JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF LOCAL ADMINISTRATION AND ENVIRONMENT (MOLAE)
THE SYRIAN ARAB REPUBLIC

THE CAPACITY DEVELOPMENT OF ENVIRONMENTAL MONITORING AT DIRECTORATES FOR ENVIRONMENTAL AFFAIRES IN GOVERNORATES IN THE SYRIAN ARAB REPUBLIC

PROJECT COMPLETION REPORT

(Executive Summary)

January 2008

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Project Area

The Capacity Development of Environmental Monitoring at Directorates for Environmental Affaires in Governorates

Project Completion Report (Executive Summary)

Table of Contents

Page

1. Objectives of the Project---------- 1
2. Achievement of Outputs---------- 2
   - 2.1 Overall Goal---------- 2
   - 2.2 Project Purpose---------- 2
   - 2.3 Achievement of Output-1---------- 5
   - 2.4 Achievement of Output-2---------- 7
   - 2.5 Achievement of Output-3---------- 9
   - 2.6 Achievement of Output-4---------- 10
   - 2.7 Achievement of Output-5---------- 11
3. Advisory Activities---------- 15
4. Actual Implementation Schedule---------- 16
5. Difficulties and Applied Countermeasures to the Project---------- 24
   - 5.1 Staff Leaving---------- 24
   - 5.2 Procurement of Equipment and Chemicals---------- 24
   - 5.3 Chemical Background---------- 25
   - 5.4 Training in Damascus---------- 25
6. Results of Capacity Development---------- 27
   - 6.1 Individual Level---------- 27
   - 6.2 Organizational Level---------- 36
   - 6.3 Institutional and Social Level---------- 42
7. Lessons Learned for Future Project---------- 43
8. Terminal Evaluation---------- 45
   - 8.1 Results of Terminal Evaluation---------- 45
   - 8.2 Feedback Results of the Terminal Evaluation---------- 54
9. Recommendations for Promotion of Environmental Monitoring---------- 57

List of Abbreviations

Organizations and Projects		Chemical Substance and Equipment	
AEC	Atomic Energy Commission of Syria	AAS	Atomic Absorption Spectrophotometer
DFEA	Directorate for Environmental Affaires	AQ	Air Quality Analysis
C/P	Counterpart	BW	Basic Water Quality Analysis
CCC	Cairo Central Center	BOD	Biochemical Oxygen Demand
COI	Chamber of Industry	CB	Chemical and Biological Analysis
EEAA	Egyptian Environmental Affaires Agency	Cl	Chloride
EOJ	Embassy of Japan in Syria	CO	Carbon Monoxide
ERL	Environmental Research Laboratory in HIAST	COD	Chemical Oxygen Demand
ESC	Center for Environmental Studies (former Scientific and Environmental Research Center: SERC)	DM	Data Management
GCEA	General Commission for Environmental Affaires	DO	Dissolved Oxygen
HCES	Higher Council for Environmental Safety	EC	Electric Conductivity
HIAST	Higher Institute of Applied Science and Technology	GC	Gas Chromatograph
ITRC	Industrial Testing and Research Center in the Ministry of Industry	GC/MS	Gas Chromatograph Mass Spectrometer
JET	JICA Expert Team	HC	Hydrocarbon
JOCV	Japan Overseas Cooperation Volunteers	HM	Heavy Metal Analysis
MAWRED	The Modernizing and Activating Woman's Role in Economic Development	IC	Ion Chromatograph
METAP	Mediterranean Environmental Technical Assistance Program	ICP	Inductively Coupled Plasma
MOA	Ministry of Agriculture	NOx	Nitrogen Oxide
MOH	Ministry of Health	NO_2	Nitrite
MOIn	Ministry of Industry	NO_3	Nitrate
MOIr	Ministry of Irrigation	O/M	Operation and Maintenance
MOLAE	Ministry of Local Administration and Environment	Ox	Oxidant
NEAP	National Environmental Action Plan	PA	Public Awareness
NGO	Non Governmental Organization	pH	Hydrogen Ion Exponent
RBO	Regional Branch Office	PO_4	Phosphate Ion
SASMO	Syrian Arab Organization for Standardization and Metrology	QA/QC	Quality Assurance and Quality Control
SPC	State Planning Commission	SPM	Suspended Particulate Matters
St/C	Steering Committee	SPM10	Particulate Matters less than 10 micrometer
SV	Senior Volunteers	SO_2	Sulfur Dioxide
T/C	Technical Committee	SOP	Standard Operation Procedure
Reports and Minutes		SPM	Suspended Particulate Matters
C/P	Counterpart	SS	Suspended Solids
EIA	Environmental Impact Assessment	StM	The Standard Methods for the Examination of Water and Wastewater 20th Edition
EMO	Environmental Monitoring Plan	TDS	Total Dissolved Solid
M/M	Minutes of Meeting	TOC	Total Organic Carbon
PO	Plan of Operation	TSP	Total Suspended Particulate
PDM	Project Design Matrix	UV/VIS	Ultraviolet/Visible Spectrophotometer
R/D	Record of Discussions	VOC	Volatile Organic Caron

Executive Summary

1. Objectives of the Project

The overall goal of the Capacity Development of Environmental Monitoring at Directorates for Environmental Affaires in Governorates (the Project) is defined that all Directorates acquire the capability to introduce and conduct regular environmental monitoring of required parameters for air and water quality according to the monitoring plans formulated by the Directorates themselves, and to implement activities for public awareness including publication of the monitoring results. The objectives of the Project are as follows:

1) Establishment of the regular environmental monitoring system related to air and water quality by Directorate for Environmental Affaires (DFEA) and General Commission for Environmental Affaires (GCEA) in Ministry of Local Administration and Environment (MOLAE), and

2) Management and usage of the monitoring data for publication and promotion of public awareness on environment.

2. Achievement of Outputs

2.1 Overall Goal

According to the Project Design Matrix (PDM) in the Record of Discussion (R/D) in 9 September 2004, overall goal of the Project is that "Environmental monitoring system and publication of the monitoring results are introduced at and spread to all the Directorates." Prospects of the overall goal in the end of the Project are shown in the following by the objectively verifiable indicators, which are defined in PDM.

Prospects of the Overall Goal

Indicator 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.
Prospects Air quality monitoring at target 3 DFEAs (Damascus, Homs, and Aleppo) in Hot Spot areas are started and first objectives have been achieved. Provisionally GCEA will be able to make a plan to set up the automatic air quality monitoring system in Hot Spot areas and the basic Lab for Air quality monitoring especially PM10 and TSP at other 11 DFEAs within the period of the 10th 5-years National Plan (2006-2010) of environmental sector. Objectives will be mostly achieved within 5 years.
Indicator 2 Roles for the national monitoring system are properly allocated among the Directorates. (reference system)
Prospects At present, roles for the national monitoring system are allocated GCEA and DFEAs with general demarcation from other concerned ministries. Due to focusing on pollution sources, 14 DFEAs have important roles for the national environmental monitoring system. Strengthening for Lab analysis is carried out to assist the national environmental monitoring system. Although the monitoring technology has been improved to a certain level, technical capacities must be improved even further and on a continuous basis in order for Syria to be able to accurately analyze all of the items in the ware quality and air quality.
Indicator 3 Results of the monitoring is continuously issued and opened to the public as an annual report at all Governorates.
Prospects Results of water quality and air quality monitoring have been accumulated in 14 DFEAs. It can be said that the reliability of monitoring data should be a pre-condition for information disclosure. Further efforts for internal and external Quality Assurance and Quality Control (QA/QC) activities are required for obtaining official accreditation of the Labs. After that, indispensable information disclosure e.g. environmental annual report and data book will be implemented to open to the public at 14 governorates in the near future.
Indicator 4 Results of the monitoring is issued and opened to the public as an annual report at the national level.
Prospects Results of water quality and air quality monitoring have been accumulated in 14 DFEAs, and been sent to GCEA. GCEA has responsibility for monitoring data analysis to clarify current environmental situation, to verify effects of countermeasures, and to promote further enforcement for pollution control in accordance with the statement on environmental sector of the 10th 5-years National Plan (2006-2010). Based on the report prepared by GCEA, environmental issues will be discussed in the Government of Syria. After getting approval of the Government, GCEA's information disclosure e.g. environmental annual report and data book will be implemented to open to the public in the near future.

2.2 Project Purpose

Regarding the accomplishment of the Project purpose, the Project results are summarized below based on the results of the Terminal Evaluation of the Project conducted in July 2007 with up dated result after the Terminal Evaluation.

Accomplishment of the Project Purpose

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.

Indicator 1

Analysis technology level to be targeted is as follows:

- 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 project

Results

In the field of water quality analysis, all of the target DFEAs have mostly achieved the targeted level, but more actual practices are required in order to improve its reliability. In the field of air quality analysis, all target DFEAs have partly achieved the targeted level especially for preparation of calibration curve, mainly due to shortage of repeating times of training. Details are described in the table below.

Achievement of Target Analysis Technology Level at Each Directorates

Directorates		Field	Achievement	Remarks
a	Damascus	Water	Mostly	Knowledge acquired through the Project has been prepared in place of SOP's.: pH, temp, color, total dissolved solids (TDS), DO, total suspended solids (SS), COD, BOD, NO_3, PO_4, Cl, NH_3-N, electrical conductivity, and turbidity have been compiled. Compilation of SOP for Chemical and Biological Analysis (CB) has been completed. SOPs for Heavy Metal Analysis: Aluminum, Arsenic, Barium, Cadmium, Chromium, Nickel, Mercury, Iron, Antimony, Copper, Manganese, Zinc, Lead, and Silver have been complied as well.
		Air	Mostly	Knowledge acquired through the Project has been prepared in place of SOPs.: SOx, NOx, Pb, TSP, PM10, Ozone, Fluorine compound, NH_3, and Dust fall have been compiled.
b	Homs	Water	Mostly	Knowledge acquired through the Project has been prepared in place of SOP's.: pH, temp, color, total dissolved solids (TDS), DO, total suspended solids (SS), COD, BOD, NO3, PO4, Cl, NH3-N, electrical conductivity, and turbidity have been compiled.
		Air	Mostly	Knowledge acquired through the Project has been prepared in place of SOPs.: SOx, NOx, Pb, TSP, PM10, Ozone, Fluorine compound, NH_3, and Dust fall have been compiled.
	Aleppo	Water	Mostly	Knowledge acquired through the Project has been prepared in place of SOP's.: pH, temp, color, total dissolved solids (TDS), DO, total suspended solids (SS), COD, BOD, NO_3, PO_4, Cl, NH_3-N, electrical conductivity, and turbidity have been compiled.
		Air	Mostly	Knowledge acquired through the Project has been prepared in place of SOPs.: SOx, NOx, Pb, TSP, PM10, Ozone, Fluorine compound, NH3, and Dust fall have been compiled.
c	Damascus Countryside	Water	Mostly	Knowledge acquired through the Project has been prepared in place of SOP's.: pH, temp, color, total dissolved solids (TDS), DO, total suspended solids (SS), COD, BOD, NO3, PO4, Cl, NH3-N, electrical conductivity, and turbidity have been compiled. Compilation of SOP for Chemical and Biological Analysis (CB) has been completed.
	Hama	Water	Mostly	Knowledge acquired through the Project has been prepared in place of SOP's.: pH, temp, color, total dissolved solids (TDS), DO, total suspended solids (SS), COD, BOD, NO_3, PO_4, Cl, NH_3-N, electrical conductivity, and turbidity have been compiled.
	Lattakia	Water	Mostly	Ditto
	Deir ez Zor	Water	Mostly	Ditto
	Idleb	Water	Mostly	Ditto
	Hasakeh	Water	Mostly	Ditto
	Rakka	Water	Mostly	Ditto
	Sweida	Water	Mostly	Ditto
	Dara'a	Water	Mostly	Ditto
	Tartous	Water	Mostly	Ditto
	Quneitra	Water	Mostly	Ditto

Indicator 2

The target Directorates conduct monitoring of water and air on regular basis according to the monitoring plan formulated by themselves.

Results

Monitoring activities of water and air quality have been carried out basically on regular basis mostly according to the plan formulated by the Project. Over planning and movement of DFEA office are main reasons for low performance. There was no sampling plan on AQ, but C/P did it for training purposes. (Basic Water Quality: BW, Chemical and Biological Water Quality: CB, Heavy Metal: HM, Air Quality: AQ, Data Management: DM, Public Awareness: PA)

Number of Sampling Data to be Collected as per the Plan and Number of Data Actually Collected Between January and December 2006

Directorates		Field	# of sample to be collected as per the plan: =(a)	# of sample actually collected: =(b)	Ration of (b) to (a) (%)	Remarks
1	Damascus	BW	138	147	107	
		CB 1	-	7	-	Sample for training
		HM	-	-	-	
		AQ	0	29	-	
2	Damascus Countryside	BW	127	114	90	
		CB 2	-	-	-	Sample for training
3	Aleppo	BW	77	61	79	Due to movement of DFEA office, sample for training
		CB 2	-	-	-	
		AQ	0	133	-	
4	Homs	BW	216	90	42	
		CB 2	-	-	-	
		AQ	0	98	-	Sample for training
5	Hama	BW	185	81	44	
6	Lattakia	BW	198	114	58	Over-estimation
7	Deir ez Zor	BW	71	50	70	
8	Idleb	BW	55	50	91	
9	Hasakeh	BW	176	46	26	Over-estimation
10	Rakka	BW	38	40	105	
11	Sweida	BW	94	91	97	
12	Dara'a	BW	55	47	85	
13	Tartous	BW	42	54	129	
14	Quneitra	BW	36	41	114	
Total		Water	1,508	1,033	68	
		Air	0	260	-	

Number of Sampling Data to be Collected as per the Plan and Number of Data Actually Collected Between January and December 2007

Directorates		Field	# of sample to be collected as per the plan: =(a)	# of sample actually collected: =(b)	Ration of (b) to (a) (%)	Remarks
1	Damascus	BW	126	54	45	Training for CB
		CB 1	-	10	-	Sample for training
		HM	98	37	38	
		AQ	544	242	44	
2	Damascus Countryside	BW	170	224	132	
		CB 2	-	2	-	Sample for training
3	Aleppo	BW	36	23	64	Due to movement of DFEA office, sample for training
		CB 2	-	2	-	
		AQ	444	140	32	
4	Homs	BW	42	120	286	Inspection
		CB 2	-	1	-	Sample for training
		AQ	584	100	17	
5	Hama	BW	179	83	46	
6	Lattakia	BW	128	103	80	
7	Deir ez Zor	BW	77	31	40	
8	Idleb	BW	50	32	64	
9	Hasakeh	BW	69	65	94	
10	Rakka	BW	44	40	91	
11	Sweida	BW	74	73	99	
12	Dara'a	BW	51	53	104	
13	Tartous	BW	69	78	113	
14	Quneitra	BW	39	30	77	
Total		Water	1,252	1,061	85	
		Air	1,572	482	31	

Indicator 3

Activities for public awareness are implemented in four (4) Directorates at least out of fourteen (14) Directorates.

