

Arab Republic of Egypt

Ex-post Evaluation of Japanese ODA Technical Cooperation Project
“Regional Environmental Management Improvement Project”

External Evaluator: Jun TOTSUKAWA, Earth and Human Corporation

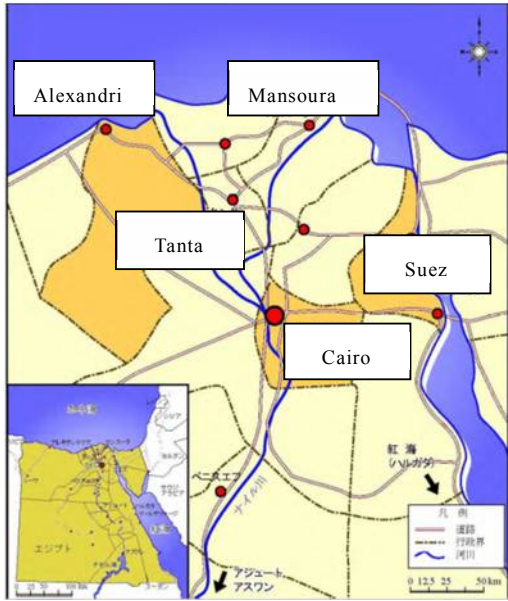
0. Summary

The purpose of the Project was to improve the capabilities of the Egyptian Environmental Affairs Agency (hereinafter called EEAA) to take measures against environmental pollution (capabilities to propose environmental protection measures and to carry out awareness raising activities). Such purpose met the environmental policy and needs of Egypt at the time of project planning and also at the time of project completion. Especially at the time of project planning, when the Egyptian government announced that the country would join the Stockholm Convention, a treaty concerning control of hazardous chemical substances, the country was expected to further enhance its capabilities for environmental measures and for analysis. In this light, the relevance of the Project, which supported the enhancement of such capabilities, is high.

During the Project period, guidelines and pollution measure proposals were developed through working groups established for each environmental issue, and sending information to the public on environmental pollution was promoted. Thus the Project objective is largely achieved. After the completion of the Project, activities are still carried out under the initiative of the departments in charge of the respective environmental issues. Therefore, the achievement level of the overall goal is also high. On the other hand, as for the Project activities, the Project cost exceeded the plan and the Project period was extended for one of the outputs. However, as most of the inputs including inputs of experts and equipment were appropriate, the efficiency of the Project is considered fair. Considering that loss of personnel is still occasionally seen and the budget for the laboratories is slightly insufficient while the sustainability is ensured through government policies, the sustainability of the Project effect is considered fair.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Project Location

(Major RBO locations where the Project was carried out)



RBO Laboratory in Suez

1.1 Background

As the country was getting more industrialized, environmental damage caused by air and water pollution was getting increasingly serious. It was pointed out that air pollution was causing health damage and financial loss (especially in the tourist industry, which is a major source of foreign revenue), and there was a report that air pollution put more than 6,000 people's lives in danger and more than 5,000 people at risk for cancer every year. Especially, suspended particulate matters from factories and vehicles, which may cause respiratory diseases, were causing serious damage, and the daily mean concentration sometimes reached $400 \mu\text{g}/\text{m}^3$ (six times higher than the Egyptian environmental standard of $70 \mu\text{g}/\text{m}^3$). Especially from September to November every year, field burning of agricultural wastes and climate conditions affected the air quality in Cairo so much that visibility was not secured (the issue of Black Smoke). It was also pointed out that water pollution caused damage to health and industries. In the Suez Canal and along the Red Sea, pollution from oil discharged and spilled from petroleum refineries and petrochemical plants, and oil spilled from tankers and tourist boats was considered as serious problems.

To address the series of issues described above, EEAA established a 5-year environmental action plan for 2002 to 2007, setting priority areas and countermeasures. However, regarding the environmental pollution that requires multiple measures, EEAA of that time did not have sufficient capabilities or experiences to propose measures after managing, analyzing and evaluating various environmental data and information in an appropriate manner. Therefore, seeking support for technical capability improvement of EEAA personnel, the Egyptian government requested the Japanese government to carry out this technical cooperation project.

1.2 Project Outline (Abbreviations listed below the table)

Overall Goal	EEAA and its ROB's together with other competent stakeholders become capable of valuating environmental situations, identifying the problems, defining the causes of such problems, acknowledging possible solutions, and implementing countermeasures through raising the environmental awareness of EMUs (Environmental Management Units), enterprises, NGOs and citizens.	
Project Purpose	EEAA and its RBOs are enhanced on the capability of managing environmental data and information, suggesting countermeasures through on-the-job training.	
Outputs	Output 1	EQS of EEAA and EQDs of RBOs become capable of proposing countermeasures against air pollutions based on the data and information collected and interpreted.
	Output 2	Suez RBO becomes capable of proposing countermeasures against oil pollution based on the data and information collected and interpreted.
	Output 3	EQS and EMS of EEAA, and EQDs and EMDs of RBOs become capable of identifying hazardous substances, compiling the data and information, and identifying their risks.
	Output 4	CDCEA(GDTD) becomes capable of planning, designing, and implementing trainings within EEAA based on the information provided by all other relevant departments/ organizations.
	Output 5	EQD and EMD of Alex RBO become capable of proposing production process improvement and pollution abatement for industries and factories based on the data and information collected and interpreted.
	Output 6	GDME&E of EEAA and concerned RBOs become capable of raising public awareness to EMUs, enterprises, NGOs, and citizens.
	Output 7	Air Quality Department (AQD) and GDME&E of EEAA become capable of disseminating environmental information to the public by effectively utilizing a real-time air monitoring station with display.
	Output 8	Sector for Regional Branches Affairs (SRBA) of EEAA and concerned RBOs become capable of enhancing their capacities by mutual interaction through CC2 (Coordination Committee 2) mechanism.
Inputs	<p>Japan side:</p> <ol style="list-style-type: none"> 1. Short-term experts: 16 2. Trainees Received : 17 3. Equipment: about 127 million yen (34 types) 4. Other <p>Mid-term review and terminal evaluation: 1 each</p> <p>Egypt Side:</p> <ol style="list-style-type: none"> 1. Counterparts (179 including technical counterparts) 2. Equipment: None 3. Land and facilities, project office, utilities 4. Counterpart salary, travel expenses, equipment owned by EEAA, cost for equipment maintenance/management/repair, test reagents, etc. 	
Project Cost	586 million yen	
Cooperation Period	November 2005 – November 2008 (Output 7 only till March 2010)	
Implementing Agency	Egyptian Environmental Affairs Agency	
Cooperation Agencies in Japan	None	
Related Project	Environmental Monitoring Training Project in Egypt (1997-2004), Project for Supply of Equipment for the Regional Environmental Monitoring Network (1997), Project for Supply of Equipment for the Regional Environmental Monitoring Network Phase II (2002), Environmental Pollution Abatement Project (LA signed in 2006)	

The abbreviations for the organizations concerned in the Project are as follows.

