee, consisting of the local relevant organizations, has been or is going to be established in each governorate, which is expected to meet periodically to discuss the issues related to public awareness for environment. The statement of Output 5 (“The results and data acquired by the Project is open to and shared with the citizens of the target Directorates” and “Staff of target Directorates is able to formulate its action plan for public awareness and environmental education”). The first one has not been achieved. Though DFEAs could report or present their results informally to the relevant organizations, they are not able to officially publish them since their laboratories of the DFEAs have not been authorized yet. As for the second one, the National Committee for Public Awareness has formulated a national strategy on public awareness. Under overall framework of the national strategy, each subcommittee, of which DFEA is a member, has started to or is going to prepare strategy/action plan for public awareness at governorate level. The GCEA is of the opinion that it is no more necessary for the Project to formulate the action plans.
3.2 Important Assumptions	1. The first Important Assumption (“Laboratory staff trained by the Project stay in

Item	Evaluation (as of Aug. 7, 2007)
	<p>laboratories and keep working on the environmental monitoring”) has not been satisfied. So far, 157 persons in total have been assigned to the laboratory work of the Project, of which 24% (38 persons) have left the DFEAs for another job, etc. Not a few left the DFEAs shortly after they participated in the training organized by the Project. In extreme cases, some stayed with the DFEAs on for a few months. In addition, some left the laboratories temporarily (for two years) for military obligations. It is noted that those who remain with the laboratories have transferred their knowledge and skills acquired through the preceding training to the newly assigned staff, if any. Those who joined the laboratories later also made efforts to keep up. Through their efforts as well as the support provided by the J/Es, the negative impacts have been alleviated to some extent.</p> <p>2. The second Assumption “Agents/manufactures timely provide some spare parts for the equipment”. As for the reagents, there is only one agent in Syria so that it is a seller’s market. It normally takes quite a time for the suppliers to deliver variety of reagents in small quantities. In order to cope with the situation, the Project has established a centralized procurement system for reagents.</p>
3.3 Appropriateness of the Inputs	
(1) Syrian side	
(a) Land, facility and equipment	<p>Timing:</p> <ul style="list-style-type: none"> Labs: Laboratory space was made available in timely manner at the beginning of the Project. The labs of DFEAs in ALP, HOM, HAM, DAR, and QNT moved to new buildings in the current year. The move itself was completed in between the training batches scheduled for the respective DFEAs. In some DFEAs, however, all the necessary facilities were not provided right away or have not been provided yet, which, coupled with other issues, made it difficult for the lab staff to continue monitoring activities as per the plan in between the training periods. In some cases, the activities were virtually ceased for more than a few months. Project Office: Office space for J/Es was made available at the basement of GCEA in Damascus in timely manner. <p>Quantity:</p> <ul style="list-style-type: none"> Labs: While the laboratory area of some DFEAs is considered sufficient, that of others is rather small. Most of the labs are equipped with most of the necessary items for laboratory works as shown in 1.1 of Annex 3. It would have been more efficient if all the necessary items have been provided to all target DFEAs. In some DFEAs, shortage of vehicles and insufficient space of the available vehicles, which could take one only one person except a driver, has sometimes made it difficult to carry out sampling activities in accordance with the monitoring plan in the absence of the J/Es, who offer transportation for them during his visit for training. In addition, the lab staff cannot transfer the acquired knowledge and skills regarding sampling to new staff, especially who joined in between the training periods, through OJT since there is not enough space in the available vehicle to take the new ones along. Project Office: Office space for the J/E team is rather small. At the peak time, the number of desks and chairs for the Experts and the interpreters is not enough. <p>Quality:</p> <ul style="list-style-type: none"> Labs: In general, the facilities provided for the laboratories have been appropriate. In the case of ALP, which has recently relocated the lab to the basement from the ground floor in order to provide more space for their work, however, quality of the provided facilities is not sufficient. For example, drain pipes are places on the ceilings. A drain ditch is located in the basement, which often causes flooding of discharged water when power cuts takes place. There is neither adequate ventilation system nor air conditioner. Although there is a plan to establish a new lab on the land adjacent to the current building, it takes more than a year according to the current plan. It is necessary to take measures to ensure the safe and healthy working conditions for lab staff as soon as possible. Project Office: The internet connection had been down very frequently in first two and half years. It has been improved since June 2007.
(b) Assignment of counterparts personnel	<p>Timing:</p> <ul style="list-style-type: none"> Technical C/Ps (i.e. lab staff) for BWQA had been assigned prior to the start of the project. The C/Ps for AQA, CBA, HMA, and Data Management has been assigned prior to the start of the related activities. As mentioned in 3.2 above, 24% of the C/P has left the laboratory works. In some cases, the successors were assigned sooner rather than later: in other cases, the replacement was not found for a longer period. In the case of RAK, for example,

