

Ex-Post Project Evaluation 2012: Package III-9 (Vietnam)

December 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

International Development Center of Japan Inc.

E V
J R
13-47

Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2010, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2009. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

December 2013
Toshitsugu Uesawa
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

No part of this report may be copied or reprinted without the consent of JICA.

Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese ODA Grant Aid Project

“The Project for the Groundwater Development in Central Highland Province”

External Evaluator: Mana Takasugi, International Development Center of Japan Inc.

0. Summary

The objective of this project was to improve the supply of water to people in the Central Highlands provinces by constructing water supply facilities in five communes within three provinces and providing well drilling equipment. This project has been highly relevant to the country’s development plan and development needs, as well as to Japan’s ODA policy. This project has somewhat achieved its objective in that more than 26,000 people in total benefited from safe and clean water provided by the five facilities, and the project contributed to a 0.7 point increase in the overall percentage of population with access to hygienic water of the three provinces. However, the achievement of the objective was limited in light of the fact that 1) there is great variation among target facilities (communes) in achieving the number of population served, its ratio, and the quantity of the water supply; and 2) the use of the equipment provided is limited in the target region. Therefore, effectiveness of the project is fair. Although both project cost and period were within the plan, the Vietnamese government had to bear additional cost to achieve the objective, and some important aspect of the Vietnamese side’s responsibility (responsibility of provincial authorities) was not conducted on time, which delayed production of results. Therefore, efficiency of the project is fair. Some problems have been observed in terms of financial aspects, including the deficit balance of the facilities and the failure to collect charges in a facility, and in terms of the current status of the operation and maintenance, including the durability of distribution pipes and the monitoring of water quality. Therefore, sustainability of the project effect is fair. In light of the above, this project is evaluated to be partially satisfactory.

1. Project Description



Project Locations



Water Supply Facility at Nhon Hoa, Gia Lai Province

1.1 Background

The Central Highlands provinces are located along the borders with Lao PDR and Cambodia, where many ethnic minorities reside. The area was the least developed area in Vietnam, with the lowest water supply coverage in the nation. Since the commonly used water supply system depending on dug wells and springs inevitably caused problems such as bad water quality and water shortages during the dry season, the government was promoting a transition to the central water supply system based on deep wells for a stable and clean water supply. However, there were gaps in resources and technical capacity to promote this in the Central Highlands provinces, where the exploitable aquifer was located below the hard unconsolidated layer.

In response to a request from the Vietnamese Government, the Government of Japan conducted the Study on Groundwater Development in the Rural Provinces of the Central Highlands (the development study) for the three provinces (Kon Tum, Gia Lai, and Dak Lak) in the Central Highlands from 2001 to 2002. The objectives of the study included: 1) to evaluate potential for development of groundwater resource in 20 communes, including the target communes of this project; 2) to formulate a master plan for 2020 on groundwater development and a water supply scheme in the target area; and 3) to conduct a feasibility study on water supplies for priority communes. In July 2002, based on the results of the above development study, the Government of Vietnam requested the Government of Japan to provide the grant aid for constructing 14 water supply facilities and for the provision of equipment. Prior to this project, Japan had also provided grant aid to the “Project for the Groundwater Development in Rural Parts of the Northern Provinces in Vietnam” (hereinafter referred to as the northern project) in 2002-2006, which was referred to as a related project during the design of this project.

1.2 Project Outline

The objective of this project was to improve the supply of water to people in the provinces of the Central Highlands by constructing water supply facilities utilizing groundwater in five communes within three provinces (Dak Ui commune in Kon Tum province, Kong Tang and Nhon Hoa communes in Gia Lai province, and Ea Drang and Ea Drong communes in Dak Lak province) and providing well-drilling equipment.

Grant Limit /Actual Grant Amount	2,012 million yen /2,001 million yen
Exchange of Notes Date	June 2007
Implementing Agency	National Center for Rural Water Supply and Environmental Sanitation (N-CERWASS), Ministry of Agriculture and Rural Development (MARD)
Project Completion Date	January 2010
Main Contractors	Construction: Hazama Corporation

	Equipment: Tokyo Engineering Consultants Co., Ltd.
Main Consultant	Tokyo Engineering Consultants Co., Ltd.
Basic Design	September 2005-March 2006
Related Projects	<p>“The Study on Groundwater Development in the Rural Provinces of the Central Highlands” (January 2001-March 2002, Technical Cooperation)</p> <p>“The Project for the Groundwater Development in Rural Part of Northern Provinces in Viet Nam” (2002-2006, Grant Aid)</p>

2. Outline of the Evaluation Study

2.1 External Evaluator

Mana Takasugi, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

Duration of the Study: December 2012-December 2013

Duration of the Field Study: March 24-April 6, 2013, and June 17-June 21, 2013

2.3 Constraints during the Evaluation Study

Since the data of 2010, the target year, could not be obtained, the evaluation analysis was done based on the data of 2012 or the latest.

3. Results of the Evaluation (Overall Rating: C¹)

3.1 Relevance (Rating: ③²)

3.1.1 Relevance to the Development Plan of Vietnam

At the time of the project design, the government of Vietnam had targeted that 85% of rural people by 2010 and all rural people by 2020 could use 60 liters of safe and clean water per person per day under the “National Rural Clean Water Supply and Sanitation Strategy up to Year 2020” (NRWSS) of 2000. The mountainous Central Highlands is one of three areas with water source problems identified by NRWSS. Also, the introduction of the central water supply system that is relatively large-scale and utilizes deep groundwater and surface water was encouraged by the Center for Rural Water Supply and Environmental Sanitation (CERWASS, currently called N-CERWASS) and relevant agencies rather than the conventional small-scale water supply systems utilizing dug wells and shallow wells .

As of this evaluation, NRWSS is still upheld, and the status of the Central Highlands as one of the priority areas remains unchanged. The promotion of the central water supply systems is also maintained.

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ③: High, ② Fair, ① Low

3.1.2 Relevance to the Development Needs of Vietnam

At the time of the project design, the Central Highlands was one of the least developed regions in the nation, with water supply coverage (including small and inexpensive systems such as dug wells and shallow wells) at little more than 50% (2005) compared to national coverage of 73% and rural coverage of 67%³. The number of central water supply systems in the three target provinces was very limited (none in the target communes). Most of the local population depended on dug wells and surface water, which inevitably caused problems such as water shortages during the dry season, bad water quality in the rainy season, and contamination by sewage from neighboring toilets and fertilizers. As of this evaluation, while the area has been developed since the time of the project design, it is still a poor area with many poor people. Although there are areas where access to water has improved through the construction of private wells and government projects, benefited from economic development, many of the local population still depend on dug wells and surface water, except for the target communes of the project.

Also, the local implementing agencies did not have the experience or capacity to construct a large-scale water supply facility, which requires higher technical skills than small-scale water supply facilities, with which they had some experience in constructing and managing. The existing equipment for drilling wells was not sufficient, either. In particular, the equipment was provided based on strong requests by the recipient government, claiming that sophisticated Japanese equipment was required to meet the geological conditions of the Central Highlands and that there was a need for technology transfer through on-the-job training (OJT).

According to the interviews conducted during the evaluation, the recipient government thinks that the project's relevance was high at the planning and implementation stages, even though the priority for groundwater development is currently not as high as before due to its lower potential because of water shortages in the Central Highlands.

3.1.3 Relevance to Japan's ODA Policy

At the time of the project design, Japan's ODA to Vietnam was conducted under the "Country Assistance Program for the Socialist Republic of Viet Nam" (2004). The program had three priority areas, of which water supply was placed under "improvement of lifestyle and social aspects." One of the priority issues under this priority area was "agriculture and rural development/local development," in which the program clearly states that "priority for assistance is given to the development and management of social and economic infrastructure (including water supply, rural roads, electrification, irrigation, and flood control)." The project was also in line with the Country Program (March 2006) of the Japan International Cooperation Agency (JICA).

This project has been highly relevant to the country's development plan, development needs, as

³ The Basic Design Study Report of the project (2006).

well as Japan’s ODA policy, therefore its relevance is high.

3.2 Effectiveness⁴ (Rating: ②)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

3.2.1.1 Water Supply Facilities

The project constructed five water supply facilities, one in each of the five communes. This section first reviews the population served, the rate of population served, the quantity of the water supply, and the utilization rate of the facilities to verify whether they meet the target figures and to analyze the factors which influenced the results. As mentioned earlier, this is done based on the data of 2012 or the latest since the data of 2010, the target year, could not be obtained. Second, the supply hours and non-revenue water are reviewed. Finally, it verifies the achievement level of this project’s target to “contribute to the increase of the overall percentage of population with access to hygienic water of the three provinces by 1.4% [percentage points].”

(1) Population Served, Rate of Population Served, Quantity of Water Supply, and Utilization Rate of the Facilities

The population served, the rate of population served, and the quantity of the facilities’ water supply were all below the target. The achievement level of the population served was 59%. Against the target of 85%, the rate of population served was 43% on average (51% achieved) (Table 1). The average target attainment level of all the five facilities was 79% for daily average supply and 66% for daily maximum supply. The utilization rate of the facilities was 54% on average (70% of the target achieved) (Table 2).

Table 1 Population Served by the Project Facilities and Rate of Population Served

Province	Commune		Population		Population served			Rate of population served (%)		
			Estimate (2010)	Actual (2012 /latest)	Target (2010)	Actual (2012 /latest)	Achievement (%)	Target (2010)	Actual (2012 /latest)	Achievement (%)
Kon Tum	K3-1	Dak Ui	3,243	3,372	2,757	1,135	41	85	34	40
Gia Lai	G1	Kong Tang	7,996	9,278	6,797	1,387	20	85	15	18
	G2	Nhon Hoa	13,521	13,567	11,493	4,565	40	85	34	40
Dak Lak	D2	Ea Drang	19,759	20,616	16,795	13,023	78	85	63	74
	D4-1	Ea Drong	8,391	8,868	7,132	6,232	87	85	70	83
Total			52,910	55,701	44,974	26,342	59	85	43	51

Source: Basic Design Study and data provided by Commune People’s Committees, project facilities, and P-CERWASS/DPC of each commune.

Note 1: Populations served in G1 and D2 were calculated based on the number of households served x (commune population / the total number of households in the commune).

Note 2: K3-1 and D4-1 were designed to cover only part of the commune rather than the entire commune. This project took up these facilities out of several projects (facilities) proposed in these communes by the development study.

Note 3: The data of 2012 or the latest is used for the “actual” figure since the data of 2010 could not be obtained.

⁴ Sub-rating for Effectiveness is to be put with consideration of Impact

Table 2 Quantity of Water Supply and Utilization Rate of the Project Facilities

Province	Commune		Daily Average Supply (Qav:m ³ /d)			Daily Maximum Supply (Qmax:m ³ /d)			Utilization rate (%)		
			Target (2010)	Actual (2012 /latest)	Achievement (%)	Target (2010)	Actual (2012 /latest)	Achievement (%)	Target (2010)	Actual (2012 /latest)	Achievement (%)
Kon Tum	K3-1	Dak Ui	199	140	70	259	170	66	77	54	70
Gia Lai	G1	Kong Tang	489	200	41	636	230	36	77	31	40
	G2	Nhon Hoa	827	325	39	1,075	430	40	77	30	39
Dak Lak	D2	Ea Drang	1,209	1,500	124	1,572	1,500	95	77	95	123
	D4-1	Ea Drong	514	380	74	668	460	69	77	57	74
Total			3,238	2,545	79	4,210	2,790	66	77	54	70

Source: Basic Design Study and data provided by project facilities and P-CERWASS/DPC

Note 1: The data of 2012 or the latest is used for the "actual" figure since the data of 2010 could not be obtained.

Note 2: Daily average supply and daily maximum supply of G1 in 2010 were 250m³ and 300m³, respectively.

Note 3: Utilization rate is daily average supply / capacity of the facility (= target daily maximum supply).

The achievement level of all the above indicators was over 50% on average. However, there is great variation among the target facilities, especially in the rate of population served: While the achievement levels of three facilities in Kon Tum and Gia Lai were below 50%, those of two facilities in Dak Lak were around 70-80%. A possible reason behind this difference is the fact that the two facilities in Dak Lak had been completed earlier, and therefore the handover and commencement of operations occurred one year earlier than the others. With a longer operating record, it can be said that the facilities in Dak Lak got on track earlier, and the importance of safe water became widely recognized among the population⁵. Moreover, Dak Lak Province had made an additional investment of around 12 billion VND (around 54 million yen) during 2009-2013 from the provincial budget and that of the Provincial Center for Rural Water Supply and Environmental Sanitation (P-CERWASS), which manages the facilities, to carry out additional work (the construction of five additional wells, the installation of 60.6km of additional distribution pipes, and the installation of stabilizers to seven wells). Information, Education and Communication (IEC) activities are also actively conducted in Dak Lak. These are considered to have allowed Dak Lak to mitigate the impact of such factors as described below, including water shortages, unstable operation of wells, limited distribution pipeline, and low population awareness.