- * AQD: Air Quality Department)
- * CDCEA: Central Department of Communication and Environmental Awareness
- * EEAA: Egyptian Environmental Affairs Agency
- * EQD: Environmental Quality Department
- * EQS: Environmental Quality Sector in EEAA
- * GC: Greater Cairo
- * GDME&E: General Directorate of Media and Environmental Education
- * GDTD: General Department for Training and Development
- * HSMD: Hazardous Substances Management Department in EEAA
- * SRBA: Sector of Regional Branches Affairs in EEAA
- * RBO: Regional Branch Office

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Overall Goal

As for the overall goal, it was considered that the Project was on track toward the realization of the overall goal although it might take 3-5 years or longer for the overall goal to be fully achieved.

Concrete impacts were produced through cooperative actions with other organizations to raise awareness of environmental issues and hazardous chemical substances; e.g. the cement industry and the petroleum industry in Alexandria discussed potential collaboration to solve the issue of industrial wastes, and the water police made an arrest for violating the regulation concerning the handling of polychlorinated biphenyl (hereinafter called PCB¹).

1.3.2 Achievement of Project Objective

The report said the Project objective would be mostly achieved by the time of complete termination of the Project. The indicators – 1) development of effective countermeasures against environmental pollution and hazardous substances, 2) collection and dissemination of data and information, and 3) initiation of new activities at RBOs – were considered to have reached the level where the complete achievement could be expected by the time of the Project completion.

1.3.3 Recommendations

The following three were the recommendations made for the post project period.

- 1) Develop and allocate sufficient budget so that the counterparts can smoothly continue activities on their own after the Project completion.
- 2) In order to ensure technical sustainability, consider a human resource management system to avoid loss of counterpart personnel who gained experience through the Project and to make up for loss of human resources.
- 3) In order to incorporate the Project outcome into the national/regional policies, give official recognition, and utilize the countermeasure proposals developed by the Project and the coordination functions with internal/external personnel concerned.

¹ Because of its excellent insulation properties and non-flammability, PCB had been used for a wide range of purposes, including transformers, condensers and other electric devices. However, due to its high toxicity, PCB production was banned in 1973 in Japan. (Information from the website of the Environmental Restoration and Conservation Agency)

2. Outline of the Evaluation Study

2.1 External Evaluator

Jun TOTSUKAWA, Earth and Human Corporation

2.2 Duration of Evaluation Study

The External Evaluator performed an evaluation study as follows in the course of this ex-post evaluation:

Duration of the Study: September 2012 - February 2014

Period of the Field Study: February 25 – March 10, and June 10 – 14, 2013

3. Results of the Evaluation (Overall Rating: B²)

3.1 Relevance (Rating: ③³)

3.1.1 Relevance with the Development Plan of Egypt

(1) At the Time of the Project Initiation

The “Egypt and the 21st Century”, Egypt’s long-term economic and social action plan (1997-2017), stressed the importance of the measures for “environmental protection” as an essential item to the continuous development of the nation.

Later, the Egyptian government formulated the National Environmental Action Plan (hereinafter called NEAP) 2002-2017 and, based on the action plan, EEAA developed the EEAA 5-year Action Plan 2002-2007. The EEAA Action Plan included such goals as air quality improvement in Greater Cairo (GC), protection of the Nile and other water resources, environmental education and training, awareness raising, capacity development in EEAA and compliance with international environmental treaties. The action plan also stressed the importance of further capacity development of EEAA personnel in areas of expertise and cited the increase of their technical expertise as one of the priority items.

Based on the above, the Project’s intention of promoting environmental protection and enhancing capabilities of EEAA personnel, which contributes to the promotion of environmental protection, is relevant to the development plan of the country.

(2) At the Time of the Project Completion

Since the time of project completion to the present time of ex-post evaluation, NEAP has been considered as a fundamental environment policy of the country.

The latest annual plan (2012/2013), which is based on NEAP, includes major programs for water quality improvement, air quality improvement, control of hazardous chemical substances, environmental awareness raising, enhancement of technical capabilities of the personnel, and enhancement of capabilities of RBOs to conduct inspection. These programs have almost the

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

³ ③: High, ②: Fair, ①: Low

same contents as the priority support items of the Project. Therefore, it is considered that the contents of the Project are still deemed important in the environmental policy of Egypt at the time of ex-post evaluation.

In light of the above, the Project has been relevant to the country's policy since the completion of the Project to the time of ex-post evaluation

3.1.2 Relevance with the Development Needs of Egypt

(1) At the Time of the Project Initiation

Through Japan's technical cooperation projects, equipment provision with grant aid and cooperation with other donors (mainly Denmark, for arrangement of environment management data, installation of air pollution measurement devices, etc.), EEAA had acquired capabilities to monitor air and water quality, which are fundamental environment data items, and were able to conduct on-the-spot inspection of factories and other pollution sources⁴. However, regarding environmental pollution that required more complex measures (pollution that had more than one possible sources), they were not fully able to make proposals for effective countermeasures after proper analysis and evaluation of the monitoring data.

As appropriate involvement of various stakeholders was necessary when carrying out measures against complex pollution, training and awareness raising activities for relevant stakeholders were considered important. However, EEAA did not have a sufficient organizational structure to carry out such training and awareness raising activities in an efficient manner and, on this point, capability development was also considered necessary.

Moreover, looking at external relations, the country was expected to conduct monitoring in a more advanced and detailed manner after the announcement of 2004 to join the Stockholm Convention, a treaty concerning control of hazardous chemical substances.

Thus EEAA of that time was expected to enhance their technical capabilities. Therefore, the support from the Project for their capability development was highly relevant to the needs of EEAA.

(2) At the Time of the Project Completion

The Project was to enhance the capabilities of the Headquarters and RBOs of EEAA to address issues through establishment of cooperative relationships among departments and with external parties concerned with analysis of accumulated data and various environmental issues. Thus the contents of the Project were relevant to the needs of EEAA throughout the Project period.

Environmental issues still existed in the country at the time of the Project completion and

⁴ Specifically, EEAA was considered to have capabilities for smooth operation of 43 air quality monitoring points, annual water quality monitoring survey in the Nile, monitoring survey at canals and drainages, water quality monitoring on the coast, etc.

especially air and water pollution was still serious. In addition to air and water pollution, the issues of waste management and soil contamination caused by expansion of industrial areas in the country is gaining more attention and EEAA is expected to take further diversified environmental measures.

In light of the above, the capability development of EEAA personnel is as important at the time of ex-post evaluation as was during the Project implementation period. Therefore, the Project is relevant to the needs of the country.

