

Thailand

### “Environmental Fund Project”

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## 1. Project Description



Map of the Project Area



Sanitary Landfill in Khon Kaen

### 1.1 Project Objective

The objective of this project is to promote environmental conservation activities (mainly wastewater treatment plant and waste disposal plant projects) by local governments throughout Thailand by expanding the established Environmental Fund and providing funds through a set of grants and loans under the unified supervision of the Thai Government, thereby contributing to environmental conservation and improvement in the Kingdom of Thailand.

### 1.2 Outline of Loan Agreement

Approved Amount/ Disbursed Amount	11,200 million yen / 2,971 million yen <sup>1</sup>
Loan Agreement Signing Date/Final Disbursement Date	September 1993 / January 2004
Ex-Post Evaluation	Fiscal 2005
Executing Agency	Office of Environmental Policy and Planning , Ministry of Science, Technology and Environment
Main Contractor	Krung Thon Engineers Co., Ltd. (Thailand), Prayoonvisava Engineering Co., Ltd. (Thailand), See Sang Karn Yotah (1979)

<sup>1</sup> Excluding amount of prepayment (4,888 million yen) for the Samut Prakarn wastewater management project.

	Co., Ltd. (Thailand), Vichitbhan Construction Co., Ltd. (Thailand), Gateway Development Co., Ltd. (Thailand), North West Water International Ltd.(United Kingdom)(JV)
Main Consultant	W.S. Atkins International Ltd. (United Kingdom),Sinclair Knight Merze Propriety Ltd. (Australia),Macro Consultants Company Ltd. (Thailand) (JV), Padeco (Thailand) Ltd. (Thailand),Tesco Ltd. (Thailand) (JV), ICF Consulting Group (USA)

### 1.3 Background of Ex-post Monitoring

With rapid economic growth and urbanization since the latter half of the 1980s, the urban environmental pollution problem in Thailand has become serious. In order to address this environmental deterioration, this Project financed the environmental protection activities of the local government through a set of grants and loans under the unified supervision of the Thai Government. Two urban wastewater treatment plants and 22 sanitary landfills have been constructed through this fund. These subprojects, excluding Samut Prakarn wastewater management project, cost 1,346 million baht of which 1,000 million baht was financed by the ODA loan.

Ex-post evaluation deemed the Project as a whole as low due to i) the inadequate planning ability of local governments and the executing agency of the subprojects to achieve the planned effects, ii) the Project period took much longer than planned and iii) there were problems in operation and management structure of wastewater treatment projects.

Under these circumstances, ex-post evaluation made recommendations to the Thai government as follows:

- 1) Establishment of sub-project selection criteria,
- 2) Implementation of Environmental Impact Assessment,
- 3) Requirement of reduction and separation of wastewater and solid waste, and recycling activity to receive financing for subproject, and
- 4) Establishment of organization that enables promotion of experience.

Therefore, this project was selected for ex-post monitoring and reviewed under each criterion with the findings from the field survey and other research activities with a final conclusion being drawn.

## 2. Outline of the Monitoring Study

### 2.1 Duration of the Monitoring Study

Duration of the Study: April 2011 to February 2012

Duration of the Field Study: July 18 to August 6, 2011

### 2.2 Constraints during the Monitoring Study

Although Office of Natural Resources and Environmental Policy and Planning was designated to evaluate and monitor the subprojects, its structure was insufficient to monitor all the current status of subprojects and some indicators of subprojects have not been collected.

### **3. Monitoring Results**

#### **3.1 Effectiveness**

##### **3.1.1 Quantitative Effects**

##### **3.1.1.1 Indicators of Operational Effects**

##### **(1) Volume of Urban Wastewater Treated**

At the time of ex-post monitoring, the urban wastewater treatment volume at Tarae City was 746 m<sup>3</sup>/day, which was 36% of treatment capacity in 2011. The figure far below the 2,054 m<sup>3</sup>/day planned for at the time of subproject and the 1,300 m<sup>3</sup>/day at ex-post evaluation. is. On the other hand, in Huakhwang City wastewater of 1,300 m<sup>3</sup>/day was treated as 87% of initially planned. The total treatment volume of the two cities was 2,046 m<sup>3</sup>/day (Table 1), which is far below the planned volume of 528,000 m<sup>3</sup>/day (in around 2000 after the recomposition of subprojects). The major reason is that the Environment Fund financed only two wastewater treatment plants<sup>2</sup> although initially 9 cities had planned to construct such facilities at the time of Loan Agreement and three cities were selected after the recomposition<sup>3</sup> (Table 2).

