

Summary of Terminal Evaluation

1. Outline of the Project

Country: Republic of Panama

Issue/Sector: Environmental management

Division in Charge: Group II (Environmental Management), Global Environment Department

Period of Cooperation

8 October 2003 - 7 October 2006

Project Title: Water Quality Monitoring Techniques Project

Cooperation Scheme: Technical Cooperation Project

Total Cost (at the time of evaluation): 220 million yen

Partner Country's Implementing Organization(s):

Implementing Agencies: Direction for Protection of Environmental Quality (DIPROCA), National Environment Authority (ANAM)

Supporting Organization(s) in Japan: None in particular

- Short-term assignment of Individual JICA experts (water quality monitoring techniques): March 2001 - March 2004
- JICA's Japan-Chile Partnership Program (JCPPP)
- JICA's environmental management administration improvement program

Solid waste management plan (Technical Cooperation Project): October 2005 - September 2008

Waste Management Techniques for Central American Countries (region-focused training)
Three times between July 2004 and July 2006

Domestic sewage treatment for Central American Countries (region-focused training) Three times between July 2004 and July 2006

Senior Overseas Volunteers (environmental science and technology; industrial waste treatment) 2004 - 2006

- IDB National Environmental Program - Phases I and II (in preparation)
- JBIC/IDB co-financing the Panama Bay Sanitation Project (only a loan agreement for the IDB portion; and a project formulation study underway for the JBIC portion)

1-1 Background to the Project

The majority of Panama's population of approximately 2.8 million is concentrated in Panama prefecture, where Panama City, the national capital, is located. The river water running

through Panama City's streets is severely polluted. The pollution is now so serious that shellfish and other benthonic organisms are unable to survive.

This water pollution can be primarily attributed to the fact that domestic wastewater and water discharged from factories and offices are flushed directly into the river without treatment. This, in turn, is because of a lack of sewer pipes and water purification facilities, failure to maintain and repair existing facilities so that they cannot be operated, and inadequate legal restrictions and monitoring systems governing industrial waste.

In February 2000, the Panamanian government established the Regulations for Wastewater, a law setting standard values for wastewater in order to improve the severe water pollution. In addition, the government formulated the Plan to Purify the Panama Bay and Urban Water, a Project to build sewage and treatment systems. The government then requested about US\$ 400 million in aid for this Project from the Japanese government and the Inter-American Development Bank (IDB).

However, Panama lacks the analysts, laboratories for analysis and systems for administrative monitoring needed to accurately ensure accomplishment of water quality standards are being followed. As a result, the National Environmental Authority of Panama currently plays the central role, and required establishment of a water quality monitoring system and to strengthen the role for verification of compliance with wastewater regulations.

Thus the Panama government requested the Japanese government to carry out a technical cooperation Project to rebuild the current water quality analysis laboratory, train analysts and promote and reinforce water quality monitoring. In response to this request, the Japanese government began a three-year technical cooperation Project in October 2003.

1-2 Project Overview

(1) Overall Goal

The management for the observance and accomplishment of the wastewater standards in the Republic of Panama is strengthened

(2) Project Purpose

The accurate monitoring information about waste water (industrial, residential) and natural water (rivers, lakes, and seas) in the Province of Panama is provided by the ANAM analytical Lab.

(3) Outputs

1) Necessary equipment for water quality analysis and compliance monitoring can be supplied and operated definitely in the ANAM Lab.

2) ANAM Lab scientists can make water quality monitoring and analysis by themselves for natural water and wastewater in accordance with environmental standards.

3) The findings obtained at the ANAM's water analysis laboratory will be publicized through ANAM's website and publications.

(4) Inputs (by the time of evaluation)

Japanese side:

Long-term Experts: 3 experts
Equipment: 45 million yen
Short-term Experts: 5 experts
Third-country expert assignment (JCPP): 7 experts
Trainees received: 6 persons in Japan and 4 in Chile

Panamanian side:

Counterparts (C/Ps): 19 persons
Local cost expenditures: 415,614 balboa (including remunerations for C/Ps)

Land and facilities

2. Evaluation Team

Role/responsibility	Name	Position
Team Leader	Kenichi TANAKA	Senior Advisor, Institute for International Cooperation, JICA
Cooperation Planning	Katsumasa HAMAGUCHI	Environmental Management Team II, Group II, Global Environment Department, JICA
Evaluation Analysis	Hiromi OSADA	Senior Consultant, IC-Net Ltd.