Results Activities for public awareness have been implemented in 4 priority Directorates as described in the results of Indicators 5.2 and 5.3 in the subsequent section.
Indicator 4 Monitoring results are issued and continuously opened to the public as an annual report at Governorates level.
Results Annual reports for the year 2006 have been prepared by all DFEAs and preparation of the reports for the year 2007 in underway. The reports, however, have not been published yet because of no authorization status of lab analysis data.

2.3 Achievement of Output-1

According to the Project Design Matrix (PDM) in the Record of Discussion (R/D) in 9 September 2004, the overall target of Output-1 is "Technical level of laboratory staff concerning environmental sampling and analysis is improved". The achievement is summarized in the table below by indicator.

Summary of Achievement of Output-1

Indicators

1.1 All laboratory staff conducted environmental monitoring according to the SOP completed by the Project by three years after the commencement of the Project

Achievement Result
(BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)

Currently, 95.3% of all lab staff have become able to conduct EMO as shown in the table below. SOP was drafted by JET in 2005-2006. Then, C/Ps have revised it through actual practice considering specific conditions of wastewater from pollution sources. It shows almost full achievement and establishment of the base for monitoring. CB 1 is for Damascus DFEA, and CB 2 is for Damascus Countryside, Homs, and Aleppo DFEAs.

Number of lab staff who can conduct EMO according to SOP and its ratio to all the lab staff.

Directorates		Field	# of target lab staff =(a)	# of staff who can conduct EMO according to SOP=(b)	Ratio of (b) to (a)	Remarks
1	Damascus	BW	4	4	100.0	
		CB 1	4	4	100.0	
		HM	5	5	100.0	
		AQ	3	3	100.0	
		All	16	16	100.0	Water + Air
2	Damascus Countryside	BW	8	8	100.0	
		CB 2	7	5	71.4	
		All	15	13	86.7	BW+CB
3	Aleppo	BW	3	3	100.0	
		CB 2	2	1	50.0	
		AQ	4	4	100.0	
		All	9	8	88.9	Water + Air
4	Homs	BW	6	6	100.0	
		CB 2	4	3	75.0	
		AQ	6	6	100.0	
		All	16	15	93.8	Water + Air
5	Hama	BW	6	6	100.0	
6	Lattakia	BW	8	8	100.0	
7	Deir ez Zor	BW	4	4	100.0	
8	Idleb	BW	4	4	100.0	
9	Hasakeh	BW	3	3	100.0	
10	Rakka	BW	3	3	100.0	
11	Sweida	BW	8	8	100.0	
12	Dara'a	BW	5	5	100.0	
13	Tartous	BW	6	6	100.0	
14	Quneitra	BW	3	2	66.7	
Total		Water	93	88	94.6	BW, CB, HM
		Air	13	13	100	
		All	106	101	95.3	

Indicators	Achievement Result (BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)
1.2 All lab staff reach the grade B level by 3 years. -Grade B=be able to analyze and work out the data, but need decision by the superior to evaluate and determine the data.	Currently, 90.6 % of lab staffs have reached the grade B level already as shown in the table below. This figure also shows the establishment of the base for environmental monitoring.

Number of lab staff who have reached the Grade B level and its ratio to all the lab staff

Directorates		Field	# of target lab staff =(a)	# of staff who have reached Grade B level =(b)	Ratio of (b) to (a) (%)	Remarks
1	Damascus	BW	4	3	75.0	
		CB 1	4	3	75.0	
		HM	5	5	100.0	
		AQ	3	3	100.0	
		All	16	14	87.5	Water + Air
2	Damascus Countryside	BW	8	8	100.0	
		CB 2	7	5	71.4	
		All	15	13	86.7	BW+CB
3	Aleppo	BW	3	3	100.0	
		CB 2	2	1	50.0	
		AQ	4	4	100.0	
		All	9	8	88.9	Water + Air
4	Homs	BW	6	6	100.0	
		CB 2	4	3	75.0	
		AQ	6	6	100.0	
		All	16	15	93.8	Water + Air
5	Hama	BW	6	6	100.0	
6	Lattakia	BW	8	8	100.0	
7	Deir ez Zor	BW	4	4	100.0	
8	Idleb	BW	4	4	100.0	
9	Hasakeh	BW	3	3	100.0	
10	Rakka	BW	3	3	100.0	
11	Sweida	BW	8	7	87.5	
12	Dara'a	BW	5	4	80.0	
13	Tartous	BW	6	5	83.3	
14	Quneitra	BW	3	2	66.7	
Total		Water	93	83	89.2	BW, CB, HM
		Air	13	13	100.0	
		All	106	97	90.6	

1.3. 50% of all lab staff reach the grade A level by 3 years after the commencement of the Project -Grade A=be able to analyze, evaluate the data, and determine parameters by his/her own.	Currently, 20.8% of lab staff of all DFEAs has reached the grade A level as shown in the table blow. Low achievement is mainly due to leaving B level C/Ps. However, around 22 C/Ps are in A level by the Project. These A level C/Ps should be trainers and train others and new staff after the Project.

Number of lab staff who have reached the Grade A level and its ratio to all the lab staff

Directorates		Field	# of target lab staff =(a)	# of staff who have reached Grade A level =(b)	Ratio of (b) to (a) (%)	Remarks
1	Damascus	BW	4	1	25.0	
		CB 1	4	0	0.0	
		HM	5	1	20.0	
		AQ	3	0	0.0	
		All	16	2	12.5	Water + Air
2	Damascus Countryside	BW	8	2	25.0	
		CB 2	7	0	0.0	
		All	15	2	13.3	BW+CB
3	Aleppo	BW	3	1	33.3	
		CB 2	2	0	0.0	
		AQ	4	1	25.0	
		All	9	2	22.2	Water + Air
4	Homs	BW	6	2	33.3	
		CB 2	4	0	0.0	
		AQ	6	2	33.3	
		All	16	4	25.0	Water + Air
5	Hama	BW	6	2	33.3	
6	Lattakia	BW	8	1	12.5	
7	Deir ez Zor	BW	4	2	50.0	
8	Idleb	BW	4	1	25.0	
9	Hasakeh	BW	3	1	33.3	

Indicators	Achievement Result (BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)							
	10	Rakka	BW	3	0	0.0	
	11	Sweida	BW	8	2	25.0	
	12	Dara'a	BW	5	1	20.0	
	13	Tartous	BW	6	1	16.7	
	14	Quneitra	BW	3	1	33.3	
	Total		Water	93	19	20.4	BW, CB, HM
			Air	13	3	23.1	
			All	106	22	20.8	

2.4 Achievement of Output-2

According to the Project Design Matrix (PDM) in the Record of Discussion (R/D) in 9 September 2004, the overall target of Output-2 is "Laboratories are properly managed by laboratory staff themselves". The achievement is summarized in the table below by indicator.

Summary of Achievement of Output-2

Indicators	Achievement Result (BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)
2.1 Equip in labs are properly operated and maintained according to the O/M manual compiled by lab staff by 3 years after the commencement of the Project	The O/M manual was drafted by the JICA Expert Team in 2005 and C/Ps have revised it through actual practice considering specific conditions of their labs. Currently, 84.0 % of the lab staff of all DFEAs is able to operate and maintain the equipment in the lab according to the O/M manual as shown in the table blow.

Number of lab staff who can operate and maintain equipment in lab according to the manual and overall compliance of the manual at each Directorate.

Directorates		Field	# of target lab staff =(a)	# of staff who can O/M equip. in lab according to the manual =(b)	Ratio of (b) to (a) (%)	Remarks
1	Damascus	BW	4	3	75.0	
		CB 1	4	3	75.0	
		HM	5	5	100.0	
		AQ	3	3	100.0	
		All	16	14	87.5	Water + Air
2	Damascus Countryside	BW	8	8	100.0	
		CB 2	7	2	28.6	
		All	15	10	66.7	BW+CB
3	Aleppo	BW	3	2	66.7	
		CB 2	2	1	50.0	
		AQ	4	4	100.0	
		All	9	7	77.8	Water + Air
4	Homs	BW	6	6	100.0	
		CB 2	4	3	75.0	
		AQ	6	6	100.0	
		All	16	15	93.8	Water + Air
5	Hama	BW	6	6	100.0	
6	Lattakia	BW	8	8	100.0	
7	Deir ez Zor	BW	4	4	100.0	
8	Idleb	BW	4	4	100.0	
9	Hasakeh	BW	3	3	100.0	
10	Rakka	BW	3	3	100.0	
11	Sweida	BW	8	7	87.5	
12	Dara'a	BW	5	5	100.0	
13	Tartous	BW	6	2	33.3	
14	Quneitra	BW	3	1	33.3	
Total		Water	93	76	81.7	BW, CB, HM
		Air	13	13	100.0	
		All	106	89	84.0	

<table>
<tr><th>Indicators</th><th>Achievement Result
(BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)</th></tr>
<tr><td>2.2.
Spare parts and consumable materials management system is established by 3 years after the commencement of the Project</td><td>O/M sheets for spare parts and chemical reagents were prepared at all DFEAs in June 2006 and it has been managed and up dated by the lab chief and lab staff in charge. The O/M sheets for spare parts have been updated as appropriate as shown in the table below.

Status of establishment of management system at each Directorate
<table><tr><th colspan="2">Directorates</th><th>Timing of preparation of O/M sheet</th><th>Updating of record on occasion</th></tr><tr><td>1</td><td>Damascus</td><td>June 2006</td><td>July 2006(oil meter)
May 2007(low volume air sampler)
July 2007(EC meter)</td></tr><tr><td>2</td><td>Damascus Countryside</td><td>ditto</td><td></td></tr><tr><td>3</td><td>Aleppo</td><td>ditto</td><td></td></tr><tr><td>4</td><td>Homs</td><td>ditto</td><td></td></tr><tr><td>5</td><td>Hama</td><td>ditto</td><td>July 2007(pH meter)</td></tr><tr><td>6</td><td>Lattakia</td><td>ditto</td><td></td></tr><tr><td>7</td><td>Deir ez Zor</td><td>ditto</td><td></td></tr><tr><td>8</td><td>Idleb</td><td>ditto</td><td>Jan 2006(COD meter)</td></tr><tr><td>9</td><td>Hasakeh</td><td>ditto</td><td></td></tr><tr><td>10</td><td>Rakka</td><td>ditto</td><td></td></tr><tr><td>11</td><td>Sweida</td><td>ditto</td><td>July 2007(EC meter)</td></tr><tr><td>12</td><td>Dara’a</td><td>ditto</td><td></td></tr><tr><td>13</td><td>Tartous</td><td>ditto</td><td></td></tr><tr><td>14</td><td>Quneitra</td><td>ditto</td><td></td></tr></table></td></tr>
<tr><td>2.3
Chemical reagents are properly stored and cared according to the O/M manual by 3 years after the commencement of the Project</td><td>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 DFEAs, chemical reagents are properly stored and cared. The Team has observed a case where the reagents that need to be kept under certain temperature are stored outside the refrigerator in a lab room without A/C. Director of the said DFEA plans to provide A/C to lab shortly so that adverse effects on the reagents are expected to be solved.

Status of storing and caring chemical regents at each Directorate
<table><tr><th></th><th>Directorates</th><th>Timing of preparation of O/M sheet</th><th>Frequency of updating of O/M sheet (one time/ 3 months)</th></tr><tr><td>1</td><td>Damascus</td><td>June 2006</td><td>Continued</td></tr><tr><td>2</td><td>Damascus Countryside</td><td>ditto</td><td>Continued</td></tr><tr><td>3</td><td>Aleppo</td><td>ditto</td><td>Not continued
(due to serious shortage of staff)</td></tr><tr><td>4</td><td>Homs</td><td>ditto</td><td>Continued</td></tr><tr><td>5</td><td>Hama</td><td>ditto</td><td>Continued</td></tr><tr><td>6</td><td>Lattakia</td><td>ditto</td><td>Continued</td></tr><tr><td>7</td><td>Deir ez Zor</td><td>ditto</td><td>Continued</td></tr><tr><td>8</td><td>Idleb</td><td>ditto</td><td>Continued</td></tr><tr><td>9</td><td>Hasakeh</td><td>ditto</td><td>Continued</td></tr><tr><td>10</td><td>Rakka</td><td>ditto</td><td>Not continued</td></tr><tr><td>11</td><td>Sweida</td><td>ditto</td><td>Continued</td></tr><tr><td>12</td><td>Dara’a</td><td>ditto</td><td>Continued</td></tr><tr><td>13</td><td>Tartous</td><td>ditto</td><td>Continued</td></tr><tr><td>14</td><td>Quneitra</td><td>ditto</td><td>Continued</td></tr></table></td></tr>
</table>

<table>
<tr><th>Indicators</th><th>Achievement Result
(BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)</th></tr>
<tr><td>2.4.
Liquid and solid wastes from lab are properly treated according to the lab O/M manual by 3 years after the commencement of the Project</td><td>As for treatment of liquid wastes from labs, preparation of “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.

