Indonesia

Environmental Study Centers Development Project

Report Date: March 2001
Field Survey: September 2000

1. Project Profile and Japan's ODA Loan

Location Map of Project Area
(12 places throughout the country)

Water Quality Inspection Equipment Obtained by this Project (Environmental Research Center, Institute of Techonology in Surabaya)

(1) Background

The Republic of Indonesia's Fifth Five-Year Plan (1989 ~ 1994) set a goal of national economic growth that would be sustainable and compatible with conservation of the living environment and natural resources. That approach was prompted by problems of water pollution, air pollution and waste in urban areas; the depletion of soil in rural areas; and the destruction of ecological systems by development projects and by commercial logging.

At the time of the appraisal for this project (1991), Indonesia had 55 environmental research centers nationwide[1]. These centers conducted surveys and research on environmental problems, but they were not on sound financial footing, which made it difficult for them to obtain the personnel, materials and equipment necessary for educational and research activities. In particular, they lacked staff for tasks such as policy formation, research and monitoring. There was an urgent need to train such experts and raise the levels of skills, at central and regional levels, needed for solving environmental problems[2].

(2) Objectives

To support human resources development at 12 relatively well equipped environmental research centers nationwide, and to provide those centers with additional equipment necessary for their educational and research work.

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1 The centers were established in the 1970s as agencies attached to universities around the country, with aid from the Ford Foundation, USAID, CIDA and others.

2 The Indonesian government requested this project as an ODA loan from Japan Bank for International Cooperation (then OECF), as a co-financing project with the World Bank. The World Bank provided loans for the research survey portions of the Second Professional Human Resource Development Project (loan agreement signed in 1991), and the Environmental Study Centers Development Project.

(3) Project Scope

1) Construction works

Expansion and improvement of research laboratories at 12 main Environmental Research Centers.

Table 1 Indonesia's Main Environmental Research Centers (12 locations improved under this project)

Parent university	Location	Main research fields
North Sumatra University (USU)	Medan	Tropical rain forest ecology
Sri WidjayaUniversity (UNSRI)	Palembang	Wetland ecology
Indonesia University (UI)	Jakarta	Waste management and assessment
Bogor Agricultural University (IPB)	Bogor	Tropical rain forest ecology, acid rain
Institute of Technology in Bandung (ITB)	Bandung	Industrial development and environmental management
Institute of Technology in Surabaya (ITS)	Surabaya	Assessment, sewage treatment
Dipo NegoroUniversity (UNDIP)	Semarang	Marine environment, slum problems
Lamban Mangkrat University (UNLAM)	Bandjarmasin	Water quality conservation
Hasanuddin University (UNHAS)	Ujung Pandang	River basin conservation
Cendorawasi University (UNCEN)	Manokwari	Wild creatures and natural resources
Padjah Jaran University (UNPAD)	Bndgung	Development projects and the environment
Gadjah Mada University (UGM)	Jogjakarta	Sustainable agriculture and the role of trees

Source: JBIC materials

2) Provision of equipment and materials

The basic equipment, materials and publications needed for environmental research and investigation were provided.

3) Human resources development

Education of researchers from each environmental research center at universities in Indonesia and abroad (three courses, Ph.D, Masters and diploma) and training programs in Indonesia.

4) Technical assistance

Advice and other assistance connected with the technical aspects of environmental problems, human resources development and environmental research covered by this project.

5) Public services

Provision of information and advice to central and local governments, and educational information to the general public.

(4) Borrower/Executing Agency

Republic of Indonesia / Directorate General of Higher Education, Ministry of Education and Culture.

(5) Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥1,101 million / ¥1,038 million
Exchange of Notes/Loan Agreement	September 1991 / September 1991
Terms and Conditions	Interest rate: 2.6%, Repayment period: 30 years (10 years for grace period), General Untied
Final Disbursement Date	October 1997

2. Results and Evaluation

(1) Relevance

This project aimed to expand and improve the education and research environment at existing environmental research centers in order to develop human resources in the fields of environmental science and technology. That objective was in line with the tasks of sustainable economic growth and environmental conservation that were set in Indonesia's Fifth Five-Year Plan. Environmental conservation and sustainable economic growth are the fields that are still prioritized in Indonesia, and therefore the project's aims continued to be relevant at the time of the evaluation.