According to the project facilities and their management bodies, the reasons for the low achievement of the target indicators are multifaceted, including unusual water shortages, the impacts of economic development such as road improvements and population increases, and a lack of awareness among the population, but they can be categorized by the following six factors: First, the rainfall in the rainy season of 2012 was unusually low, which resulted in a major decrease of the water level during the 2012-2013 dry season, when this evaluation was conducted (this affected all five

⁵ According to documents provided by JICA, the number of users was very low in the initial period in Dak Lak, too. According to the interviews with facilities and P-CERWASS/DPC, the awareness of the predominant ethnic minorities in the Central Highlands of the importance of safe water is not high, and they have a tendency to wait and see a new service rather than signing up for it immediately. Therefore, the connection rate tends to rise only after a certain period of time.

communes). Of the total 20 wells of the five facilities, five are not operating due to water shortages (two dry wells and three wells with very low water levels). Especially in Kon Tum, the only well of the facility is not operating for this reason, and the facility had temporarily stopped operation at the time of the field visit in this evaluation. Even when the facility was operating, there were areas where water could not reach due to low water pressure. On the other hand, the impact is smaller in Dak Lak, thanks to the construction of additional wells as mentioned earlier. Second, there are three non-operating wells for reasons other than water shortages. One of them is thought to be caused by a pump problem. An electrician was called but could not solve the problem, and P-CERWASS is examining how to solve it (D2 commune). The other well cannot operate due to unstable voltage to the pump, and P-CERWASS does not have the budget to install a stabilizer (G2 commune). Another well has never operated since the handover, as the land acquisition was not completed in order to install electricity to the pump (incoming feeder line) (G2 commune). To summarize, the above two factors affected the number of non-operating wells and therefore the low level of water supply.

Third, there is a coverage problem with the facilities. In some areas in Gia Lai and Dak Lak, roads have been raised and paved, which hampered the laying of supply pipes from the distribution pipes installed on one side of the road to houses on the other side. This made the coverage area of the facilities smaller than the original plan, and up to 67% of the planned user households could not have a supply pipe connection. This impact was mitigated in Dak Lak, as it made additional investments early to lay extra distribution pipes on the other sides of the roads. Fourth, the population growth was larger than the estimates in all communes. In some communes, population increased rapidly. With a larger denominator, the rate of population served became smaller⁶. If the population estimates were accurate, the rate would have been 1-4 points higher than the actual situation in four communes, except for G2. The total would have been 45% (target achievement rate of 53%), two points higher than the actual situation.

Fifth, the lack of people's awareness of the importance of clean water also contributed to the low achievement of the targets. Many instances, especially in Kon Tum, have been observed in which users leave faucets and supply pipes broken and do not contact the operators. According to the beneficiary survey⁷, 90% of the beneficiaries had private wells prior to the introduction of tap water by the project. Therefore, only 18% use tap water as the only source of water, and many others use multiple water sources including tap water (55% use tap water as the main source of water, and 25% use tap water but not as the main source). The reasons for using multiple water sources included "not enough water," "to save water charge," and "water supply time is too short/not convenient."⁸ Sixth, by

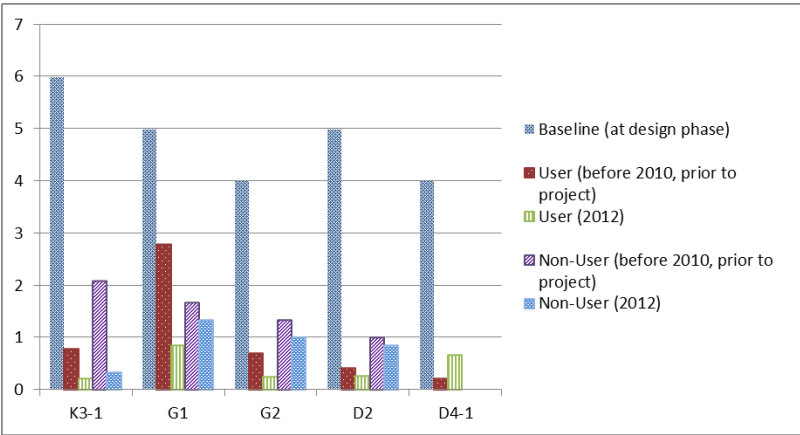
⁶ Three out of five communes have been upgraded to towns as a result of the growth in population and economic activities (G1, G2, and D2 communes). Of the three, G1 and D2 were selected as district capitals.

⁷ The beneficiary survey was conducted in April 2013 in all five communes (100 households). Non-users in the five communes were also surveyed (31 households).

⁸ According to the survey of 31 non-users, the reasons for not using the water service were: "I have applied and am on the waiting list" (6 respondents), "No pipe coverage in my residential area" (4 respondents), "Satisfied with the current water source" (2 respondents), "Installation fee is too expensive" (2 users), etc. Indeed, Ea Drang commune was suspending new connections at the time of the field visit due to the low quantity of water, thus keeping applicants on the waiting list.

limiting supply hours and quantity to respond to water shortages, users return to other sources of water such as dug wells. This furthered the need for limiting supply hours to meet operating costs. In this way, an insufficient quantity of water and a low user population have become a vicious circle.

Behind the fifth and sixth factors, it can be pointed out that nine years had passed between the development study and the completion of the project. While the population could not benefit from the project, they proceeded with the construction of dug wells or the improvement of their depths against the backdrop of the growing economic development of the region. According to the beneficiary survey, the number of months with water shortages has improved before and after the project. Also, the users had better results than non-users (Figure 1). However, the degree of improvement was much larger between the baseline (as of the Basic Design Study) and before the project (prior to 2010) than between before and after the project. It indicates that, thanks to the above improvement on dug wells, the situation of water shortages had already improved even before the benefit of the project materialized. An insufficient quantity of water in the project facilities also might have affected the relatively small degree of improvement in water shortages.



Source: Basic Design Study (2006) and beneficiary survey (April 2013).

Figure 1 Changes in the Number of Months with Water Shortages

This project had set the year for project completion as the target year to achieve the objective, which means that it was expected that the facilities would become operational, in full scale, soon after the handover and would achieve the target coverage and the consequent quantity of supply calculated based on the target coverage rate. In reality, however, the full-scale service usage by the beneficiaries did not materialize as planned. This is thought to have been caused not only by the six reasons discussed above but also by the population’s propensity to wait and see the new service before deciding to sign up for it. The latter is also considered to be one of the contributing factors to the high achievement levels of facilities in Dak Lak, where operations started earlier than the others. In this way, it is demonstrated that it takes a certain period of time to develop the population’s awareness in order for the facilities to become fully operational at the planned scale. Therefore, it can be said that

the project’s target to achieve the objective in the year of project completion was a little ambitious⁹.

(2) Supply Hours

As of 2012, three facilities supplied water for more than 20 hours. Then the water level of the wells in these facilities decreased due to the unusually severe water shortage. As a result, as of the field visit for this evaluation conducted at the end of the dry season, supply hours of the two facilities in G1 and D2 communes dropped by half, and the facility in Kon Tum (K3-1 commune) was temporarily not operating due to the low level of water in its only well. According to the beneficiary survey, the average supply hours recognized by the users were less than the official record (other than K3-1).

In Gia Lai, supply hours have been consistently limited since 2012, unlike those of other provinces affected by water shortages. This is because the operators are trying to save operation cost and to prevent the unintended use of water, such as for farming or washing motorbikes, by limiting water supply to only when farmers are at home.

Table 3 Supply Hours

Province	Commune		2012	As of Mar 2013
Kon Tum	K3-1	Dak Ui	20	0
Gia Lai	G1	Kong Tang	5	2.5
	G2	Nhon Hoa	9	9
Dak Lak	D2	Ea Drang	24	12
	D4-1	Ea Drong	24	24

Source: Data provided by project facilities and P-CERWASS/DPC.

(3) Non-Revenue Water Ratio¹⁰

The non-revenue water (NRW) ratio of the five facilities was between 19%-34%, with the average at 27%. The causes of NRW are considered to be broken distribution pipes (broken by humans or animals when the pipe is exposed on the road surface due to road construction or soil runoff), leakage from the pipe joint, and broken faucets and bulbs at users’ houses (the bulb is installed at the side of the supply pipe rather than at users’ houses, and the users do not contact the operator even when they notice leakage so they can use the leaking water for free). The average NRW ratio of Southeast Asian cities is 35%¹¹, and that of the northern project was between 35-51%¹². Therefore, the NRW ratio of this project is lower than or at the same level as those of other regions of the country or of neighboring countries.

⁹ JICA currently recommends that grant aid projects set the target year at three years after the project completion year as a basic rule.

¹⁰ NRW is the difference between the volume of water put into a water distribution system and the volume that is billed to customers. NRW includes unbilled authorized consumption such as washing the facility, unbilled water such as meter errors or meter intangible flow, water leakage, illegal connections to pipes, etc. The ratio of NRW to the total volume of water put into a water distribution system is called the NRW ratio, and, in general, the lower the better. The definition of NRW includes billed but uncollected water, but, in the case of Kon Tum where water charge is not collected, such water seems not to be included, as described below.

¹¹ NRW ratio of below 20% is regarded as a success in this region. Rudolf Frauendorfer and Roland Liemberger *The Issues and Challenges of Reducing Non-Revenue Water*. Asian Development Bank. 2010.

¹² Junko Miura “Ex Post Evaluation of Japanese ODA Grant Aid Project: The Project for the Groundwater Development in Rural Part of Northern Provinces in Viet Nam” JICA (2011). The report cites NRW ratios of 26% in Phnom Penh, 28% in Vientiane, 38% in Ho Chi Minh City (the above figures as of 2001), and 12.1% in Siem Reap (2009).

Table 4 Non-Revenue Water Ratio

Province	Commune		NRW (%)
Kon Tum	K3-1	Dak Ui	33
Gia Lai	G1	Kong Tang	34
	G2	Nhon Hoa	23
Dak Lak	D2	Ea Drang	25
	D4-1	Ea Drong	19
Average			27

Source: Data provided by project facilities and P-CERWASS/DPC

(4) Contribution to the Overall Service Ratio of Three Provinces

The project aimed to contribute to the increase of the overall percentage of population with access to hygienic water of the three provinces (including dug wells and shallow wells) by 1.4 percentage points.¹³ This target was not achieved, as the ratio of the actual number of beneficiaries to the total population of the three provinces in 2004 was 0.8%. As mentioned above, the target achievement of population served by the project was merely 59%, therefore the target achievement of the contribution to the overall service ratio of the three provinces was also limited. The ratio of the actual number of beneficiaries to the total population of the three provinces in 2011 was 0.7%. Thus, it can be said that the project has contributed to the increase of the overall service ratio of the three provinces by 0.7 point¹⁴.

To summarize, the overall achievement levels of the quantity of water and utilization rates of the facilities were around 70%. Even though the population served and its ratio achieved only 50%-60% of the target, more than 26,000 people in total benefited from safe and clean water provided by the five facilities in communes where there had been no such service prior to the project. Although water supply hours have decreased temporarily due to a severe water shortage, the facilities are functioning well and have maintained over 20 hours of supply in three out of five facilities before the occurrence of water shortage. There was no major problem in the NRW ratio. Therefore, while there is great variation among target facilities in the achievement of the target, based on the above quantitative analysis, it can be concluded that this project has somewhat achieved its objective.

3.2.1.2 Provision of Equipment

With regard to the target 60 wells to have been dug in the Central Highlands between 2007-2010 using the equipment provided by the project, only five wells (successful wells only) were dug by the end of 2010 (Table 5). In reality, it was only in 2009 when the Vietnamese side could start using the equipment for drilling other wells, as it was handed over in January 2008 and used for drilling the

¹³ The ratio of planned beneficiaries of 44,974 to the total population of 3,149,700 of the three provinces (2004). According to the Basic Design Study, the service ratio of that time was 51% in Kon Tum, 52% in Gia Lai, and unknown in Dak Lak.

¹⁴ The service ratio as of this evaluation was 76.4% in Gia Lai, 73.5% in Dak Lak (according to P-CERWASSs), 60.3% in Kon Tum (2009 Census), and 82.8% as the Central Highlands' total ratio (five provinces) (2010, Statistical Year Book).

wells for the project facilities. Considering the situation, the number of wells dug for four years up to 2012 (the same as the planned period of four years) was also compared to the target (column “total” in Table 5). Still, the figure remained a mere seven successful wells. In view of the fact that the data on the success rate of drilling wells were not available at the time of the project design, the total number of wells dug (including unsuccessful wells) was also considered. Even so, only 14 wells (four in Gia Lai, two in Dak Lak, three in Dak Nong, and five in Lam Dong) were drilled.