In addition, it was confirmed the wastewater treatment capacity of the two plants has been maintained since the ex-post evaluation.

##### **(2) Increase Proper Treatment Volume of Urban Solid Waste**

In around 2000, according to the plans of the Project, after the recomposition of subprojects, total treatment capacity of urban solid waste was estimated to be 6.19 million m<sup>3</sup> and the completed treatment capacity became 5.96 million m<sup>3</sup>. According to the Office of Natural Resources and Environmental Policy and Planning (ONEP) and Regional Environmental Offices, as of 2012, four sites out of a total of 22 have already reached treatment capacity and other six remaining sites are constructing next phase facility or will reach capacity within five years<sup>4</sup> (Table 1). These facts indicate the sanitary landfill subprojects have been fully utilized almost reaching their respective capacities.

In other words, before the sanitary landfills were established, urban solid waste had been improperly processed, with such practices as open dumping and illegal abandonment, but they

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<sup>2</sup> Samut Prakarn Wastewater project, one of 3 selected subprojects after the recomposition, had been once financed by the Environment Fund (ODA loan portion Baht 1,750 million) but Thai Government voluntarily repaid the amount after a protesting activity in 2003. Then, this monitoring study does not include the subproject. Since the project had the capacity of 525,000 m<sup>3</sup>/day, the indicator of capacity volume significantly dropped from the planned volume.

<sup>3</sup> The Ex-Post evaluation concluded the reason primarily because Public Works Department and Pollution Control Department also constructed wastewater treatment facilities and secondarily because the technical standard and fund procurement ability of local governments were insufficient to realize the decentralized environmental management.

<sup>4</sup> After reaching capacity, the waste collection cannot be stopped and the waste is stacked up exceeding capacity or dumped openly near landfill waste treatment plants.

were being treated at the pace of 1,271 ton per day at the time of ex-post monitoring. In 2011, the pace is 1,264 ton per day (Table 1). For example, the solid waste treatment volume for Khon Kaen City is shown in Table 3. These numbers include the collected volume beyond the capacity of subprojects. After reaching capacity at the treatment facility, it can be stated that the collected urban waste was not treated properly, though the increasing urban solid waste was collected effectively after the sanitary landfill subprojects reached capacity.

Table 1 Current Condition of Subprojects

**Urban Wastewater Management Projects**

	City Name	Capacity	Unit	Cost (Mil. Baht)	Treatment Volume (m <sup>3</sup> /day in 2011)	Current Condition (2012)
1	Tarac	2,054	m <sup>3</sup> /day	64	746	In operation.
2	Huakwang	1,500	m <sup>3</sup> /day	22	1,300	In operation.
	Subtotal	3,554	m <sup>3</sup> /day	86	2,046	

**Solid Waste Treatment Subproject**

	City Name	Capacity	Unit	Cost (Mil. Baht)	Collection Volume (ton/day in 2011)	Current Condition (2012)
1	Sensuk	148,701	m <sup>3</sup>	94	80	Full. Moved to Chonburi Central Treatment Facility.
2	Sadao	79,088	m <sup>3</sup>	82	38	In operation.
3	Samut Songklam	139,364	m <sup>3</sup>	47	27	Stopped operation due to protest activity.
4	Nakhon Panom	730,000	m <sup>3</sup>	79	24	In operation.
5	Bang Kla	147,188	m <sup>3</sup>	26	8	In operation. Up to 2017.
6	Varin Chumrab	84,409 →122,400	m <sup>3</sup>	58	28	In operation. Phase 3 under construction.
7	Buri Ram	130,033	m <sup>3</sup>	52	54	In operation. Phase 2 by provincial budget.
8	Khon Kaen	1,000,000	m <sup>3</sup>	46	203	Full. Disposed in open dumping.
9	Yasothon	158,840	m <sup>3</sup>	53	20	In operation.
10	Si Sa Ket	198,872	m <sup>3</sup>	66	62	In operation.
11	Sena	90,000	m <sup>3</sup>	46	16	Full. Disposed in open dumping.
12	Maha Sarakam	720,000	m <sup>3</sup>	32	87	Full. Phase 2 in operation.
13	Chumpon	227,552	m <sup>3</sup>	48	60	In operation.
14	Pattaya	825,000	m <sup>3</sup>	53	250	In operation.
15	Sukhothai Thani	247,200	m <sup>3</sup>	58	49	In operation.
16	Taklee	91,250	m <sup>3</sup>	48	46	In operation.
17	Chiang Yun	23,614 →36,350	m <sup>3</sup>	22	28	In operation. Phase 2 by provincial budget in 2009.
18	Bethong	32,400	m <sup>3</sup>	83	28	In operation.
19	Pattani	255,500	m <sup>3</sup>	70	50	In operation.
20	Trat	270,000	m <sup>3</sup>	89	31	In operation. Up to 2017.
21	Klang	200,000	m <sup>3</sup>	62	25	In operation. Up to 2014.
22	Yala	160,000	m <sup>3</sup>	80	50	In operation.
	Subtotal	5,959,011	m <sup>3</sup>	1,294	1,264	Total capacity and cost are at the time of completion.
	Total			1,380		