As shown in the "Comparison of Original and Actual Scope", the actual number of universities procuring educational equipment and materials was greater than in the original (six universities were added), and the number of trainees studying at universities or training in Indonesia was increased. The additional six universities were initially only supposed to provide training. They were: Universitas Brawijaya (UNIBRAW) in Malang, Udayana University in Denpasar, Nsasedana University in Kupan, Universitas Sam Ratulangi in Manado, Murawaruman University in Samarinda, and Patimura University in Ambon. The second change was made when the service had to be expanded to accommodate larger than anticipated number of applicants (Table 2).

Table 2 Planned and Actual Implementation of the Domestic and Overseas Training Programs (summary)

Program type	Plan	Actual	Change ratio (Actual/ Plan)
Domestic, degrees	78	106	1.36
Domestic, general	280	575	2.05
Overseas, degrees	43	46	1.07
Overseas, general	14	15	1.07
Other training	431	510	1.18
Totals	846	1,252	1.48

Source: Prepared from executing agency's materials

The funds for these extensions were covered by reserve fund, which increased due to exchange rate changes at the implementation stage (devaluation of the Rupiah), and by additional expenditure from the Indonesian government. The changes to the scope of the project were relevant, as they were intended to increase the project's contribution by improving the research environment and expanding application of the programs beyond the initial plan.

(2) Efficiency

The executing agency for this project was the Directorate General of Higher Education (DGHE) of the Ministry of Education and Culture. The Directorate of Research and Community Service Development (DRCS) was set up as the secretariat, and was assisted by domestic and foreign experts employed as technical support.

The schedule was delayed by two and a half years overall due to the time expended in cautious deliberation over tendering for the selection of 12 local contractors, and because the dispatch of trainees took longer than anticipated.

The total cost of the project overran estimated figures by approximately 13%, from the planned ¥1,765 million to ¥1,997 million, due to the expansion of the project scope. The excess was covered by payments from the Indonesian government. The value of the ODA loan provided was ¥1,038 million, down from the planned ¥1,101 million.

(3) Effectiveness

The survey was conducted with the cooperation of the Directorate General of Higher Education (DGHE) of the Ministry of Education and Culture (the executing agency), distributed 30 questionnaires to researchers and students at the 12 Environmental Science Centers (ESCs). The main questions asked respondents to discuss their own research work, any contributions they felt they had made to the country and to society, their satisfaction with the ESC, and their future intentions. A total of 15 questionnaires were received, from ESCs affiliated with four universities: Surabaya Institute of Technology, Hasanuddin University, Pajajaran University and Surabaya Institute of Technology. The small sample size means that careful consideration will have to be given to the statistical significance of the survey. However, as most of the questions not multiple choice, but asked respondents to answer freely, the results can be used to infer the qualitative effects yielded by the project. The main results obtained from the survey are presented below.

1) Contribution to research activity, the country and society

The ESC at Surabaya Institute of Technology, in Surabaya in East Java Province, pursues research work on the theme of “Environmental Assessment and Sewage Treatment”. Specifically, it supports the East Java provincial government on the development of enforcement of environment-related regulations and environmental measures, cooperates with the local office of the Environmental Management Agency (BAPEDAL), and conducts publicity events, such as environment-related seminars.

The ESC at Hasanuddin University in Makasar in South Sulawesi Province, pursues research on the theme of “Conservation of River Basins”. In addition to research into and practical application of optimum water source management, it pursues a wide range of activities, such as waste water processing projects, waste material reuse projects and environmental improvement programs for the poor.

The ESC at Pajajaran University in Bandung pursues research into “Development Projects and the Environment”. Its research in recent years, in cooperation with industry, examines the treatment and use of materials such as waste oil from petrochemical plants. It also conducts toxicity trials on animals.

The ESC at Bandung Institute of Technology, also in Bandung, has set “Industrial Development and Environmental Management” as its theme. It researches topics such as waste material treatment methods

and the recycling and reuse of coconut shells.

2) Satisfaction with Environmental Science Centers (ESCs)

Respondents were asked to describe their satisfaction with the ESCs as a venue of research work by choosing one of three grades, “very satisfied”, “satisfied” or “not satisfied”. Five respondents who were “very satisfied”, three were “satisfied” and seven were “not satisfied”. The difference between the eight who were at least satisfied and the seven who were dissatisfied can be ascribed to internal factors at each center, such as the lack of opportunities to apply research findings in society and the fact that environment-related classes are not emphasized at some universities. Dissastified respondents also mentioned that “research equipment and materials, and related publications are inadequate”.

3) Future intentions

As described in the section above, the overall situation is certainly not “satisfactory”; nevertheless, 13 of the 15 respondents (87%) indicated that they would “want to continue research at the ESC in the future”. The reason is that the ESCs are officially as national core institutions for tackling environmental problems; the researchers’ work is made possible by the existence of the Centers.