Table 5 Number of Wells Dug by Equipment Provided by the Project

		2007	2008	2009	2010	2011	2012	Total	Achievement (%)
Target	National	15	15	15	15	-	-	60	
	Central Highlands	15	15	15	15	-	-	60	
Actual	National	0	0	6(3)	8(7)	5(2)	14(10)	33(22)	55 (37)
	Central Highlands	0	0	4(1)	5(4)	5(2)	0	14(7)	23 (12)

Source: Basic Design Study (2006) and data provided by N-CERWASS
 Note: () is the figure of successful wells. The figure for 2012 includes the number up to March 2013.

The following issues have affected the low level of target achievements:

- It was planned that, after being used to drill wells for the project facilities, the equipment would be located in the Central Highlands and used for drilling wells in the region by P-CERWASSs. Instead, it has been located in Hanoi since 2008, when the drilling was completed for the project facilities. Therefore, those who use the equipment in the Central Highlands must bear the transportation cost from Hanoi to the site. (The issue of the location of the equipment is discussed further in “3.5 Sustainability.”)
- The development budget to drill new wells in the Central Highlands is limited.
- Although the equipment provided can drill wells in less time than pre-existing equipment can, its operating cost (for fuel and the number of operators required) is higher, and it requires wide-open spaces.
- Because of climate change, the potential for groundwater in the Central Highlands has decreased and, as a result, the success rate in drilling wells is also decreasing. In view of this, the Vietnamese government has shifted its policy on the main source of water for the central water supply system in this region from deep groundwater to surface water.
- Considering the above situation, N-CERWASS has utilized the equipment for large-scale and urgent national projects in regions other than the Central Highlands when it is not used there, so as to effectively utilize the equipment.

Indeed, more than half the wells drilled by the project equipment were constructed outside the Central Highlands. The total number of drilled wells including these was 22 (successful wells only) in four years, still below the target. Still, the average number of wells drilled per year (including unsuccessful wells) was 8.25, which was similar to the target and actual figures of the northern

project¹⁵. This suggests that the target of this project might have been set too high.

To summarize, even though the target achievement level is low in the Central Highlands, it is concluded that the equipment provided was utilized to a certain extent, contributing to the achievement of NRWSS at the national level. This is based on the total number of wells drilled, including those drilled outside the target region. The recipient government tried to fully utilize the equipment despite unfavorable conditions in the target region. Even so, the low level of target achievement in the Central Highlands is still a problem, as this was the original objective of the equipment provision. To avoid this, there should have been a more detailed usage plan at the project design phase (to be further elaborated on in “4.3 Lessons Learned (2)”).

3.2.2 Qualitative Effects

(1) Water Quality

According to the beneficiary survey, users’ satisfaction levels on water quantity remained low, with only 34% answering “always sufficient” and 38% answering “always in shortage.” On the other hand, the satisfaction level on water quality improved from the baseline survey of the Basic Design Study in all communes, with 75% of the respondents answering “always good.”

Table 6 Degree of Satisfaction of Quantity and Quality of Water

Commune		K3-1 Dak Ui	G1 Kong Tang	G2 Nhon Hoa	D2 Ea Drang	D4-1 Ea Drong
Satisfaction on current water quantity	Baseline (at design phase)	B	A	B	B	B
	Beneficiary survey (ex-post evaluation) (on tap water)	A:100%	A:60% B:20% C:20%	A:0% B:24% C:76%	A:30% B:20% C:50%	A:0% B:79% C:21%
Satisfaction on current water quality	Baseline (at design phase)	A	A	B	A	B
	Beneficiary survey (ex-post evaluation) (on tap water)	A:0% B:5% C:95%	A:5% B:0% C:95%	A:0% B:5% C:95%	A:15% B:55% C:30%	A:0% B:42% C:58%

Source: Basic Design Study (2006) and beneficiary survey (April 2013).

Note: Index criteria

	Satisfaction on water quantity	Satisfaction on water quality
A	Always in shortage	Always poor (turbidity, nasty smell, etc.)
B	Shortage during dry season	Poor during certain periods (turbidity, nasty smell, etc.)
C	Always sufficient	Always good

As Table 6 suggests, the users are generally satisfied with the quality of water, and several facilities observed that their users drink water even without boiling it. This could not be confirmed with substantial evidence, as the results of water quality tests were not filed in the management bodies of the facilities in Gia Lai and Kon Tum. Even so, since the test result of Dak Lak did not have any problem and there was no claim of any major water quality problem in the other provinces, it can be concluded that, in general, “safe and clean water” is supplied by the project facilities. Minor complaints about the chlorine smell and about hard water are observed in many facilities. In response

¹⁵ It was planned to use the equipment provided to drill eight wells per year in the northern project (according to the Basic Design Study Report of this project). It actually drilled the average of 8.3 wells per year between 2006 and 2011 (The ex-post evaluation report of the northern project, 2011).

to the first complaint, facilities in Gia Lai do not chlorinate the water, as they claim that water from the source is of good quality even without chlorination. This might be necessary as a transition measure but should be reviewed in the future.

(2) Technology Transfer on Operation and Maintenance of Equipment Provided

This project aimed at contributing to the improvement of the well-drilling capacity of the Vietnamese side by transferring technology to N-CERWASS technicians through OJT of the drilling of wells with equipment provided. According to interviews with N-CERWASS officers, the project enhanced the capacity to drill deep wells and to operate and maintain necessary equipment. As a result, N-CERWASS became able to do tasks they had previously outsourced.

Based on the above quantitative and qualitative analysis, this project has somewhat achieved its objective to provide clean and safe water to the people. However, the achievement of the objective was limited in light of the fact that 1) there is great variation among target communes in the achievement of population served, its ratio, and the quantity of water supply; 2) the use of the equipment provided is limited in the target region. Therefore, effectiveness of the project is fair.

3.3 Impact

3.3.1 Intended Impacts

According to the project plan, the project was expected to reduce the prevalence of water-borne diseases as an indirect impact, as a result of a supply of safe and clean water. This could not be confirmed by this evaluation for three reasons: First, data on the prevalence rate of water-borne diseases were not available at the time of both project design and evaluation. Second, the population is still using water sources other than tap water. Third, the prevalence of water-borne diseases seems to have not been so great from the outset, considering the situation where private dug wells were deepened or newly constructed between the baseline survey of the Basic Design Study and the completion of the project, which resulted in better water quality. Indeed, 75% of the beneficiary survey respondents answered that they have not experienced any water-borne disease either before or after the introduction of tap water by the project.

3.3.2 Other Impacts

No problem was identified in terms of impacts on the natural environment and on gender and minority considerations. There was no resettlement, as the construction sites of the facilities are public lands. Nine of 16 locations for water intake (wells) were private lands which, although small, required land acquisition. The low success rate of well drilling resulted in an increase in the number of drilling sites and in necessary land acquisition. There were some cases in which agreements on compensation amounts took time and affected the construction schedule. Even so, the land acquisition was conducted in accordance with Vietnamese law, and no comment was raised on any major problem. Although the project was also expected to serve as a model of a commune-level central water supply system during the project design, any subsequent

project using this project as a model was not confirmed¹⁶.

According to the beneficiary survey, 75% of the users recognized that the availability of clean water provided by this project has brought positive change to their lives. Specifically, they explained the change as: “having good feelings about the water quality” (35%), “not afraid of lacking water” (28%), “not afraid of getting water-borne diseases” (25%), “saving the cost of water filters” (8%), and “saving time to fetch water” (3%). This indicates that the project has had a psychological impact on the target population by providing safe and clean water.



Water faucet at a beneficiary household. Prior to the project, the family used a dug well. Now tap water is the main source of water for cooking, drinking, washing, etc., and the amount of water used has doubled from before the introduction of tap water.



Water faucet and meter box at a café / house. After the introduction of tap water, the family stopped using the dug well since it was located close to the toilet. Now, tap water is used for household use, glass washing at the café, and hand washing by café customers.

To summarize, an intended impact to reduce the prevalence of water-borne diseases could not be confirmed due to insufficient data. A psychological impact, such as users feeling secure about water quality, was confirmed qualitatively. There was no negative impact.

Overall, this project has somewhat achieved its objectives, therefore its effectiveness and impact is fair.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The project constructed five water supply facilities utilizing 20 deep wells, which includes 16 newly constructed wells and four existing wells (exploratory test wells drilled during the development study were used as production wells), mostly as planned. As a result, five water supply facilities with the planned capacity were completed. As shown in Table 7 below, changes in specifications from the original plan under the responsibility of the Japanese side were all minor and did not affect the achievement of the objective, the construction schedule, or the project cost.

¹⁶ On the other hand, the preceding northern project serves as the model for a similar project and host visits from the target provinces of the World Bank project. Therefore, this project also has the potential to become a model for similar projects if such projects are implemented in the Central Highlands in the future.



Elevated tank (Kong Tang)



Signboard (Ea Drong)



Distribution pump (Nhon Hoa)

Table 7 Output (Planned / Actual)

	Planned	Actual																		
Japanese side	<ul style="list-style-type: none"> - Water intake (deep well, pump, well shed, electrical equipment, etc.) - Water treatment plant (aeration chamber, sedimentation basin, rapid sand filter, distribution reservoir, elevated water tank, pH control equipment, disinfection equipment, administration building, lifting pump building, supply pump, mechanical equipment, electrical equipment, etc.) - Conveyance and distribution pipes - Individual service pipe (ferrule provided with saddle, service pipe, meter) (only material) - Well drilling equipment <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">1. Well Drilling Equipment</td> </tr> <tr> <td>- Drilling rig</td> <td style="text-align: right;">1 unit</td> </tr> <tr> <td>- High pressure air compressor</td> <td style="text-align: right;">1 unit</td> </tr> <tr> <td>- Miscellaneous ancillary equipment</td> <td style="text-align: right;">1 set</td> </tr> <tr> <td>- Air lift equipment</td> <td style="text-align: right;">1 unit</td> </tr> <tr> <td colspan="2">2. Supporting Equipment</td> </tr> <tr> <td>- Crane cargo truck</td> <td style="text-align: right;">1 unit</td> </tr> <tr> <td>- Pumping test equipment (submersible pump, generator, triangular weir)</td> <td style="text-align: right;">1 set</td> </tr> <tr> <td>- Well logging equipment</td> <td style="text-align: right;">1 set</td> </tr> </table> - Soft-components: establishment of operation centers, preparation of a general regulation and operation and maintenance (O&M) manual, implementation of IEC, development of management system (including customer ledger, database for water charge collection, OJT on water meter reading and water charge collection). 	1. Well Drilling Equipment		- Drilling rig	1 unit	- High pressure air compressor	1 unit	- Miscellaneous ancillary equipment	1 set	- Air lift equipment	1 unit	2. Supporting Equipment		- Crane cargo truck	1 unit	- Pumping test equipment (submersible pump, generator, triangular weir)	1 set	- Well logging equipment	1 set	<p>The plan was implemented mostly as planned. The following modifications have been made:</p> <ul style="list-style-type: none"> - Change of the location of the water treatment plants and water intake (2 facilities each) and the subsequent extension of conveyance and distribution pipes (a few dozen to several hundred meters). - As a result of the water quality test, while a well did not need the planned pH control equipment, another well needed it. Thus the equipment was transferred from the planned well to the other well. - In one facility, where the distribution pipe crosses a river, the crossing method was changed from the planned method of attaching the pipe to an existing bridge to an inverted siphon, in accordance with the policy of the road authority. - As a result of the survey, it was found that there was a mistake in elevation of one part, which would cause a lack of water in part of the distribution pipe. To avoid this, a booster pump was added.
1. Well Drilling Equipment																				
- Drilling rig	1 unit																			
- High pressure air compressor	1 unit																			
- Miscellaneous ancillary equipment	1 set																			
- Air lift equipment	1 unit																			
2. Supporting Equipment																				
- Crane cargo truck	1 unit																			
- Pumping test equipment (submersible pump, generator, triangular weir)	1 set																			
- Well logging equipment	1 set																			
Vietnamese side	<p>Land acquisition, land creation, gate & fence, etc.; incoming feeder intake for water intake and water treatment plant (electricity installation), laying individual service pipe, provision of faucet, drain ditch, disposal of unexploded ordnance, management cost of PMU, computer and other equipment for soft-components, construction cost of the equipment team.</p>	<p>In Nhon Hoa, Gia Lai, incoming feeder intake (electricity installation) for a well has not been completed. In Ea Drong, Dak Lak, no computer was installed in the water supply facility. Except for these, the responsibility was executed as planned.</p>																		

Source: Basic Design Study (2006), interviews and questionnaires of this evaluation (2013).