Note: "→" shows increase of capacity from initial subproject.

Source: ONEP and Regional Environmental Office.

Table 2 Outline of Subproject Indicators of Operational Effect

Type	Year	1993	2000	2006	2011
		L/A	After Subproject Recomposition	Ex-Post Evaluation	Ex-Post Monitoring
Wastewater Treatment Plant	Count	9	3	2	2
	Treatment Capability (m <sup>3</sup> /day)	Not Estimated	528,554	3,554	2,046 (Treatment Volume)
Sanitary Landfill	Count	41	22	22	22
	Capacity(m <sup>3</sup> )	Not Estimated	6,194,629	5,959,011	1,264ton/day collection. Remaining capacity unavailable.

Source: Appraisal, Ex-Post Evaluation and this survey.

Table 3 Urban Solid Waste Collection Volume in Khon Kaen City

Fiscal Year	2007	2008	2009	2010	2011 (9 months)
Total Treatment Volume (ton)	66,228	62,588	67,148	84,928	64,680
Average Daily Treatment Volume (ton/day)	181	170	185	233	239

Source: Khon Kaen City data

### 3.1.1.2 Internal Rate of Return (IRR)

Since IRR was not calculated at the time of ex-post evaluation, this ex-post monitoring survey does not cover this item.

### 3.1.2 Qualitative Effects

Based on hearings of Pattaya and Khon Kean City officials in charge of waste treatment, as for construction of waste treatment facilities and collection of charges on emissions, the cities and citizens conferred on waste treatment and waste collection in late 2000s and it was confirmed that the segregation of waste was now a necessity more than ever. This means that this Project had certain positive effect on citizens' environmental awareness, especially concerning the categorization of waste general, medical and hazardous waste.

## 3.2 Impact

### 3.2.1 Intended Impact

#### 3.2.1.1 Improvements in Environmental Quality for Urban Residents of Target Cities

The beneficiary populations of Tarae and Huakhwang City wastewater treatment services were increased by 33% from 9,370 persons (at ex-post evaluation) to 12,440 persons (at ex-post monitoring). However, the impact is limited and is equal to 0.5% of the planned 2.32 million persons because the number of subprojects implemented was far less than the original plan as described in 3.1.1.1(1) (See also footnote 2).

The beneficiary populations of urban waste treatment services increased by 34% from 970,000 in the urbanized area of 22 cities to 1,304,000 in 2010. The number exceeds 18% from the planned service population of 1,100,000 and it is judged the service contributed to improve urban environment significantly.

#### 3.2.1.2 Improvement of Urban Sanitation Environment

Regarding the environmental problems near the landfills pointed out by the ex-post evaluation, the ex-post monitoring confirmed the local governments and neighborhood residents hold regular meetings on the subject. In particular, as for Pattaya, City although ex-post evaluation pointed out that there was a strong odor and air pollution from the adjacent medical waste incineration facility, Pattaya City solved the problem by improving the operation of the plant through dialogue with local residents.

Thus, by appropriate waste treatment, this Project contributed to improve the urban sanitary environment to some extent.