Item	Evaluation (as of Aug. 7, 2007)
	<p>the C/P for Data Management has not been assigned since the predecessor left the job in October 2006.</p> <ul style="list-style-type: none"> Not a few C/Ps have been assigned after the start of the Project. Some have been recently assigned and some more are planned to be assigned in order to make up for staff shortage. It shows a seriousness of DFEA/GCEA regarding environmental monitoring. It would have been more efficient, however, if those had been appointed early enough to acquire sufficient skills and techniques by the end of the Project. Some of them got transferred to a laboratory of other DFEAs. <p>Quantity</p> <ul style="list-style-type: none"> While appropriate number of technical C/P has been assigned to most of the DFEAs, shortage is still a big issue for some DFEAs, of which the GCEA are also well aware. The GCEA has sent an official letter to the Minister of MOLAE, requesting to increase the number of lab staff of the DFEAs, who have chemical background, by approximately 50 in total. Most of the C/P engage in the Project on part-time basis: there are some other works for them to do and are not able to concentrate on the Activities of the Project, including continuation of regular monitoring in between the training periods. Very often, the C/P is requested to go sampling and/or analyze the samples in order for the DFEAs to respond to claims of the citizens, request of the other government bodies, including the Governor. Sometimes, some of them were too much occupied with other tasks to attend all the necessary training activities carried out by the Project. <p>Quality</p> <ul style="list-style-type: none"> Most of the C/P did not have chemical background before the commencement of the Project though it is one of the Pre-Conditions. They are agronomists, petroleum engineers, nutritional engineers, etc.. The J/Es, therefore had to devote their considerable time to teaching basic chemistry before starting and during the training. Some of the C/P did not have experience to use computers and/or basic software like Excel, which is necessary for analysis and data management. It is noted that most of them were eager to learn and had capacity to keep up with the training which was new to them. During the training period, those who could stay longer than their normal working hour (up to 3pm) worked till late when they felt it necessary to finish what they were doing on that day. Some of the DFEAs provide financial assistance for their staff to take English and PC lessons at private institutions.
(c) Running expenses for the implementation of the Project	<p>Timing: The budget has been disbursed to the DFEAs in January –February.</p> <p>Quantity: Necessary amount has been allocated to the DFEAs.</p>
(2) Japanese side	
(a) Japanese Expert	<p>Timing:</p> <ul style="list-style-type: none"> In general, the J/Es were dispatched according to the original schedule. In the case of the Expert in AQA, his second dispatch was postponed for nearly one and half month, taking into account delay in procurement and delivery of the major equipments for AQA. The delivery, however, was further delayed and the Expert was not able to start the full-fledged training using the major equipments in the said period. <p>Quantity:</p> <ul style="list-style-type: none"> The assignment period for most of the J/Es was moderately appropriate. Duration of the assignment of the Experts in BWQA is short, considering that he has to go around all the 14 DFEAs to carry out training activities without any technical assistants. As for AQA, shortness of the assignment period, coupled with the above mentioned delay of the procurement procedure and delivery of the major equipment, has led to insufficient time for training. Sometimes, only one or two sampling was possible and analysis was not completed during the training period. They have to wait the J/Es to come back until their analysis results were checked. Besides, the C/P felt the period between training was too long. When some new problems occur, they had to wait until the next training period. In order to make up for deficiency in time, the J/E team normally work till late in the evening though official working hour of the GCEA is 8 to 14. They often come to the Project Office to work on weekend. <p>Quality:</p> <ul style="list-style-type: none"> The experts with adequate technical background and skills have been dispatched. According to the C/P interviewed by the Evaluation Team, the Experts were ready to respond to any technical problems the C/P faced and their response was quick.

Item	Evaluation (as of Aug. 7, 2007)
(b) Study tour in Egypt	<p>Timing:</p> <ul style="list-style-type: none"> Two study tours have been carried out so far. Timing of the tours had been discussed with the GCEA before finalization. They were implemented according to the plan without delay. <p>Quantity:</p> <ul style="list-style-type: none"> So far, total of 19 persons have been dispatched. With regard to the number of the participants as well as their member was discussed and agreed by both sides in advance. As for the duration, many of the participants felt that it was too short, considering the contents covered and distance between the sites they visited. As a result, most of them felt tired towards the end of the day and sometimes could not concentrate on the issues being raised. Some felt that the duration was insufficient to have a comprehensive idea on Egyptian experiences. <p>Quality:</p> <ul style="list-style-type: none"> Most of the participants felt that fields, contents, and quality of study tour were relevant with their needs. Some felt that it would have been more effective if they had had more time and opportunities to discuss with Egyptian C/Ps on their experience and to exchange views and information. <p>Utilization:</p> <ul style="list-style-type: none"> While most of the participants and/or their immediate supervisors felt that they could utilize what they have learned in the Activities of the Project, some felt that they could not because the level of Egypt is very different from what they are now.
(d) Provision of equipment	<p>Timing:</p> <ul style="list-style-type: none"> In the case of CBA, the procurement and delivery of the equipment was implemented as scheduled but not so far the equipments for the other analytical fields. In the case of BWQA, delivery of the necessary equipment was delayed, which resulted in an overall delay of the related training for two months. As for HMA, delay in installment of AAS, the major equipment, caused a reduction in the training period. In the case of AQA, delay in procurement procedure and delivery of the major equipments, including High-Volume Air Samplers, Low-Volume Air Samplers, etc. led to almost one-year delay in starting the full-fledged training activities. (For details, please see Annex 4) <p>Quantity:</p> <ul style="list-style-type: none"> Appropriate number of equipment has been provided to the target DFEAs. <p>Quality:</p> <ul style="list-style-type: none"> Items, specifications, and quality of most of the provided equipment were appropriate. There was a defect in Low-Volume Air Samplers, which required a repair by the supplier. The related training was not able to be conducted and was postponed for five months till the subsequent training batch. In the beginning of the Project, high-range reagents, which are meant for detection of COD for industrial wastewater, were provided to all DFEAs, irrespective of types of major pollutants in the regions. In the case of TAR, SWD, etc., where not a many factories exist, the major concern is contamination of drinking water, agricultural water, etc., for which low-range reagents should be used. Recognizing the problem, in 2006, JICA provided low-range reagents to all of the DFEAs. <p>Operation & Maintenance (O/M):</p> <ul style="list-style-type: none"> O/M manuals for all of the provided equipment have been prepared in Arabic. Through training provided by the Project, most of the lab staff has become able to operate the relevant equipment appropriately according to the manuals. In terms of maintenance, a list of suppliers to be contacted has been prepared by each DFEA so that the DFEAs can make a contact in case any failure or malfunction of the provided equipment occurs. <p>Utilization:</p> <ul style="list-style-type: none"> Most of the provided equipment has been utilized fully.