3.4.2 Project Inputs

3.4.2.1 Project Cost

The project's grant limit amount was 2,012 million yen. The actual cost was lower than planned,

at 2,001 million yen (99% of the planned cost). The local funds equivalent of 249 million yen was to be provided by the Government of Vietnam as counterpart funds. The actual cost was lower than planned at 235 million yen (94% of the planned cost).

However, P-CERWASS Dak Lak made an additional investment of about 12 billion VND (approximately 54 million yen) between 2009 and 2013 to carry out additional work for the two facilities (60.6km of additional pipes, drilling of five additional wells, and installation of stabilizers to seven well pumps). Among these, the installation of additional pipes in 2010 had an especially large impact on the achievement level of the target in that it mitigated the problem that about 50% of the planned beneficiary households could not have the supply pipe connection due to road improvement, as described earlier in “3.2 Effectiveness.” The cost for this was also large, at about 8.5 billion VND (about 38 million yen). This work was purely additional and not foreseen in the original plan. According to documents provided by the Vietnamese side, they requested the assistance of the project consultant in designing these additional pipelines as of February 2008. Therefore, it can be assumed that the adverse effect of road improvement was recognized at a relatively early stage of the project. In view of this, the possibility of road improvement should have been investigated and countermeasures should have been included in the project design. Even if it was difficult to anticipate this as of the planning, some kind of measures should have been taken within the framework of the project as soon as the project came to know about the road improvement plan, considering the scale of its impact on the project result.

3.4.2.2 Project Period

The planned project period was 31 months, from June 2007 to January 2010. The actual project was completed as planned. It is difficult to strike the aquifer of the target area, as it is located 200m deep in the hard bedrock and only exists in bedrock incision (crack) rather than spread as a layer. In this situation, well drilling, including the necessary land acquisition, took longer than expected, as the success rate of drilling wells turned out to be 45%, much lower than the expected 80-85% in the plan. Even so, the project was completed within the planned project period.

However, in Nhon Hoa Commune, Gia Lai Province, the land acquisition was not completed in order to install electricity to the pump (incoming feeder intake) for a well. Because of this problem, as of this evaluation, the well has never been operational since the handover¹⁷. In the two facilities in Gia Lai, the incoming feeder intake for other wells also took long—four and seven months, respectively—following the handover in February 2010. As a result, the start of the water supply service was in July and November 2012, respectively, or five and nine months after the handover.

Although both project cost and period were within the plan, some inputs were not appropriate for

¹⁷ According to the Vietnamese side, although P-CERWASS Gia Lai and relevant agencies have sought an agreement, no agreement has been reached to complete the land acquisition because the amount of compensation requested by the household concerned has been much higher than the compensation price framework.

producing the outputs, which led to the Vietnamese government bearing additional cost, and some important items borne by the Vietnamese side were not conducted on time, which negatively affected the effectiveness. Therefore, efficiency of the project is fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

3.5.1.1 Water Supply Facilities

In Vietnam, water supply facilities used to be handed over to and managed by the Commune People’s Committee (CPC) after construction was completed. However, operation and management by the CPC lacked human resources, expertise, and experience in water supply service. The method of communication between P-CERWASS and CPC, or the chain of command and control, was not established. Considering these factors, the project proposed a management structure in which an operation center is established in each facility under the management of P-CERWASS. This was implemented in Dak Lak and Gia Lai provinces. These P-CERWASSs directly manage the project’s water supply facilities by employing operation center staff who conduct daily operations, maintenance, and water charge collection under the supervision of P-CERWASS and report to P-CERWASS. As of this evaluation, 16 of 82 central water supply systems in Dak Lak Province (including the two facilities of this project) are directly managed by P-CERWASS. In Gia Lai, only the two facilities of the project are directly managed by P-CERWASS. N-CERWASS highly appreciates the management system by P-CERWASS as a specialized agency, and regards the project as the model of the target region (see box column at the end of this section).

In Kon Tum Province, on the other hand, the project implementation body had been the District People’s Committee (DPC), which still manages the facility by placing the operation center directly under its supervision. This is because the sizes of both the facility and P-CERWASS are relatively small, the target commune is located away from the provincial capital but relatively close to the district capital, and the pre-existing facility was upgraded by the project. The water supply facility of the project is the only such facility managed by the DPC¹⁸.

The number of staff at operation centers is shown in Table 8. Each center has a smaller number of staff than planned for the following reasons: While it was planned that each center would employ four operators and a designated

Table 8 Number of Staff at Operation Centers

Province	Commune		Plan (2010)	As of ex post evaluation (Mar. 2013)
Kon Tum	K3-1	Dak Ui	6	5
Gia Lai	G1	Kong Tang	8	1
	G2	Nhon Hoa	9	3
Dak Lak	D2	Ea Drang	12	4
	D4-1	Ea Drong	8	3

Source: Data provided by project facilities.

¹⁸ The authority to decide who should manage a water supply facility is at the Province People’s Committee (PPC). In the Basic Design Study, it was expected that, once target communes increase to a certain number, the water management unit (WMU) would be established, with P-CERWASS being the project implementation body and the operation centers being the subordinate body of WMU. However, activities to realize this vision, such as the establishment of the WMU, was not included in the project design, and the number of central water supply systems under P-CERWASS has not drastically increased in the target provinces. Therefore, WMU has not been established as of this evaluation.

number of charge collectors corresponding to the size of the commune, in reality, operators also perform the tasks of charge collectors so as to save costs. Although comments on some delays in repair work were heard in G1 commune, where the number of staff is only one, all facilities are performing the tasks as planned.

Communication between the operation centers and P-CERWASS/DPC as their managers is established through either monthly meetings (Dak Lak) or monthly reports (Gia Lai and Kon Tum). When a problem arises, operation centers communicate with P-CERWASS/DPC by phone. P-CERWASS/DPC visit operation centers once or twice a month in Dak Lak and when the need arises in Gia Lai and Kon Tum.

3.5.1.2 Equipment Provided

Since there is no operation and maintenance center for well drilling equipment in the Central Highlands, the Basic Design Study stipulated that N-CERWASS would establish the equipment team in the Central Highlands responsible for well drilling, and for operation and maintenance of the equipment. In reality, since 2008, when drilling in the five communes was completed, the equipment has been stationed at the Center of Consultancy and Technology Transfer (CCTT) of N-CERWASS based in Hanoi, which is responsible for operation and maintenance (O&M) of the equipment of N-CERWASS. The equipment provided by the project has been managed by eight designated staff members (one manager, five operators, and two maintenance workers). According to N-CERWASS, the station of the equipment and team was changed due to the following reasons:

- A large area to place the equipment could not be secured in the Central Highlands.
- Highly skilled technicians necessary to manage the sophisticated Japanese equipment cannot be found in the Central Highlands.
- The budget for drilling new wells is limited in the Central Highlands, thus the equipment would not be put to regular use.
- Each P-CERWASS is under the jurisdiction of each PPC and there is little organizational link among P-CERWASSs. N-CERWASS does not have a direct presence, such as a branch office, in the Central Highlands. Therefore, it is difficult for N-CERWASS to select one province or P-CERWASS to station the equipment.

There is no problem in terms of the use of the equipment as the operation status of the equipment is good, and in terms of the staff allocation to the equipment team, the number is secured almost as planned. However, the change of location is one of the reasons for the low achievement level of the excavation target of the equipment provided (seven wells against the targeted 60 wells in the Central Highlands), thus negatively impacting the effectiveness of the project. In addition, this change was decided by N-CERWASS as early as



The air compressor on regular maintenance at CCTT

December 2007, which was prior to the handover of the equipment, and was confirmed during the project and the Warranty Period Inspection. Nevertheless, there was no mention of this change in relevant reports. As a result, this evaluation came to recognize this only after communication with the Vietnamese side during the preparation of the field visit and interview. A utilization situation like this, which is different from the original plan, should be documented in these reports in the same way as other changes in project design.

In light of the above, while there are some changes from the original plan, the necessary organizational structure is arranged according to the actual situation, both in terms of water supply facilities and equipment provided, and the division of roles is clear among different organizations. The minimum necessary number of staff is secured despite a few minor problems. Therefore, it can be concluded that sustainability of the institutional aspects of O&M is ensured. In addition, as for the facility in Kon Tum Province, sustainability will be enhanced if a system is established in which DPC can seek technical advice from P-CERWASSs of Kon Tum or neighbouring Gia Lai, water supply corporations in nearby cities, or N-CERWASS, considering its limited experience and low achievement level of the target figures.

3.5.2 Technical Aspects of Operation and Maintenance

The water supply facilities are planned and designed to apply a conventional system of manual operation and facility monitoring with a minimum of required items, which is common in Vietnam. Therefore, there was no observation of technical difficulties in day-to-day operations during the interviews with operation centers and their management bodies. These entities have operated and managed the facilities with no major difficulties.

O&M training and OJT by the project were implemented as planned. There are staff members in each operation center who received the training/OJT by the project, thus the content of the training is firmly transferred to the centers. In terms of O&M of the equipment provided, more than half the staff members who received OJT in the project still remain on the equipment team. Thus, the training content is firmly established in the team, which has no technical problems. On the other hand, the dispatching of staff to external training and seminars, or to joint workshops among the three provinces—as suggested in the project design—was not fully implemented. This was partly because the Basic Design Study Report did not clarify who should take responsibility for this and when it should be implemented. Another reason is the limited budget on the Vietnamese side. Moreover, the O&M Manual developed by the soft-component of the project was still kept at the operation centers at Gia Lai and Kon Tum but missing in Dak Lak, as of the field visit of this evaluation. In all facilities, the staff members regarded themselves as fully familiar with the content of the manual without reading it again, as some of them had originally received the training from the project.

Thus, the bodies responsible for O&M of the water supply facilities and the equipment provided have the necessary technical skills, in general. Still, in view of aging and deterioration, and of the

possible need for major repairs in the future, the sustainability of technical aspects of O&M will be enhanced if the following situation can be improved: opportunities for refreshed or updated training of staff members is limited and they do not necessarily have advanced techniques for complicated repair work.

3.5.3 Financial Aspects of Operation and Maintenance

3.5.3.1 Water Supply Facilities

The customer ledger was completed and updated in each commune. The system of water charge collection is established. The water tariff and collection rate of the charge are shown in Table 9. The water tariff is set at a proper or low level, compared to the average annual income of the population, the standard of the Ministry of Finance, and tariffs of similar projects. According to the beneficiary survey, 90% of the users are satisfied with the water tariff.

Table 9 Water Tariff and Collection Rate

Province	Commune		Water tariff (VND/m ³)	Collection rate (%)
Kon Tum	K3-1	Dak Ui	3,000	0
Gia Lai	G1	Kong Tang	4,000	95
	G2	Nhon Hoa	4,000	95
Dak Lak	D2	Ea Drang	3,000	98
	D4-1	Ea Drong	3,000	100

Source: Data provided by project facilities and P-CERWASS/DPC

While the collection rate is over 95% in four out of five facilities, it is 0% in Dak Ui Commune in Kon Tum. In this commune, the water supply was made free of charge in the first year to promote the use of tap water, but people have not paid even in subsequent years for the following reasons: The commune's population is poor and cannot afford to pay the charges (however, the average annual income of the commune was not the lowest among the target communes of the project), and the area receives various government subsidies given that it is a famous battlefield of the Vietnam War (the Resistance War against America), with many poor, ethnic minority populations. This easily led the people to misunderstand that the free water supply in the first year meant a free supply forever. Also, there are alternative sources of water such as dug wells.

The revenue and expenditures of the facilities are shown in Table 10. The annual total operation and maintenance costs of two facilities (K3-1 and D2) exceed those in the plan, with K3-1 being more than double the planned amount. The other facilities spend less than the planned O&M costs. However, the reasons for the lower costs are considered to be a lower utilization rate of the facility and a smaller number of staff members. All five facilities are in deficit, and DPC/P-CERWASSs are making up the balance. P-CERWASSs of Dak Lak and Gia Lai have applied for raising the tariffs (to 3,200VND and 6,000VND, respectively) to PPC. While in Dak Lak it is expected to be approved soon, P-CERWASS Gia Lai has been waiting for approval for more than a year. The deficit of the two facilities in Dak Lak

and G2 commune in Gia Lai is limited to within 10% of the expenditures and 1% of the total budget of P-CERWASS. On the other hand, the G1 facility partly receives a government subsidy and the deficit of K3-1 is 100% of the expenditure, as the charge is not collected.