Based on the proposal by the JICA Expert Team, GCEA has purchased wastewater treatment facilities for Damascus DFEA, expecting wastewater from all labs to be treated there. The facilities have not been operational, however, due to technical troubles on unit operation system that the supplier has not been able to fix. In the mean time, the other DFEAs have been storing the liquid wastes in tanks, some of which have been already sent to Damascus DFEA already as shown in the table below.

Even in December 2007, it is not improved due to lack of initiative and leadership of GCEA. The JICA Expert Team advised its technical committee in GCEA including several technical suggestions related to consistency of unit operation system.

Status of treatment of liquid wastes from lab at each Directorate
<table>
<tr><th rowspan="2"></th><th rowspan="2">Directorates</th><th colspan="2">Frequency of sending lab wastewater to DAM DFEA</th></tr>
<tr><th>Storing in tank</th><th>Sending record to DAM</th></tr>
<tr><td>1</td><td>Damascus</td><td>Yes</td><td></td></tr>
<tr><td>2</td><td>Damascus Countryside</td><td>Yes</td><td>17 Feb 2007 (80L)</td></tr>
<tr><td>3</td><td>Aleppo</td><td>Yes</td><td>19 April 2007 (80L)</td></tr>
<tr><td>4</td><td>Homs</td><td>Yes</td><td>21 June 2007 (80L)</td></tr>
<tr><td>5</td><td>Hama</td><td>Yes</td><td></td></tr>
<tr><td>6</td><td>Lattakia</td><td>Yes</td><td></td></tr>
<tr><td>7</td><td>Deir ez Zor</td><td>Yes</td><td></td></tr>
<tr><td>8</td><td>Idleb</td><td>Yes</td><td>22 April 2007 (80L)</td></tr>
<tr><td>9</td><td>Hasakeh</td><td>Yes</td><td></td></tr>
<tr><td>10</td><td>Rakka</td><td>Yes</td><td></td></tr>
<tr><td>11</td><td>Sweida</td><td>Yes</td><td>23 April 2007 (80L)</td></tr>
<tr><td>12</td><td>Dara’a</td><td>Yes</td><td></td></tr>
<tr><td>13</td><td>Tartous</td><td>Yes</td><td>25 April 2007 (80L)</td></tr>
<tr><td>14</td><td>Quneitra</td><td>Yes</td><td>23 April 2007 (80L)</td></tr>
</table></td></tr>
<tr><td>2.5
Each Directorate prepares its budget plan for regular monitoring.</td><td>Budget plan for regular monitoring has been prepared by all of the DFEA in 2005 and 2006 as shown in Chapter 3.7 and 5.2. The budget plan for the fiscal year 2008 was prepared and submitted to MOLAE in August 2007 and it will be provided in January 2008.</td></tr>
</table>

2.5 Achievement of Output-3

According to the Project Design Matrix (PDM) in the Record of Discussion (R/D) in 9 September 2004, the overall target of Component-3 is “Environmental analysis data is accumulated and properly managed”. The achievement is summarized in the table below by indicator.

Summary of Achievement of Output-3

<table>
<tr><th>Indicators</th><th>Achievement Result
(BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)</th></tr>
<tr><td>3.1. Monitoring data collected and analyzed are accumulated in the monitoring records 3 years after the commencement of the Project</td><td>Currently, total of 2,568 samples have been collected and 58,202 data have been analyzed. Total of 21,256 data have been accumulated in the database of a computer at laboratory of DFEAs. These data have been arranged in table and/or graph for preparation of the annual report through training by the JICA Expert Team. All DFEAs are able to arrange data and analyze in comparison with the discharge standard in December 2007. Only Homs DFEA can analyze the data more detail considering the purpose of environmental monitoring and its effect because of the existence of one senior level manager. As for other 13 DFEAs, however, more integrated and detailed analysis skills will be required for effective and efficient pollution source control in near future.

Number of monitoring data accumulated in computer..
<table>
<tr><th colspan="2">Directorates</th><th>Field</th><th># of data (samples) collected</th><th># of data analyzed</th><th># of data accumulated in computer</th><th>Remarks</th></tr>
<tr><td rowspan="5">1</td><td rowspan="5">Damascus</td><td>BW</td><td>201</td><td>6,930</td><td>2,324</td><td>Jan. 2006 to Nov. 2007</td></tr>
<tr><td>CB 1</td><td>10</td><td>40</td><td>0</td><td>Samples for training</td></tr>
<tr><td>HM</td><td>36</td><td>442</td><td>0</td><td></td></tr>
<tr><td>AQ</td><td>242</td><td>242</td><td>154</td><td></td></tr>
<tr><td>All</td><td>389</td><td>6,712</td><td>2,478</td><td></td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Damascus Countryside</td><td>BW</td><td>338</td><td>7,924</td><td>3,570</td><td></td></tr>
<tr><td>CB 2</td><td>2</td><td>8</td><td>0</td><td>Samples for training</td></tr>
<tr><td>All</td><td>340</td><td>7,932</td><td>3,570</td><td></td></tr>
<tr><td rowspan="4">3</td><td rowspan="4">Aleppo</td><td>BW</td><td>84</td><td>2,884</td><td>854</td><td></td></tr>
<tr><td>CB 2</td><td>2</td><td>8</td><td>0</td><td>Samples for training</td></tr>
<tr><td>AQ</td><td>115</td><td>115</td><td>92</td><td></td></tr>
<tr><td>All</td><td>226</td><td>3,032</td><td>946</td><td></td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">Homs</td><td>BW</td><td>210</td><td>5,460</td><td>1,792</td><td></td></tr>
<tr><td>CB 2</td><td>1</td><td>4</td><td>0</td><td>Samples for training</td></tr>
<tr><td>AQ</td><td>100</td><td>100</td><td>80</td><td></td></tr>
<tr><td>All</td><td>311</td><td>5,564</td><td>1,872</td><td></td></tr>
<tr><td>5</td><td>Hama</td><td>BW</td><td>164</td><td>4,564</td><td>1,736</td><td></td></tr>
<tr><td>6</td><td>Lattakia</td><td>BW</td><td>217</td><td>6,230</td><td>2,506</td><td></td></tr>
<tr><td>7</td><td>Deir ez Zor</td><td>BW</td><td>81</td><td>2,534</td><td>868</td><td></td></tr>
<tr><td>8</td><td>Idleb</td><td>BW</td><td>82</td><td>2,548</td><td>938</td><td></td></tr>
<tr><td>9</td><td>Hasakeh</td><td>BW</td><td>111</td><td>2,842</td><td>994</td><td></td></tr>
<tr><td>10</td><td>Rakka</td><td>BW</td><td>80</td><td>2,240</td><td>560</td><td></td></tr>
<tr><td>11</td><td>Sweida</td><td>BW</td><td>164</td><td>4,844</td><td>1,750</td><td></td></tr>
<tr><td>12</td><td>Dara’a</td><td>BW</td><td>100</td><td>2,716</td><td>1,050</td><td></td></tr>
<tr><td>13</td><td>Tartous</td><td>BW</td><td>132</td><td>3,360</td><td>1,246</td><td></td></tr>
<tr><td>14</td><td>Quneitra</td><td>BW</td><td>72</td><td>2,142</td><td>742</td><td></td></tr>
<tr><td colspan="2" rowspan="3">Total</td><td>Water</td><td>2,086</td><td>57,720</td><td>20,930</td><td>Mostly BW and HM</td></tr>
<tr><td>Air</td><td>482</td><td>482</td><td>326</td><td></td></tr>
<tr><td>All</td><td>2,568</td><td>58,202</td><td>21,256</td><td></td></tr>
</table>
</td></tr>
</table>

2.6 Achievement of Output-4

According to the Project Design Matrix (PDM) in the Record of Discussion (R/D) in 9 September 2004, the overall target of Component-4 is “Laboratory staff is able to formulate an environmental monitoring plan specifying parameters required”. The achievement is summarized in the table below by indicator.

Summary of Achievement of Output-4

<table>
<tr><th>Indicators</th><th>Achievement Result
(BW: basic water., CB: chemical & bio, HM: heavy metal, AQ: air quality)</th></tr>
<tr><td>4.1. Environmental monitoring plan (EMP) specifying parameters and sites is formulated in respective lab by one year after the commencement of the Project.</td><td>In the fields of BW and AQ, monitoring plans for the year 2006 and 2007 have been prepared. The plans for the year 2008 including CB and HM were prepared in December 2007, and it will be submitted to GCEA in January 2008.
Status of preparation of a monitoring plan at each Directorate
O = prepared X=not prepared
<table>
<tr><th colspan="2">Directorates</th><th>Field</th><th>Plan for 2006</th><th>Plan for 2007</th><th>Remarks</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Damascus</td><td>Water</td><td>O</td><td>O</td><td>-BW : Plans for 2006 and 2007 prepared
-CB: Expected to be included in the plan for 2008
-HM: One-year plan prepared in August 2007.</td></tr>
<tr><td>Air</td><td>O</td><td>O</td><td>-Plan for 2008 to be prepared</td></tr>
<tr><td>2</td><td>Damascus Countryside</td><td>Water</td><td>O</td><td>O</td><td>-BW : Plans for 2006 and 2007 prepared
-CB: Expected to be included in the plan for 2008</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Aleppo</td><td>Water</td><td>O</td><td>O</td><td>-BW : Plans for 2006 and 2007 prepared
-CB: Expected to be included in the plan for 2008</td></tr>
<tr><td>Air</td><td>O</td><td>O</td><td>-Plan for 2008 to be prepared</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Homs</td><td>Water</td><td>O</td><td>O</td><td>-BW : Plans for 2006 and 2007 prepared
-CB: Expected to be included in the plan for 2008</td></tr>
<tr><td>Air</td><td>O</td><td>O</td><td>-Plan for 2008 to be prepared</td></tr>
<tr><td>5</td><td>Hama</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>6</td><td>Lattakia</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>7</td><td>Deir ez Zor</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>8</td><td>Idleb</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>9</td><td>Hasakeh</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>10</td><td>Rakka</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>11</td><td>Sweida</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>12</td><td>Dara’a</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>13</td><td>Tartous</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
<tr><td>14</td><td>Quneitra</td><td>Water</td><td>O</td><td>O</td><td>BW</td></tr>
</table></td></tr>
<tr><td>4.2 Environmental monitoring guideline is introduced into a standard for all labs is formulated in respective lab by 3 year after the commencement of the Project</td><td>The JICA Expert Team prepared a guidance for preparation of environmental monitoring guideline through discussion with GCEA. GCEA sent it to all DFEAs for preparation of their own guidelines in August 2007 based on experiences of annual monitoring plan preparation.

The guidelines prepared by DFEAs were collected by GCEA and provided to the JICA Expert Team in November 2007. Based on these drafts, the JICA Expert Team commented and suggested DFEA for improvement. DFEAs are required to revise and update year by year considering their own monitoring purposes and peculiarity of environment conditions.</td></tr>
</table>

2.7 Achievement of Output-5

According to the Project Design Matrix (PDM) in the Record of Discussion (R/D) in 9 September 2004, the overall target of Component-5 is “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”. The achievement is summarized in the table below by indicator.

Summary of Achievement of Output-5

<table>
<tr><th>Indicators</th><th>Achievement Result</th></tr>
<tr><td>5.1
Preliminary condition on PW is comprehended by each Governorate and shared among organization concerned.</td><td>
Preliminary survey on condition of public awareness was conducted in 2004 and 2005 in 7 governorates (i.e. Damascus, Damascus Countryside, Aleppo, Homs, Hasakeh, Sweida, and Tartous) selecting high populated Governorates and representing regional locations. It was conducted by the sub-contract work but the C/Ps in charge for public awareness joined in actual survey work. Major results are as follows;
-70% of interviewees reply current situation slightly polluted, 20% feel something worse,
-Mostly they get information by TV, radio, and newspaper, but few by brochures and internet,
-Only 10% currently have complaints on nearby environment,
-More than 60% do not know current complaint receiving system of DFEA and Governor Office,
-60% of citizens who have complaints currently, know the complaint receiving system

For C/Ps, it was the first time to recognize the facts mentioned above quantitatively. They confirmed that this survey method is useful to plan activities and to review effectiveness on public awareness. Method and results were also presented in the 2nd meeting of the National Committee for Information and Environmental Awareness in February 2006.

Implementation of preliminary survey on public awareness (○ = implemented X=not implemented)
<table>
<tr><th colspan="2">Governorate</th><th>Survey</th><th>Remarks</th></tr>
<tr><td>1</td><td>Damascus</td><td>○2004</td><td>Actual content is trained in the 1st integrated training for environmental management held in DAM.</td></tr>
<tr><td>2</td><td>Damascus Countryside</td><td>○2004</td><td>ditto</td></tr>
<tr><td>3</td><td>Aleppo</td><td>○2004</td><td>ditto</td></tr>
<tr><td>4</td><td>Homs</td><td>○2005</td><td>ditto</td></tr>
<tr><td>5</td><td>Hama</td><td>X</td><td>ditto</td></tr>
<tr><td>6</td><td>Lattakia</td><td>X</td><td>ditto</td></tr>
<tr><td>7</td><td>Deir ez Zor</td><td>X</td><td>ditto</td></tr>
<tr><td>8</td><td>Idleb</td><td>X</td><td>ditto</td></tr>
<tr><td>9</td><td>Hasakeh</td><td>2005</td><td>ditto</td></tr>
<tr><td>10</td><td>Rakka</td><td>X</td><td>ditto</td></tr>
<tr><td>11</td><td>Sweida</td><td>2005</td><td>ditto</td></tr>
<tr><td>12</td><td>Dara’a</td><td>X</td><td>ditto</td></tr>
<tr><td>13</td><td>Tartous</td><td>2005</td><td>ditto</td></tr>
<tr><td>14</td><td>Quneitra</td><td>X</td><td>ditto</td></tr>
<tr><td colspan="2">Total</td><td>7</td><td></td></tr>
</table>
</td></tr>
<tr><td>5.2.
Materials for activities for public awareness, such as textbook, manuals, and pamphlets are prepared.</td><td>
Materials for activities for public awareness, such as textbook, manuals, etc. have been prepared by GCEA and the priority DFEAs as shown in the tables below.