3.1.3 Relevance with Japan's ODA Policy

As for Japan's ODA policy, the Country Assistance Program for Egypt (2000) included "Environmental conservation and improvement of the living environment" in the five priority areas. The program mentioned the aid policy in the field that serious efforts should be made for water quality conservation in the Nile, securing of safe drinking water, prevention of air pollution in large cities, etc., and comprehensive support in the environmental field should be considered.

The Project ultimately contributes to the environmental conservation and improvement of the living environment of the country, while enhancing capabilities of EEAA personnel. Therefore, the Project is relevant to Japan's ODA policy.

In light of the above, the Project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness and Impact⁵ (Rating:③)

3.2.1 Project Outputs

3.2.1.1 Project Output

* In the Project, working groups (WG) were formed for each output with multiple members selected from among counterpart personnel. The WGs are called WG1 for Output 1, WG2 for Output 2, and so on. For Output 3 and Output 8, Coordination Committees (CCs) were created instead of WGs and named CC1 (Output 3) and CC2 (Output 8). These names are also used in this ex-post evaluation.⁶

1) Output 1: EQS of EEAA and EQDs of RBOs become capable of proposing countermeasures against air pollutions (site-evaluation, technical and administrative measures) based on the data and information collected and interpreted.

⁵ Effectiveness should be judged in consideration of impact to determine a rating.

⁶ Such implementation structure with WGs started during the midterm review of the Project. During the evaluation, PDM was revised after the roles of WGs were clarified. As each WG was linked to relevant output, responsibilities of project members were clarified for each output and the Project operation was made smooth and clearly explainable to external parties.

At the time of the Project completion, Output 1 was largely achieved.

Through project activities, an inventory of pollution sources was created and counterparts learned analytical skills for air pollution control such as how to analyze emission load. On the other hand, some counterpart members in charge of Output 1 left EEAA before the end of the Project and it caused some inefficiency in terms of number of persons who acquired skills. The achievement status of the output against indicators is described below.

Table 1 Achievement of Indicators for Output 1

Indicator	Achievement
Indicator 1-1: 60% of energy consumption in 9 related target governorates is directly captured.	A total of 1,301 pieces of inventory information, including information of small- to mid-sized pollution sources in industrial areas, were collected. The capture rate was over 70% in terms of all energy consumption including mobile pollution sources.
Indicator 1-2: Emission Inventory Report is prepared at selected sites.	Reports were developed on thermal power generation, bricks, cement, coal and other sectors and also on pollution sources such as industrial parks and rice straw burning.
Indicator 1-3: Internal reports are issued based on the analysis of collected data.	Analytical data and other collected data concerning SO _x , NO _x and PM was compiled by WG1 and shared with AQD and 3 RBOs in August 2008. (SO _x : sulfur oxide, NO _x : nitrogen oxide, PM: particulate matters)
Indicator 1-4: EMA/EEAA MM5/CAAX2* model are to be validated and executed in five scenarios with the reasonable level of accuracy. *Simulation model of regional dispersion of air pollutants	As the start of simulation calculation was significantly delayed due to a delay in the input of inventory information, the calculation officially started only in July 2008. Therefore, load analysis was also delayed. Considering such situation, this indicator was not fully achieved.
Indicator 1-5: Four activities (required fixed sources, mobile sources, nonpoint sources and estimation of required cost) for countermeasure preparation are mastered by at least 10 staff representing EEAA, GC RBO, Tanta RBO and Mansura RBO.	Activities and methods required for countermeasure proposals have been mastered by WG1 members through OJT. However, partly because many of the major members of WG1 have left the position, the number of the counterpart staff who have mastered “all” the activities is less than 10. However, as the number of counterpart staff who has mastered “individual” activities exceeds 10, the indicator is achieved at a certain level.
Indicator 1-6: Integrated workshop with at least 60 participants is to be conducted before the end of August 2008 in order to share countermeasure proposals for air quality.	Integrated workshop was held with 47 participants on August 18, 2008. Considering the fact that it was held in a summer vacation season and just before Ramadan, when many people were on vacation, and that such comprehensive presentation activities had never been carried out before in EEAA, the number of participants is considered high. Although the number of participants did not reach the indicator (60), representatives of all the relevant department attended the workshop as intended. Therefore, the indicator has exceeded the expected level in a practical sense.

2) Output 2: Suez RBO becomes capable of proposing countermeasures against oil pollution based on the data and information collected and interpreted.

Output 2 was largely achieved at the time of the Project completion.

Suez RBO mastered the analysis method for oil fingerprinting through project activities and it led them to develop the Plan for Measures against Oil Pollution in the Suez Canal. The achievement status of the output against indicators is described below.

Table 2 Achievement of Indicators for Output 2

Indicator	Achievement
Indicator 2-1: Integrated countermeasure plan that is effective for reducing oil pollution risk in Northern Gulf Region and viable for Suez ROB is prepared and approved by EEAA.	The Plan for Measures against Oil Pollution in the Suez Canal was developed through a total of 13 workshops. The contents of the plan were judged effective in reduction of oil pollution by the concerned personnel of EEAA. Out of the three strategies consisting of the plan, two have been agreed on within the EEAA Headquarters, but the third strategy did not get final approval from the viewpoint of budget allocation because it included a plan to install an emergency measure unit.
Indicator 2-2: Database for fingerprint data on crude oil and derivatives is furnished.	With a physical property measurement system and other devices, measurement of oil fingerprint data of 12 types of crude oil from overseas and 3 types of petrochemical products has been completed.

3) Output 3: EQS and EMS of EEAA, and EQDs and EMDs of RBOs become capable of identifying hazardous substances, compiling the data and information, and identifying their risks.

Output 3 was largely achieved at the time of the Project completion.

In the course of the Project activities, techniques for identification of pollution sources through sampling and analysis of hazardous chemical substances, for evaluation of analysis data, etc. have been learned and, based on such techniques, such deliverables as monitoring reports and guidelines have been developed. The achievement status of the output against indicators is described below.