Table 10 Revenue and Expenditures of the Water Supply Facilities (2012)

(unit: 1,000VND)

Province	Commune		Annual O&M cost (plan)	Revenue (actual)	Expenditures (actual)				
					Total	Salary	Electricity	Repair and other expenses	Balance
Kon Tum	K3-1	Dak Ui	132,458	0	283,570	149,742	63,828	70,000	-283,570
Gia Lai	G1	Kong Tang	358,813	78,723	138,786	56,766	64,632	17,388	-60,063
	G2	Nhon Hoa	608,255	404,826	427,945	195,994	222,914	9,037	-23,119
Dak Lak	D2	Ea Drang	930,705	938,453	955,230	NA	NA	NA	-16,777
	D4-1	Ea Drong	412,786	299,212	340,204	NA	NA	NA	-40,992

Source: Basic Design Study Report and data provided by P-CERWASS/DPC

The water supply facilities are in deficit, despite the fact that the water tariff is set higher than the planned tariff and that the collection rate is generally high, except for Kon Tum. Possible reasons for this include: the population served is smaller than the plan; while the total O&M cost is less than the plan, it is relatively high compared to the utilization rate of the facility; and the electricity rate, which accounts for a large part of the O&M cost, has frequently increased.

3.5.3.2 Equipment Provided

The CCTT to which the equipment team belongs has sufficient budget to operate and maintain the equipment provided, as the CCTT's budget is partly independent, and it has revenue from not only the government budget but also from service charges to private companies for repairing their machines.

On the other hand, material and construction costs for well drilling are borne by project investors (P-CERWASS or District/Commune People's Committee based on the budget allocation by PPC). For example, the investment budget of P-CERWASS Dak Lak is decreasing, compared to the time of Basic Design Study. According to N-CERWASS, generally speaking, the development budget for water supply in 2013 is limited nationwide. Although the budget allocation is the responsibility of PPC and cannot be generalized, it can be said that the budget for well drilling is not sufficient.

As shown above, the operation and maintenance of the water supply facilities run without a major financial constraint since P-CERWASS/DPC are making up the deficit. However, in terms of financial sustainability, the fact that all five facilities are in deficit, although the extent varies, is a problem. In terms of the financial sustainability of the equipment provided, though the O&M cost is secured, the development budget for drilling new wells is limited.

3.5.4 Current Status of Operation and Maintenance

Each facility is keeping an operations record, and the water supply systems of all five facilities are functioning (however, K3-1 commune is temporarily not operating due to low water levels). According to the beneficiary survey, 90% of the users are satisfied with the service of the facilities. There was no comment from the facilities/management bodies about difficulties in obtaining spare parts.

Looking at the individual wells of the facilities, only 12 of the total 20 wells are in operation. As explained in “3.2 Effectiveness,” eight wells are not in operation. Of these, one well is not operating due to unstable voltage to the pump. P-CERWASS Dak Lak procured and installed stabilizers to the pump through its own initiative and solved this problem. The same issue of unstable voltage in general was raised in Gia Lai and Kon Tum provinces.

Polyvinyl chloride (PVC) pipe was adopted for the project because it was possible to procure in Vietnam, and there are advantages such as strength for pressure, anti-corrosion, easy construction, and economic benefit. For budgetary reasons, an inexpensive kind of pipe that joins several small parts was selected. However, the durability of the pipe is low, which is believed to have caused many water leakages one year after completion. The implementing agencies claim that, although this problem was foreseen and they had explained their concerns to the project consultant, no measures were taken because of the budgetary limitation. In this way, when a future O&M problem is foreseen and it is difficult for the contractors to take measures, it might be necessary for the JICA Office to listen to the recipient government’s concerns and explain the conditions of the Japanese side and, where necessary, discuss how to improve the situation with the contractor.

As for the equipment provided, it is functioning well and receives regular maintenance based on a set schedule.

In terms of the system of water quality monitoring, the health authority of each area is responsible for conducting regular tests twice a year. This evaluation obtained the test results of the facilities in Dak Lak only. In Gia Lai, P-CERWASS believed that the water quality test was conducted in the project facilities, but it had not received any test results. When the P-CERWASS inquired of the health authority, it was found that they have not conducted any tests, based on their understanding that the water quality was good because of the test conducted upon handover. In Kon Tum, the facility knew of at least one test received in the past, though they have not received the results. Each operation center did not know whether the test was conducted or not and assumed that the health authority obtained the sample directly from user households without notifying the operation center. To summarize, although a system is in place by the government to monitor water quality and it is widely recognized, its implementation and results could not be confirmed in some facilities.

In this way, the current status of operation and maintenance is proper in general, though there are some issues in the physical durability of some parts of the facility and in the structure of water quality monitoring.

Some problems have been observed in terms of the financial aspects and the current status of

O&M, therefore sustainability of the project effect is fair.

BOX. Piloting the Operation and Management System with a Consideration to Sustainability

This project introduced an operation and management structure by a specialized agency, P-CERWASS, rather than by CPC, which is customarily responsible for the management of water supply facilities to two out of three provinces¹⁹. This is based on the following analysis of the Basic Design Study: operation and management by the CPC lacked human resources, expertise, and experience in water supply service; the method of communication between P-CERWASS and CPC, or the chain of command and control, was not established; P-CERWASS has experience in constructing, operating, and maintaining small-scale water supply facilities; and, in Dak Lak, there was a move toward transferring the facility management responsibility to P-CERWASS.

In fact, the operation and management, including monitoring of the facilities, problem solving, and charge collection are functioning without any major issue in the two provinces that introduced management by P-CERWASS. On the other hand, the facility in Kon Tum, managed by DPC with little experience in water supply, faces many operational issues, including a non-functioning water charge collection and a suspension of operation due to a decreasing water level. In terms of the target achievement, moreover, P-CERWASS Dak Lak has demonstrated a high level of ownership by constructing additional wells and pipelines; that is reflected in achievement levels higher than those of other provinces. This was also affected by the fact that the P-CERWASS had a relatively high capacity to manage water supply facilities, even prior to the project, thanks to technical assistance by the Danish International Development Agency (DANIDA) (2000-2010).

According to N-CERWASS, the management system by P-CERWASS had been practiced in southern Vietnam but was newly introduced by the Japanese grant aid in the north and in the Central Highlands. Witnessing the success of this model, the PPCs in Dak Lak and the northern provinces started to delegate the management of water supply facilities developed by other investors, such as the government, to P-CERWASSs. In Dak Lak, for example, 16 facilities, including the two project facilities, of the total 82 facilities in the province are directly managed by P-CERWASS as of this evaluation²⁰. As a result, the advantage of managing multiple facilities has been realized, including supplementing the deficits of the project facilities by the profits of other facilities. Some model effect has also been seen in the northern project, where a similar project by the World Bank adopts the P-CERWASS management model, and its stakeholders visit the project facilities.

¹⁹ As of the development study (2001-2002), the management structure centered on CPC was proposed. The Basic Design Study (2005-2006) proposed the management system by P-CERWASS to all facilities based on the analysis explained below.

²⁰ In Dak Lak, a plan had been proposed to the provincial assembly for the adoption of a system change to enable P-CERWASS to manage all water supply facilities in the province as of 2005 when the Basic Design Study was conducted. However, it had not been realized as of this evaluation.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project was to improve the supply of water to people in the Central Highlands provinces by constructing water supply facilities in five communes within three provinces and providing well drilling equipment. This project has been highly relevant to the country's development plan and development needs, as well as to Japan's ODA policy. This project has somewhat achieved its objective in that more than 26,000 people in total benefited from safe and clean water provided by the five facilities, and the project contributed to a 0.7 point increase in the overall percentage of population with access to hygienic water of the three provinces. However, the achievement of the objective was limited in light of the fact that 1) there is great variation among target facilities (communes) in achieving the number of population served, its ratio, and the quantity of the water supply; and 2) the use of the equipment provided is limited in the target region. Therefore, effectiveness of the project is fair. Although both project cost and period were within the plan, the Vietnamese government had to bear additional cost to achieve the objective, and some important aspect of the Vietnamese side's responsibility (responsibility of provincial authorities) was not conducted on time, which delayed production of results. Therefore, efficiency of the project is fair. Some problems have been observed in terms of financial aspects, including the deficit balance of the facilities and the failure to collect charges in a facility, and in terms of the current status of the operation and maintenance, including the durability of distribution pipes and the monitoring of water quality. Therefore, sustainability of the project effect is fair. In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementation Agency

(1) Improvement of Quantity of Water Supply and Population Served (Effectiveness and Financial Sustainability)

The quantity of the water supply and the user population are both lower than originally planned and have been trapped into a vicious circle. This has led to where the financial balances of all five facilities are in deficit. To improve this situation, it is recommended that P-CERWASS Gia Lai and DPC Dak Ha start from the measures listed below that require relatively low cost in order to improve the quantity of water intake and supply, supply hours, and the number of users. It is strongly recommended that the Vietnamese side take up these measures, since the same were also proposed during the Warranty Period Inspection.

- Installing stabilizers to the wells
- Obtaining an agreement to supply electricity to the non-operating well
- Repairing distribution and supply pipes, and service meters
- Conducting IEC activities in collaboration with CPC

Some operation centers commented that they limit supply hours in order to prevent wasting water

for unintended purposes. However, in Dak Lak, where the operation started earlier than other provinces, unintended use is prevented through active IEC utilizing radios, and penalties imposed for unintended use by CPC, rather than reducing supply hours. This is a good practice that can be followed by the other two provinces. In the future, it is recommended that the construction of additional water sources (wells, etc.) and/or distribution pipes be considered. In addition, it is recommended that DPC Dak Ha obtain advice from P-CERWASS Kon Tum or Gia Lai, or N-CERWASS, on the O&M of the facility, including measures to tackle decreasing water levels, since it does not have previous experience in managing a water supply facility.

(2) Strengthening of Charge Collection and Gradual Increase of Water Tariff (Financial Sustainability)

While the improvement of water quantity and the number of users through recommendation (1) above is expected to improve the financial balances, it is advisable to take additional measures, especially for Dak Ui commune (K3-1), where the water charge is not collected at all, and for Kong Tang commune (G1), where some non-payment issues were raised. For example, awareness raising among users should be done by collaborating with CPC. In addition, for the four facilities in Gia Lai and Dak Lak, where the application to raise the water tariff has already been submitted to the province, it is desirable to pursue the raise, but in a gradual manner, by considering proper timing to minimize the impact of increased tariffs on increase of users and on improvement of the collection rate.

Improvement in the financial condition will allow the proper maintenance of facilities and a subsequent reduction in non-revenue water, which further improves the financial condition. Also, if P-CERWASS/DPC does not need to supplement the facilities' budgets, it could invest more in such areas as training and in measures to mitigate decreasing water levels.

(3) Strengthening of Water Quality Monitoring Structure (Effectiveness and Sustainability)

No problem was identified in the quality of water in each facility. However, neither the facility nor their management bodies in Gia Lai and Kon Tum received the results of water quality tests from the health authority. Therefore, it was impossible to confirm whether the monitoring structure of water quality is functioning. It is recommended that the facilities and P-CERWASS/DPC communicate closely with the health authority, ensure the test is conducted regularly, and receive the written results each time. In addition, although there is currently no problem with water quality, the situation in which facilities in Gia Lai do not chlorinate the water should be rectified in the future by, for example, incrementally increasing the amount of chlorine until users get used to the smell.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Reflecting the Characteristics of the Target Area and Future Estimation in Project Planning

This evaluation raised six factors that affected and limited achievement of population covered and

quantity of water supplied (see “3.2.1.1 Water Supply Facilities”). These suggest the importance of properly including and analyzing the characteristics of the target region and its future estimation in the project design. In particular, the following aspects should be taken into consideration when similar projects will be planned in the future, in order to attain high achievement levels of the project objective:

- While it is difficult to take complete measures to mitigate water shortages, as they are influenced by such issues as climate change, it might be effective to consider various water sources such as surface water in addition to deep groundwater to mitigate the impact of decreasing water levels in areas where geological conditions are harsh, as in this project²¹.
- It is advisable to confirm the stability of electrical pressure and assess the need of taking any measures in designing a similar project. The problem of electrical pressure was pointed out in all three provinces. If stabilizers were included in the original specification of the project, problems such as breakdowns of pumps could have been avoided.
- In rapidly developing countries like Vietnam, especially in target areas located along major roads as in this project, the existence and content of road development/improvement plans should be checked in the project design phase. Also, population estimates should properly consider potential growth in the population. These will allow realistic target setting and minimize the impact of socioeconomic development on the project. For example, in areas where road improvement is expected, the project could adjust the construction schedule with the road authority, install the distribution pipes on both sides of the roads, or discuss with the recipient government the possible plan to dig up the improved road and install the pipes. Moreover, during the Detailed Design, the latest road improvement plan should be reviewed to see whether there is no change in the plan since the Basic Design Study, so that necessary revision is made in the project design. To do so, in addition to the above measures, it should be considered as much as possible to allocate the project cost to cover at least part of the additional construction work by utilizing the remaining funds of the project, in cases where it is applicable²².
- In this project, it took nine years to complete since the development study. During the time the population could not benefit from the project, they proceeded with the construction of dug wells or the improvement of their depths, resulting in low growth of the user population of the project’s facilities. In projects that take a long time from the initial needs assessment to the project completion, it is possible that planned beneficiaries turn to alternative measures, as

²¹ Although it was not anticipated as of the design of this project, the Vietnamese government has shifted its policy on the main source of water for the central water supply system in the Central Highlands from deep groundwater to surface water. There is also a case in which a project facility constructed additional shallow wells near a lake to supplement water.