Types and number of public awareness materials prepared by GCEA (2005~2006)
<table>
<tr><th>Year</th><th>Textbooks</th><th>Manuals</th><th>C/D</th><th>others</th></tr>
<tr><td>2005</td><td>-Eco-plant game (300 sets)
-Its instruction manual</td><td>-</td><td>-Video program “Japan Experience on Pollution Control” (2,000 sets)</td><td>-Humat Beia Newsletter No.1 (3,000 sets)
-Humat Beia Newsletter No.2 (3,000 sets)</td></tr>
<tr><td>2006</td><td>-</td><td>-Environmental Works Manual (2,000 sets)</td><td>-Water treatment Technology in Japan (300 sets)
-The History of Pollution and Environmental Restoration in Yokkaichi (300 sets)</td><td>-Humat Beia Newsletter No.3 (1,500 sets)
- Humat Beia Newsletter No.4 (2,000 sets)
-Humat Beia Newsletter No.5 special issue for study tour to Egypt (200 sets)</td></tr>
<tr><td>2007</td><td>-</td><td>-</td><td>-</td><td>-Humat Beia Newsletter No.6 and No.7 (each 1,500 sets)</td></tr>
</table>
Types and number of public awareness materials prepared by the priority Directorates (since Jan, 2007)
<table>
<tr><th colspan="2">Directorates</th><th>Textbooks</th><th>C/D</th><th>others</th></tr>
<tr><td>1</td><td>Damascus</td><td>-Eco-plant game (20 sets)</td><td>- CDs mentioned in the table above (50 sets)</td><td>-Presentation materials for workshop and seminar
-Humat Beia Newsletter</td></tr>
<tr><td>2</td><td>Homs</td><td>ditto</td><td>ditto</td><td>ditto</td></tr>
<tr><td>3</td><td>Aleppo</td><td>ditto</td><td>ditto</td><td>ditto</td></tr>
<tr><td>4</td><td>Lattakia</td><td>ditto</td><td>ditto</td><td>ditto</td></tr>
<tr><td colspan="2">Total</td><td>80 sets</td><td>200 sets</td><td>800 sets</td></tr>
</table>
</td></tr>
</table>

Indicators	Achievement Result
5.3 Seminars and workshops targeted for educational institutions and so forth are conducted.	In total, 12 workshops have been conducted by 4 priority DFEAs as shown in the tables below.

Damascus DFEA

	Year	Type of workshop/seminar	# of participants	Type of institutions/organizations
1	May 2006	Workshop for demonstration of Eco-plant game	App .10	Staff in Damascus DFEA
2	Feb. 2007	Seminar on public awareness raising for industrial sector	3	Staff in Damascus DFEA
3	Feb., 2007	Workshop with Chamber of Industry initiated by GCEA and DFEA	30	Damascus Chamber of Industry and member companies

Homs DFEA

	Year	Type of workshop/seminar	# of participants	Type of institutions/organizations
1	May 2006	Workshop with Chamber of Industry initiated by GCEA and DFEA	50	Homs Chamber of Industry and member companies
2	Feb. 2007	Seminar on public awareness raising for industrial sector	3	Staff in Homs DFEA

Aleppo DFEA

	Year	Type of workshop/seminar	# of participants	Type of institutions/organizations
1	May 2006	Seminar on awareness targeting the owner of factories, through Chamber of Industry	Over 30	Aleppo Chamber of Industry and member companies
2	Jan. 2007	Seminar on public awareness raising for industrial sector	9	Staff in Aleppo DFEA
3	Jan. 2007	Workshop with Chamber of Industry initiated by GCEA and DFEA	30	Aleppo Chamber of Industry and member companies

Lattakia DFEA

	Year	Type of workshop/seminar	# of participants	Type of institutions /organizations
1	May 2006	Workshop for demonstration of Eco-plant game	3	Staff in Lattakia DFEA
2	Jun. 2006	Seminar on awareness targeting the owner of factories through Chamber of Industry	6	JUDCO Steel
3	Jan. 2007	Seminar on public awareness raising for industrial sector	12	Staff in Lattakia DFEA
4	Jan. 2007	Workshop with Chamber of Industry initiated by GCEA and DFEA	20	Lattakia Chamber of Industry and member companies

In addition, the following workshops/seminars have been organized at GCEA

GCEA

	Year	Type of workshop/seminar	# of participants	Type of institutions/organizations
1	June 2005	Environmental education seminar	21	Environmental NGOs based in Damascus Governorate, public awareness staff in DFEA Damascus, and JOCV volunteers for environmental education
2	Jan. 2006	Media event "Collaboration with Stakeholders on Environment"	36	DFEAs, NGOs, Youth Union, Mass Media
3	Feb. 2006	Lecture on Public Awareness and Environmental Education	22	Public awareness staff in DFEAs
4	May 2006	Workshop for demonstration of Eco-plant game	3	Staff in GCEA

Indicators	Achievement Result
5.4 Periodical network meeting among organizations and institutions regarding to E&E in each Governorate are organized.	In the beginning of the Project, the JICA Expert Team supported C/Ps in charge for public awareness to formulate the Environmental Awareness Forum in Syria which is to be the body for periodic network meeting among concerned organizations on environmental education (E&E) and public awareness. The first meeting was held January 2005 as a Media Event titled "Collaboration with Stakeholders on Environment". After that, several demonstrations and seminars were held by C/Ps in GCEA and DFEAs and the JICA Expert Team supported such activities in 2005. Under the MOLAE decision No.2051 dated on Oct. 3, 2005, the National Committee for Information and Environmental Awareness was established. The National Committee consists of concerned ministries and NGOs and the periodic meeting has been held as described in Chapter 3.6. Therefore, the JICA Expert Team discussed and agreed with GCEA to hand over the roles of periodic network meeting to be conducted by the Environmental Awareness Forum in Syria targeting general stakeholders in order to avoid duplication activities. After that, the JICA Expert Team shifted its target on public awareness from pupils and NGOs to pollution sources (factories) and conducted periodic network meeting with factories through the Chamber of Industry selecting four priority Governorates (Damascus, Homs, Aleppo, and Lattkia). Under the Committee, a sub-committee consisting of the relevant organizations in regional level was established in each governorate and its periodic meeting has been held to cope with regional issues on public awareness and to conduct plans and actions in accordance with the national strategy and action plan prepared by the National Committee. Currently, all DFEAs are requested by GCEA to prepare a regional strategy for public awareness by the end of 2007. The JICA Expert Team proposed GCEA to prepare an action plan for pollution source control using monitoring data in each DFEA in parallel with preparation of the regional strategy for public awareness. Based on discussion and agreement with GCEA, an official request letter of GCEA was sent to all DFEAs for preparation of their action plan in accordance with a guidance prepared by the JICA Expert Team. This proposal was also informed and discussed in the National Committee for Information and Environmental Awareness. DFEAs submitted an action plan to GCEA in October 2007 except for the Dier ez Zor, Rakka, and Quneitra DFEAs. Based on the comments and suggestions by the JICA Expert Team, the prepared action plans will be revised and modified by each DFEA. Each DFEA is required to take actual activities in accordance with this action plan in the course of implementation of overall regional level strategy and plan authorized by the sub-committee. The revised plan and result of actions should be reported to GCEA and the sub-committee by DFEA, and be reported to the National Committee by GCEA.

3. Advisory Activities

In the course of the Project, the following 11 advisory activities have conducted by the JICA Expert Team during the Project period.

List of Advisory Activities

Advisory Activities	Target	Contents	Current Results
1) Laboratory layout plan for the Basic Water Quality	all DFEA	-Initial layout plan for lab construction	-DFEA constructed new lab based on advice
2) Selection of meteorological monitoring stations	Damascus, Homs, Aleppo DFEA	-Strategic location of monitoring stations, -Layout and installation plan	-3 DFEA installed meteorological monitoring equip
3) Laboratory improvement of Aleppo DFEA	Aleppo DFEA	-Movement from basement to 1st floor -Improvement of lab conditions	-Plan to move 1st floor in Feb 2008 -Plan to improve lab in Feb 2008
4) Heavy Metal Analysis in Lattakia DFEA	Lattakia DFEA	-Check and instruction of AAS -Operational suggestions	-Trial based on advices and suggestions
5) Biological analysis equipment procurement in Sweida DFEA	Sweida DFEA	-Instruction on spec preparation -Suggestions on equip	-Procured based on advice
6) Involvement of the Governor of Governorate	GCEA	-Strengthening project management -Encouragement of DFEA	-Closer connections between Governorate office and DFEA
7) Budget planning in DFEA	GCEA and DFEA	-Item and app amount -Revision of plan	-Preparation by DFEA with support of GCEA
8) Quality assurance and quality control (QA/QC)	GCEA and DFEA	-Internal & external QA/QC activities	-Adoption of AEC program -Usage of standard solution -Cross-check trial with other labs
9) Visit the Atomic Energy Commission (AEC) for information on QA/QC	GCEA and Damascus DFEA	-Study QA/QC system in AEC	-Introduction in DFEA -Application to AEC program
10) Laboratory wastewater treatment	GCEA and Damascus DFEA	-Spec preparation -Technical advices	-GCEA procured facility -On-going improvement of operation
11) Purchasing reagents	GCEA and DFEA	-Central purchasing system	-Starting by GCEA and DFEA

4. Actual Implementation Schedule

Most Activities in PDM had been conducted as planned schedule without any serious problems and hindrance. Only the following minor matters are pointed out to bring about some change of the planned schedule. Actual implementation of the Project activities specified by the Plan of Operation in PDMe, which was partially modified the original PDM by the Terminal Evaluation Mission, for each output are described in the next pages with comparison of the planned schedule.

(1) Activity 1.1.1 (SOP preparation) was scheduled only in 2005. 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.

(2) Activity 1.2.1 (Theoretical training) was scheduled 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.

(3) Activity 1.3.1 (Advice for laboratory establishment) 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) Activity 1.3.3 (Air Quality training) was started from the end of 2006 mainly due to a half year

delay of equipment for air quality measurement.

(5) Activity 2.2.1 (Hands on training) includes training on lab wastewater treatment facility. The installation of lab wastewater treatment is pre-condition in the original PDM. 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.

(6) Activity 5.3.1 (Seminars and workshops on E&E and public awareness) was changed its target stakeholders 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.

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
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	-Training materials -Number of training conducted -Number of participants	1.2.1 Basic (group) training of environmental management for personnel of DFEAs	Planned			▲ (1st)			▲ (2nd)								
			Actual			▲ (1st)	▲ (1st)										
		1.2.2. Training on data analysis and interpretation (BW, CB, HM, AIR)	Planned			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
		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				▬	▬	▬	▬	▬	▬	▬	▬	▬		
		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 IV	2005 I	2005 II	2005 III	2005 IV	2006 I	2006 II	2006 III	2006 IV	2007 I	2007 II	2007 III	2007 IV	2008 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	Planned		▬												
			Actual		▬	▬		▬	▬	▬	▬	▬	▬	▬	▬		
		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)"	Planned				▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual				▬	▬	▬	▬	▬	▬	▲ (LTK)	▬	▬	▬	
		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)"	Planned					▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual							▬	▬	▬	▬	▬	▬	▬	
		1.3.4 Establishment of sample transport system to DFEA in Damascus from other DFEAs	Planned							▬	▬	▬	▬	▬	▬	▬	
			Actual							▬	▬	▬	▬	▬	▬	▬	
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	Planned				▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual				▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
		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)"	Planned				▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual				▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
		1.4.3 Recommendations for the training system about environmental management	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 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													
				2004	2005				2006				2007				2008
				IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
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														
			Actual														
2.2 Hands-on trainings at equipment operation and maintenance, reagents storage and treatment, liquid and solid laboratory wastes treatment and others	-Number of trainings conducted - Number of participants	2.2.1 Establishment of laboratory of Damascus DFEA and other 13 DFEAs and training on the equipment at DFEAs (BW, CB, HM, AIR)	Planned														
			Actual														
2.3 Provide necessary assistance and guidance to prepare Directorates' budget plan for regular monitoring	n/a	2.3.1 Support of budgetary planning of regular periodical environmental monitoring of DFEAs	Planned														
			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 3