Table 3 Achievement of Indicators for Output 3

Indicator	Achievement
Indicator 3-1: Monitoring report(s) are annually issued on hazardous chemical substances and information reported is shared and discussed with relevant stakeholders.	<ul style="list-style-type: none"> • Inventory and monitoring activities were carried out for PCB, PAH, chrome and cadmium from 2006 to 2008 and a report was developed. • The report on PCB inventory and monitoring was presented at an international seminar in February 2008 and used as a tool for the discussion of activities required for appropriate management of PCB wastes.
Indicator 3-2: Reports of Egyptian situation of hazardous chemical substances are issued.	A report that describes management of PCB, PAH and heavy metal (chrome and cadmium) was developed in August 2008 as a report concerning the situation of hazardous chemical substances in Egypt. (PAH: polycyclic aromatic hydrocarbon)

Indicator 3-3: Number of staff acquires knowledge and skills to manage the process from identifying possible pollution sources by sampling and analysis of hazardous chemical substances, evaluation of analyzed data, identification of hazardous chemical substances risks, and proposing countermeasures.	Through the training and OJT provided by the Project, EEAA and RBO personnel acquired knowledge and techniques for appropriate management of hazardous substances. The number of such personnel has undoubtedly increased compared with the number before the Project initiation. (A total of 16 people)
Indicator 3-4: Data of pollutants is compiled as database, and shared the database with EEAA and RBOs.	Database of hazardous chemical substance data was completed in July 2008. The Hazardous Substances Management Department (HSMD) of EEAA entered the result of the PCB inventory survey as well as the result of monitoring of PAH and heavy metal (chrome and cadmium) and the data was shared among EEAA and RBOs.
Indicator 3-5: Guidelines for hazardous substances management are prepared.	Guidelines concerning appropriate management of PCB wastes, especially old type transformers and used oil that may be contaminated with PCB, were completed in August 2008.

4) Output 4: CDCEA (GDTD) becomes capable of planning, designing, and implementing trainings within EEAA based on the information provided by all other relevant departments/ organizations.

Output 4 was achieved at the time of the Project completion.

Counterpart personnel learned how to plan, implement and evaluate training through project activities. The achievement status of the output against indicators is described below.

Table 4 Achievement of Indicators for Output 4

Indicator	Achievement
Indicator 4-1: All training courses held by EEAA are registered at GDTD.	All training courses held by EEAA, including those in the Project, were registered in the Project period.
Indicator 4-2: Training courses are implemented.	After TNA (Technical Needs Assessment) training, a pilot training course was planned and implemented under the theme of "Inspection of Petroleum Industry" based on the result of the training.
Indicator 4-3: Evaluation by participants of training courses is utilized for improving new courses.	With the evaluation sheet created by counterparts, evaluation was conducted when the TNA training was completed in May 2008. Analysis of training exams and evaluation sheets for instructors and trainees, are now used for the planning of new courses has started.
Indicator 4-4: Materials for training are compiled in GDTD.	The training materials used in the Project are stored in GDTD.
Indicator 4-5: At least 6 staff under GDTD become capable of managing the procedures of training activities (to conduct/analyze TNA, plan, implement and evaluate the training course).	6 GDTD staff members took TNA training and learned the methodologies and knowhow of TNA activities. As the 6 members were involved in the planning, implementation and evaluation of the pilot course of "Inspection of Petroleum Industry", they are deemed to have understood the series of training activities.

5) Output 5: EQD and EMD of Alex RBO become capable of proposing production process improvement and pollution abatement for industries and factories based on the data and information collected and interpreted.

Output 5 was achieved at the time of the Project completion.

Through the Project activities, procedures for the inspection of enterprises (on-the-spot inspection) were clarified and the contents of the report were improved. Introduction and guidance concerning production process improvement was also conducted in a more effective manner after on-site practice. The achievement status of the output against indicators is described below.

Table 5 Achievement of Indicators for Output 5

Indicator	Achievement
Indicator 5-1: Manuals/guidelines for inspectors are prepared and published.	Manuals for on-the-spot inspection of the petroleum and petrochemical industries were developed in July 2008. Through the work to develop the inspection manuals, WG4 acquired knowledge about production processes of the petroleum and petrochemical industries, good practice for pollution prevention equipment, cleaner production technologies, and environment, health and safety management systems.
Indicator 5-2: Seminars are held for industries to introduce successful introduction of cleaner production processes including any good practices and of other organization(s).	A seminar was held to introduce advanced production processes (2008) to relevant stakeholders including environmental management managers of local factories. Several local enterprises and cleaner production centers introduced the financial support mechanism for the introduction of advanced production processes to the participants.
Indicator 5-3: Number of countermeasure proposals prepared by RBOs is increased in the target industries.	WG4 collected proposals for petroleum, petrochemical and cement industries. They especially considered the possibility of using industrial wastes in the cement industry as materials and/or fuel.
Indicator 5-4: Assessed inspection reports for the selected industries show significant improvement in quality.	In August 2008, experimental on-the-spot inspection was conducted at 2 plants – a polyethylene plant and a natural gas plant. After the inspection, based on the discussion of the inspection team, JICA experts and counterparts took the initiative in developing inspection reports. The reports specified the points for improvements based on the discussion.
Indicator 5-5: A report of best practices and recommendations for the selected industries is prepared and distributed.	The report on the introduction of best practices of pollution prevention equipment and cleaner production technologies was developed in August 2008. The report was distributed to local industries and local government units in November 2008.

6) Output 6: GDME&E of EEAA and concerned RBOs become capable of raising public awareness to EMUs, enterprises, NGOs, and citizens.

Output 6 was largely achieved at the time of the Project completion.

A public environmental awareness survey and public awareness raising activities were

conducted as part of project activities. In the public awareness raising activities, EEAA performed tasks in a systematic manner and mastered the skills although they had little previous experience. However, they were not able to reflect the result of the impact evaluation in their next plan during the Project period due to lack of time for trial. Therefore, this output is considered to be “largely” achieved. The achievement status of the output against indicators is described below.

Table 6 Achievement of Indicators for Output 6

Indicator	Achievement
Indicator 6-1: Reports of baseline surveys of public awareness are issued.	Public awareness survey was conducted in the area of each RBO and a report was developed after discussion on such matters as target groups, number of samples and sample areas. Under the leadership of local consultants, 4 staff members from EEAA and RBO joined the survey as OJT and were involved in the development of the report.
Indicator 6-2: The number and details of awareness raising activities conducted in the Project are registered in CDCEA.	4 RBOs (Suez, Asyut, Tanta and Alexandria) and CC1 conducted awareness raising activities five times and CDCEA recorded and registered the contents.
Indicator 6-3: The report of second survey is issued.	With the aim of evaluating the activities of WG5, analyzing the level of public awareness raised by the activities, and considering total impact of the activities, the 2 nd environmental awareness survey was carried out and a report was developed in 2008.
Indicator 6-4: Evaluation by participants of awareness raising activities is utilized for designing new activities.	The Project carried out the 2 nd environmental awareness survey and measured the impact of the awareness raising activities. However, they did not reach the level of utilizing the evaluation result for the development of next PO.

7) Output 7: Air Quality Department (AQD) and GDME&E of EEAA become capable of disseminating environmental information to the public by effectively utilizing a real-time air monitoring station with display.

Output 7 was largely achieved at the time of the Project completion (March 2010). (The Project period for this output was extended to March 2010 as there were delays in the procurement of equipment, etc.)

At the time of completion of the activities for this output, information release to citizens had started with the equipment in operation and contents of environmental messages were being prepared. However, the achievement is considered to be at the level of being “largely” achieved because the number of message contents was not enough and the equipment had often troubles. The achievement status of the output against indicators is described below.