²² The difference between the grant limit agreed between the governments and actual grant amounts (total contract amounts of consultants and contractors). This is normally returned to the national treasury, but, when certain criteria are met, with JICA’s approval, it can be utilized as an addition to the contract amount to cover the change of the design.

they did in this case. To avoid this, JICA should notify the recipient government of the project's status and prospects, even after the assessment/study, and request that it explain the situation to the local population. At the same time, in projects dealing with urgent issues like water supply, both governments should manage the entire procedure—including study, request, adoption, design, and implementation—without any intervals and try their best to realize the anticipated impact as soon as possible.

- In target areas which require special attention, such as those with high ratios of ethnic minorities and the like, elaborate plan is required. For example, IEC activities should be carefully planned, such as conducting IEC continuously throughout the planning and implementation and after the handover. Although various surveys and stakeholder meetings were conducted during the Basic Design Study and the project implementation, some issues were observed in communes with high proportions of ethnic minorities, including: taking a longer time for the population to decide to use the tap water, taking good care of the facilities, and charge collection. Considering that the need for further IEC in K3-1 commune in Kon Tum was especially emphasized in the development study, the project could have taken further measures, such as strengthening IEC in the commune. This is considered to be effective given that the commune with a large number of minority populations in Dak Lak demonstrated relatively high achievement levels of the target, where P-CERWASS carries out continuous IEC.

(2) Clear Planning and Monitoring of the Use of Equipment Provided

In this project, the equipment provided and the team to operate and maintain it are located in the capital of Hanoi rather than in the target region as agreed upon in the Basic Design Study. The timing to establish the equipment team was not specified in the study, and the change of the location was not documented either in the relevant reports of JICA. From the fact that the equipment provided by this project was not fully utilized to attain the planned target because of the change in location, the lack of a development budget, and unrealistic target setting, the following two lessons can be learned:

1) To realistically set the target value to be achieved by the recipient government utilizing provided equipment. Although some information, such as the success rate of drilling wells, may not be available at the planning phase, it is advisable to realistically analyze such aspects as the actual period in which the recipient can utilize the equipment compared to the project period, examples of similar projects, the financial situation of the recipient, and the mentality about the cost-quality balance of the recipient. This will help in setting more realistic targets.

2) When the equipment is planned to be used in specific target areas, and especially when the implementing agency does not have a pre-existing office in that area, it is recommended that the Japanese side request that the recipient government submit a utilization plan that includes the location and timing to place the equipment, staffing, the list of projects and their schedules, the budget, and so

on, rather than simply indicating the expected usage in the Basic Design Study Report. The utilization plan should be put into practice before completion of the project so that the Japanese side can confirm the initial implementation of the plan and document it in relevant reports. Then JICA should monitor its implementation at occasions such as the Warranty Period Inspection. It should be noted that, in the case of Vietnam, it is PPC, not N-CERWASS or P-CERWASS, who has the authority to decide on new groundwater development projects and budget allocations. Therefore, it would be necessary to involve PPC in developing such a plan.

Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese Technical Cooperation Project
“The Project for Implementation Support for 3R Initiative in Hanoi City to
Contribute to the Development of a Sound Material-Cycle Society”

External Evaluator: Miho Sakuma, International Development Center of Japan Inc.

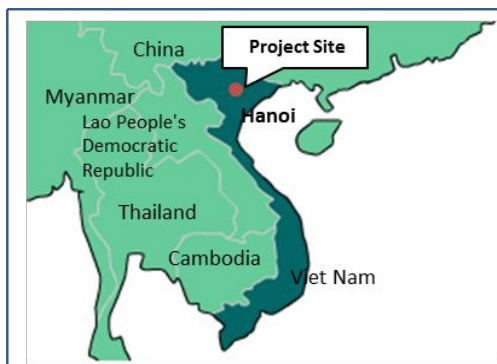
0. Summary

The Project aimed at creating a material cycle society in Hanoi City by means of establishing a 3R (reduce, reuse and recycle) system and making waste-related municipal policies incorporate the 3R through the implementation of a source separation and composting program, environmental education and publicity activities. As the Project was highly relevant to the development plan and development needs of Vietnam as well as Japan’s ODA policy, its relevance is high. The Project has generally achieved its objective. The source separation of organic waste which was conducted on full-scale basis under the pilot project for the first time in Vietnam has achieved better results than planned with the understanding and cooperation of the residents of the four model wards in central Hanoi and has become an established practice in the post-project period. With the wide publicity of such achievement, Hanoi City is now recognized as an advanced 3R city at home and abroad. In terms of the impacts on policies, the source separation of organic waste and composting are clearly stated as effective means of practicing the 3R in the National Strategy for Integrated Solid Waste Management up to 2025 and Vision 2050 (announced in 2009) while there is a good prospect of the enforcement of the Master Plan for Solid Waste Management in Hanoi City which is essential for the implementation of the 3R. The Project has contributed to the development of a system to promote the 3R as such new organizations as the 3R Council, 3R Stars, 3R Volunteer Club and 3R Supporters were established under the Project. There are, however, some pending issues, including (i) the non-expansion of the source separation of organic waste to areas other than the model wards due to a lack of funding and shortage of manpower and (ii) the discontinuation of the activities of the 3R Council and 3R Stars. Therefore, the effectiveness and impact of the Project is fair. Although the cooperation period was as planned, various surveys and publicity activities which were not originally planned were added, resulting in a significantly higher project cost than planned. Therefore, the efficiency of the Project is fair. As promotion of the 3R is clearly stated in the environmental policy and solid waste management strategy of Vietnam, its sustainability from the policy aspect is high and there are no institutional and technical problems in regard to the continuation of activities in the model wards. Meanwhile, there are some pending issues in relation to the implementation system and finance, therefore,

sustainability of the project effects is fair. Once the said Master Plan has been officially approved with a concrete prospect of budgetary appropriation for and investment in the activities proposed in the Master Plan, there is a realistic expectation of an improvement of the waste treatment facilities and strengthening of the implementation system together with increased funding, all of which are necessary to achieve an expansion of the source separation areas.

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

1. Project Description



Project Location



Containers for source separation at an ordinary household in the model area (at the time of ex-post evaluation)

1.1 Background

In recent years, Vietnam has been experiencing an increasing level of environmental pollution associated with rapid socioeconomic development and urbanization. In 2004 prior to the Project, Hanoi City¹ with a population of three million in an area of 921 km² generated urban waste at a rate of 1.0 kg/person/day. The waste collection rate was approximately 70% and the recycling/reuse rate was approximately 20%. Uncollected solid waste on the roadsides and illegally dumped waste in lakes and marshes were causing poor drainage and groundwater contamination. To deal with these environmental problems, Hanoi City came up with an environmental strategy of recycling 30% of household waste by 2020 and launched a movement to recycle solid waste. However, activities to recover valuable materials were only conducted by informal waste collectors and remained the economic activities of individual persons.

¹ On 1st August, 2008, Hanoi city merged with neighboring towns and villages. As a result, its geographical area increased by about 3.6 times to 3,344 km² with a population size of 6.23 million (2008) which was more than double the size in 2004.

Meanwhile, the Government of Vietnam emphasized the strengthening of its environmental protection policy in its national strategy to achieve the industrialization and modernization of the country by 2020 and identified the adoption of the philosophy of “the 3R Initiative” as an important development challenge in the said policy. Under these circumstances, the Government of Vietnam made a request to the Government of Japan, which internationally advocates the 3R Initiative and possesses advanced technologies with actual achievements in the field of solid waste management, for the provision of technical cooperation for the sustainable development of Hanoi City in harmony with the environment.

1.2 Project Outline

Overall Goal		(Long-term Overall Goal): Sound Material-Cycle Society will be established in Hanoi City. (Middle-term Overall Goal): Harmonized 3R system based on source separation programmes for organic waste is implemented.
Project Objective		The harmonized 3R system based on source separation programmes for organic waste is ready to familiarize to the whole area of Hanoi city.
Outputs	Output 1	Municipal solid waste (MSW) collection in pilot project area(s) is improved through implementation of pilot project with source separation of organic waste and composting.
	Output 2	Awareness of residents in pilot project area(s) and Hanoi citizens is improved by implementing environmental educational and PR activities on 3R under the spirit of mottainai (“no waste”).
	Output 3	Source separation programmes for organic waste, environmental education programmes and the concept of 3R are disseminated.
	Output 4	A strategic paper and action plan for the next steps to improve MSW collection system with source separation programmers for organic waste are developed.
Inputs		Japanese Side: 1. Experts 13 in total (2 for Long-Term, 11 for Short-Term) 2. Trainees 23 in total (Training in Japan: Twice, Third Country Training (Thailand): Once) 3. Equipment: Approximately: 15 million yen

	Vietnamese Side: 1. 21 Counterparts 2. Local Cost 1,429 million Vietnam Don 3. Office space, collection vehicles for source separation and facilities for composting
Total Cost	493 million yen
Period of Cooperation	November, 2006 – November, 2009
Implementing Agency	Hanoi Urban Environment Limited Company (URENCO)
Cooperation Agency in Japan	Ministry of the Environment
Related Projects	<ul style="list-style-type: none"> • Study for Planning of Environmental Conservation Master Plan in Hanoi City (1998-2000) • The Comprehensive Urban Development Program in Hanoi Capital City (2004-2006) • The Project for Supply of Equipment for Waste Management in Hanoi City (2002-2003)

Under the Project, citizens, private enterprises and administrative bodies in Hanoi worked together with the aim at introducing 3R based on source separation throughout the city. At the time of the ex-ante evaluation for the Project, however, even though the source separation of organic waste was practiced in part of central Hanoi, activities were not making smooth progress. The problem was that the concept of 3R was not widely known among the citizens of Hanoi. It was, therefore, decided to adopt a multi-stage approach. The first stage was to make the citizens of Hanoi understand the concept of 3R through environmental education and PR activities. This would be followed by the establishment of a 3R system in four model wards in central Hanoi through the practice of the source separation of organic waste and a composting pilot project. The third stage would be the development of a city-wide material cycle society over the medium to long-term by means of making recycling-related policies reflect/incorporate the positive outcomes of the pilot project. Throughout this process, the Hanoi Urban Environmental Limited Company (URENCO) would build up its experience and know-how while the citizens of Hanoi would be expected to raise the level of their environmental awareness.

The URENCO, the counterpart for the Project, is a public corporation under the direct jurisdiction of the Hanoi People's Committee (HPC) and provides the actual waste

collection and treatment service based on a contract with the Department of Construction (DOC) of the HPC. The service area of the URENCO's solid waste collection operation covers four central Hanoi districts (Hoan Kiem, Hai Ba Trung, Dong Da and Ba Dinh) with a service population of approximately one million people. In addition, the URENCO is entrusted to operate and manage the Nam Son Landfill Site, the largest solid waste disposal facility in Hanoi City, and its own Cau Dien Compost Plant² by the HPC.³

Under the Project, the URENCO played a principal role as it was involved in all activities ranging from the implementation of source collection and composting to environmental education, awareness raising for source separation and collaboration as well as coordination with citizens, private enterprises and administrative bodies in the four model wards. Many 3R-related departments, etc. of the HPC also participated in and/or cooperated with the activities under the Project. These were the DOC which controls urban infrastructure facilities in general, including waste management facilities, in Hanoi City under the leadership of the Deputy Chairman for Waste Management, the Department of Natural Resources and Environment (DONRE) responsible for the promotion of the 3R policy and the Department of Education and Training responsible for environmental education.

The relationship and roles of stakeholders in the pilot project under the Project and the related main activities are shown in Figure 1.

² This plant became operational in 2002 with the assistance of the Government of Japan.

³ In Hanoi City, there are small companies engaged in the collection of municipal solid waste (MSW) in districts other than the four central districts. However, these companies are relatively new and their overall collection and treatment volumes of MSW and service populations are both small. A MSW collection service is basically available in nine districts in central and semi-central Hanoi. In the suburbs, individual households are responsible for their own waste. In the case of industrial waste, medical waste and other special kinds of waste other than MSW, these are collected even in the suburbs.