Output 3
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 IV	2005 I	2005 II	2005 III	2005 IV	2006 I	2006 II	2006 III	2006 IV	2007 I	2007 II	2007 III	2007 IV	2008 I
3.1 Design the monitoring record formats for laboratories and for the GCEA in the MOLAE	-Monitoring report format for Directorates -Monitoring report for GCEA	3.1.1 Situation of data management (DM) in MOLAE (DFEA)	Planned		▬												
			Actual		▬												
		3.1.2 Preparation of format for environmental monitoring record	Planned			▬	▬	▬	▬	▬	▬		▬		▬		
			Actual			▬	▬	▬	▬	▬	▬		▬		▬	▬	
3.2 Compile monitoring records in each Directorate	-Environmental monitoring records	3.2.1 Record of environmental monitoring in DFEAs	Planned			▬	▬	▬	▬	▬	▬		▬		▬	▬	
			Actual			▬	▬	▬	▬	▬	▬		▬		▬	▬	
3.3 Send the monitoring records from Directorates to the GCEA in the MOLAE	n/a	3.3.1 Set-up data concentrating system in MOLAE regarding environmental monitoring	Planned					▬	▬	▬	▬		▬		▬	▬	
			Actual					▬	▬	▬	▬		▬		▬	▬	
3.4 Publish environmental annual report in each Directorates	(additional activity of PDMe)	3.4.1 Support for the preparation and publication of annual environmental reports by each DFEA	Planned					▬	▬	▬	▬		▬		▬	▬	
			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													
				2004	2005				2006				2007				2008
				IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
4.1 Conduct preliminary pollution source inventory surveys	Report of surveys conducted	4.1.1 Preparatory survey for pollution source in each governorate	Planned			▬	▬										
			Actual			▬	▬										
4.2 Specify monitoring sites and their parameters	-Number of monitoring sites -Number of monitoring parameters	4.2.1 Training on practical skill and environmental monitoring plan (BW, CB, HM, AIR)	Planned			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
		4.2.2 Support for preparation of "environmental monitoring plan" (BW, CB, HM, AIR)	Planned			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
4.3 Formulate the environmental monitoring plan specifying parameters and monitoring sites in respective laboratory	Environmental monitoring plan for each Directorate	4.3.1 Training on practical skill and environmental monitoring plan (BW, CB, HM, AIR)	Planned			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
		4.3.2 Support for preparation of "environmental monitoring plan" (BW, CB, HM, AIR)	Planned			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
			Actual			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
4.4 Provide necessary assistance and guidance to introduce the environmental monitoring guidance into a standard for all laboratories	n/a	4.4.1 Guidance of enforcement of "environmental monitoring guidelines"	Planned												▬	▬	
			Actual												▬	▬	
		4.4.2 Comprehensive evaluation of environmental monitoring in DFEAs	Planned						▬				▬			▬	
			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 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 IV	2005 I	2005 II	2005 III	2005 IV	2006 I	2006 II	2006 III	2006 IV	2007 I	2007 II	2007 III	2007 IV	2008 I
5.1 Conduct preliminary survey on activities regarding to environmental education and public awareness in each governorates	Report of preliminary survey conducted	5.1.1 Public awareness (PA) survey in governorates	Planned														
			Actual														
5.2 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														
			Actual														
5.3 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														
			Actual														
5.4 Enhance the cooperation among organizations and/or institutions regarding to 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														
			Actual														
		5.4.2 Organizing periodical network meetings among organizations and/or institutions regarding to environmental education (E&E)	Planned														
			Actual														
5.5 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														
			Actual														

Joint implementation between JICA Expert Team and Syrian counterpart

5. Difficulties and Applied Countermeasures to the Project

5.1 Staff Leaving

Totally 184 counterparts have been assigned for the Project. Around 62 staff, however, left the Project and only 122 counterparts remain as of September 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.

5.2 Procurement of Equipment and Chemicals

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.

5.3 Chemical Background

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.

5.4 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.

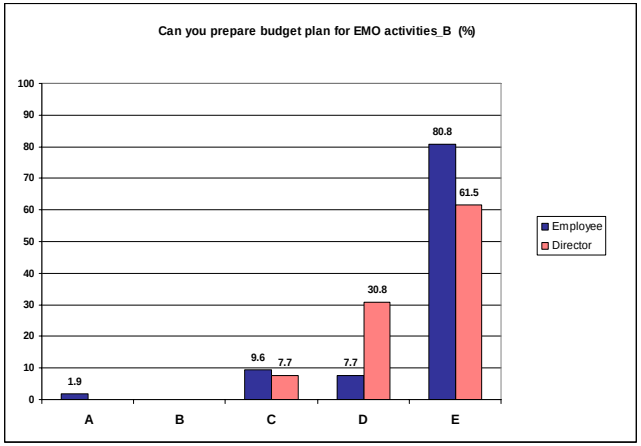
6. Results of Capacity Development

6.1 Individual Level

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. 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. The results are shown in the following pages. 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 form 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.

Impact on Individual Level (1/8)

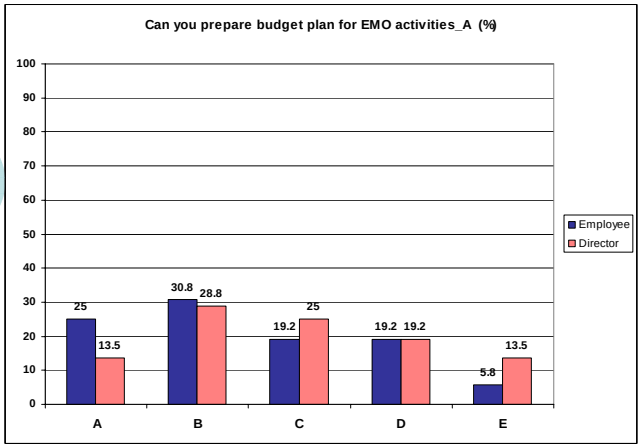
Before the Project



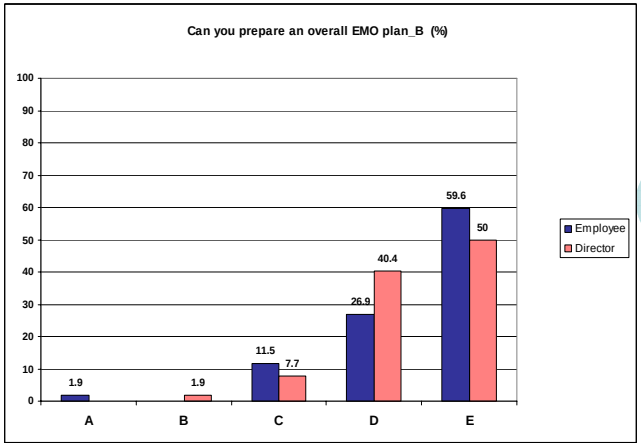
Basic Water Quality

Can you prepare budget plan for EMO activities?

After the Project



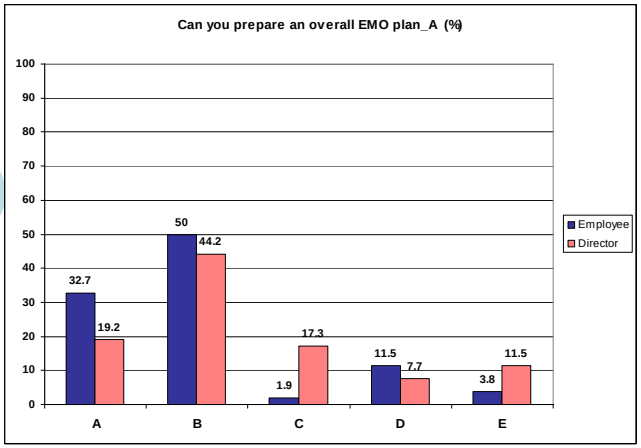
Before the Project



Basic Water Quality

Can you prepare an overall EMO plan?

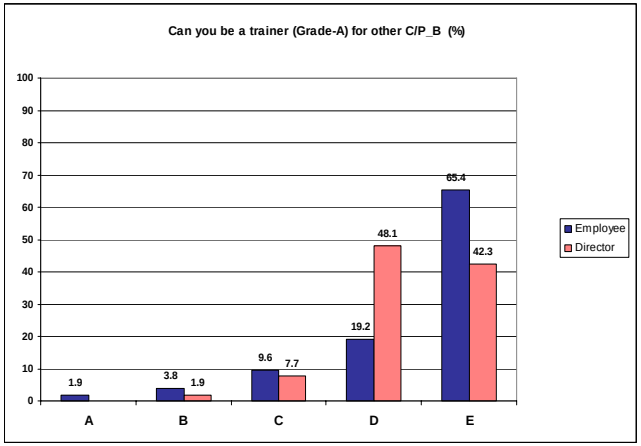
After the Project



***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)

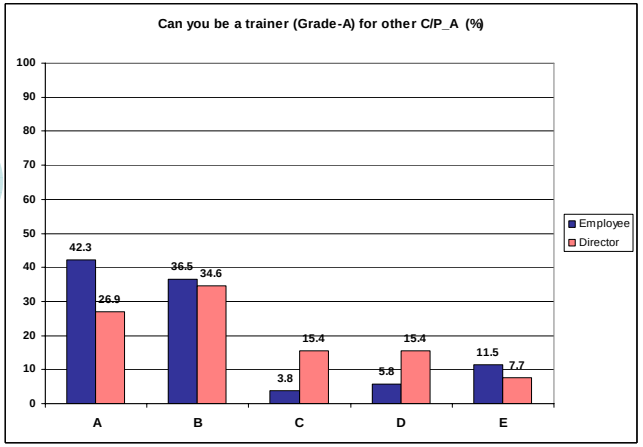
Before the Project



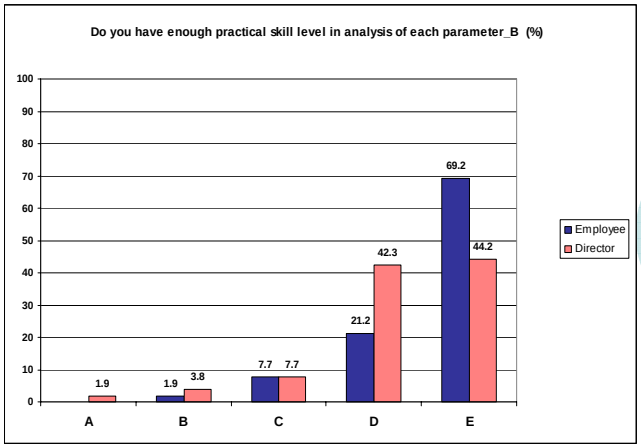
Basic Water Quality

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

After the Project



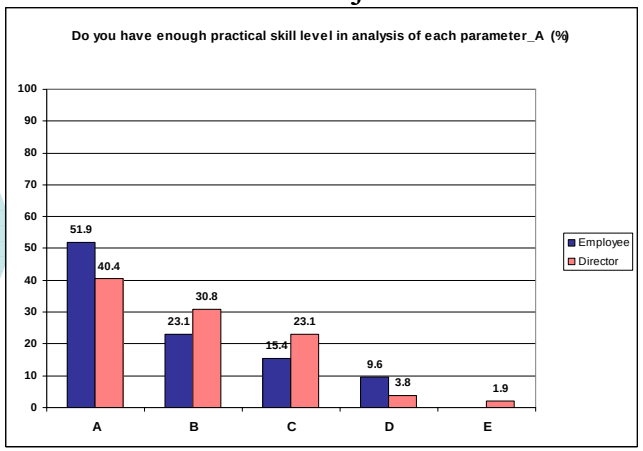
Before the Project



Basic Water Quality

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

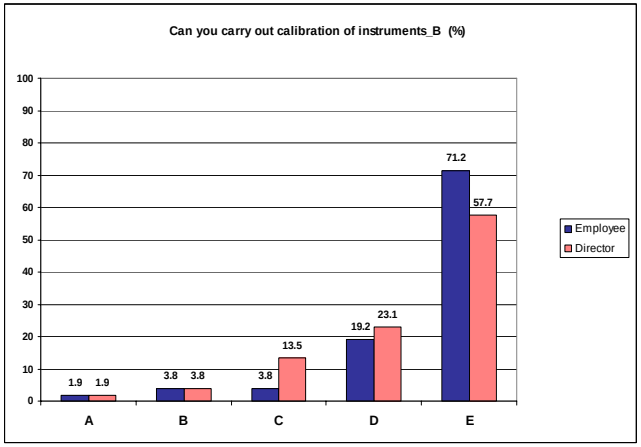
After the Project



***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)

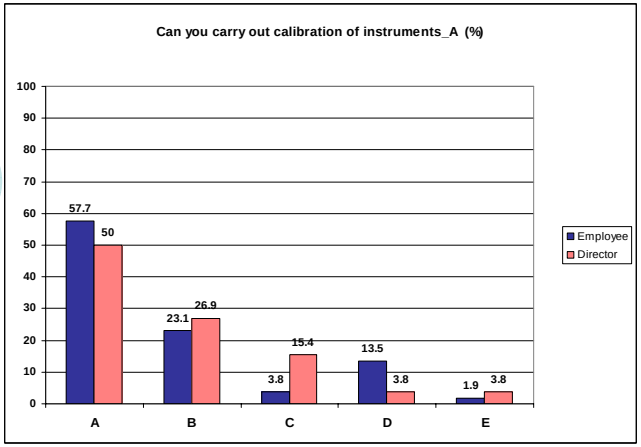
Before the Project



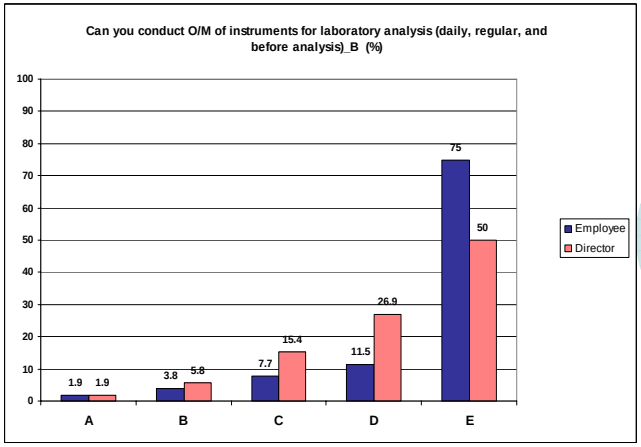
Basic Water Quality

Can you carry out calibration of instruments?