Table 7 Achievement of Indicators for Output 7

Indicator	Achievement Status
Indicator 7-1: Real-time air monitoring station with display is operated and properly maintained.	The operation of the real-time air monitoring station installed in the Tahrir Square started in a proper manner. However, as the display system sometimes has trouble, troubleshooting skills should be further enhanced.
Indicator 7-2: Management plan of contents of display is prepared.	The minimum contents required has been created through collaboration between the expert team and local experts and the base of the content library has been completed. Although the contents required for daily operation of the display have been completed, there is not enough contents in the medium run.
Indicator 7-3: Real-time air monitoring station with display is well-recognized by the people in Cairo city, serving as a “symbol of environmental watchdog”.	After the installation of the monitoring station, newspapers reported on the monitoring station and the air monitoring. It is expected that such coverage will help increase understanding and interest of citizens concerning the air monitoring station and also promote public understanding of the air quality in Cairo.

8) Output 8: Sector for Regional Branches Affairs (SRBA, former CDBA) of EEAA and concerned RBOs become capable of enhancing their capacities by mutual interaction through CC2 (Coordination Committee 2) mechanism.

Output 8 was achieved at the time of the Project completion.

Relevant RBOs shared information with each other through project activities. As the information obtained through such opportunities was then fed back within each RBO, it probably contributed to the enhancement of organizational capabilities of RBOs. The achievement status of the output against indicators is described below.

Table 8 Achievement of Indicators for Output 8

Indicator	Achievement Status
Indicator 8-1: Seminar(s) for sharing the experiences and information obtained through the project activities are held among RBOs.	After a kick-off seminar was held in January 2007, CC2 action plan was developed at the initiative of SRBA and approved by concerned technical departments. After that, seminars were held in FY2007 and FY2008 to share experience and knowledge obtained through the Project.
Indicator 8-2: To ensure that the mechanism for sharing the experiences and information among RBOs are developed, monthly report from all RBOs includes CC2 activities.	Activities through CC2 were covered in monthly reports as part of the activities of each RBO. Therefore, they contributed capacity development of individuals and organizations.

On the whole, the major contents of the eight outputs were achieved at a high level although some indicators were underachieved.

3.2.1.2 Achievement of Project Objectives

Project Objective: EEAA and its RBOs are enhanced on the capability of managing environmental data and information, suggesting countermeasures through on-the-job training.

The Project objective is largely achieved.

In this project, various environmental issues were linked to individual outputs and the Project objective was to achieve comprehensive capabilities to address the issues. As mentioned in the section of the achievement status of the outputs, the outputs mostly show good results and the achievement level of the Project objective is also good as well in this connection. The achievement status of the Project objective is described below.

1) Indicator 1: Effective countermeasures against environmental pollution and hazardous substances are prepared.

(Achievement)

Effective countermeasures against environmental pollution and hazardous substances have been prepared. For example, Suez RBO has already established strategies and an action plan against oil pollution. Guidelines for PCB waste management was also developed in the final stage of the Project.

2) Indicator 2: More concrete data, information and achievements obtained from RBO activities (including proposal of decrees) are published.

(Achievement)

Data and information obtained through the Project activities were gathered and published. Activity progress and results were presented to external organizations and citizens through such opportunities as workshops.

3) Indicator 3: EEAA/RBOs start their new activities after sharing information and implementation of training

(Achievement)

Movements to expand the Project outputs to other RBOs gradually started before the completion of the Project. For example, in the case of PCB, all RBO conference was called on May 2008 and it was confirmed that each RBO would carry out the same survey and activities. Based on this, each RBO started formulation of a survey planning action plan. Although no activity was actually initiated within the Project period, there were movements for the initiation of activities.

Thus, although most of the contents of the indicators were achieved, initiation of new activities mentioned in Indicator 3 was not confirmed before the completion of the Project. Therefore, the Project objective is considered to be “largely” achieved.

3.2.2 Impact

3.2.2.1 Continuity of Outputs until the ex-post evaluation

As stated above, EEAA is still consecutively taking actions on the contents of the outputs after the Project completion and for the achievement of the overall goal. On the other hand, there are some issues to be addressed to improve future sustainability as well. This section discusses the status of continuing impact of each output after the Project completion.

Table 9 Continuing Impact of Outputs

Outputs	Rating at the Time of Project Completion	Continuity from the Time of Project Completion to Date
Output 1: Countermeasures against air pollution	Largely achieved	<p>➔ The output has been continued and further developing.</p> <p><u>Positive points</u></p> <p>1) At the time of project completion, it was pointed out that EEAA did not have solid cooperative structure with other concerned government ministries. However, they have started receiving information from the most important ministries concerning pollution sources, including the Ministry of Petroleum and the Ministry of Electricity and Energy. Thus the cooperation with other concerned organizations have been improved.</p> <p>2) Although it was judged that the simulation models were not completed during the Project period, 4 AQD staff members are currently taking training on the models. (Training is provided by the model analysis software company.)</p> <p>3) Dissemination of information to the public is becoming regular activities; e.g., air quality information is updated daily on a website.</p> <p>4) Training on air quality was conducted (with 30 participants).</p>
Output 2: Countermeasures against oil pollution	Largely achieved	<p>➔ The output has been continued and further developing.</p> <p><u>Positive points</u></p> <p>1) The countermeasure plan concerning oil pollution in the Gulf of Suez was developed during the Project period and has been utilized as a basic policy for the annual planning of the Suez RBO. As for the emergency response unit that was not approved during the Project period, the establishment plan was included in EEAA's annual plan for the fiscal year of 2012/2013.</p> <p>2) The fingerprint database has been updated and the standard samples of 18 types of domestic oil have been added since the time of project implementation.</p>
Output 3: Countermeasures against hazardous chemical substances	Achieved	<p>➔ The output has been continued and further developing.</p> <p><u>Positive points</u></p> <p>1) After the completion of the Project, a presentation made by the Project counterpart at an international conference drew aid from donors – Integrated Management of PCBs Project (2010-2013) by UNEP and Sustainable Management of POPs Project (2009-2011) by GEF.</p> <p>The implementation of these two projects made it possible to follow up the technical transfer made by the Project and to update PCB inventory.</p>