The two respondents who did not intend to go on working at their ESC commented that “there are not enough opportunities to apply research findings in society”. They are looking for the expansion of research activity through cooperation between industry and academia, bureaucracy and academia, or all three parties together.

4) Opinions and wishes

The respondents raised the following issues, which they believed should be resolved in order to enhance the Centers in the future.

<Tasks for the improvement of the Environmental Science Centers>

- Books and academic magazines in the environmental field are lacking, and the library functions are weak as a result (The library content has not been regularly expanded or updated since it was introduced by this project).
- There is a global trend toward environmental monitoring methods based on new technologies such as GIS, but (Indonesia’s) Environmental Science Centers cannot cope with the trend.
- The budget allocations from the central government and university headquarters are inadequate, and it not easy to operate and maintain the Centers as they should be.

(4) Impact

1) Environmental Impact

This project consisted of improving (expanding and rebuilding) the facilities of existing Environmental Science Centers, procuring equipment and materials, and training people. As such, it has no negative environmental impact.

2) Social Impact

Each Environmental Science Center was built on the campus of the university with which it is affiliated. Therefore, there was no need to acquire new land, and the project involved no social problems such as relocation of residents.

(5) Sustainability

1) Operation and Maintenance Agency

The Environmental Research Centers are agencies affiliated with existing universities, and the operation and maintenance of each center has been carried out by its parent university since the completion of the project.

In addition, the Environmental Science Center Coordination Office (BKPSL: Badan Koodinasi Pusat Studi Lingkungan) was established under the Directorate General of Higher Education to make the research activities of Centers around the country more efficient and effective. The BKPSL coordinates and supports the activities of the Environmental Science Centers, such as the publication of textbooks, and regional seminars and training programs. It examines whether such activities should be common to all Centers, or if they would be more effective when conducted in separate regional units.

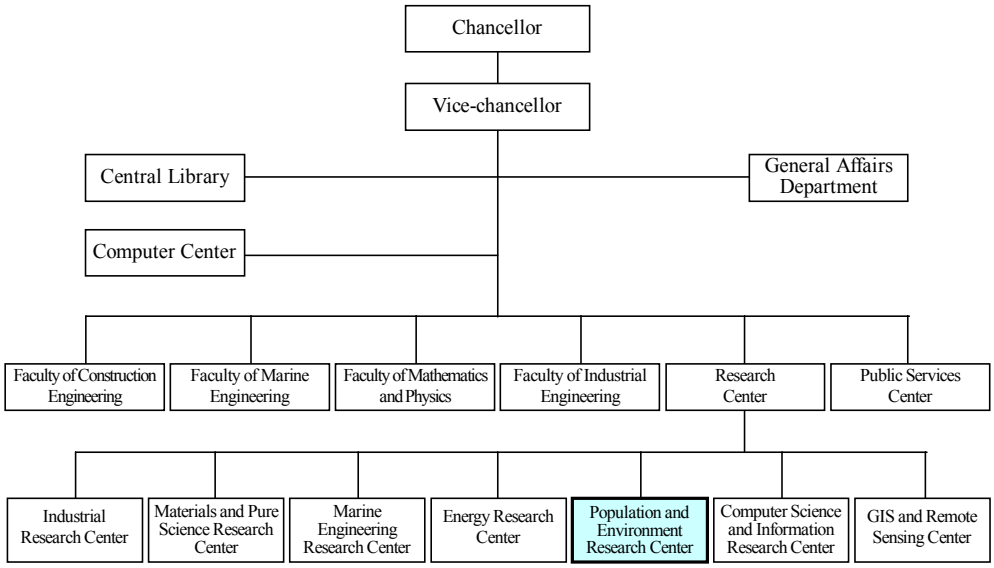
2) The status of Environmental Science Centers

The Environmental Science Center at the Surabaya Institute of Technology in East Java Province was visited in the course of this evaluation, in September 2000, to discuss an outline of its activities and to inspect its laboratories, experimental equipment, publications and other materials provided under this project. The content of the Environmental Science Center's work and the history of the Institute are described below.

The Surabaya Institute of Technology (ITS), which boasts 13,000 students and a teaching staff of 10,000, is the only technical university in East Java Province. Its name is recognized around the world. It has seven research centers, one of which is the Environmental Science Center built there under this project (named the Population and Environmental Science Center, PSL) (Figure 1). The PSL at ITS is situated within Surabaya, the capital city of East Java Province. Its geographical situation is reflected in its three research fields, coastal environments, industrial environments and urban environments.