Period of Evaluation

19 August 2005 - 3 September 2005

Type of Evaluation: Terminal Evaluation

3. Results of Evaluation

3-1 Achievement Level

The Project has achieved the targets for all the four indicators in the revised PDM 2.1 that was proposed during the Mid-term Evaluation and approved at the joint coordination committee. Two outstanding issues that were considered as potential objectives, namely (i) wastewater quality monitoring and (ii) monitoring quality control, are now regarded as issues to be addressed over a mid- to long-term after the completion of the Project. Because the start of the construction of the laboratory building by the Panamanian side was delayed, the draft chamber (air exhauster) will be installed immediately before the completion of the Project.

3-2 Summary of Evaluation Results

(1) Relevance

1) Relevance to the needs of local communities

BOD5 near the estuary of the main river that flows through the built-up areas of Panama City is about twice the wastewater quality standards¹, or more specifically 70-80 mg/L.²

2) Consistency with the policies of the Panamanian government

The Panamanian government established the General Law on the Environment, the basic law for environmental oversight, in 1998. In 2002, the government announced the National Environmental Strategy, which set out, among other policies, the policy of building up the institutional capacity of ANAM. In this policy context, ANAM drafted a proposed decree that would define the role of its environmental quality laboratory (ANAM Laboratory) as a government agency in the legal framework of Panama. It then submitted the draft decree to the Ministry of Economy and Finance (MEF).³ The decree will be put into force subject to approval by the Ministry of the Presidency.⁴ In this context of legal development, the Panamanian government wanted this technical cooperation project (“Project”) to address one aspect of the capacity of the ANAM Laboratory, that is, its skills in water quality monitoring. The current administration of Martin Torrijos announced the vision for the employment and economic development strategies for 2005-2009. This vision gives priority to improving urban sanitation (with focus on sewage treatment) and cleaning up the Bay of Panama. Thus, the Project Purpose is relevant to the policy and institutional needs of the Panamanian government even today.

3) Conformity with Japan’s aid policy

Earlier, the local taskforce of Japan’s ODA analyzed the status of development in Panama, the new policy of the Torrijos Administration, and the impact of Japan’s ODA on the country. In March 2005, the taskforce held policy consultations with the Ministry of Economy and Finance and agreed that Japan’s ODA for Panama focuses on three sectors⁵ and five priority issues.⁶ Based on these consultations, JICA formulated its Country Program for Panama. Under this program, JICA developed the environmental management administration improvement program to address one of the five priority issues, “strengthening of environmental pollution control.” The Project is one of the two projects under this program. Thus, the Project is in conformity with Japan’s aid policy toward Panama.

(2) Effectiveness

Prospect of the Project Purpose being attained

The Project has largely achieved the targets for all the four indicators which measure the achievement level of the Project Purpose. The target has been achieved for the number of monitoring sites for river water quality [Indicator 1] and the numbers of items to be analyzed and observed [Indicator 2]. Water quality monitoring at five points in on lake and four points in one sea area [Indicator 3] was started in 2006. ANAM has already posted water quality data for 2002 and 2003 on its website, and it plans to do so with the data from 2004 and onward by the completion of the Project [Indicator 4].

ANAM’s skills in water quality monitoring have remarkably improved since the launch of the Project, owing to the provision of adequate analytical equipment and training programs. For example, analytical skills for heavy metals, agrochemicals and other hazardous chemicals, as well as aquatic organisms have been newly acquired in the Project. The introduction of new analytical equipment has improved analytical quality in fundamental physical and chemical testing.