Item	Evaluation (as of Aug. 7, 2007)
3.4 Preconditions	<ul style="list-style-type: none"> The first condition (“Appropriate number of laboratory staff who have chemical background are assigned in the target Directorates for Environmental Affairs in Governorates”) had not been satisfied prior to the start of the Project. It has not been satisfied fully yet. At present, 40% of total number of lab staff (and 36% of the C/P who engage in sampling and analysis) has chemical background. The others are agronomists, civil engineers, etc. The second condition (“laboratory spaces are prepared in the target Directorates for Environmental Affairs in Governorates”) had been satisfied prior to the start of the Project. The third condition (“Adequate waste water treatment plants shall be prepared before starting laboratory chemical analysis training in the target Directorates for Environmental Affairs in Governorates”) had not been satisfied before starting laboratory chemical analysis. It has not been satisfied yet. In order to treat the wastewater generated through laboratory analysis, the GCEA has purchased wastewater treatment facilities for DAM DFEA based on the suggestion of the J/E Team. At present, only DAM DFEA possesses such facilities and the wastewater generated from the other DFEAs is planned to be treated at DAM DFEA. Though the facilities were delivered and installed in December 2006, it has not been operational due to technical troubles that the supplier has not been able to fix. Accordingly, wastewater transport system to DAM DFEA from the others has not been established yet. In the other DFEAs, the wastewater is stored in tanks at present. As for the treatment of expired reagents, the J/E team has recommended to return them to the agent.
3.5 Coordination with other relevant Japanese and international projects schemes	<ul style="list-style-type: none"> <u>Japanese Scheme</u>: Five Japan Overseas Cooperation Volunteers in the field of Environmental Education and one Senior Volunteer who works in the Chamber of Industries in ALP have had cooperative network and exchange information with the Project. The J/E team also has contacts with the Technical Cooperation Project like “The Project on Establishment of Water Resources Information Center” and “The Project on Efficient Irrigation Development and Extension in the Syrian Arab Republic”, as well as Development Study Team of “The Study on Urban Planning for Sustainable Development of Damascus Metropolitan Area” and “The Study on Sewerage System Development in Syrian Arab Republic”. <u>Other International Cooperation</u>: The Project has exchanged information with “The Municipal Administration Modernization (MAM) Programme” financed by EU. And the Egyptian Environmental Affairs Agency has received Syrian personnel during one month for water analysis training and 19 personnel as study tour in 2005 and 2006.

4) Impact

Item	Evaluation (as of Aug. 7, 2007)
4.1 Impact at the Overall Goal level	
(1) Likelihood of achievement	Judging from the prospect of achievement of the Objectively Verifiable Indicators (Annex 3), it is likely that the Overall Goal is likely to be achieved in 3-5 years after the end of the Project.
(2) Important Assumption	The Important Assumption (“The Syrian government keeps its policy support to provide staff, equipment and budget to the rest of the Directorates”) is likely to be satisfied.
4.2 Other impacts	
(1) Positive impacts	<p>Impacts on the DFEAs and local governments</p> <ul style="list-style-type: none"> Lab staff has acquired knowledge, skills, and experiences to implement environmental monitoring. With a lab established in each governorate, the DFEAs have become able to initiate environmental inspection in accordance with the Law No. 50 in governorates. The Project has provided opportunities to participate in the meetings with the Minister of MOLAE and the General Manager of the GCEA at the presence of the Japanese side. Confidence of other local organizations in the lab activities, decisions and reports of the DFEA has increased. Opportunities for collaboration with other concerned department have increased. The DFEAs have acquired a good knowledge about the degree of pollution, their associated risks, adverse impacts of the industrial technology, and the need to take care of environment with scientific data.

Item	Evaluation (as of Aug. 7, 2007)
	<p>Impacts on citizens</p> <ul style="list-style-type: none"> • The increase in citizen trust by the effected water analysis • More interest in environment and pollution issues and aspects <p>Impacts on industries</p> <ul style="list-style-type: none"> • Some factories have installed wastewater treatment facilities, • There are some complains which had been treated according to the analysis results/ • They understand the need to adhere to the environmental Law No.50 • Those who aware of importance of environment.
(2) Negative impacts	Negative impacts have not been observed so far. They are not foreseen, either.

5) Sustainability

Item	Evaluation (as of Aug. 7, 2007)
5.1 Institutional & Organizational Aspects	
(1) Policy and legal supports	Environmental monitoring has sufficient policy and legal support.
(2) Organizational strategy plan	Environmental monitoring is one of the important tasks of the DFEAs, which is necessary for them to enforce Law No. 50.
(3) Official authorization of laboratories	<ul style="list-style-type: none"> • As stated already, authorization of the laboratories of the DFEAs by AEC is essential for the monitoring data produced by the laboratories to be officially recognized as scientific and reliable. It is also a prerequisite for publication of the data. At present, none of the laboratories have been authorized by AEC yet. • Meanwhile, some laboratories of the DFEAs (i.e. DAM, DAMC, LTK, HOM) have participated in a program of AEC called "Program for Quality Control of Laboratory Analysis" since August 2006. SWD has just participated in the Program since June 2007. It is a system of licensing examination using test sample water administered by AEC. Data produced by the laboratories is licensed or a given official approval by AEC if the data is rated "A".
(4) Deployment of the C/P	<ul style="list-style-type: none"> • So far, 24% of the assigned C/P has left the DFEAs for another job, etc. In addition, the C/Ps of some DFEAs are not permanent employees of the DFEAs. It is uncertain if all of the current C/Ps will remain with the DFEAs in future. • In the meantime, the C/Ps trained by the Project are likely to be posted in appropriate positions. Therefore, they will be able to fully utilize their knowledge and skills to continue their task and sustain the Project effect. In case of these C/P personnel remaining with the DFEAs the technical sustainability will be secured after the completion of the Project.
(5) Management capacity of the relevant activities.	All of the DFEAs have managed the Project activities without any serious problems. It is expected that they would manage the relevant activities (i.e. environmental monitoring and public awareness) by themselves after completion of the Project.
(6) Coordination with other relevant organizations	The DFEAs have coordinated their monitoring and/or public awareness activities with various local organizations as stated in Annex 4. It is likely that the collaborative relationship with the relevant organizations will be sustained.
5.2 Financial Aspects	So far the Syrian government has allocated necessary budget for the laboratories of the DFEAs. It is likely that financial sustainability is secured.
5.3 Technological Aspects	
(1) Technical capacity of the C/P	<p>At present, total of 119 persons are assigned to the project as technical C/P, who have been trained in the areas of environmental sampling and analysis (BWQA, CBA, HMA, and AQA), laboratory management, data management, formulation of environmental monitoring plan, and public awareness.</p> <p>(a) Sampling and analysis</p> <p>In terms of sampling and analysis, technical level of most of the C/Ps is expected to be developed enough to continue the relevant activities by themselves, though further improvement regarding Quality Assurance/Quality Control (QA/QC), in particular, in the field of AQA is necessary. As for the rest of them, those who have and will reached such a level are expected to transfer the acquired techniques and knowledge to them through OJT, utilizing Standard Operation Procedures (SOP), manuals, teaching materials developed by the Project. In terms of interpretation and evaluation of the analyzed data. It is necessary for a lab to have at least one person who is able to analyze, evaluate the data, and to determine parameters by his/her own for each relevant analytical field.</p> <p>(b) Laboratory management</p> <p>It is likely that the C/P will be able to operate the provided lab equipment according to the</p>