Output 4: Planning and implementation of training	Achieved	<p>➔ Although there are some ongoing positive points, there are also issues to be solved.</p> <p><u>Positive points</u></p> <p>1) When trainings are conducted, evaluation sheets are handed out for the evaluation of training contents. The evaluation result serves as a basis for next year's training plan and is especially used for the review of training contents and the selection of instructors.</p> <p><u>Issues to Be Solved in the Future</u></p> <p>1) The training courses conducted in the Project were not basically continued after the completion of the Project. According to the training department, the reasons are 1) lack of personnel who can serve as a training instructor, and 2) lack of budget for test reagents required in many of the training courses.</p> <p>However, core personnel with expertise concerning air, hazardous substance management, etc. are still in EEAA and it seems that some personnel can actually be the instructors. Real underlying causes seem to be that the training department does not fully recognize the importance and necessity of training, or RBOs, who should need training, do not acknowledge their own technical necessity and such needs do not come to the surface.</p>
Output 5: Production process improvement	Achieved	<p>➔ The output has been continued and further developing.</p> <p><u>Positive points</u></p> <p>1) Guidance on production process improvement is still provided to industries. One of the seminars was held in November 2010 for local association of small and medium enterprises. With the participation of 26 companies, the Alexandria RBO, as a main presenter, showed the current situation of industrial pollution and cleaner production.</p> <p>2) About 20-30 inspections are conducted every year, and cleaners introduced through the opportunity of inspection. (Successful cases of such introduction are described in the section of the overall goal.)</p>
Output 6: Public awareness raising	Largely achieved	<p>➔ The output has been continued and further developing.</p> <p><u>Positive points</u></p> <p>1) During the Project period, questionnaires were conducted only to access the situation "after" the awareness raising activities, not to access the situation "before" the activities, which could be a benchmark. However, comparison of "before and after" status started in 2009 so that change in awareness can be checked. They also plan contents for next awareness raising activities using survey results and collected comments.</p>
Output 7: Real-time air monitoring station with display	Largely achieved	<p>➔ There are challenging issues (caused by unexpected external factors).</p> <p><u>Positive points</u></p> <p>1) The number of types of environmental contents has increased to 15.</p> <p><u>Issues to Be Solved in the Future</u></p> <p>1) The equipment installed in the Tahrir Square is not operated at the time of ex-post evaluation as some devices were destroyed and lost in a massive demonstration that started in January 2011.</p>

Output 8: Information sharing among RBOs	Achieved	<p>➔ There are challenging issues.</p> <p><u>Issues to Be Solved in the Future</u></p> <p>1) The opportunities for information and experience sharing have shifted almost completely to the training activities conducted by GDT for the whole EEAA and sporadic seminars and other events. In the process of training planning, there is collaboration between GDT and SRBA, but SRBA does not take the initiative in holding seminars as they did during the Project period.</p>
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3.2.2.2 Achievement of Overall Goal

Overall Goal: EEAA and its ROBs together with other competent stakeholders become capable of valuating environmental situations, identifying the problems, defining the causes of such problems, acknowledging possible solutions, and implementing countermeasures through raising the environmental awareness of EMUs, enterprises, NGOs and citizens.

The achievement level of the overall goal is high at the time of ex-post evaluation.

The contents of the overall goal have been generated not only in light of indicators but also in terms of actual activities; e.g., EEAA Headquarters, Alexandria RBO, Suez RBO, Tanta RBO, etc. made concrete proposals to industries and many activities for raising environmental awareness were carried out in cooperation with NGOs and citizens.

The achievement status of each indicator is described below.

1) Indicator 1

- EEAA is acknowledged as the reliable supporting agency for private and public sectors in Egypt.

(Achievement)

To determine “whether EEAA is acknowledged as a supporting agency”, one proof is the level of implementation of environmental improvement proposals to the private sector. On this point, for example, in the area covered by the Alexandria RBO, five large leading local plants accepted improvement proposals (introduction of cleaner production) after the completion of the Project, as shown in the following table.

The fact that 26 large plants in the country have participated in the Telemetry Monitoring System, which was established by the initiative of AQD of the EEAA, is also the result of progress based on a certain level of trust in EEAA.

These achievements were the fruit of recently tightened environmental regulations and the long-time negotiation between EEAA and the private sector.

Table 10 Examples of Production Process Improvement in the Alexandria Region

Company Name	Major Introduction/Improvement Items
Amreyah Cement	Improvement in the method to treat wastes from clinkers
SESCOtrans	Reduction of hazardous substances from clinkers
Amreyah Refinery	Improvement in plant effluent (introduction of N-methylpyrrolidon)
Egyptian Petrochemical	Improvement in plant effluent
Alexandria Cement	Improvement of the emission system (introduction of an electric precipitation system)

Source: Documents from Alexandria RBO

2) Indicator 2

- Regulations/decrees which enhance the implementation of countermeasures proposed by the Project are stipulated.

(Achievement)

The Law for the Protection of the Environment was amended in April 2009. Of the amendments, amendments concerning 1) tightening of industrial pollution control along the coast and 2) tightening of pollutant emission control standards were relevant to the contents of the Project and were to promote countermeasures proposed by the Project.

Specifically, after the tightening of legal regulation concerning industrial pollution along the coast mentioned in 1), plants may not satisfy the standards without improving production processes. Moreover, as the pollutant discharge standards have also been tightened as mentioned in 2), plants are required to improve methods for water discharge and emissions.

3) Indicator 3

- The regulations and guidelines, etc. to support the implementation of countermeasures suggested by the Project are promulgated and executed by sector ministries concerned.

(Achievement)

The Guidelines for the participation in the Telemetry Monitoring System have been developed by EEAA and other relevant parties, and monitoring activities for air quality improvement have started. As for the management of hazardous chemical substances, the Guideline for Blending and Handling of Insulating Oil has been developed and utilized. In addition, EEAA and the Ministry of Electricity and Energy have started discussion on the standards for quality and handling of recycled oil by the time of the ex-post evaluation.

These guidelines were developed after the completion of the Project as the independent activities of EEAA. It is a typical example of EEAA's ongoing activities.

4) Indicator 4

- Environmental awareness of enterprises and the citizens is enhanced.

(Achievement)

EEAA's activities to raise environmental awareness have been gradually spreading in the society. For example, in December 2012, GDME&E conducted a survey with the cooperation of a NGO about the existence of the air monitoring station established in the Tahrir Square by the Project and the status of air quality. The result showed that 62% of the respondents knew the existence of the station and understood the status of the air quality (the fact that the air quality is not good).

While the result of the questionnaire in 2012 as part of GDME&E's activities to raise environmental awareness showed that only about 5% of the respondents was aware of or interested in waste problems and recycling before the awareness raising activities, the result of the follow-up survey after the activities showed that about 85% of the respondents were more aware and interested and paying more attention to waste separation, etc. Thus it would be fair to say that the environmental awareness of the citizens has been raised generally.

5) Indicator 5

- New activities to improve environment at the commute level are started with combined efforts among EEAA/RBOs together with other competent stakeholders.