#### 3.2.2 Other Impacts

##### 3.2.2.1 Impact on Natural Environment

Site survey confirmed that sanitary landfill by subprojects in Khon Kaen and Pattaya properly treated effluent. Therefore, negative impact on natural environment by these waste treatment facilities in both cities was mitigated more than that at the time of ex-post evaluation.

##### 3.2.2.2 Resettlement and Land Acquisition

Land acquisition for construction of new sanitary landfills is becoming more difficult than ever because of construction costs and opposition by neighbors. Once the waste volume exceeds the facility capacity, it is obliged to dump openly on adjacent land and environmental management problems will arise in the future.

##### 3.2.2.3 Other Positive and Negative Impacts

###### (1) Foster Responsibility of Local Governments

The Enhancement and Conservation of National Environmental Quality Act of 1992 and Local Decentralization Act in 2002 expanded the scope of responsibility of local government in environmental management. Before enactment of these Acts, the national government was responsible for wastewater treatment and sanitary landfills. After enactment of the law, local governments are required to participate in these projects independently through the Environmental Fund which is funded by the national government. Then, local government is required to secure own financial resources for environmental projects. Therefore, this Project promoted active project formulation by local governments and raised awareness and ownership of local governments to advance environmental projects.

Although the national decentralization policy targeted local project formulation by local fund, this project was transitional style of local project formulation by central fund. In addition, transfer of revenue source and revenue allotment from national to local government did not progressed smoothly and local revenue is limited.. Consequently, local revenue proportion (national government revenue divided by local revenue) remained at 24.1%, far below the original target of 35% which was to be attained by 2006(JICA Report “Analysis from a Capacity Development Perspective: JICA Program on Capacity Building of Thai Local Authorities” 2007). Later, the proportion increased to 25.2% in 2008.

According to ONEP and hearings at project sites, with the growth in income, the environmental awareness of local governments and citizens is rising and willingness to pay the cost to protect the environment is fostered.

## (2) Strengthening of Project Formulation and Operation and Maintenance Capability of Local Government

The site survey found local governments directly hired necessary engineers and improved their project formulation and operation and maintenance capability, although some local governments outsourced operation and maintenance of facilities.

In addition, Environmental Impact Assessment (EIA) was required for subproject appraisal from 2003. In 2005, a new law required the holding of public hearings in advance of application to the Environmental Fund. Based on this law, the local governments are responsible for conducting not only project formulation, but also public hearings and EIAs. A treatment facility with more than a capacity 3,000 m<sup>3</sup>/day is required to conduct an EIA by law. In the case of Chern Talay Wastewater subproject, the Tambon (corresponding to city) Administration Office conducted Initial Environmental Examination (IEE) instead of EIA because the design treatment volume is low enough to exempt from conducting EIA.

## (3) Segregation and Recycling of Waste

Segregation and recycling of urban solid waste have been performed mainly at the treatment site and only partially near the source such as households and enterprises. In general, urban waste in Thailand is segregated into two categories, general and hazardous, as they are not incinerated. This monitoring could not confirm activation of recycling activities by citizens triggered by the subprojects, but ONEP requests subproject applicants to incorporate the concept of 3Rs (Reduce, Reuse and Recycle) activities for subproject formulation.

By these facts, this ex-post monitoring found positive impacts, improvement of living environment of targeted urban area residents due to proper treatment of solid waste, improvement in project formulation, improvement of operation and maintenance capability of local governments in environmental conservation, and increased environmental awareness of the citizenry.

### **3.3. Sustainability**

#### **3.3.1 ONEP and Secretariat of Environmental Fund**

##### **3.3.1.1 Structural Aspect of Operation and Maintenance**

By the reorganization of Ministry of Science, Technology and Environment into Ministry of Natural Resources and Environment (MONRE), ONEP became a department under the MONRE. The ONEP subordinates the Secretariat of Environmental Fund. As of 2011, the Secretariat had five divisions and one committee, with 45 staff members (19 senior, 24 general and 2 permanent). Among this, Project Analysis and Evaluation Division (9 staffs) and Technical Affairs Division (5 staffs) are appraising subprojects, excluding EIAs. Environmental Impact Assessment Bureau is responsible to appraise EIAs.

ONEP is proactively involved in public relations activities such as publication of brochures. In particular, ONEP prepared and revised the following provisions and clarified the selection process of subprojects and criteria with the Prime Minister's notification.