Item	Evaluation (as of Aug. 7, 2007)
	<p>O/M manuals and to manage spare parts and reagents according to the manuals after the end of the Project. It is necessary to pay due attention to handling of toxic reagents. For example, they must be kept in a locker. In addition, it is advisable to place an Electronic Balance in a special chamber in order to mitigate the effects of winds and dusts to the minimum.</p> <p>(c) Data management The C/P has already developed or will be able to develop sufficient capacity to continue the relevant activities by themselves after the end of the Project.</p> <p>(d) Environmental monitoring plan With monitoring guidelines in place, it is expected that the C/P will be able to formulate/update the monitoring plans for their respective labs, regarding the parameters covered by the Project.</p> <p>(e) Public awareness It is likely that staff of public awareness section of the DFEAs will continue their activities after the end of the Project.</p>
(2) Utilization and dissemination of the transferred techniques and the project deliverables	<ul style="list-style-type: none"> Basic techniques for water quality and air quality monitoring have been improved step by steps because of the implementation of the Project. Therefore technical cooperation has been contributed to dissemination of basic technique on environmental monitoring in laboratory activities of the DFEAs. The project deliverables, including manuals, SOPs, monitoring plans etc. are essential to implementation of environmental monitoring activities so that they would be utilized fully after the end of the Project. The C/P who have receiver training through the Project have transferred their knowledge and skills acquired through the preceding training to the newly assigned staff and/or those who were not able to attend the session. It is highly likely that they will continue to do so after the end of the Project.
(3) Utilization of the provided machinery and equipment	<ul style="list-style-type: none"> All the equipments for the Project have been procured and installed for the water quality analysis. The frequency of the operation of the equipment especially will be increased subject to the necessity of the analysis in the DAM DFEA. To carry out better environmental monitoring, both sides recognized that some of the donated machineries, e.g. AAS, Spectrophotometers, portable measuring instrument, may need complicated repair works. So it is essential that a certain system be established for the future through a partnership with related actors such as distributors and other laboratories in Syria.

(3) Recommendations

The following recommendations were made by the terminal evaluation, which were described in the Minutes of Meeting for the terminal evaluation on 8 August, 2007.

1) For the Remaining Period

- a) It requires continuous efforts to have staff with adequate background and to keep them not to change the job though the GCEA has attempted to address the issue.
- b) Five DFEAs (i.e. Damascus, Damascus Countryside, Homs, Lattakia, and Sweida) have already applied, and nine DFEAs are trying to apply the "Program for Quality Control of Laboratory Analysis". The GCEA is needed to promote renewal of the accreditation every three months. It is needed to enhance the QA/QC and the capacity of interpretation and evaluation of analysis.
- c) Hazardous/Toxic waste water treatment plant has been established in the Damascus DFEA; however, it is necessary to repair it for normal operation as soon as possible.

2) For the Post-Project Period

<Short Term Recommendations>

a) Planning for training of Air Quality Analysis

Only three DFEAs (I.e. Damascus, Homs, and Aleppo) have air quality monitoring training, but still need additional training.

Planning for the technical training of Air Quality Analysis is necessary for the rest of DFEAs to reach to the Overall Goal of the Project.

b) Continuous contact with JICA

After the Project, continuous contact with JICA Syria Office is recommended to inform the latest condition of the DFEA labs and to request when necessity arises.

c) Beforehand application for the budget

Budget plan for operational expenses of the labs has been already submitted to the MOLAE and the State Planning Commission (SPC). Smooth and timely disbursement of the applied budget is necessary.

d) The condition needed for the technical capacity development

The C/Ps have acquired basic knowledge and skills for the water quality and air quality monitoring and now they are capable to handle the routine work. However, the enhancement of the precision of the water quality and air quality monitoring methodology will be needed for more effective achievement of the DFEA labs, mission defined within the related legal framework. To conduct the future activities smoothly, the following matters are recommended.

- i) Continuous disbursement of sufficient budget for the operation of the DFEA labs.
- ii) More incentives for the staffs who work in the labs.
- iii) Adequate technicians, who will be engaged especially in the activities on analysis in the labs, based on operational plan to be established with verifiable indicators.
- iv) Continuous and appropriate preventive maintenance of the equipments and machineries in the labs.

<Mid and Long Term Recommendations>

a) Job descriptions

The role of the GCEA and the DFEAs labs has various aspects, e.g. supervision of the industries, provision of technical advice to the organizations related with the water quality and air quality control, etc. It is relevant for the lab staff to take action related with those aspects. However, in the aspect of the technical capacity development of the lab, it is essential for the analysis in the lab and data management. In this sense,

the division of the duties in the lab under the integrated institutional framework will be needed in the near future.

The important role of the GCEA is to manage all of the DFEAs, to coordinate all project activities, and to provide technical supports.

b) Environmental Policy

The GCEA has prepared the National Monitoring Plan and is going to utilize monitoring results for the implementations of the environmental policies such as public awareness, Environmental Impact Assessment (EIA) system, and environmental inspection. It is needed to have appropriate procedures on how to reflect the monitoring activities in the environmental administration at the national and local levels.

c) Accreditation of the Atomic Energy Commission (AEC)

Since the DFEA labs are aiming to be reference laboratories on environmental field in Syria, it is essential to obtain the accreditation of AEC (and the ISO 17025) in the future. Then the labs are expected to proceed the next step for the preparation toward the accreditation. Therefore, it is recommended for JICA to provide appropriate advice when the GCEA and the DFEAs request for it.