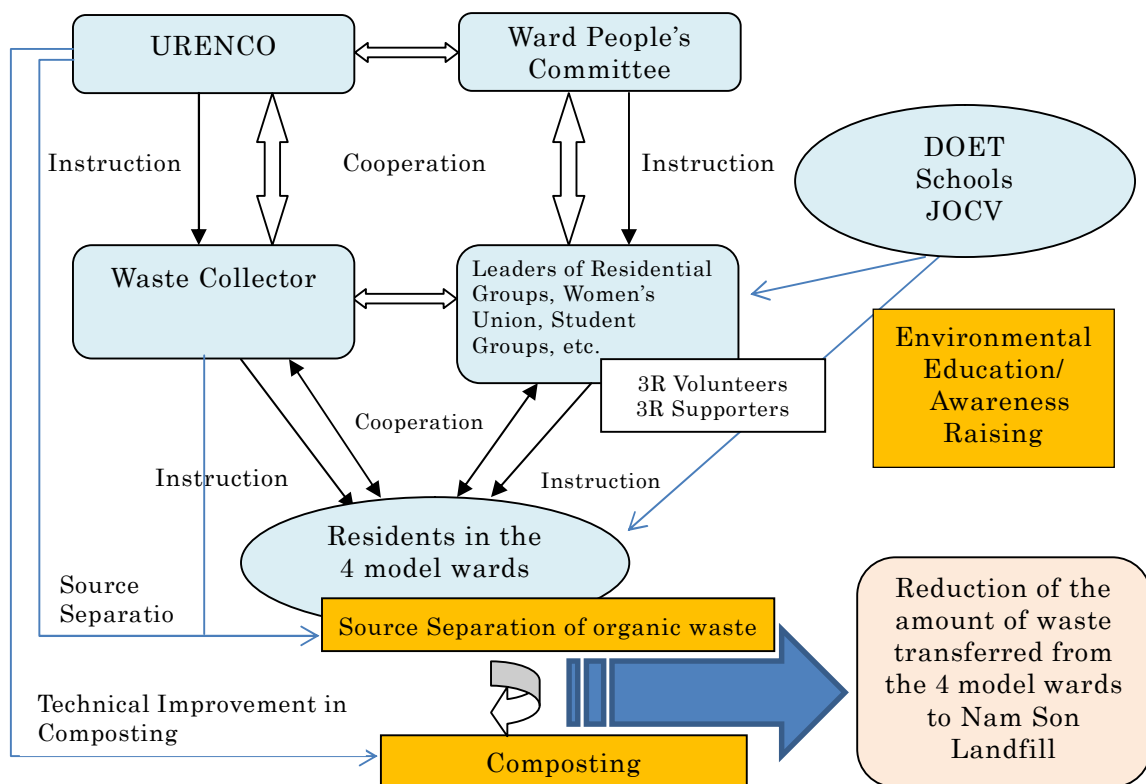


Figure 1 Relationship and Roles of Stakeholders in the Pilot Project and Main Activities

Under the Project, the 3R Stars was established as a forum designed to involve wide-ranging stakeholders in the process of policy recommendation and realization based on mutual consent and also to develop a partnership of all stakeholders involved in the formation of a recycling society. The URENCO acted as the Secretariat for this 3R Stars of which the members were representatives of the people's committees in the four model wards and four districts in central Hanoi, 3R-related HPC departments, research institutes, universities, private companies, organizations concerned, public funds, mass media and women's groups as well as residential groups in the model wards. At the same time, the 3R Council was established to discuss and recommend the suitable 3R policies for building a recycling society in Hanoi City. The Deputy Chairman for Waste Management of the HPC acted as the Chairman of the 3R council while the DOC acted as the Secretariat. The council members were representatives of 3R-related HPC departments, Women's Union of Hanoi City, Agricultural Cooperatives, environment police and people's committees of the four model wards and four districts in central Hanoi as well as academics.

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of the Overall Goal

Certain concrete progress was already observed with the relevant indicators, i.e. “expansion of the source separation areas” and “commencement of the next step, including projects, actions and movement based on a strategic paper”, at the time of the ex-post evaluation based on the facts that partial budgetary funding was made available for the introduction of source separation in areas other than the pilot project wards in four districts of central Hanoi and that the work to revise the Hanoi Solid Waste Management Regulation (January 10, 1994) was in progress to clarify the roles of and division of work among various 3R-related organizations and also to secure the necessary budget. However, judgment of the achievement of the overall goal at the time of the ex-post evaluation was postponed on the grounds that it would be premature to make a judgment in view of (i) the absence of comprehensive data and information regarding waste management in Hanoi City, (ii) the lack of a master plan for waste management in Hanoi City and (iii) the insufficient organizational capacity of the DOC responsible for waste management in Hanoi City.

1.3.2 Achievement of the Project Objective

At the time of project completion, the project objective had been almost achieved with the efforts of both the Vietnam and Japanese sides. The Project successfully demonstrated the effectiveness of the various approaches employed for the promotion of the 3R, including the active involvement of many stakeholders in the source separation and composting program, environmental education and participation of citizens. In addition to the implementation of the Project, prominent and important outcomes of the Project included (i) its impacts on the National Strategy for Integrated Solid Waste Management up to 2025 and the Vision 2050, two principal 3R strategies at the national level, and (ii) its contribution to the development of desirable policy and legal environments enabling the continuation of the project effects through the formulation of the Action Plan to Expand Source Separation to the Whole of Hanoi (hereinafter referred to as “the Action Plan”) and the Strategic Paper on the 3R Initiative (hereinafter referred to as “the Strategic Paper”) along with the progress of the revision of the Hanoi Solid Waste Management Regulation.

1.3.3 Recommendations

Before the completion of the Project, two recommendations were made regarding things to be done in the remaining period. The first was for the UNRECO to conduct a comprehensive cost-benefit analysis of the introduction of the source selection of organic

waste and composting program to entire Hanoi City based on knowledge acquired through the pilot project implemented in the project period. The second was assessment of the capacity of the counterparts at the end of the Project to check for any capacity improvement through the implementation of the Project along with the sorting out of any pending issues.

Two further recommendations were made to ensure the sustainability of the project effects in the post-project period. The first was for the HPC and DOC to formulate a master plan for the implementation of a waste treatment service covering entire Hanoi City, including those merged with the city in 2008. The second was for the HPC, DOC and other bodies responsible for waste administration in Hanoi City to strengthen their guidance of their lower tier organizations together with strengthening of the organizational, technical and financial capacity of the HPC and DOC to disseminate the project effects to expand the source separation of organic waste and to promote integrated 3R.

2. Outline of the Evaluation Study

2.1 External Evaluator

Miho Sakuma, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

Duration of the Study: December, 2012 – December, 2013

Duration of the Field Study: March 17 – April 6 and June 17 – June 22, 2013

2.3 Constraints During the Evaluation Study

The evaluator has requested the provision of historical financial data for the URENCO and its compost plant but only some such data has been made available. Therefore, the financial situation of the URENCO and its compost plant has been judged based on the results of interviews with the people concerned and the partial historical data provided. For evaluation of the effectiveness of the Project, it must be pointed out that the descriptions of the targets and indicators in the Project Design Matrix (PDM) are not very clear and that objective measurement of the outputs, etc. is difficult for some of the targets and indicators. Because of this, some indicators are interpreted by the evaluator where necessary and the degree of achievement of each target/indicator at the time of project completion is either verified or estimated at the time of this ex-post evaluation.

3. Results of the Evaluation (Overall Rating: C⁴)

3.1 Relevance (Rating: ③⁵)

3.1.1 Relevance to the Development Plan of Vietnam

The importance of promoting the 3R in the solid waste management policy for the environmental sector remained unchanged from the time of the ex-ante evaluation to the time of the ex-post evaluation. The Strategic Orientation for Sustainable Development in Vietnam (Vietnam Agenda 21) (2004), which was a valid policy at the time of the ex-post evaluation, called for a number of technical measures relating to solid waste and harmful waste. These included (i) adoption of sanitary landfill in medium to large size cities, (ii) improvement of recycling technologies, (iii) facilitation of volume reduction of solid waste at source and (iv) employment of a technology to convert waste to compost in order to reduce the area required for landfill. In terms of awareness raising, the Vietnam Agenda 21 called for community-level awareness raising activities, active participation of the public in the collection and treatment of waste, prevention of the dumping of waste at the public roadside and the separation of waste at households. Meanwhile, the Law on Environmental Protection (revised in 2005 and enforced in 2006) makes waste producers responsible for the minimization of waste by means of the 3R. The 8th Five Year Socioeconomic Development Plan (2006 – 2010) aimed at achieving the coexistence of environmental protection and sustainable development as a direction for development. As such, the relevance of the Project to the development policy of Vietnam was continually maintained from the planning stage to the completion of the Project.

3.1.2 Relevance to the Development Needs of Vietnam

The Government of Vietnam has set the recycling use of solid waste based on the 3R Initiative as one of the important themes in the “Vietnam Agenda 21”, “Law on Environmental Protection”, “National Strategy for Environmental Protection up to 2010 and Vision Towards 2020” (2003) and “Order of the Prime Minister for the Promotion of Solid Waste Management in Central Areas of Cities and Industrial Parks”. At the time of the ex-ante evaluation as well as the time of the ex-post evaluation, it was the intention of the Government of Vietnam to promote the 3R as one of its policies.

In 2003, the volume of MSW collected in Hanoi City was approximately 1,600 tons/day and the collection rate was 70%. Uncollected solid waste at public roadsides and the illegal dumping of waste in lakes and marshes caused such problems as poor drainage and groundwater contamination. There was concern that the rapid economic growth and

⁴ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁵ ③: High, ② Fair, ① Low

urbanization would result in some three times more waste in 2020 than in 2003. As a result of the stipulation of the compulsory source separation of household waste in the central areas of cities by “the National Strategy for Environmental Protection up to 2010 and Vision Towards 2020” (2003) which was followed by “the Order of the Prime Minister for the Promotion of Solid Waste Management in Central Areas of Cities” (2005), the URENCO began the trial source separation of organic waste and composting program for some 1,700 households in central Hanoi from around November, 2003. However, the insufficient experience and lack of know-how on the part of the URENCO and lack of environmental awareness among citizens meant that the collection volume was small with little proper separation, highlighting the strong need to tackle many issues, including a viable response to the ever increasing volume of waste, urgent capacity building of the URENCO and necessary improvement of environmental awareness among citizens.

The merger of Hanoi City with neighboring towns and villages in August, 2008, increased the municipal area by about 3.6 times the area in 2004 and also more than doubled the population from 3,083,000 before the merger to 6,451,000 as of April, 2009.

In the light of such a changing situation, the HPC in December 2009 immediately after the completion of the Project approved a plan to expand the Nam Son Landfill Site (opened in 1999 with an area of 83.5 ha) to a reclaimed neighboring site of 106 ha as it was concerned about the possibility of the Nam Son Landfill Site, which was the principal MSW disposal facility in Hanoi City, becoming completely filled sooner than expected (planned end of service in 2020). Such approval illustrated the increasing necessity for a reduction of the waste volume.

In 2006 when the ex-ante evaluation was conducted, the concept of the 3R was not yet common in Vietnam. However, interviews during the ex-post evaluation confirmed that the people involved in waste management viewed the introduction of the 3R in the capital of Hanoi as timely as the government policy for waste management mentioned earlier had already endorsed the concept of the 3R.

In summary, the Project centering on a pilot project for the source separation of organic waste and composting was relevant to the needs of Hanoi City from the viewpoint of the accumulation of concrete experience and know-how by the URENCO and the development of environmental awareness among citizens. Interviews during the ex-post evaluation have confirmed that there was a strong need for the strengthening of the source separation system and strengthening of environmental education for citizens (especially

those outside the model districts) even after the completion of the Project.

3.1.3 Relevance to Japan's ODA Policy

Japan's Country Assistance Program for Vietnam (2004) prioritizes the "promotion of growth", "improvement of lifestyle and social aspects" and "institutional building" for Japan's assistance and the Project fell in the category of "improvement of lifestyle and social aspects". Meanwhile, the JICA's Project Implementation Program for Vietnam (March 2006) at the time of project planning considered "urban waste management" to be an important sub-sector of the environment sector. As such, the contents of the Project were consistent with Japan's prioritized aid policies and themes for Vietnam. The relevance of the Project to Japan's ODA policy is further emphasized by the fact that Japan aimed at disseminating its own experience and know-how to the rest of the world based on the outcomes of the Ministerial Conference on the 3R Initiative held in Tokyo in April 2005.

This Project has been highly relevant to the country's development plan, development needs as well as Japan's ODA policy; therefore, its relevance is high.

3.2 Effectiveness and Impact⁶ (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Project Outputs

1) Output 1: MSW collection in pilot project area(s) is improved through implementation of pilot project with source separation of organic waste and composting.

Output 1 was achieved by the time of the terminal evaluation. The contents and concrete results of the pilot project are described below.