At the end of August 2000, the PSL had a registered university research staff of 254, all of which are attached to the university, not to the PSL. When there is an opportunity for investigation or research (work contracted from PSL by external agencies, such as the government or private companies), the staff work on the research within the PSL. In most cases, the research staff promotes research ordered by external agencies. Of the six researchers who studied overseas (in Japan), four remained at the PSL and made use of their contacts in Indonesia and abroad to win research orders.

Figure 1 Organization of Surabaya Institute of Technology

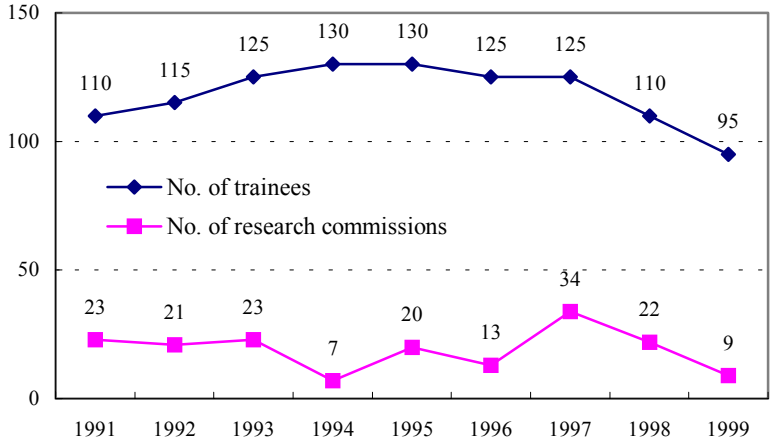


Research and operations for external clients are beneficial for the PSL and the ITS for the following reasons:

- It is difficult to obtain a research budget from the central government, and outside research orders help to stabilize the Science Center's financial position.
- The PSL can pursue research work that matches real social and economic needs, thereby making a social contribution.

The water quality measurement equipment and other experimental equipment procured under this project is still usable, but more precise versions of the same devices have been developed recently. The Center wants to install the new models, but it is difficult to obtain the necessary budget allocation. As a result, the Center has been unable to make the upgrades it wants. It also wants to expand its environment-related publications, but that effort is also constrained by budget difficulties. According to the chief of the center, seminars and other events on the environment provide opportunities to exchange information with the staff of Environmental Science Centers attached to other universities, but all the Centers are, to some degree, struggling to obtain funds for updating their experimental equipment, buying new books, and for other needs. That is one reason why the PSL wants to take on more commissioned research , but government regulations oblige all teaching staff to spend six months of every year in the classroom teaching, which makes it difficult for researchers to increase the amount of time they spend on in the center (Figure 2).

Figure 2 Levels of Activity by the Surabaya Institute of Technology Environmental Science Center



This project is said to have had the following qualitative effects on the ITS PSL:

- Progress has been made in research on the processing of hospital waste.
- The adoption and publication of environment-related textbooks has raised environmental awareness.
- The invitation of experts from Indonesia and abroad has brought in new knowledge and skills.
- The Center has become more competitive in the environmental research field.
- The "Environment Society" was established in 1988 with the participation of all Environmental Science Centers, building a nationwide scientific network.

3) Sustainability

A good research environment built by improving laboratories, experimental equipment and publications, is essential for supporting efficient and effective research work. The 18 Environmental Science Centers[3] built under this project have succeeded in improving their internal research environment. The abilities and qualities of the people working in the centers have also been raised to a new level by the training programs conducted in Indonesia and abroad.

The research environment must be renewed at appropriate intervals if the efficiency and efficacy of its research work is to be maintained. In particular, the pace at which new equipment is developed and the increase? of publications in advanced environment-related academic fields are more rapid than in more conventional fields. It is clear that equipment and publications at the centers will become outdated more rapidly and will require replacement at appropriate intervals.

The questionnaire survey conducted as part of this study found that representatives of all the centers, when asked about their wishes, said they wanted to renew their experimental equipment and other materials and to buy new publications and magazines to acquire new knowledge and skills. These wishes arise from the centers' common inability to obtain adequate budget allocations from their parent

[3] Laboratories were added and improved and equipment and materials procured for 12 centers, and a further six centers received only equipment and materials, for a total of 18 centers.

universities. The universities, in turn, do not receive adequate budget allocations from the central government. This financial problem must be dealt with. The inadequacy of budget allocations and allowances is nothing new. The Centers raise research funds for themselves by taking on commissioned research, and promote their services in order to attract such orders. However, as mentioned above, teaching staff are obliged by government regulations to work in the classroom for six months of every year, which means they cannot increase their contracted research work as they would like to.