Technicians at the ANAM Laboratory also inspect pollution accidents caused by wastewater discharged from establishments and provide technical consulting services. It is safe to conclude that the ANAM Laboratory has acquired basic skills in water quality monitoring;

(3) Efficiency

1) Prospect of the Outputs being achieved

The Project will likely achieve the targets for all the ten Indicators for the three Outputs by its completion. This successful prospect has been made possible by the Inputs and Activities that took more account of economic and overall efficiency. For Indicator 2-5, the original plan was to compile standard operating procedures (SOPs). This plan was replaced by the plan to prepare an analytical manual instead after the Mid-term Evaluation Team found it impossible to compile SOPs by the completion of the Project in light of the current framework and the remaining inputs for the Project. An analytical manual on ten items has been completed. It is necessary to meet two major requirements to compile SOPs. The first requirement is to improve the work framework for the counterparts and their analytical skills and techniques.⁷ The other requirement is long-term commitment while ensuring coordination with the project on the standardization of analytical methods in Panama (AGACE⁸).

2) Quality and quantity of the project activities and inputs

The counterpart training covered three fields: monitoring techniques, water analysis (under four themes), and quality control. A total of ten Panamanian counterparts participated. The training in Japan was combined with the training in Chile under the Japan-Chile Partnership Program (JCPP).⁹ The idea was cost-effectiveness and communication efficiency was made possible by the common language of Spanish.

Efficient inputs were pursued for this counterpart training by combining a minimum number of long-term experts from Japan with inputs from a third country (Chile). Specifically, JICA assigned two Japanese long-term experts, one to the post of chief advisor, who was responsible for the overall management of the Project, and the other to the post in charge of water quality monitoring techniques, the acquisition of which requires continuous OJT. JICA also assigned five Japanese short-term experts for five training courses. Short-term experts were also assigned from Chile under JCPP (seven man-assignments). It is worth noting that the remarkable outputs in terms of both quality and quantity are being produced with only three-man-assignments of long-term experts (including one expert who was assigned twice) and 12-man-assignments of short-term experts. The fact that the Project has outperformed other technical cooperation projects can be attributed to the high level of management and technical capacity of the two long experts and their sincere commitment to the Project.¹⁰

The current six counterpart technicians at the ANAM Laboratory all have a bachelor's degree in biology or chemistry from the National University of Panama.¹¹ The Japanese experts evaluate them as having sufficient qualifications to conduct project activities and learn and develop transferred techniques.

The turnover of counterparts has been kept to a minimum, with only the project manager and the project coordinator being replaced. It has not directly affected the technology transfer activity of the Project.

(4) Impact

1) Effects toward the attainment of the Overall Goal

The Overall Goal will likely be attained as a total impact of the Project and other measures combined.¹² The Project is nonetheless having the following effects toward that end, indicating that the capacity of Panamanian society as a whole is improving.

(i) The Project has resulted in an increase in laboratory personnel and improved capacity for administrative oversight of wastewater.

(ii) The fact that ANAM has owned a water analysis laboratory as an agency for regulating and supervising the discharge of wastewater allows it to offer technical responses to water pollution accidents in the country, including emergency inspections. Requests for such technical responses have been on the rise since the launch of the Project.¹³

(iii) The ANAM Laboratory receives an increasing number of requests for investigation and analysis from environmental NGOs that are fighting water pollution. This in turn is promoting the exchange of environmental information with such organizations.

(iv) The increased capacity of the ANAM Laboratory as a result of the Project is promoting cooperation with other analytical laboratories of a similar nature.¹⁴ The ANAM Laboratory is expected to play a leadership role in the field of environmental monitoring.

2) Other effects

(i) Throughout the project period, students at the University of Panama and the Technological University of Panama have been practicing water quality analysis at the Laboratory as interns, contributing to the improvement of environmental monitoring skills of other institutions in Panama as well.

(ii) The provision of training that took advantage of the Japan-Chile Partnership Program (JCPP) has shown the way toward the acquisition of ISO-17025 accreditation, which concerns quality control at laboratories.

(iii) The ANAM Laboratory receives an increasing number of requests for water quality analysis from other donor projects, contributing to other environmental conservation projects.