After the Project



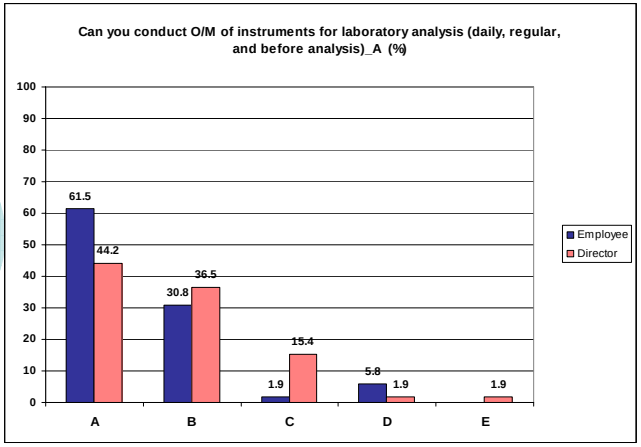
Before the Project



Basic Water Quality

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

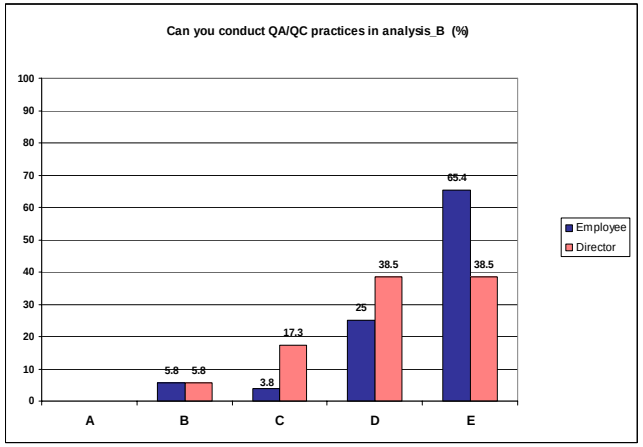
After the Project



***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)

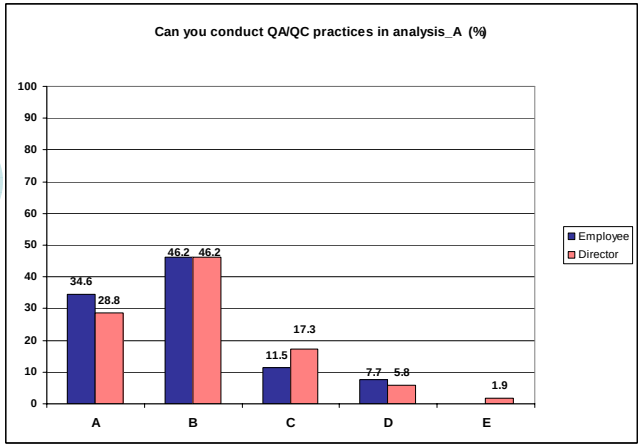
Before the Project



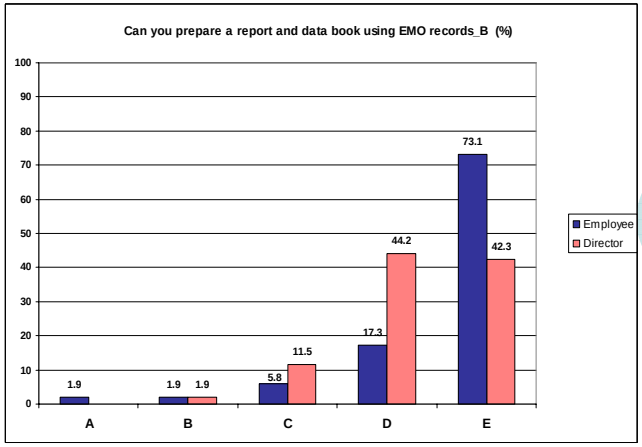
Basic Water Quality

Can you conduct QA/QC practices in analysis?

After the Project



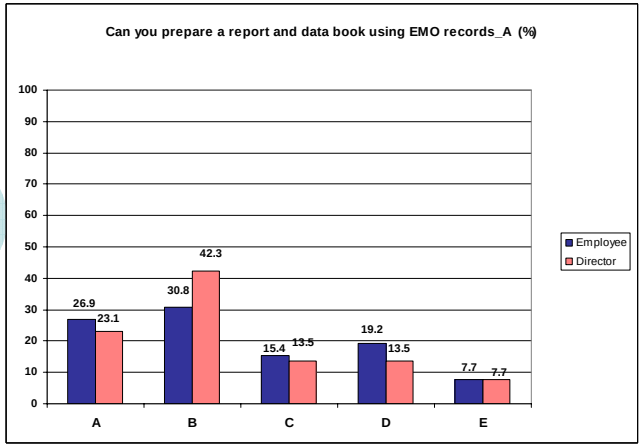
Before the Project



Basic Water Quality

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

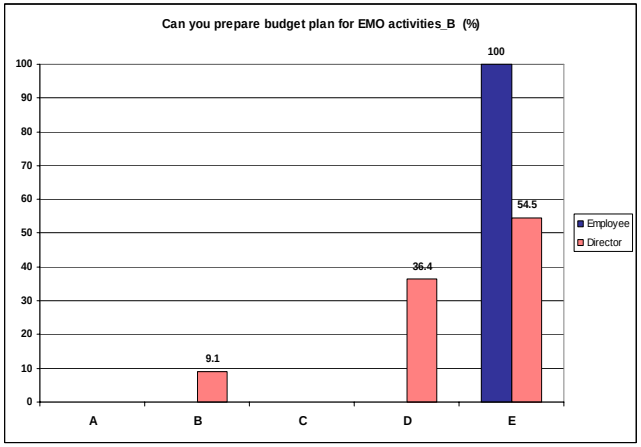
After the Project



***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)

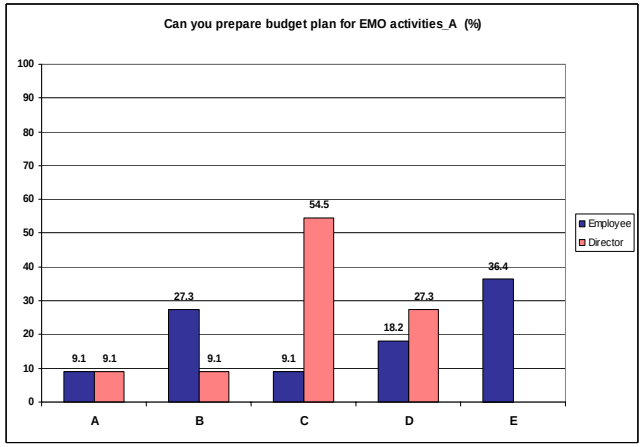
Before the Project



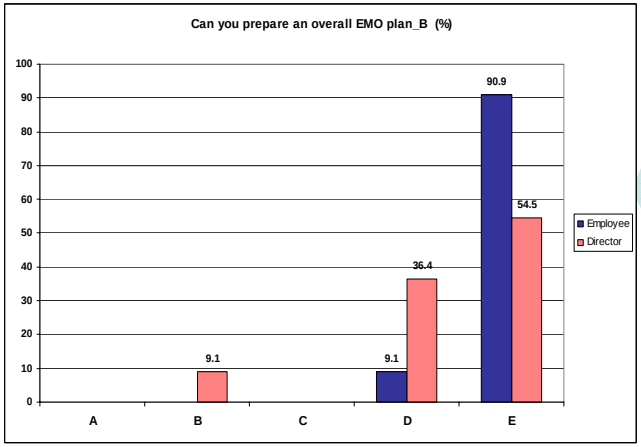
Air Quality

Can you prepare budget plan for EMO activities?

After the Project



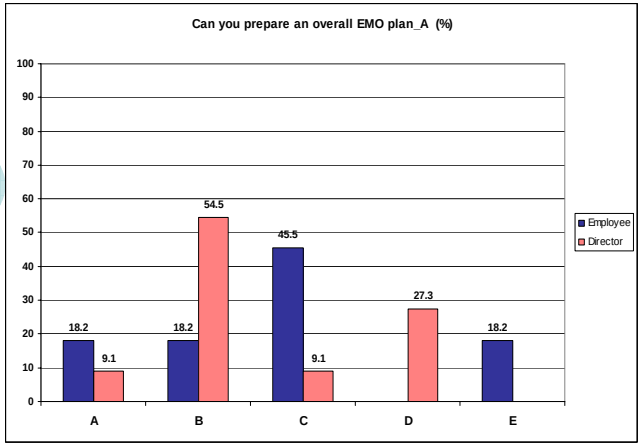
Before the Project



Air Quality

Can you prepare an overall EMO plan?

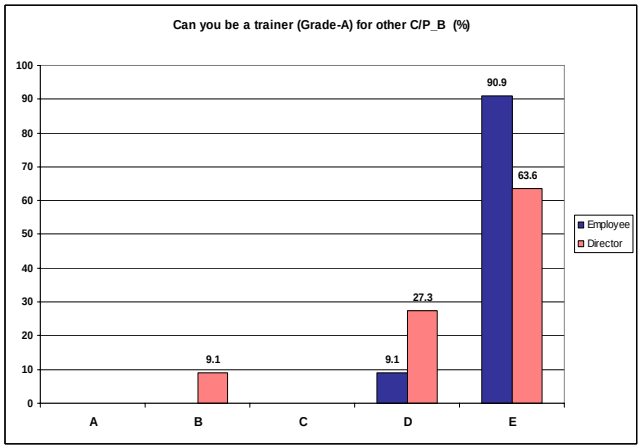
After the Project



***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)

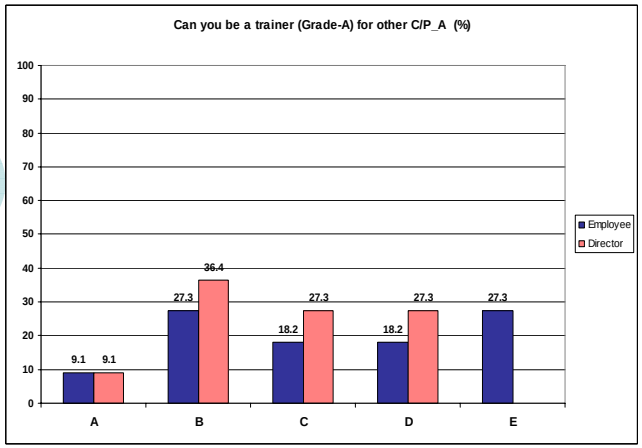
Before the Project



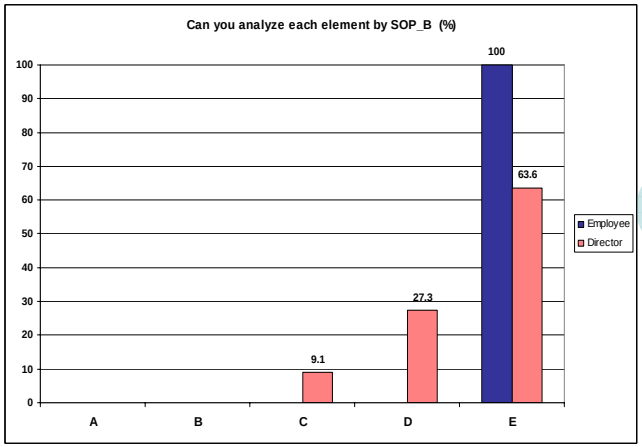
Air Quality

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

After the Project



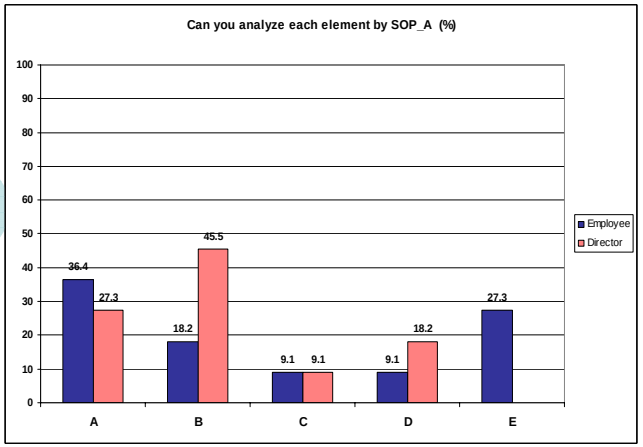
Before the Project



Air Quality

Can you analyze each element by SOP?