7.3 Feedback Results of the Terminal Evaluation

Based on the recommendations by the Terminal Evaluation Mission, the Syrian side has taken immediate actions to achieve planned targets and to ensure sustainability of the Project. Principal actions are described hereunder.

7.3.1 Reactions of the Syrian Side to Recommendations for the Remaining Period

(1) Staffing with Adequate Background and Motivation

The GCEA committed to employ enough staff with chemical background in annual recruit system of MOLAE. According to the current information, GCEA strongly requested to the Minister of MOLAE to adopt around 50 chemists next year and to assign 10 staff for 2 DFEA (Damascus and Homs) and 2 staff in each for other DFEA. Also GCEA discussed with the Minister to motivate staff in charge for lab analysis including incentives such as allowance and compensation and to get approval from concerned ministries such as the Prime Minister Office.

(2) Application for Q/C Program of the Atomic Energy Commission (AEC)

Currently, AEC is only one agency to conduct a Q/C program and accredit lab in Syria. So, labs in other ministries also apply this Q/C program. The GCEA already requested to all DFEA to apply AEC's Q/C program as a tool of external activities and committed to support them.

(3) Lab Wastewater Treatment Facility

The GCEA procured and installed a lab wastewater treatment facility in Damascus DFEA in the beginning of 2007. However, it does not work yet mainly due to technical problems. In order to cope with this problem, GCEA set up the Technical Committee headed by the Director of the Directorate of Water Safety in GCEA. Also, the JICA Expert Team advised and suggested to the Committee for earlier operation of the facility.

7.3.2 Reactions of the Syrian Side to Recommendations for the Post-Project Period

(1) Planning for Training of Air Quality Analysis

The GCEA plans to introduce monitoring equip and training of air and water quality in accordance with the 10th 5-years plan (2006-2010). All DFEA already received mobile lab equip including air quality monitoring. Next key issue is how to deal with actual training for air quality monitoring.

(2) Continuous Contact with JICA

The GCEA committed to ensure continuation of monitoring activities and sustainability of the Project in the Final Seminar held 5 December, 2007 in Aleppo, 6 December, 2007 in Hama, and 9 December, 2007 in Damascus. In line with DFEA's continuous activities, GCEA promised to submit actual data and document related to monitoring activities to JICA.

(3) Beforehand Application for the Budget

The GCEA and DFEA already prepared annual budget plan and submitted it to MOLAE. According to the current information by GCEA, total budget for the Syrian Fiscal Year of 2008 is increased 2 million SP and is about 7 million SP in total. In addition, it could be increased more 3 million SP for special budget.

(4) Setting Condition for Technical Capacity Development

The recommendations pointed out by the Terminal Evaluation Report such as budget disbursement, incentives, adequate technicians, and O/M of equip are recognized by GCEA and DFEA as described in this Project Completion Report. It can be said that the Syria side is ready for start Phase-II of the Project.

(5) Job Descriptions

Before starting the Project, mandates and demarcations of GCEA and DFEA on environmental monitoring were not clear because they had no experiences of regular monitoring activities. In other words, it can be said premature situation of differentiation of them as the

responsible administrative organizations of environmental monitoring. However, GCEA and DFEA have recognized their roles and functions through actual activities of the Project. Based on the experiences of the Project, their job description and mandate should be reviewed and clarified further, and should be prepared revised administrative framework to cope with environmental issues more effectively and efficiently.

(6) Environmental Policy

In accordance with the 10th 5-years plan, GCEA and MOLAE have prepared the by-law of Law No. 50, and the by-law of Environmental Inspection, and now under preparing the by-law of EIA. Setting up these circumstances would contribute effective administrative enforcement on environmental monitoring and management of GCEA and DFEA.

(7) Accreditation of the Atomic Energy Commission (AEC)

In future, labs in DFEA could be reference labs on environmental field in Syria. Otherwise it would be difficult to promote environmental inspection and EIA activities because these activities will require more accurate data with lab assurance. It means accreditation could be inevitable for labs in DFEA. At present, GCEA and DFEA have started external and internal QA/QC activities for accreditation. Continuation of these kinds of QA/QC activities will be required further in parallel with development of national standard system.

8. RECORDINGS OF THE STEERING COMMITTEE AND TECHNICAL COMMITTEE MEETINGS

During the project period, series of the Steering Committee (St/C) chaired by the Minister of MOLAE were held. Minutes of meeting of St/C are attached in Attachment 1.

List of Meetings of Steering Committee of the Project

Steering Committee (St/C)		
No.	Date	Key Discussion Points
1st	12 Jan., 2005	-Comments on the Draft Inception Report of the Project -Implication with MOLAE and other ministries on environmental monitoring -Involvement of Ministry of Education as a St/C member
2nd	23 Feb., 2005	-Finalization the Inception Report of the Project -Confirmation of principal roles of MOLAE and other ministries related to environmental monitoring -Agreement of a role of St/C and T/C -Participation in a training course of the Project from other ministries -Importance of public awareness and environmental education
3rd	21 Sept., 2005	-Progress and difficulties of the Project -Presentation and explanation of the Progress Report-1 -Key substantial issues related to environmental monitoring -Plan of operation of the activities in the next stage
4th	5 Mar., 2006	-Progress and difficulties of the Project -Presentation of monitoring activities and monitoring plan by DFEAs -Presentation and explanation of the Progress Report-2 -Key substantial issues related to environmental monitoring -Plan of operation of the activities in the next stage
5th	23 Aug., 2006	-Results of the mid-term evaluation -Progress of the Project up to August 2006 -Presentation and explanation of the Progress Report-3
6th	25 Feb., 2007	-Progress of the Project up to February 2007 -Presentation and explanation of the Progress Report-4
7th	9 Aug., 2007	-Results of the terminal evaluation -Presentation and explanation of contents of the Progress Report-5
8th	9 Dec., 2007	-Presentation and explanation of overall results of the Project -Discussion on the monitoring results -Prospects of environmental monitoring in Syria -Continuation of environmental monitoring activities -Confirmation of Project sustainability

During the project period, the Technical Committee (T/C) meetings chaired by the General Director of GCEA were held. Minutes of meeting of T/C are attached in Attachment 2.