(5) Sustainability

1) Institutional sustainability

The draft decree that defines the mission of the ANAM Laboratory¹⁵ is being processed for approval by the Ministry of the Presidency. The decree would provide a basic legal framework for the institutional sustainability of the Laboratory. The National Environmental Strategy, established in 2002, calls for institutional capacity building of ANAM. It is thus likely that the capacity development of the Laboratory will be an ongoing process.

2) Organizational and personnel sustainability

The sustainability of the Ministry of Interior is high in terms of human resources. In January 2005, all the technicians at the ANAM Laboratory were granted a permanent contract. In February 2006, a full-time manager of the Laboratory was appointed. ANAM intends to hire a couple of laboratory technicians over the two years. It is worth noting that the Laboratory is increasing its personnel while Panama is reducing the number of government employees. Nevertheless, the Japanese side points out that the following issues should be addressed for a qualitative improvement of the laboratory personnel:

(i) It is advisable to hire and train young talent as three of the six laboratory technicians are already in their 40s.¹⁶

(ii) Arrangements should be made to allow the analytical technicians at the Laboratory to engage exclusively in analytical activities. To that end, it is necessary to review the job descriptions at DIPROCA, to which the Laboratory reports to.

3) Financial sustainability

Although the operating budget for the Laboratory has not been sufficient, it is increasing owing to the continued efforts by ANAM. The operating costs and the costs of improving technical skills over six years have already been factored in. Nevertheless, there are a few causes for concern. For example, the Laboratory has to depend on project funds from donors. In addition, the execution rate of the domestic portion of the budget is low. An estimate by the Japanese side suggests that the current level of operating funds for the Laboratory will be secured if the shortfall in the operating budget will be financed by the funds of the planned donor projects. It may even be possible to secure funds for improving technical skills.

4) Technical sustainability

The technical sustainability of the Project is not high enough. The counterparts are now capable of a series of procedures regarding water quality monitoring of natural water. However, their technical capabilities may not compare favorably with those at other major laboratories in Panama¹⁷ at the moment because the transfer of only basic technology is just completed. The next steps to be taken by the Laboratory include acquiring skills in wastewater quality monitoring and improving quality control with a view to obtaining ISO17025 accreditation while receiving technology transfer from donors. For these purposes, it is essential to secure funds to allow the analytical technicians at the Laboratory to engage exclusively in analytical work and improve their skills.

3-3 Conclusion

The Project has largely accomplished its purpose as it has resulted in the establishment of a basic framework whereby the ANAM Laboratory provides information on water quality monitoring to the government sector and the public at large. Meanwhile, the targets for the objectives of “providing accurate information on water quality monitoring” and “conducting water quality monitoring of wastewater (industrial and domestic)” in the Project Purpose were effectively lowered in two rounds of revision to the PDM. These two objectives now

constitute two of the technical challenges for Panama. They should be readdressed over mid- to long-term.¹⁸

Throughout the project period, the Panamanian side has continued their efforts to ensure the sustainability of the ANAM Laboratory, including starting the process of establishing an institutional framework under the guidance of the Japanese experts, and increasing physical, human and financial inputs. Thus the foundation for sustainable technical enhancement is being solidified, although there is room for improvement.

In sum, the Project will likely accomplish its mission described in the current PDM. The Evaluation Team concludes that the Project should be terminated by October 2006 as scheduled.

3-4 Recommendations

(1) Recommendations for the short term

1) Maintaining contact with JICA

The Laboratory is still undergoing technical development. In order to address new challenges, it is advised to maintain contact with the Japanese government via JICA Panama Office and seek support as necessary.

2) Starting the budget procedure early

The procedure for executing the ANAM budget was a time-consuming process, posing an obstacle on the implementation of the Project. As a practical solution, the Laboratory should submit its annual expenditure schedule to DIPROCA at least three months in advance.

3) Conditions for technical capacity development

The following conditions should be met to improve technical skills of the Laboratory:

(i) Sufficient budget allocations for the operation of the Laboratory

(i) "Adequate technicians who will be engaged especially in the activities on analysis in the Lab,"¹⁹ based on the operational plan of the Laboratory.