(Achievement)

There are many cases that NGOs, universities, elementary, middle and high schools and local government units cooperate in carrying out activities to raise environmental awareness such as campaigns for beach cleaning. There are also some cooperative activities with relevant ministries and agencies. For example, to address the issue of Black Smoke from rice straw burning, which becomes serious in Egypt from August to November, EEAA and the Ministry of Agriculture and Land Reclamation jointly hold many workshops and carry out activities for farmers to use rice straws for other purposes. Such community-based awareness raising activities are carried out in a stable manner.

Based on the above, the overall goal is achieved in light of all the indicators.

3.2.2.3 Other Impacts

1) Impacts on the Natural Environment

As mentioned earlier, in Alexandria, cleaner production has been introduced and the quality of wastewater and emissions has improved. The following table shows the changes in environmental data obtained in this study.

Table 11 Changes in Environmental Data in Egyptian Petrochemical

	Before Introduction	After Introduction
PH	9.8	7.9
TSS	120mg/l	20mg/l

Source: Documents from Alexandria RBO

Note: TTS is Total Suspended Solid. According to the environmental regulation, TSS has to be below 60 mg/l. PH has to be between 5.8 and 8.6.

As for other impacts, there was no resident relocation or land acquisition for the implementation of the Project. There was no negative impact of the Project implementation.

Thanks to the implementation of the Project, the Project objective – the improvement of the capabilities to take countermeasures against environmental pollution – was largely achieved, and regarding the overall goal, many proposals for countermeasures against pollution were implemented. Therefore, there are impacts as planned and the effectiveness and impact of the Project is high.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

Table 12 Inputs in the Project

Inputs	Plan	Actual Performance
Inputs from Japan		
Project Cost	About 440 million yen	About 586 million yen
Cooperation Period	November 2005 – October 2008 (36 months)	November 2005 – November 2008 (37 months) *Period for Output 7 till March 2010 (53 months)
Experts	Short-term experts: 87 man-months Experts (from the private sector)	Short-term experts: 72.46 man-months <ul style="list-style-type: none"> • Leader • Training advisor • Environmental management (air quality) • Environmental management (water quality) • Suspended particle matters and countermeasures • Analysis of spilled oil and countermeasures • Hazardous substance analysis and management, and production process improvement • Production process improvement • Equipment management/equipment procurement • Public awareness raising and public relations • Analysis of smoke pollution sources • Dispersion model approach • Engineer for electricity, telecommunication and system • Public awareness raising and public relations (2)/administrative sharing mechanism development/coordinator • Coordinator
Trainees Received	No description of the number of trainees received	17
Equipment	About 75 million yen	About 127 million yen
Local Service Cost	Cost to strengthen foreign projects (50 million yen)	-
Inputs from the Recipient Country		
Counterpart	45 counterparts as project experts (25 from RBOs and 20 from EEAA Headquarters) 150 participants in training and awareness raising activities conducted in the Project (60 from RBOs, 60 from enterprises and 30 citizens)	A total of 179 technical counterparts
Facilities	Project office, etc.	Project office, etc.
Local Cost	Labor cost for counterparts, travel expense, equipment owned by EEAA, cost for maintenance, management and repair of equipment, test reagents, etc.	Same as on the left

Source: Information from JICA

3.3.1.1 Elements of Inputs

As for the fields of expert inputs, experts in specific areas were carefully input according to various environmental issues and this supported the achievement of outputs. The working groups created for individual environmental issues had the effect of increasing the sense of unity in the team as well as work efficiency. It would not have been possible without the inputs of experts according to the various environmental issues. On this point, the input of human resources of the Project was appropriate.

As for the trainees received, counterparts were dispatched 6 times separately for such fields as environmental issues, air pollution, oil pollution and management of hazardous chemical substances and they were provided the opportunity to learn the current status of environmental measures in Yokkaichi and other parts of Japan. As each trainee incorporated such successful results in the proposals and planning concerning environmental issues that he/she is in charge of, the input is proved effective.

As for the equipment, analysis equipment and other types of equipment were provided to the central laboratory in the EEAA Headquarters and other RBOs. Such equipment was required for the Project activities and was appropriate in terms of volume and type.

3.3.1.2 Project Cost

The Project cost was higher than planned. One major reason for this is the increase of equipment cost. The possible underlying cause was the underestimate of cost at the time of project planning.

3.3.1.3 Period of Cooperation

The Project period was from November 2005 to March 2010. It was because the activities for Output 7 were extended. The activities for all the other outputs were completed within the 3-year period from November 2005 as originally planned.

The date of the Project completion for Output 7 was extended due to delays in determination of specifications of a real-time air monitoring station with display and preparations for the installation of the station such as installation of a telephone line and electricity supply. The midterm review report suggested considering extending the period to March 2009. However, as technical guidance to ensure stable operation of the station and installation of the equipment required time, the period was eventually extended to March 2010. The input of human resources from the Japanese side for the extended period was as small as a total of 1.5 man-months and it was not the cause of significant cost increase.

As described above, the Project cost was higher than the planned amount and the cooperation period also partially exceeded the plan. However, the extension of the period was only for one of the 8 outputs and the elements of inputs were mostly appropriate to generate outputs. Therefore, the efficiency of the Project is fair.

3.4 Sustainability (Rating:②)

3.4.1 Related Policy towards the Project

Response to environmental issues still remains as an important task in the long-term national development plan at the current time of ex-post evaluation. The National Environmental Action Plan (NEAP) for the period till 2017 is still considered as the major environment policy of the nation. As seen in the amendment of the Law for the Protection of the Environment, recently there has been increasing awareness of the importance of environmental measures and the intention to tighten regulations in a comprehensive manner has been further emphasized.

Thus such awareness of the importance of taking countermeasures against environmental issues and improving capabilities for that will almost certainly continue. Therefore, the sustainability of the policy aspect is high.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

After the completion of the Project, EEAA established 3 new RBOs and is now in the stage of expanding a network for the implementation of environmental measures across Egypt.

While their organizational network has been improved, loss of human resources is still observed in the organization at the present time of ex-post evaluation. However, the status of personnel loss varies depending on department or RBO. For example, AQD, where personnel loss was the most serious during the Project period, has not experienced any loss since the completion of the Project. Some RBOs including Tanta RBO have had a low staff turnover since the implementation period of the Project. On the other hand, many of the staff members involved in the Project have left the central laboratory in Cairo and the laboratory of the Mansoura RBO to get similar posts in neighboring countries. The following table shows the employment status of the members involved in the Project.

Table 13 Current Employment Status of the Counterparts of the Project (Persons)

	At the time of project completion	Present time
AQD	4	4
HSMD	5	5 (including 2 who have moved to other departments)
Central Laboratory in Cairo	10	5 (including 2 who have moved to other departments)
Tanta RBO	4	4
Alexandria RBO	8	5
Mansoura RBO	6	2

Source: Data from the result of questionnaire of the ex-post evaluation

There are still no effective measures to retain excellent human resources in the organization and, on this point the organization still has been in challenging status. However, in terms of “number” of the personnel, vacant posts are usually filled with new employees including those from outside, thus, there are no serious issues derived from the shortage of personnel.