Given this situation, the Indonesian government must become more aware of the need for adequate funding for science and research, and make adequate budget allocations accordingly. Also, the application of the regulations mentioned above should be made more flexible. That would be an effective way of encouraging the independent efforts of the universities and of Environmental Science Centers, and thereby encourage research work without placing any additional burden on state finances.

Comparison of Original and Actual Scope

Item	Plan	Actual
① **Project Scope**		
1. Construction works		
- Expansion and improvement of research laboratories	Environmental Research Centers which 12 universities belong to as below: North Sumatra University/ Sri WidjayaUniversity / Bogor Agricultural University /Bandung Institute of Technology/Surabaya Institute of Technology/ Dipo NegoroUniversity / Lamban Mangkrat University /Hasanuddin University/ Cendorawasi University / Padjah Jaran University / Gadjah Mada University /Indonesia University	Same as left
2. Procurement of materials and equipment	12 universities above	In addition to the left, six universities were added below: Universitas Brawijaya / Udayana University / Nsasedana University / Universitas Sam Ratulangi / Murawaruman University / Patimura University
3. Development of human resources		
- Study abroad	a. Master's course in Indonesia: 50 persons	68 person
- Domestic study	b. Doctor's course in Indonesia: 28 persons	person
- Domestic training	c. Master's course in overseas: 27 persons (4 countries)	22 persons to Japan out of 30 persons from 6 countries
	d. Doctor's course in overseas: 16 persons (4 countries)	9 persons to Japan out of 16 persons from 4 countries
	e. General study in Indonesia: 280 persons	575 person
	f. General study abroad: 14 persons	15 person
	g. Management training: 186 persons	190 person
	h. Research management training: 185 persons	185 person
	i. Intern: 22 persons	75 person
	j. Education and training: 38 persons	60 person
4. Technical assistance		
	a. Overseas experts	
	- Chief technical advisor: 36M/M	Same as left
	- Short-term advisor: 72M/M	Same as left
	- UN environmental expert: 168M/M	Same as left
	b. Domestic experts	
	- Domestic project manager:36M/M	Same as left
	- Regional technical advisor:72M/M	Same as left
	- Short-term advisor:72M/M	Same as left
	- Clerical employees:36M/M	Same as left
	- Secretary:72M/M	Same as left
	- Driver: 120M/M	Same as left
5. Public services	Provision of information and advice to central and local governments	Same as left

Item	Plan	Actual
② Implementation Schedule		
1. Construction works	- Bidding Jul. 1991 ~ Mar. 1992 - Civil work Jun. 1992 ~ Mar. 1993	Apr. 1992 ~ Sep. 1992 Jan. 1992 ~ Oct. 1993
2. Materials and equipment	- Bidding Dec. 1992 ~ Mar. 1993 - Procurement May 1993 ~ Mar. 1994	Jul. 1993 ~ Jan. 1994 Jul. 1996 ~ May 1997
3. Development of human resources	- Doctor's course (selection) Jul. 1991 ~ Mar. 1995 - Doctor's course (first dispatch) Jan. 1993 ~ Mar. 1996 - Doctor's course (second dispatch) Jul. 1991 ~ Feb. 1992 - Master's course (selection) Mar. 1992 ~ Dec. 1993 - Master's course (first dispatch) Jan. 1993 ~ Mar. 1996 - Master's course (second dispatch) Jul. 1991 ~ Mar. 1994	Nov. 1992 ~ Sep. 1993 Jun. 1994 ~ Mar. 1995 Jun. 1994 ~ Mar. 1995 Nov. 1992 ~ Sep. 1993 Jun. 1994 ~ Mar.1995 Jun. 1994 ~ Mar. 1995
4. Technical assistance	Jul. 1991 ~ Dec. 1994	Jul. 1993 ~ Mar. 1997
5. Public services	Jan. 1992 ~ Dec. 1994	N.A.
③Project Cost		
Foreign currency	¥823 million	¥1,038 million
Local currency	¥942 million	¥959 million
Total	¥1,765 million	¥1,997 million
ODA loan portion	¥1,101 million	¥1,038 million
Exchange rate	1Rp.＝¥0.068 (Apr. 1991)	1Rp.＝¥0.068