List of Meetings of Technical Committee of the Project

Technical Committee (T/C)		
No.	Date	Key Discussion Points
1st	23 Feb., 2005	-Comments and finalization the Inception Report of the Project -Confirmation of concrete activities of the Project including training, equipment, counterpart personnel, and lab layout plan -Discussion of suitability of the Project considering different environmental background by each Governorate -Confirmation of a role of T/C
2nd	26 May., 2005	-Confirmation of a counterpart personnel list -Discussion on a program of the basic environmental monitoring course -Progress of preparation of lab in each DFEA -Introduction of a career evaluation of counterpart personnel -Editing direction of a news letter "Humat Beia"
3rd	4 Aug., 2005	-Review of implementation of the basic environmental monitoring course -Discussion on the next training program including a study tour to Egypt -Budget required for the Project in next year -Preparation and distribution of a news letter "Humat Beia" -Discussion related to the central lab
4th	22 Aug., 2005	-Agreement on the draft technical specifications for air and water quality analysis to be procured in 2005 -Further comments and requirements on the equipment provided by JICA

Technical Committee (T/C)		
No.	Date	Key Discussion Points
5th	18 Sept., 2005	-Review of the Project activities up to September 2005 -Presentation and Explanation of the Progress Report-1 -Technical proposal of networking system between GCEA and DFEAs -Plan of operation of the activities in the next stage
6th	13 Dec., 2005	-Plan and schedule of water and air quality training -Discussion on QA/QC as a part of data management -Progress of equipment procurement -Confirmation of monitoring activities in DFEAs -Implementation of achievement evaluation of C/Ps
7th	1 Mar., 2006	-Review of the Project activities up to February 2006 -Presentation and Explanation of the Progress Report-2 -Results of achievement evaluation -Distribution of the report of pollution source survey -Networking system between GCEA and DFEAs -Presentation of monitoring activities and monitoring plan by DFEAs -Progress of equipment procurement
8th	18 May., 2006	-Summary of environmental monitoring activities of DFEAs -Networking between GCEA and DFEAs -Plan of Operation of the Project up to September 2006 -Mid-term evaluation -Confirmation Issues on the Operation of the Project
9th	22 Jun., 2006	-Specification of AAS -Maintenance, accessory, and installation activities -Training Plan
10th	20 Aug., 2006	-Results of the mid-term evaluation -Presentation environmental monitoring activities of DFEAs
11th	4 Sept., 2006	-Progress of the Project up to August 2006 -Presentation and Explanation of the Progress Report-3
12th	9 Nov., 2006	-The next 5-year plan on environment and the Project Management -Presentation of progress and problems of the Project (Damascus, Damascus countryside, and Sweida DFEAs) -Plan of Operation of the Project
13th	21 Feb., 2007	-Progress of the Project up to February 2007 -Presentation of progress and problems of the Project (Tartous, Hasakeh, and Aleppo DFEAs) -Presentation and Explanation of the Progress Report-4
14th	22 May, 2007	-Presentation and discussion on plan of operation from May to September 2007 -Explanation of Terminal Evaluation
15th	31 Jul., 2007	-Progress of the Project up to July 2007 -Presentation and explanation of the terminal evaluation
16th	5 Nov., 2007	-Presentation and explanation of Pr/R-5 -Explanation on holding of the integrated seminar -Plan of Operation of the Project up to December 2007

9. RECOMMENDATIONS FOR PROMOTION OF ENVIRONMENTAL MONITORING

9.1 Self Training Programs Proposed

In the course of the Project, the JICA Expert Team has conducted a number of training courses and activities taking current counterpart conditions into account. In order to secure the Project sustainability and continuation of the environmental monitoring, it is recommended to conduct the Self Training in accordance with the proposed program as shown in the following pages.

The Self Training should be carried out mostly based on SOP prepared during the Project period and the annual monitoring plan prepared by each DFEA. All training materials prepared by the JICA Expert Team are in Annex 2.3, and these materials are useful to review and upgrade current lab analysis, and these are also effective to train new staff of DFEA.

9.2 Pollution Source Control by Using Monitoring Data

Continuous implementation of public awareness activities for establishment of partnership between DFEA and industrial sector by using reliable monitoring data is important as following reasons, in accordance with the project purpose to develop staff capacity of DFEA on environmental monitoring of pollution sources and realization of social environmental management.

- 1) Knowledge and understanding on contents of basic environmental law (ex. Law No. 50) and regulations such as emission standard which are to be base for target of pollution control activities to be implemented by pollution source should be continued to raised by DFEA for industrial pollution sources through various adequate method of the public awareness activity.
- 2) Industrial side requires adequate technical and administrative procedural advices on installation of pollution control facilities and improvement of production process contributing to pollution reduction, and requires information on how the advice can be obtained. For the demands from industrial side, since DFEA should be the one who provide adequate advices and information in near future, DFEA should know what advices and arrangement are required based on needs of industrial side.

Further, in order to promote voluntary pollution control management by industrial sector, some administrative system such as environmental fund, environmental corporation, and licensed pollution control manager are required to introduce. In introducing such system, collaboration among various concerned agencies such as between GCEA and Ministry of Industry will be required. Therefore, medium- and long-term action plan should be prepared for industrial pollution source control under the National Committee for Public Awareness.

Self Training Programs Proposed from January to December 2008 (1/2)