- The Notification of the National Environmental Board Concerning the Basis of Environmental Fund allocation (June 2009)
- Regulations of the Environmental Fund Committee Concerning Principles, Conditions and Procedure Concerning a Request for Fund Allocation and Loans of the Environmental Fund (June 2009)
- Regulations of the Environmental Fund Committee Concerning the Authority of Fund Managers concerning the Receipts and the Disbursements of the Environmental Fund (June 2009)

Ministry of Industry and its local bureaus are responsible for guidance and supervision of major pollution emissions sources such as factories. Pollution Control Department of MONRE prepares guidelines, but local government, such as provinces, does not have direct authority over factories.

Ex-post evaluation recommended establishing an organization to promote the experience. In response to this, Environment Quality Improvement Bureau in cooperation with ONEP, provides various training programs. However, a new organization has not been established yet.

As such, it is confirmed as for the operation and maintenance structure of Environmental Fund, expanded PR and training activities compared to those at the time of ex-post evaluation.

However, the monitoring and evaluation system of the subprojects by the executing agency has not been established after the submission of Project Completion Report in 2004.

##### **3.3.1.2 Technical Aspect of Operation and Maintenance**

To complement technical skills aspects of ONEP, an engineering consultant from Lat Krabang Institute of Technology was employed and improved its engineering skill level.

##### **3.3.1.3 Financial Aspect of Operation and Maintenance**



As shown in Table 4, the Environment Fund has revenue from government subsidy of Baht 6.25 billion (Oil Fund Baht 4.5 billion and others Baht 1.75 billion), JBIC loan of Baht 2.59 billion<sup>5</sup>, and interest from bank accounts of Baht 5.29 billion and others. Total revenue was Baht 14.13 billion.

Table 4 Change in Revenue and Expenditure of Environment Fund

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
<b>Revenue</b>																				
Oil Fund		4,500																		4,500
Budget for Environmental Development and Quality of Government Subsidy		500																		500
Interest from Bank Account	29	365	500	375	676	774	681	759	327	143	55	32	86	80	68	117	159	124	114	57
Repayment from Sub-projects			2	9	4	4	2	62	15	5	10	61	41	21	5	15	3			2
JBIC Loan						25	765	76	278	572	519	312	45							2,592
	5,029	865	877	935	778	710	1,526	465	436	632	561	459	166	89	122	174	127	114	59	14,124
<b>Expenditure</b>																				
Subsidy for construction and maintenance of pollution control system	15	5	473	3	277	289	2,954	905	1,143	1,062	616	287	74	164	8	23	92	6		8,396
Subsidy for the enhancement and conservation of environment and quality of life		40	3	30	74	646	137	57	62	55	62	32	38	19	77	9	13	25	468	1,847
Environment Fund management		1		1	2	3	10	4	7	8	5	10	9	10	6	14	12	8	7	117
Difference of exchange rate						3		2	4			4								13
Fee to IFCT								1	1	2	2	4	5							15
	15	46	476	34	353	941	3,101	969	1,217	1,127	685	337	126	193	91	46	117	39	475	10,388
Balance	5,014	819	401	901	425	-231	-1,575	-504	-781	-495	-124	122	40	-104	31	128	10	75	-416	3,736
Other Balance															643	2	6	-720	718	649
Cumulative Balance	5,014	5,833	6,234	7,135	7,560	7,329	5,754	5,250	4,469	3,974	3,850	3,972	4,012	3,908	4,582	4,712	4,728	4,083	4,385	4,385

Source: ONEP.