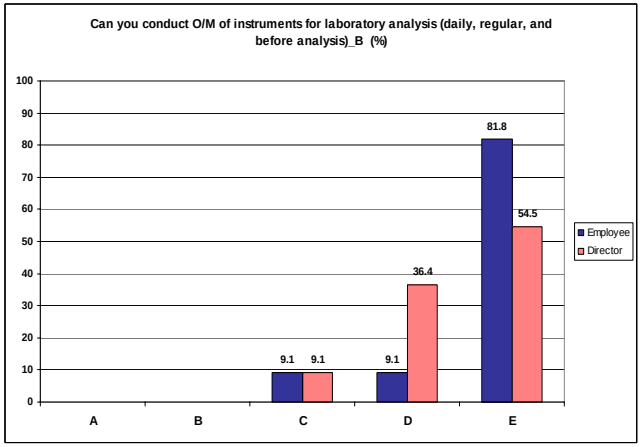
After the Project



***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)

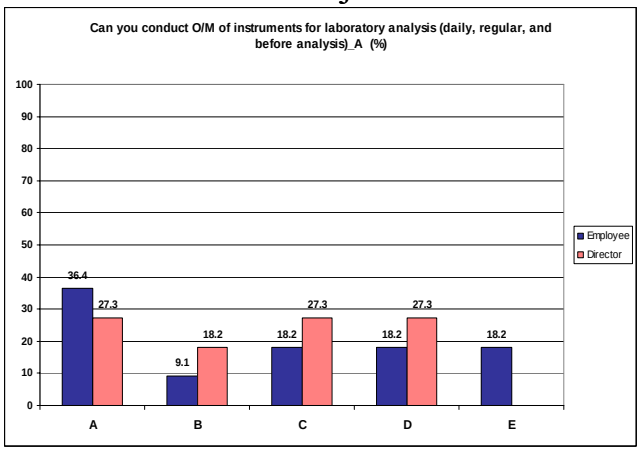
Before the Project



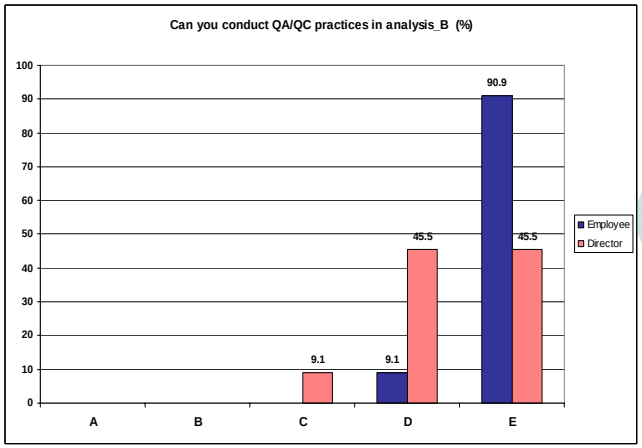
Air Quality

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

After the Project



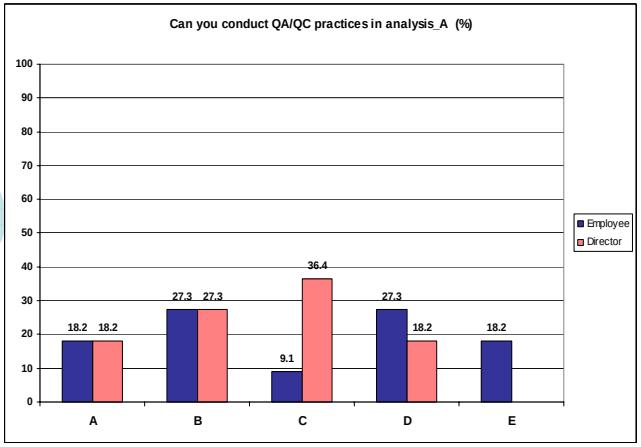
Before the Project



Air Quality

Can you conduct QA/QC practices in analysis?

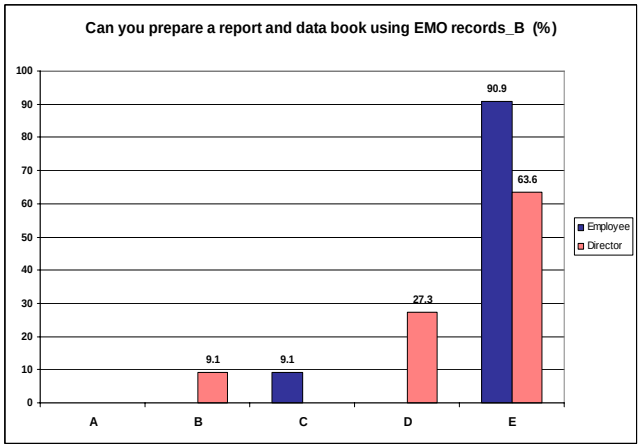
After the Project



***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)

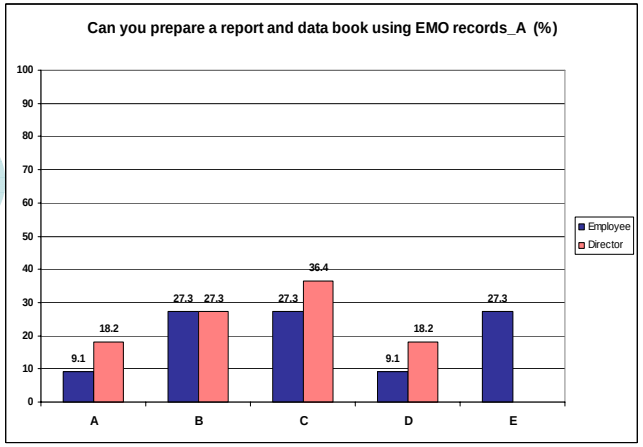
Before the Project



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%.*

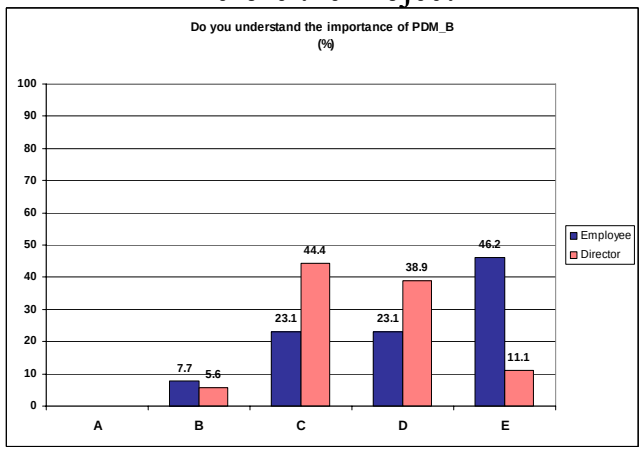
6.2 Organizational Level

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.

Impact on Organizational Level (1/5)

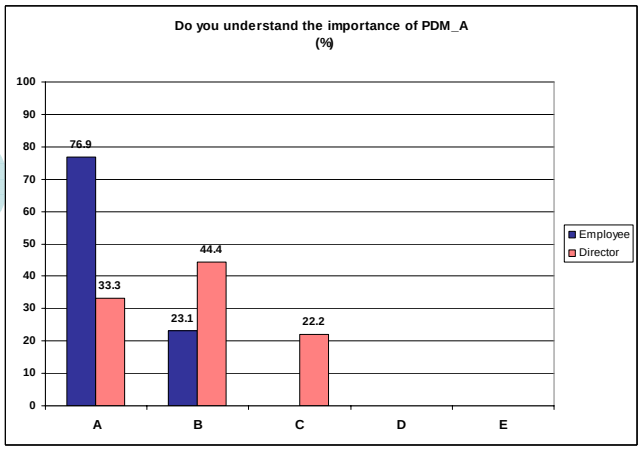
Before the Project



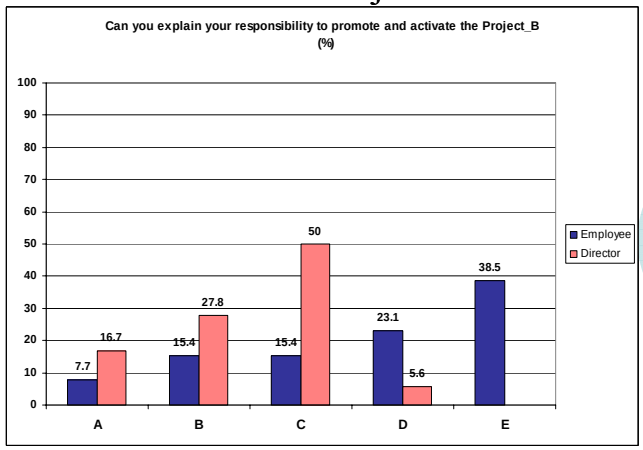
Project Management

Do you understand the importance of PDM?