(iii) Appropriate maintenance of the lab instrument and materials, including measures to prevent mechanical failures.

4) Requirement for continued assistance from Japan after the completion of the Project (recommendations based on the analysis by the Japanese side)

(i) The conditions (i)-(iii) above should be met before additional assistance is provided.

(ii) Support for the proper maintenance of the lab equipment should preferably be continued even after the completion of the Project.

(iii) As a source of funds for its capacity development, ANAM factors in projects by other donors. It is necessary to maintain coordination with these projects, including a clear division of roles.

(iv) Building a framework for the next round of assistance requires meticulous analysis of the state of affairs, including (a) the capacity of the implementing agencies (especially their management capacity); (b) the inputs that can be provided by the ANAM; and (v) the technical capacity of the counterparts.

(v) Arrangements to motivate the counterparts to learn technical skills, and monitoring of technology transfer are needed for the next round of assistance.

(2) Recommendations for the mid- to long-term

1) Clear job descriptions

For the technical capacity development of the Laboratory, it is essential to appoint adequate technicians who will exclusively engage in analytical work. To that end, it is necessary to review the job descriptions at DIPROCA so that laboratory duties will be separated from other duties.

2) Acquisition of ISO17025 accreditation

Acquiring ISO17025 accreditation is indispensable for the ANAM Laboratory, if it wants to serve a reference laboratory in Panama. It is recommended that JICA accommodates requests from ANAM and provide appropriate advice while taking advantage of JCPP and other mechanisms.

3-5 Lessons Learned

(1) Lessons learned as suggested from the Panamanian side at the joint evaluation

1) The project duration must be at least five years if a more efficient implementation and greater impact of the Project are to be expected.

2) Synergy that may come from coordination among related projects by other donors is important to enhance the impact and sustainability of the Project, especially with respect to financing and technology procurement.

3) An appropriate implementing structure and internal communication are keys to the efficient and effective implementation of the Project.

4) Maintaining the exchange of information with government officials, representatives of civil society, academics, and representatives of the private sector is important in promoting technology transfer for the Project.

5) In an international cooperation project, language barriers and cultural differences may cause difficulties in its implementation. It is important that both sides continue their efforts to overcome these problems, based on the principle of mutual understanding.

(2) Lessons Learned as suggested by the Japanese side based on project analysis after the Evaluation Team returned home

- 1) In the project formulation phase, it is essential to set project targets, activities, and inputs after studying the time available for the counterparts and their technical capacity.
- 2) Operational improvement at DIPROCA was necessary to allow the analytical technicians at the Laboratory to concentrate on their analytical work. Such improvement should have been part of the Outputs and Activities in the PDM.
- 3) An environmental laboratory needs expensive equipment. It incurs costs and operation and maintenance (O&M) and continual improvement of technical capabilities for the partner country after the completion of the Project. This makes it crucial for the two sides to discuss a technical improvement plan based on the mid- to long-term prospect of financing and design the project framework in the process of preparatory study.
- 4) The Project took advantage of JCPP to obtain short-term experts from the National Center for Environment in Chile and organize training there as part of counterpart training. This arrangement proved efficient in terms of communicating in the common language and understanding the project background. It allowed the Panamanian counterparts to see a successful model at hand, which in turn motivated them to set clear targets and conduct project activities. In this respect, south-south cooperation provides an effective tool.
- 5) Two long-term experts who were sent from Japan in March 2004 were highly instrumental in moving the project forward and achieving the prescribed objectives by the completion of the Project. They had excellent expertise, a high level of capacity for technical management, zeal for job performance and goal achievement, and flexibility in coping with inadequate external conditions (Important Assumptions in PDM) typical of a developing country. The Project has demonstrated that these qualifications serve as important criteria for selecting experts for JICA projects.
- 6) The long-term expert who also served as the chief advisor kept abreast of the current legal framework through his research and analysis. This allowed the Laboratory to produce a mid- to long-term vision after the completion of the Project without being misdirected with regard to technology transfer. Therefore, it is highly advisable to appoint an expert who is familiar with institutional as well as technical aspects as the chief advisor for the environmental administration laboratory project.