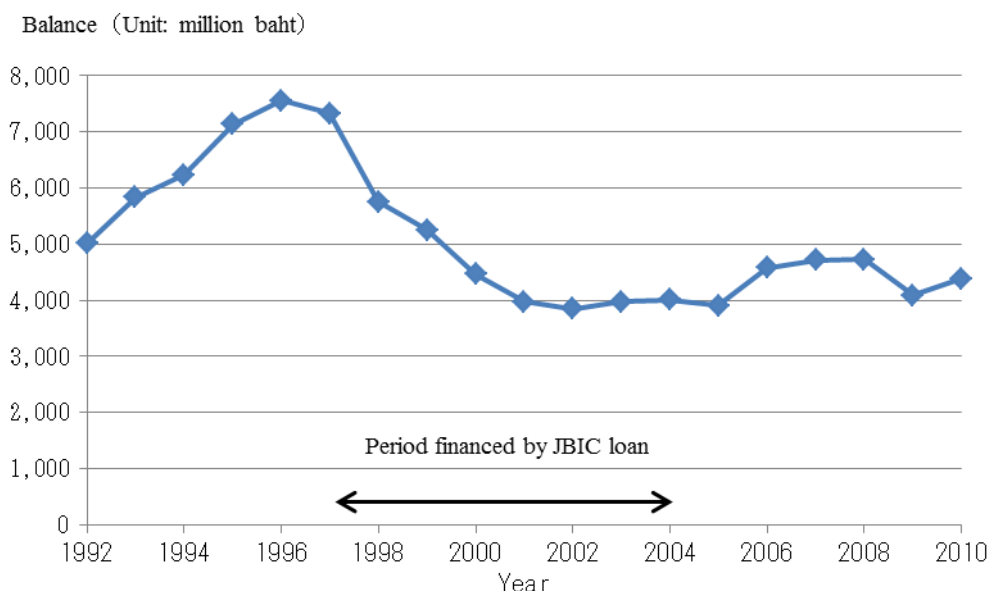


Figure 1 Change in the Balance of Environment Fund

As of June 2011(End of Fiscal Year 2010) , the balance of the Environmental Fund was Baht 4.39 billion. During fiscal 2011 and 2012, the Fund will spend Baht 880 million and 780 million respectively. In addition, there is a project planned of Baht 340 million. As a result, the balance of the Fund will be Baht 2,390 million<sup>6</sup>. Cherng Talay Wastewater Treatment Plant subproject and Nakhon Sawan Central Sanitary Landfill are included in this fund.

Although loan program for the Fund decreased the interest rate from 6.8% to 2.0% for the sake of private sector's convenience, it has not been utilized. At the time of ex-post evaluation,

<sup>5</sup> Including a loan portion to Samut Prakarn Wastewater project.

<sup>6</sup> This does not include the repayment from loan and interest income.

the Fund planned to secure government funding, but there has been no additional government support since 1996. Thus, at the time of ex-post monitoring, it is considered that the government will not budget the Fund in the future and the financial sustainability of the Fund is judged to be low.

### 3.3.2. Loan Recipients: Sustainability of Local Governments and Subprojects

#### 3.3.2.1 Technical and Structural Aspects of Operation and Maintenance

##### (1) Wastewater Treatment Plants

After the expiration of contract with the initial wastewater operator, Wastewater Management Authorities (WMA), each city administration employed engineers by itself. Thus, the sanitary department of local authorities employed external engineers and directly operate the plants. In case of Huakhwang City, five staff members (one engineer, one technician, and three workers) have been employed in operation of the plant as of 2011. Some of them are re-employed by WMA, and the city maintains technical standards.

##### (2) Sanitary Landfills

Pattaya and Khon Kaen: these cities outsource maintenance operations and their scope is limited to unskilled work such as dumping and scavenging and only simple training programs are provided for the workers. This ex-post monitoring cannot confirm that the outsourced companies maintain the necessary technical standards.

Pattaya city employed engineers for the operation of effluent treatment plant by itself and the effluent from the sanitary landfill of the subproject was treated properly. On the other hand, at other general dumping sites, ONEP and local authorities do not have sufficient information whether the appropriate engineering level and structure are maintained partially because of outsourcing of maintenance operations.

#### 3.3.2.2 Financial Aspect of Operation and Maintenance

##### (1) Wastewater Treatment Plants

Although only several local authorities in Thailand are collecting treatment fees, the both cities of Tarae and Huakhwang are collect treatment fees from users which are allocated for operating costs. In the case of Tarae City, collected Baht 470,000 and spent Baht 580,000 for operation in 2009 and the City subsidized the difference. Huakhwang City charges 10 Baht on each household and 20 Baht on each enterprise every month and collects Baht 84,000 per annum in total. On the other hand, the City spends Baht 600,000 per annum for operation and the City subsidizes the difference.

##### (2) Sanitary Landfills

Financial status of the two sanitary landfills in Pattaya and Khon Kaen, where this monitoring mission visited as sample cases, are as below.