	Title of Training	Sector	Trainer (A)	Trainer (B)	No. of Trainees	No. of Day × Times	Place/Site	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Basic Water Quality (BW)																			
	Training on sampling method for industrial wastewater (selection of sampling point, flow rate, etc.)	BW	Mr. Muhamed Ali Al Husien (HOM)	Prof. of Damascus University	Appr. 42 (3/DFEA)	2×1	GCEA		Lecture 1 d OJT 1 d										
	Training on QA/QC	BW	AEC Staff	ditto	Appr. 42 (3/DFEA)	2×1	GCEA (or AEC)			Lecture 1 d OJT 1 d									
	Training on water treatment (result interpretation)	BW	Mr. Muhamed Ali Al Husien (HOM)	ditto	Appr. 42 (3/DFEA)	3×1	GCEA					Lecture 2 d OJT 1 d					Lecture 2 d OJT 1 d		
	Training on wastewater treatment (result interpretation)	BW	Mr. Muhamed Ali Al Husien (HOM)	ditto	Appr. 42 (3/DFEA)	3×1	GCEA						Lecture 2 d OJT 1 d (STP)					Lecture 2 d OJT 1 d (STP)	
	Training on new staff at each DFEA	BW	Laboratory chief		Appr. 14 (1/DFEA)	2×2	Each DFEA	Lecture 1 d OJT 1 d								Lecture 1 d OJT 1 d			
	Analysis methods for other parameters	BW	Laboratory chief		Appr. 28 (2/DFEA)	1×1	Each DFEA		OJT 1 d										
Chemical and Biological Water Quality Analysis (CB)																			
Oil Content meter	Sample collection using wide-mouth glass bottle, and sample treatment by acid	CB	Ms. Amara Alhamwy (DAM), Mr. Malek Soliman (DAMC), Ms. Sana Mansour (HOM), Mr. Ahamad Mo'ala (ALP)	Ms. Inas Webby(DAM), Ms. Faten Harmoush(HOM)	3	1 × 24	DAM, DAMC, HOM, ALP	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Preparation of standard solution (100 ~ 200 mg/L)	CB			3	3 × 12	ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Zero calibration and span calibration	CB			3		ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	External extraction and emulsion break by separatory funnel	CB			3		ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Sample measurement according to EMP	CB			3		ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Recovery of used solvent using the solvent reclaimers	CB			3	1 × 2	ditto				OJT						OJT		
	Confirmation of background oil concentration in reclaimed solvent	CB			3	1 × 2	ditto				OJT						OJT		
Spectrophotometer	Sample collection and treatment by appropriate chemicals	CB	Ms. Inas Webby (DAM), Mr. Malek Soliman (DAMC), Ms. Sana Mansour (HOM), Mr. Ahamad Mo'ala (ALP)	Ms. Asmaa Al-Tabakh(DAM), Ms. Faten Harmoush(HOM)	3	1 × 24	ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Preparation of standard solutions (PO ₄ , NH ₃ , Cr-T, Cr-VI, NO ₂ , S)	CB			3	3 × 12	ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Sample measurement according to EMP	CB			3		ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	AC ^(Note1) (reagent blank, standard addition, standard solution)	CB			3		ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Creation of calibration curve using User Program for each parameter	CB			3		ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Comparison of the results measured by DR5000 and DR890	CB			3	1 × 6	ditto	OJT		OJT		OJT		OJT		OJT		OJT	
Ion Selective Electrode	Sample collection and treatment by appropriate chemicals	CB	Ms. Asmaa Al-Tabakh	Ms. Inas Webby	3	1 × 24	DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Preparation of standard solutions and ionic strength adjuster for each parameter	CB			3	3 × 12	DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Check of slope for each parameter	CB			3		DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Sample measurement according to EMP	CB			3		DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Measurement of EC and pH by ISEs	CB			3		DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Comparison of the results measured by ISE and DR890	CB			3		DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
Total Coliform	Sample collection and treatment by appropriate chemicals	CB	Ms. Layla Al Durra	Ms. Asmaa Al-Tabakh	3	1 × 24	DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Preparation of cultuer media and culture dish	CB			3	2 × 6	DAM		OJT		OJT		OJT		OJT		OJT		OJT
	Sterilization of devices by autoclave, oven, alcoholic lump	CB			3		DAM		OJT		OJT		OJT		OJT		OJT		OJT
	Use of funnel assemble and filtration unit	CB			3		DAM		OJT		OJT		OJT		OJT		OJT		OJT
	Incubate and count of colony	CB			3		DAM		OJT		OJT		OJT		OJT		OJT		OJT
SS and Settleable solids	Sample collection and treatment by appropriate chemicals	CB	Ms. Asmaa Al-Tabakh	Ms. Inas Webby	3	1 × 24	DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Preparation of filter (vacuume filtration unit, drying, weghing)	CB			3	2 × 6	DAM	OJT		OJT		OJT		OJT		OJT		OJT	
	Sample measurement according to EMP	CB			3		DAM	OJT		OJT		OJT		OJT		OJT		OJT	
	Measurement of settleable solids	CB			3		DAM	OJT		OJT		OJT		OJT		OJT		OJT	
	Comparison of measured results by optical method and gravimetric method	CB			3		DAM	OJT		OJT		OJT		OJT		OJT		OJT	
COD _C (Open Reflux method)	Sample collection and treatment by appropriate chemicals	CB	Ms. Inas Webby	Ms. Layla Al Durra	3	1 × 24	DAM	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Preparation of reagents/chemicals (K ₂ Cr ₂ O ₇ , Fe(NH ₄) ₂ (SO ₄) ₂ ·H ₂ O), etc.	CB			3	2 × 6	DAM		OJT		OJT		OJT		OJT		OJT		OJT
	Standardization of FAS by titration	CB			3		DAM		OJT		OJT		OJT		OJT		OJT		OJT
	Sample measurement according to EMP	CB			3		DAM		OJT		OJT		OJT		OJT		OJT		OJT
	Comparison of the results measured by open reflux method and reactor digestion method	CB			3		DAM		OJT		OJT		OJT		OJT		OJT		OJT
WWTF	Treatment of lab wastewater received from other DFEAs	CB	Ms. Reem Sadr	Ms. Iman Sulayman	5	2 × 4	DAM			OJT			OJT			OJT			OJT
	Check of quality of wastewaters treated by the WWTF ^(note2)	CB			5		DAM			OJT			OJT			OJT			

Self Training Programs Proposed from January to December 2008 (2/2)