¹ Article 35 of DGNTI-COPNIT, the ordinance for enforcement of the General Law on the Environment. The standard was reduced to 35 mg/L in 2000).

² BOD5 was measured for the purpose of the Project.

³ The director of DIPROCA submitted a copy of the proposed text to JICA Panama Office while the Mid-term Evaluation Team was staying in Panama, as agreed in the consultations on the Minutes of Meeting between the Japanese and Panamanian sides.

⁴ The draft decree defines the role of the ANAM Laboratory as one of the four functions of DIPROCA. It states to the effect that: "The ANAM Laboratory compiles analytical

information on the levels of achievement of environmental quality standards based on technical evidence. Its mission is to assess the environmental quality of water, air, noise, and soil in relation to the application of environmental standards, that is, maximum permissible limits.”

⁵ (i) Reduction of rural poverty; (ii) sustainable socioeconomic growth; and (iii) environmental conservation.

⁶ (a) Capacity development for the poor in farming and fishing villages in the regions; (b) reduction of economic disparities between regions; (c) improvement of national healthcare services; (d) conservation of the natural environment; and (e) strengthening of environmental pollution control.

⁷ The Direction for Protection of Environmental Quality (DIPROCA) originally planned to copy the SOPs for CENMA of Chile and add changes to them to prepare SOPs for the ANAM Laboratory. The Japanese side explained that SOPs should be prepared to suit the particular conditions of each laboratory and that the ANAM Laboratory should further increase its technical capacity toward establishing its own analytical procedures. The Panamanian side accepted this explanation.

⁸ Proyocto de Acreditación y Gestion Ambiental en Centroamérica. This is a project for environmental management and accreditation for six Central American countries. It is managed chiefly by a coordination council that involved relevant organizations.

⁹ The Japan-Chile Partnership Program. This is a JICA-supported program for cooperation between developing countries.

¹⁰ The chief advisor, age 52, is a consultant who is a qualified Professional Engineer in three fields: applied science, construction, and integrated engineering management. The expert in water analysis, 34, is a professional analysis technician with ten years of practical experience (including two years of experience as a JOCV).

¹¹ In the Panamanian university system, those who have a bachelor's degree in these two fields and others are called “Licenciado.”

¹² Other measures include (i) developing the environmental regulatory framework; (ii) promoting the environmental management initiative; and (iii) capacity building of other organizations concerned. These fields have been addressed largely by the IDB National Environmental Program.

¹³ According to a technical chief at the ANAM Laboratory, the Laboratory receives an average of three complaints or requests for intrusive site investigation into industrial wastewater.

¹⁴ Five laboratories at three national universities.

¹⁵ Manual de Organizacion y Funciones de la Autoridad nacional del Ambiente

¹⁶ It is widely recognized in Japan that laboratory analysis technicians of 40 years of age or older have difficulty in acquiring new skills. It may be difficult for them to provide technical responses to every changing environmental problem and learn how to operate new equipment.

¹⁷ Panamanian technical standards for wastewater, DGNTI-COPANIT 35 & 39-2000, identifies the following five organizations as provisional certified analytical institutions until proper certification functions of the national certification commission are put in place: (i) the University of Panama; (ii) the technical analysis institute of the University of Panama; (iii) the water and air laboratory of the University of Panama; (iv) the Technological University of Panama; and (v) the chemical laboratory of the Technological University of Panama. Analytical work for wastewater from establishments is currently contracted out to these five institutions. The ANAM Laboratory has yet to be officially certified in the standards.

¹⁸ Opinions of the Japanese side.

¹⁹ This condition was a center of attention in the bilateral consultations on the Minutes of Meeting. It meant the appointment of counterpart technicians who would concentrate exclusively on analytical work. The Japanese side first proposed the following text: "Adequate technicians who will engage exclusively in the analytical activities of the Lab." The Panamanian side insisted that the word "exclusively" be replaced with "especially." This was how this condition was finalized. This episode indicates how difficult it is to introduce such an exclusive appointment system.