Pattaya City Sanitary Landfill: it outsources maintenance operations. The City collects garbage collection fee of 40 Baht every month from households and has revenue of Baht 31.20 million per year. On the other hand, the city paid Baht 72.50 million for the outsourced company in 2009. The company claimed that labor cost was climbing so that the outsourcing price was revised from 649 Baht to 1,100 Baht per ton after negotiations between the city and the company in 2010, which further stressed the city's finances.

Khon Kaen Sanitary Landfill: the Khon Kaen City collects 40 Baht per household every month and has annual revenue of Baht 16.60 million, but with the outsourcing cost at Baht 18.30 million per annum, the City subsidizes the difference.

As described above, the discharge revenue and expenditure, regardless of direct operation or outsourcing, cannot be balanced and it became a financial burden on local finances for both wastewater treatment plants and sanitary landfills. In addition, because there is much ambiguity on cost sharing and responsibility among the government, local governments and residents (polluters), these environment management costs will remain a burden on local finances in the future. In particular, the cost of solid is so high that it will be likely not to perform appropriate treatment with the increase in financial burden.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

By the subprojects of Environment Fund financed by this Project, wastewater treatment plants and sanitary landfills have been constructed and local cities started appropriate environmental management. Although 9 wastewater treatment plants had been planned initially, only two have been constructed after all because of project cancellation, etc.. This leads to low effectiveness as same as at the time of ex-post evaluation.

This monitoring recognized certain impact on environmental improvement by wastewater treatment plants and sanitary landfills.

There are no problems to report in terms of technical aspects of sustainability, but there are some financial problems to report. This is because the local governments will remain dependent on the financial resources of the central government in order to develop environmental projects. Especially, even if the central government bears the construction cost, the recurring costs will be a large burden on local finances. Because the financial demands for wastewater treatment plants and sanitary landfills are large, the current scale of the Fund is too limited to fulfill the demand.

### **4.2 Recommendations**

None.

### **4.3 Lessons Learned**

Although this Project was designed as a two-step loan<sup>7</sup>, the relationship among the implementing agencies, such as ONEP and Environmental Fund, and local authorities, and subproject has not been clear after the funding and the monitoring and evaluation systems have not been established. It is recommended that as for future two-step loan projects an executing agency be established to appropriately monitor and evaluate the system to receive appropriate feedback from local authorities.

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<sup>7</sup> Actually, the subprojects were financed as grant base.

### Comparison of Original and Actual Scope

Item	Planned (Following Subproject Recomposition)	Actual
1. Output	<p>1) Financial allowances for environmental management projects</p> <ul style="list-style-type: none"> <li>• Construction of urban wastewater treatment plants (3 cases) Treatment capacity: 528,554m<sup>3</sup>/day</li> <li>• Construction of sanitary landfill waste disposal sites (22 cases) Capacity: 6,194,629m<sup>3</sup></li> </ul> <p>2) Consulting Service</p> <ul style="list-style-type: none"> <li>• Suggestions pertaining to lending procedures and operation</li> <li>• Support for loan supervision</li> <li>• Support to supervise execution</li> <li>• Aid for technical appraisal</li> <li>• Liaison and coordination between the OECF (at that time) and the executing agency</li> <li>• Support for dissemination of Environment Fund</li> <li>• Technical advice</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of urban wastewater treatment plants (2 cases) Treatment capacity: 2,300m<sup>3</sup>/day</li> <li>• Construction of sanitary landfill waste disposal sites (22 cases) Capacity: 5,959,011m<sup>3</sup></li> </ul> <ul style="list-style-type: none"> <li>• SAPI Team for Overseas Economic Cooperation Fund, Japan, 1995.</li> <li>• SAPI Team for Japan Bank for International Cooperation, 2002.</li> <li>• SAPI Team for Japan Bank for International Cooperation, 2003.</li> </ul>
2. Project Period	September 1993 to August 1997 (48months)	September 1993 to January 2003 (113 months)
3. Project Cost		
Foreign Currency	11,200 million yen	2,971 million yen (approx. 1,000 million Baht)
Local Currency	3,886 million yen	346 million Baht
Total	15,086 million yen	1,346 million Baht
ODA loan portion	11,200 million yen	2,971 million yen