	Title of Training	Sector	Trainer (A)	Trainer (B)	No. of Trainees	No. of Day × Times	Place/Site	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Heavy Metal Analysis (HM)																			
	OJT for data management	HM	Each C/P (themselves)		5	3 months	DAM	⇒	⇒	⇒									
	OJT for data evaluation	HM	Mr. Talaat Harb		4	3 months	DAM		⇒	⇒	⇒								
	OJT for O/M	HM	Each C/P (themselves)		5	as appropriate	DAM			Check of Consumables			Check of Reagents						
	Periodical maintenance	HM	The supplier Each C/P (themselves)		5	2×2	DAM				OJT 2 d						OJT 2 d		
	OJT for standard addition method and matrix modifier	HM	Each C/P (themselves)		5	2×5	DAM					OJT 6 d						OJT 4 d	
	Training for new staff at each DFEA	HM	All C/Ps		1 or 2	2×2	each DFEA						Lecture 2 d Hands-on 10 d						Lecture 2 d Hands-on 10 d
	Training for other DFEAs	HM	Mr. Talaat Harb		6	2×2	DAM or DAMC							OJT 2 d		OJT 2 d			
	Training for recording	HM	AEC Staff		5	2×1	AEC								OJT 2 d				
Air Quality (AQ)																			
	Training on monitoring plan (EMP)	AQ	Ms. Omaira Younes (DAM), Mr. Muhamed Ali Al Husien (HOM), Mr. Ilia Wasel (ALP)	Ms. Feryal AlHusaini (DAM), Mr. Mahmoud Al yousef (HOM), Ms. Dunia Ghareib (ALP)	DAM: 5 HOM: 10 ALP: 4	2×2	DAM, HOM, ALP			Plan (1)						Plan (2)			
	Air quality sampling (OJT)	AQ	Ms. Rafah Zaghmout (DAM), Mr. Kusai Alyousef (HOM), Ms. Khuloud Owayed (ALP)	Ms. Hiba Adra (DAM) Mr. Ahmad Kaffa (HOM) Mr. Mahmoud Hasan Ismail (ALP)	DAM: 5 HOM: 10 ALP: 4	2×12	ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Wide area investigation (OJT)	AQ				3×4	ditto	OJT			OJT			OJT			OJT		
	Analysis in laboratory (OJT)	AQ	Ms. Hiba Adra (DAM) Ms. Itidal Alawad (HOM)	Ms. Omaira Younes (DAM), Ms. Sana Mansour (HOM), Mr. Ilia Wasel (ALP)	DAM: 5 HOM: 10 ALP: 4	2×12	ditto	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT	OJT
	Training on QA/QC	AQ	Ms. Dunia Ghareib (ALP)			2×4	ditto		Lecture			Lecture			Lecture			Lecture	
	Data evaluation and interpretation	AQ	Mr. Almuthanna Ghanem (DAM), Mr. Mahmoud Al yousef (HOM), Mr. Muhamed Ali Al Husien (HOM), Mr. Mahmoud Hasan Ismail (ALP), Mr. Ilia Wasel (ALP)	Ms. Hiba Adra (DAM), Ms. Rafah Zaghmout (DAM), Mr. Muhamed Ali Al Husien (HOM), Ms. Aeda Hlawik (HOM), Mr. Ilia Wasel (ALP), Ms. Dunia Ghareib (ALP)	DAM: 5 HOM: 10 ALP: 4	2×6	ditto		Lecture		Lecture		Lecture		Lecture		Lecture		Lecture
	Data Management (OJT)	AQ	Mr. Almuthanna Ghanem (DAM) Ms. Aeda Hlawik (HOM) Mr. Ilia Wasel (ALP)	Ms. Feryal AlHusaini (DAM) Mr. Kusai Alyousef (HOM) Ms. Khuloud Owayed (ALP)	DAM: 5 HOM: 10 ALP: 4	2×4	ditto			OJT			OJT			OJT			OJT
	O/M (OJT)	AQ	Ms. Rafah Zaghmout (DAM) Ms. Itidal Alawad (HOM) Ms. Dunia Ghareib (ALP)	Ms. Hiba Adra (DAM), Mr. Ahmad Kaffa (HOM), Mr. Mahmoud Hasan Ismail (ALP)	DAM: 5 HOM: 10 ALP: 4	2×2	ditto		Check						Check				
	Training on new staff at each DFEA	AQ	Ms. Feryal AlHusaini (DAM) Mr. Mahmoud Al yousef (HOM) Ms. Dunia Ghareib (ALP)	Ms. Rafah Zaghmout (DAM), Mr. Kusai Alyousef (HOM), Ms. Khuloud Owayed (ALP)	DAM: 5 HOM: 10 ALP: 4	2×as times required	ditto	if any	if any	if any	if any	if any	if any	if any	if any	if any	if any	if any	if any
Data Management (DM)																			
	Training on GCEA networking system & database on water and air quality	DM	Mr. Shaka Al Soleman GCEA IT Section	Mr. Molham Darwish GCEA IT Section	Appr. 28 (2/DFEA)	1×3	GCEA		Lecture and OJT 1 d			Lecture and OJT 1 d				Lecture and OJT 1 d			
	Basic statistics (standard deviation, coefficient of variation CV, correlation coefficient, error and uncertainty, Z score etc.)	DM	DAM University or Environmental Study Center		14 (1/DFEA)	1×2	GCEA	Lecture 1d					Lecture 1d						
	Training on EDL and recording digit for BQ and CB (measuring range, EDL, recording digit etc.)	DM	staff in charge of DM (each DFEA)		14 (2/DFEA)	1×3	each DFEA	Lecture and OJT 1 d			Lecture and OJT 1 d				Lecture and OJT 1 d				
	Training on annual report preparation on water and air quality	DM	Laboratory Chief (each DFEA)		Appr. 42 (3/DFEA)	1×3	each DFEA		Lecture 1d				Lecture 1d						Lecture 1d
Public Awareness (PA)																			
	Workshop (1) on implementation of the Action Plan for Industrial Pollution Source Control by Using Monitoring Data (Presentation of the draft Action Plan by each DFEA, discussion on how to improve the Action Plan)	PA	GCEA Inspection Section	GCEA Public Awareness Section	Appr. 28 (2/DFEA)	1×1	GCEA			Workshop									
	Workshop (2) on implementation of the Action Plan for Industrial Pollution Source Control by Using Monitoring Data (Presentation of revised Action Plan by each DFEA, discussion on necessary institutional set-up, procedure, and implementation schedule)	PA	GCEA Inspection Section	GCEA Public Awareness Section	Appr. 28 (2/DFEA)	1×2	GCEA							Workshop			Workshop		

note: WWTF: Wastewater Treatment Facility