3.4.3 Technical Aspects of the Implementing Agency

There are various successful results of the environmental measures taken by EEAA after the Project. It is judged that the maintenance and/or further development of EEAA’s technical knowledge and skills made it possible to increase implementation cases of the proposals.

On the other hand, EEAA still experiences continuous loss of personnel in some departments and has been failing to conduct various training courses, which were conducted during the Project implementation period. These factors may threaten the technical sustainability. Fortunately, the personnel from each department who learned core techniques still remain in EEAA and such personnel take the lead in maintaining outputs of the Project. However, if these members leave EEAA, the various techniques they learned might not remain in the organization. Therefore, to further ensure technical sustainability, such personnel should be effectively introduced as instructors and the techniques mastered by some staff members in the headquarters, etc., should be expanded to other entities including RBOs. Such actions are expected to serve as a hedge against loss of personnel and can increase technical sustainability.

3.4.4 Financial Aspects of the Implementing Agency

The expected sustainable outcome of the Project is “EEAA can propose effective countermeasures against environmental pollution (can make proposals on an ongoing basis)”. One element that supports the continuance of making effective proposals is training of EEAA personnel. However, they do not have abundant training budget at the present time. Although laboratory analysis is also important in supporting proposals from a scientific perspective, each laboratory does not always get enough budget and some laboratories cannot conduct detailed analysis because they cannot obtain test reagents and other necessary materials. Behind such situation, there is a background factor of budget cut due to political uncertainty from 2011. Such financial issue can be a hindrance to producing sustainable outcomes.

However, we should stress that the training activities in EEAA do not require significant budget increase. (According to the training department, about 120% of the current budget would be enough. The internal budget for training is about 150,000 Egyptian Pounds = about 2.1 million yen). The underlying cause for the laboratory issues is not equipment trouble but the budget shortfall for consumable supplies including solvents. Therefore, the size of required budget is not large, which can be handled with an internal decision of EEAA. It all depends on the decision-making for budget.

Judging from such situation in a comprehensive manner, although there are currently some

issues with financial sustainability, they are solvable. Therefore, the sustainability of the Project is fair.

As stated above, some problems have been observed in the structural, technical and financial aspects of the executing agency, therefore, sustainability of the Project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The purpose of the Project was to improve the capabilities of the Egyptian Environmental Affairs Agency (hereinafter called EEAA) to take measures against environmental pollution (capabilities to propose environmental protection measures and to carry out awareness raising activities). Such purpose met the environmental policy and needs of Egypt at the time of project planning and also at the time of project completion. Especially at the time of project planning, when the Egyptian government announced that the country would join the Stockholm Convention, a treaty concerning control of hazardous chemical substances, the country was expected to further enhance its capabilities for environmental measures and for analysis. In this light, the relevance of the Project, which supported the enhancement of such capabilities, is high.

During the Project period, guidelines and pollution measure proposals were developed through working groups established for each environmental issue, and sending information to the public on environmental pollution was promoted. Thus the Project objective is largely achieved. After the completion of the Project, activities are still carried out under the initiative of the departments in charge of the respective environmental issues. Therefore, the achievement level of the overall goal is also high. On the other hand, as for the Project activities, the Project cost exceeded the plan and the Project period was extended for one of the outputs. However, as most of the inputs including inputs of experts and equipment were appropriate, the efficiency of the Project is considered fair. Considering that loss of personnel is still occasionally seen and the budget for the laboratories is slightly insufficient while the sustainability is ensured through government policies, the sustainability of the Project effect is considered fair.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.1.1 Recommendations to the Executing Agency

- **Implementation of Training Activities**

Since the completion of the Project, various training courses conducted during the Project have not been conducted by the training department and technical guidance has been provided only through internal OJT in the concerned departments. Ideally, in addition to OJT in each department, systematic and planned technical guidance should be provided by the training

department, who covers the whole EEAA. Using as instructors core personnel from AQD, HSMD and other departments who learned techniques through the Project, the base of technical transfer should be expanded from the Headquarters to concerned personnel in RBOs. Moreover, with a view to the possibility of change and loss of personnel in the future, it is also necessary to increase the personnel who can be instructors in the future. On this point, we suggest that the training department should appoint multiple members as instructors, instead of asking the same people all the time, from a mid- and long-term perspective of developing instructors.

- Development of Training Plan

Although TNA (Technical Needs Analysis) is effective and important in the process of planning training, we should keep it mind that too much weight should not be put on visible needs because the techniques and methods the trainees do not recognize may not be mentioned as their needs. For example, methods for hazardous substance control are rarely mentioned as training needs in the relevant field because many RBOs have no experience. Giving full attention to such important points for needs analysis, the training department should develop a training plan after sufficient discussion with concerned departments in the headquarters that address various environmental issues.

- Budget Allocation (for Solvents and Other Consumable Supplies)

In order to propose environmental measures in a scientific and timely manner, continuous analysis at laboratories is absolutely necessary. However, due to shortage of solvents and other consumable supplies, some laboratories cannot fully conduct analysis.

On the other hand, the stock status of consumable supplies varies depending on laboratory and some laboratories usually have enough stock. Therefore, the ex-post evaluation team suggests that each RBO should be required to make a clear report about the stock status of consumable supplies they have and then budget for such consumable supplies should be secured and allocated.

- Reactivation of the Information Sharing Mechanism among RBOs

The information sharing mechanism among RBOs that the Project aimed to establish is not really functioning at the present time of ex-post evaluation. Although there are some opportunities for RBO personnel to access other RBO's information in the form of "training", activities that the Project originally aimed at, such as sharing of good practice information among RBOs and mutual introduction of new techniques, have rarely been conducted since the completion of the Project. Effect of such activities has been proved in some cases, e.g. a case where information exchange among RBOs led to the adoption of oil fingerprinting. Therefore, we suggest that the information sharing mechanism among RBOs should be reactivated.

- Restoration of the Real-Time Air Monitoring Station with Display after Political Stabilization

The real-time air monitoring station with display has been left broken and/or loss some parts due to massive demonstrations. Although it has not been able to be repaired by the continuity of demonstration since 2011, the monitor should be repaired and restored after the current situation calms down.

4.1.2 Recommendations to JICA

None.

4.3 Lessons Learned

One large characteristic of the Project was that it dealt with techniques concerning a wide range and variety of environmental issues. Therefore, the number of counterpart personnel was large. The Project created a working group for each environmental issue and assigned counterparts to individual groups. This brought a sense of belonging and ownership to the counterparts when they were involved in the Project. In other projects, especially projects with outputs in various fields, such project implementation structure with a working group for each output may lead to significant effect and efficiency through clarification of responsibilities and promotion of a sense of ownership.