After the Project



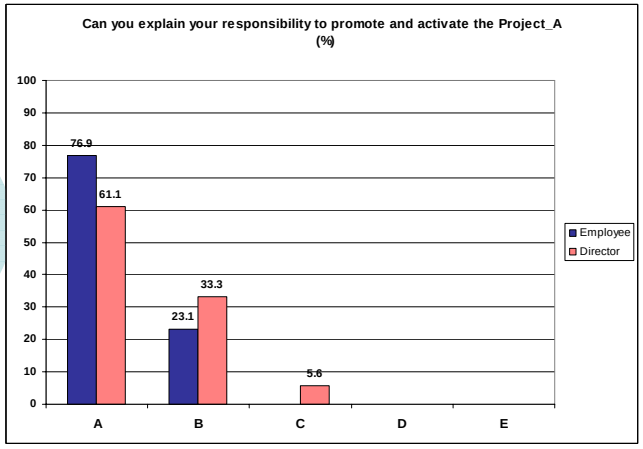
Before the Project



Project Management

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

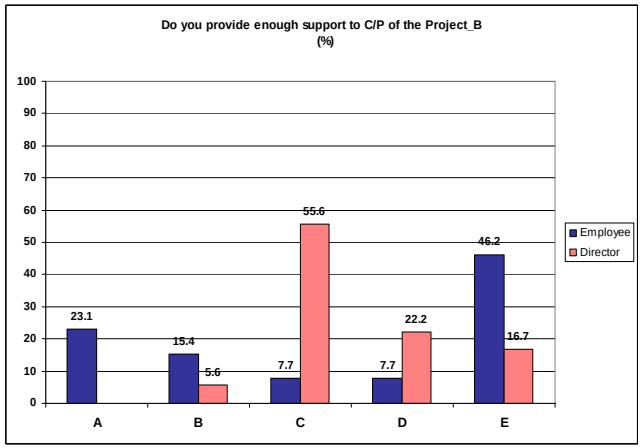
After the Project



***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)

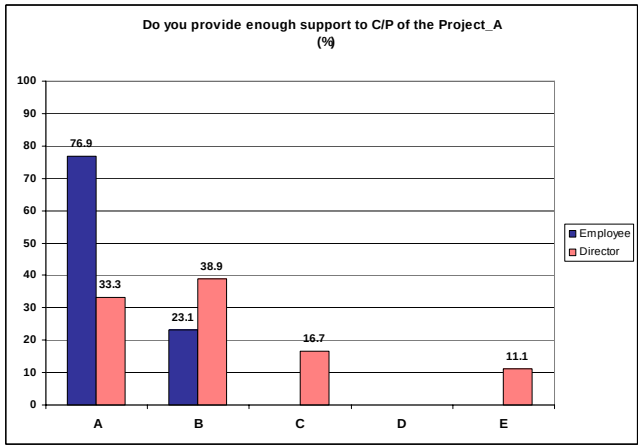
Before the Project



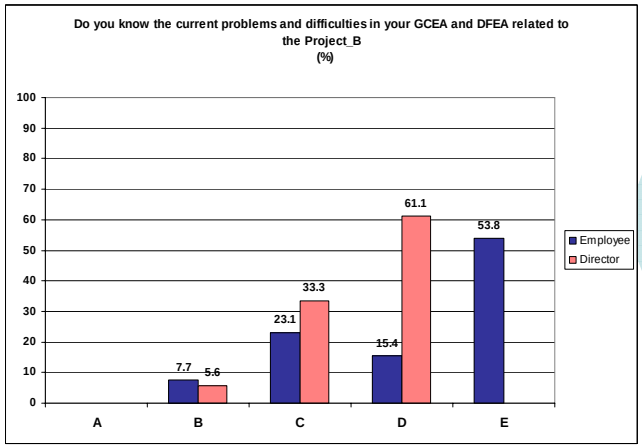
Project Management

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

After the Project



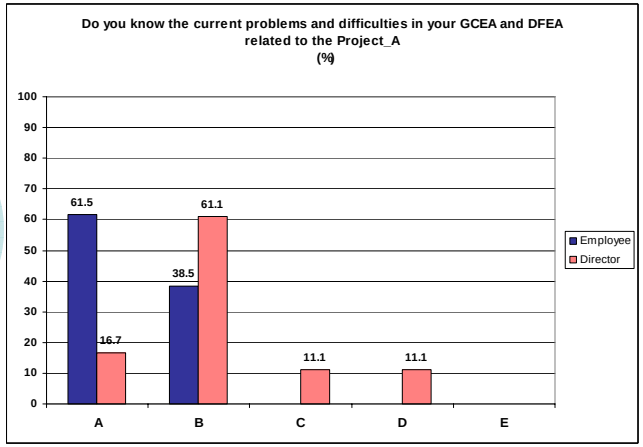
Before the Project



Project Management

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

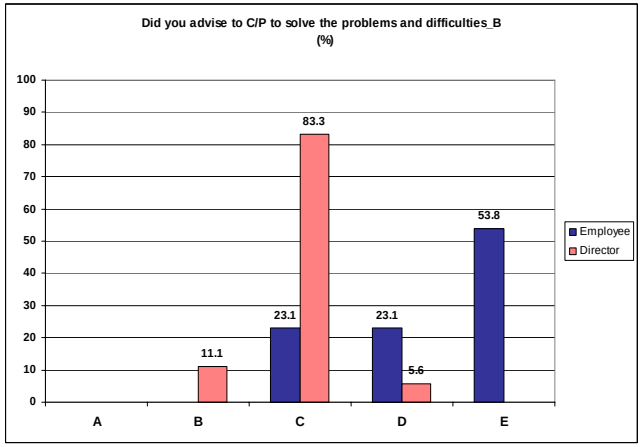
After the Project



***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)

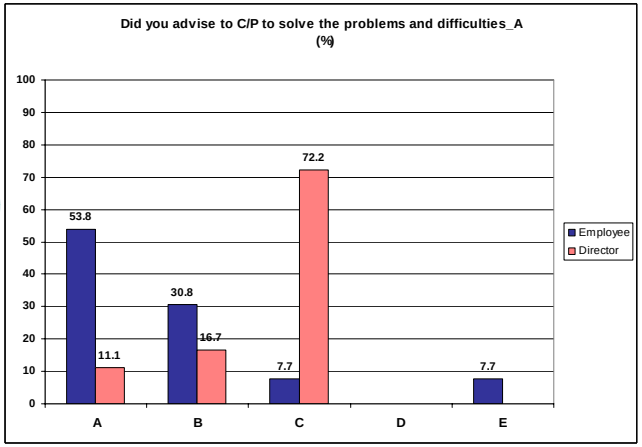
Before the Project



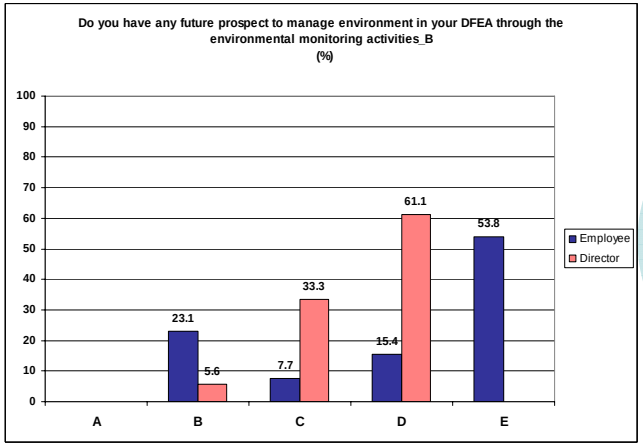
Project Management

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

After the Project



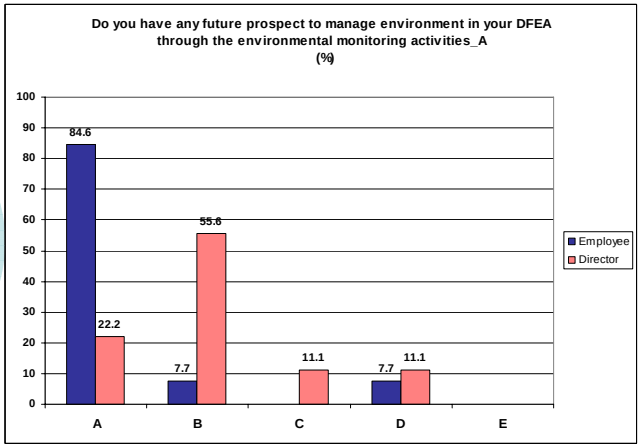
Before the Project



Project Management

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

After the Project



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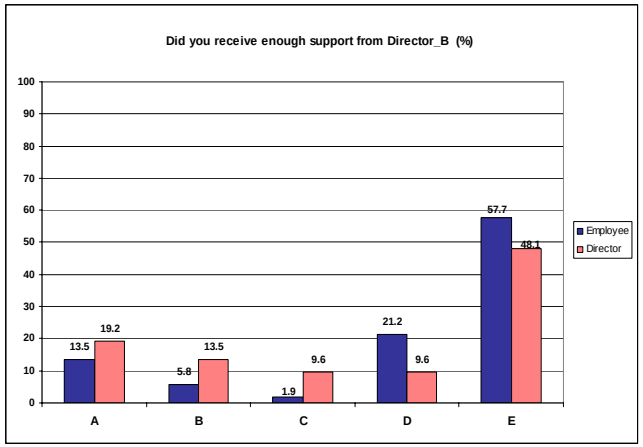
Impact on Organizational Level (4/5)

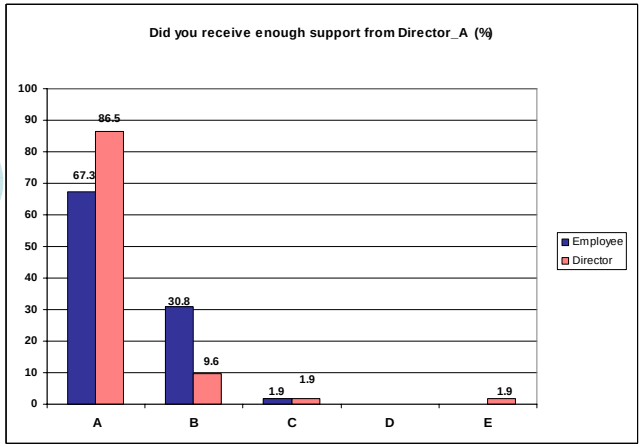
Before the Project



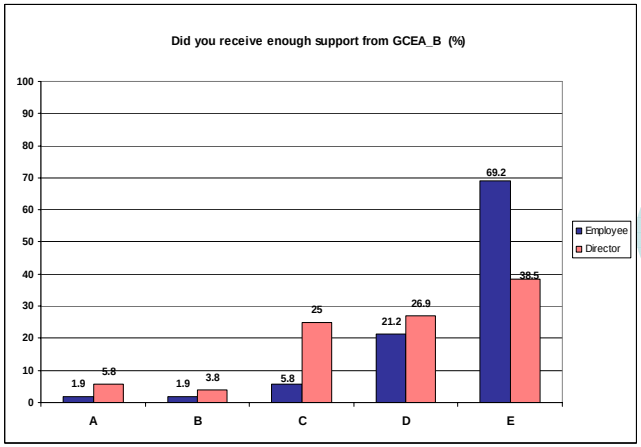
Basic Water Quality

Did you receive enough support from Director?

After the Project



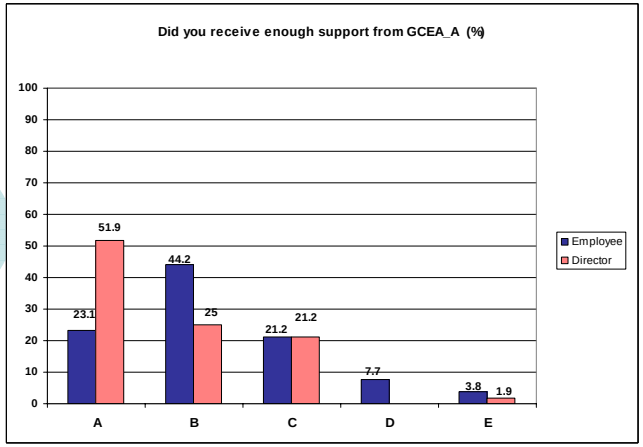
Before the Project



Basic Water Quality

Did you receive enough support from GCEA?

After the Project



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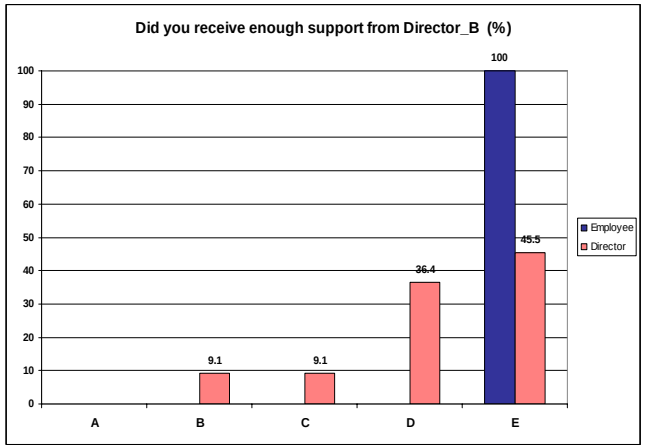
Impact on Organizational Level (5/5)

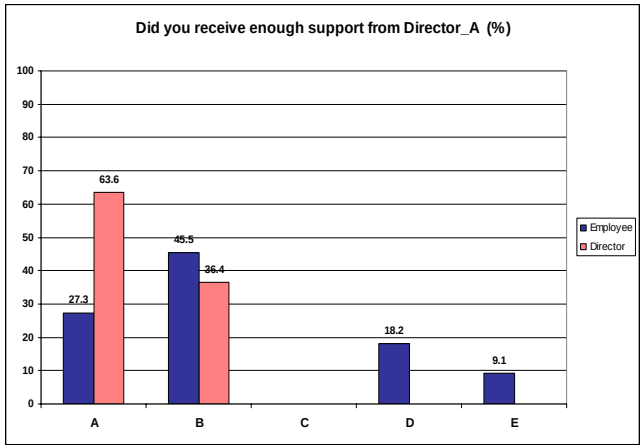
Before the Project



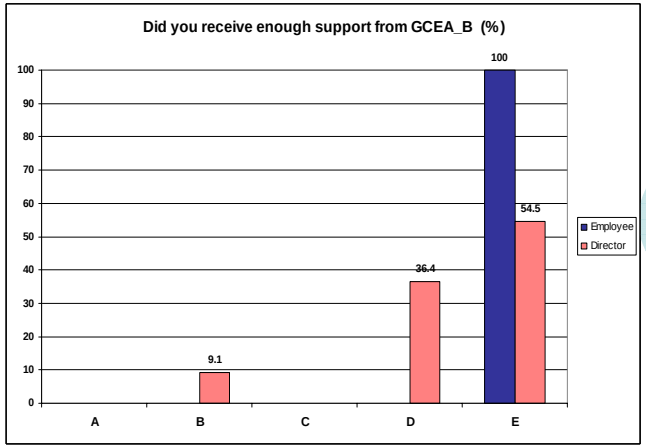
Air Quality

Did you receive enough support from Director?

After the Project



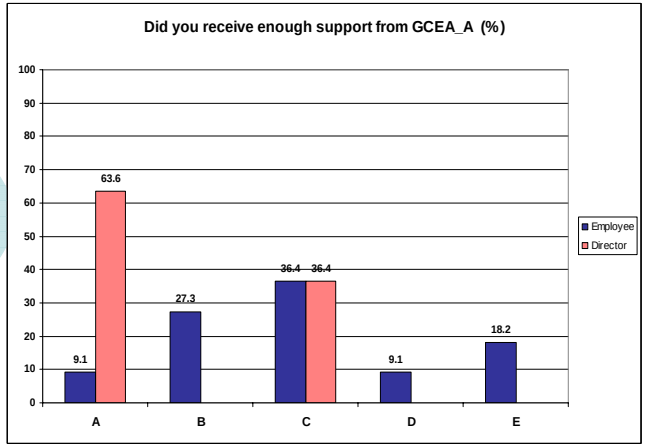
Before the Project



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 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 descried 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.

7. Lessons Learned for Future Project

(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 descried 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 atomic absorption spectrophotometer is described in the 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 abruption.

(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.

(5) Assignment of Lab 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.

8. 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 results of the terminal evaluation was presented and discussed in the 7th Steering Committee held on 9 August 2007.

8.1 Results of Terminal 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	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. ・ 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	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. ・ 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	The Overall Goal is considered to be relevant with the national development plan of Syria. ・ "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	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.
1.3 Adequacy as means	
(1) Project Design	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

Item	Evaluation (as of Aug. 7, 2007)
	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.
(2) Technological Advantage of Japan	・ 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 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 sir 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 tome 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	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. 1. Output 1: ・ 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,

Item	Evaluation (as of Aug. 7, 2007)
	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. 2. Output 2: ・ Achievement of Output 2 is steady. In general, equipment in labs are property 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 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. 3. Output 3: ・ 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. 4. Output 4: ・ 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. 5. Output 5: ・ 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

Item	Evaluation (as of Aug. 7, 2007)
	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 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. 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.

Item	Evaluation (as of Aug. 7, 2007)
3.3 Appropriateness of the Inputs	
(1) Syrian side	
(a) Land, facility and equipment	Timing: ・ 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. Quantity: ・ 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. Quality: ・ 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	Timing: ・ 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, the C/P for Data Management has not been assigned since the predecessor left the job in October 2006. ・ 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. Quantity ・ 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

Item	Evaluation (as of Aug. 7, 2007)
	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, he 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. Quality ・ 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 has 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	Timing: The budget has been disbursed to the DFEAs in January –February. Quantity: Necessary amount has been allocated to the DFEAs.
(2) Japanese side	
(a) Japanese Expert	Timing: ・ 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. Quantity: ・ 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. Quality: ・ 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.
(b) Study tour in Egypt	Timing: ・ 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. Quantity: ・ 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 fell tired towards the end of the day and sometimes could

Item	Evaluation (as of Aug. 7, 2007)
	not concentrate on the issues being raised. Some felt that the duration was insufficient to have a comprehensive idea on Egyptian experiences. Quality: ・ 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. Utilization: ・ 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	Timing: ・ 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) Quantity: ・ Appropriate number of equipment has been provided to the target DFEAs. Quality: ・ 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. Operation & Maintenance (O/M): ・ 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. Utilization: ・ Most of the provided equipment has been utilized fully.

Item	Evaluation (as of Aug. 7, 2007)
3.4 Preconditions	・ 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	・ Japanese Scheme: 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". ・ Other International Cooperation: 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	Impacts on the DFEAs and local governments ・ 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

Item	Evaluation (as of Aug. 7, 2007)
	associated risks, adverse impacts of the industrial technology, and the need to take care of environment with scientific data. Impacts on citizens ・ The increase in citizen trust by the effected water analysis ・ More interest in environment and pollution issues and aspects Impacts on industries ・ 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	・ 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	・ 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	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. (a) Sampling and analysis 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

Item	Evaluation (as of Aug. 7, 2007)
	analyze, evaluate the data, and to determine parameters by his/her own for each relevant analytical field. (b) Laboratory management It is likely that the C/P will be able to operate the provided lab equipment according to the 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. (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. (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. (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.
(2) Utilization and dissemination of the transferred techniques and the project deliverables	・ 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	・ 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.

8.2 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.

(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.

(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 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.

9. Recommendations for Promotion of Environmental Monitoring

(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 per attached in the next page.

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 4, and these materials are useful to review and upgrade current lab analysis, and these are also effective to train new staff of DFEA.

(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 Courses 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. Amera 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
	Sumple 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 reclaimer	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
	Sumple 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
	Sumple 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
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	
	Sumple 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_{Cr} (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 ($K_2Cr_2O_7$, $Fe(NH_4)_2(SO_4)_2)_2H_2O$), 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
	Sumple 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			

note: WWTF: Wastewater Treatment Facility

Self Training Courses 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. Omaima 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. Dunia Ghareib (ALP)	Ms. Omaima 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				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 OJT1 d			Lecture and OJT1 d				Lecture and OJT1 d			
	Basic statistics (standard deviation, coefficient of variation CV, correlationcCoefficient, 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 OJT1 d			Lecture and OJT1 d				Lecture and OJT1 d				
	Training on annual repot 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