Contents of the Pilot Project

- The source separation pilot project consisted of seven components: (i) fact-finding survey on waste management, (ii) selection of collection points, (iii) procurement of tools, including a source separation guidebook for residents, (iv) training of waste collectors, (v) implementation of source separation, (iv) monitoring and evaluation and (vii) establishment of a standardized source separation program. The financial analysis of source collection was added later.
- The trial composting project consisted of two components: (i) improvement of the Cau Dien Compost Plant and (ii) expansion and securing of the demand for compost. The

⁶ Sub-rating for Effectiveness is to be put with consideration of Impact.

prospect of an increase of the compost production volume as a result of the expanded areas for source separation put emphasis on the process and technological improvement enabling the production of a large volume of compost in a short period of time. As a result, facility improvement and the provision of equipment were subsequently added to the project. Because it was thought to be necessary to expand the sales to match the increased production volume, a range of technical assistance, including financial analysis and the planning of a composting project, market survey, demand survey, analysis of the compost quality and improvement of the compost quality, was introduced under the Project.

- The following four wards were selected as model areas for the pilot project with the consent of all stakeholders in the Project based on such criteria as (i) area with typical characteristics which make the area a model for the ultimate expansion of the planned activities to entire Hanoi City, (ii) selection of one ward from each of the four central districts of Hanoi City and (iii) high level of commitment to the pilot project among local stakeholders.
 - ① Phan Chu Trinh Ward in Hoan Kiem District (approximately 2,000 households with a population of 8,224)
 - ② Nguyen Due Ward in Hai Ba Trung District (approximately 2,000 households with a population of 11,140)
 - ③ Thanh Cong Ward in Ba Dinh District (approximately 7,000 households with a population of 24,873)
 - ④ Lang Ha Ward in Dong Da District (approximately 7,300 households with a population of 28,584)

Concrete Results

- Indicator 1: The volume of waste disposed of at the landfill site is reduced by 30%. The average household waste volume reduction rate by August 2009 after the implementation of the pilot project was 45.4% for Phan Chu Trinh Ward, 41.6% for Nguyen Du Ward, 42.1% for Thang Cong Ward and 31.2% for Lang Ha Ward. Such a massive improvement was the result of the high level of cooperation by the residents, introduction of fixed time and fixed point collection using containers and fixed time collection of organic waste in very narrow streets in dense housing areas due to the development of special vehicles for the exclusive use for waste collection in narrow streets.⁷

⁷ These were special trucks and hand carts designed for exclusive use in narrow streets. In central Hanoi, there are many narrow streets which are impassable by ordinary collection vehicles. As it was not possible to install collection containers along these streets, residents dumped their waste at the roadside. With the development of specially designed collection vehicles to serve these

- Indicator 2: The percentage of residents in each pilot project area recognizing that the sanitation conditions of the area have improved is 50% or more. A survey conducted after the implementation of the pilot project as part of the Project found that an average of more than 90% of the residents in the four model wards considered that the sanitation conditions had improved compared to the pre-pilot project period, far exceeding the target 50% (Materials provided by JICA, November 2009).
- Based on the materials provided by JICA (November 2009) and the findings of interviews with stakeholders during the ex-post evaluation period, several positive results of the trial composting project have been confirmed. These are (i) verification of the improved composting process, (ii) improved quality of compost, (iii) establishment of a demand for compost in Hanoi City and its surrounding area, (iv) increased local demand for compost and (v) positive fertilizer effect of compost through a relevant survey.

Based on the above, the conditions of waste collection in the pilot project wards are judged to have improved through the pilot project for the source collection of organic waste and the trial composting project.

The pilot project is highly evaluated for its successful demonstration of the source collection of organic waste not only in terms of the tangible improvement of the waste collection conditions in the model wards but also in terms of the feasible reduction of waste to be disposed of at a final disposal site by 30% or more.

2) Output 2: Awareness of residents in pilot area(s) and Hanoi citizens are raised through implementation of environmental education and PR activities on 3R under the spirit of “mottainai”.

The contents and concrete results of the activities designed to achieve Output 2 are described below.

Activities

- Production of effective educational tools/programs
- Training of Hanoi URENCO staff members
- Experimental application of educational tools/programs in the model pilot project

narrow streets, however, it has become possible for these vehicles to collect waste at fixed times, increasing the organic waste collection rate. This has had the effect of reducing the volume of non-organic household waste to be transported to a final disposal site.

wards

- Evaluation of the educational tools/programs

Concrete Results

- Indicator 1: The percentage of residents in each pilot project area who know about the pilot project is 80% or more. A survey conducted as part of the Project after the commencement of the pilot project found that the proportion of residents who knew about the source separation activities was 93.9% in Phan Chu Trinh Ward, 97.6% in Nguyen Du Ward, 84.9% in Thanh Cong Ward and 85.0% in Lang Ha Ward in August, 2009 (Material provided by JICA, November 2009).
- Indicator 2: The Project is reported in the media 30 times or more. The number of reports on the Project by various media exceeded 300 times (Material provided by JICA, November 2009).
- Indicator 3: The number of mass organizations participating in the 3R activities is 10 times or more. The 3R Volunteer Club of which the membership consisted of university and senior high school students was established in December 2007 with the encouragement of the Project Team, playing an important role in the dissemination of information on the pilot project, etc. and educational activities on the 3R for residents. The scope of the activities of this 3R Volunteer Club gradually expanded as their targets widened from residents of the model wards to the citizens of Hanoi through the Mottanai Fair (held twice a year) and other events. By the time of the Project's completion, the number of activities in which 3R volunteers were involved right from the planning stage with the collaboration of the Project Team totaled 50. Moreover, there were 20 major 3R promotion events in which the 3R Supporters, consisting of members of women's groups and residential groups in the model wards, participated.

Based on the above, the awareness level of residents of the pilot project wards as well as the citizens of Hanoi is judged to have been raised through the implementation of environmental education and PR activities on the 3R under the spirit of "mottainai".

3) Output 3: Source Separation programmes of organic waste, the environmental education programmes and the concept of 3R are disseminated.

Although the difference between Output 2 and Output 3 is not easy to instantly understand because of the similar description of each output, Output 2 focuses on the raised awareness and PR of the pilot project and the 3R targeting the citizens of Hanoi in general and the residents of the model wards in particular. In contrast, Output 3 focuses

on the launch of an organization (3R Stars) and its activities in expectation of the post-project continuation of such activities.

Output 3 was achieved by the time of the project completion.⁸ The relevant concrete results are described below.

- Indicator 1: Establishment of an organization or forum composed of various stakeholders to promote the source separation program and environmental education program and to disseminate the concept of the 3R. February 2007 saw the establishment of the 3R Stars of which the membership consisted of representatives of 85 waste management-related organizations, including government bodies, universities, research institutes, media, private enterprises and the model wards as well as individuals. The 3R Stars contributed to the promotion of the participation of citizens in the 3R activities and the establishment of a partnership between stakeholders. The Hanoi URENCO functions as the secretariat for the 3R Stars.
- Indicator 2: Meetings of the 3R Stars and workshops or other meetings related to the extension of the 3R program are held six times or more with 30 or more total participants in these workshops or meetings. Meetings of the 3R Stars were held six times during the project period with the participation of a total of 85 organizations and about 650 persons. At the third meeting held on 15th March, 2008, the 3R Stars adopted the 3R Stars Declaration consisting of 10 items designed to disseminate the concept of the 3R and this declaration was signed by the Deputy Mayor of the HPC. These 3R Stars meetings provided the foundations for the formulation of the draft “Action Plan to Expand Source Separation to the Whole of Hanoi” and “Strategic Paper on the 3R Initiative” and also for discussions on the desirable revision of the Hanoi Solid Waste Management Regulation with a view to securing a source of funding for 3R activities. The final international seminar held on 25th September, 2009, under the Project attracted 135 participants, including those related to the Project in Hanoi City, one representative from each of six major cities in Vietnam and 14 representatives from seven neighboring countries (Indonesia, the Philippines, Thailand, Malaysia, Myanmar, Bangladesh and Cambodia).
- Indicator 3: A planning manual for the dissemination of the source separation program to other areas is prepared. The manual in question was discussed and compiled at

⁸ As “the number of wards or stakeholders which have participated in a workshop is more than 30”, which is one of the indicators for Output 3 listed in the PDM (revised version of February 25, 2009) for the Project, is found to be insufficient to accurately and objectively evaluate the degree of achievement of Output 3, the present ex-post evaluation uses three indicators set at the time of the ex-post evaluation to check the degree of achievement of Output 3.

meetings of the 3R Stars to address such issues as source separation and environmental education based on the experience and evaluation results of the pilot project.

Based on the above, the targets of the indicators for Output 3 were achieved and the original purpose of Output 3 of linking Output 1 and Output 2 to Output 4 is judged to have been achieved.

4) Output 4 : A strategic paper and action plan for the next steps to improve the MSW collection system with source separation programmes of organic waste is developed.

Output 4 was generally achieved by the time of the Project's completion except for Indicator 3.⁹ Interviews with the people involved confirmed the following facts.

- Indicator 1: A strategic paper is developed based on discussions at the 3R Stars meetings. The targets of this strategic paper were discussed and compiled through a series of meetings of the 3R Stars, meetings of the Task Force (of which the members are representatives of the DOC, URENCO, Japanese Expert Team and DONRE as well as waste management experts and university teachers) and meetings of the 3R Council composed of representatives of the DOC and other stakeholder organizations as well as knowledgeable persons (see Table 1).
- Indicator 2: An action plan is developed based on discussions at the 3R Stars meetings. A survey was conducted from October to December 2008 for the purpose of eventually expanding the model source separation program to entire Hanoi City. Based on the findings of this survey, discussions at the 3R Stars meetings and the evaluation results of the pilot project by the Project Team, the draft action plan was approved at a meeting of the Joint Steering Committee for the Project held on 25th February, 2009 (see Table 2).

⁹ As the indicator "recognition of the next stage of development by all of the counterparts based on the action plan" listed in the PDM (version revised on 25th February, 2009) for the Project is insufficient to evaluate the degree of achievement of Output 4, the present evaluation uses the three indicators set at the time of the terminal evaluation for this purpose.

Table 1. Targets of Strategic Paper on 3R Initiative

In 2009:
<ol style="list-style-type: none"> 1. Enactment of the Solid Waste Management Regulation in Hanoi City 2. Approval of the Action Plan on Source Separation (SS) expansion in Hanoi City
Until 2010:
<ol style="list-style-type: none"> 1. Completion of institutional and financial mechanism on waste management on basis of 3R implementation in Hanoi City 2. Expansion of SS implementation to the whole of Hoan Kiem District. 3. Preparation and approval of Master Plan on Solid Waste Management in Hanoi City 4. More than 30% of Hanoi residents know about 3R and SS through PR and EE activities and the mass media.
Until 2013:
<ol style="list-style-type: none"> 1. Implementation of the Comprehensive Solid Waste Management Plan of Hanoi City 2. Improvement of waste collection, transportation and treatment system in Hanoi City through standardizing model of SS and 3R activities 3. Expansion of SS implementation to the whole of Ba Dinh, Dong Da, and Hai Ba Trung Districts. 4. More than 50% of residents in Hanoi know about 3R and/or SS through Public Relations (PR) and Environmental Education (EE) activities and the mass media
Until 2015:
<ol style="list-style-type: none"> 1. Development of comprehensive waste treatment system and sanitary landfills of Hanoi City 2. Basically strengthen waste collection, transportation and treatment with modern process and technology. 3. Expand SS to Tay Ho, Cau Giay, Thanh Xuan, Hoang Mai, Long Bien and some Wards/communes of Tu Liem, Gia Lam, Thanh Tri, Dong Anh, Soc Son Districts. 4. All residents of Hanoi City recognize and/or take actions on 3R and/or SS and more than 80,000 pupils are involved in EE program on 3R and SS 5. Reduce about 30% of landfill waste
Until 2020:
<ol style="list-style-type: none"> 1. Strengthen waste collection, transportation and treatment with SS based 3R process 2. Modern process and technology for waste treatment including incineration and energy recovery should be examined and introduced 3. Expand SS to the whole of Hanoi City 4. 3R and SS becomes common sense of Hanoi citizens 5. Reduction of about 70% of landfill waste

Source: Materials provided by JICA, November 2009.

Table 2. Action Plan to Expand Source Separation to Whole of Hanoi (Summary)

This Action Plan is mainly consist of Source Separation (SS), Public Relations (PR) and Environmental Education (EE), and these components are integrated into this action plan. To introduce each activity, there are 3 steps. The first step will be to conduct PR activities for residents to tell them the new collection system using a fixed time and fixed collection point, and separation of organic, in-organic waste and recyclables. A precondition of this PR for residents is that PR activities to spread basic idea of 3R have been already conducted. In order to implement SS smoothly, PR activities will be implemented at the first stage to disseminate the concept of 3R and SS. The second step is to train leaders in the communities in order to conduct EE to community members continuing PR. After the residents understand their roles and responsibilities, the introduction of SS comes after the PR and EE as the final step. PR and EE will be implemented continuously at this stage. The each period of PR, EE, and SS depends on conditions or characteristics of the target communities.

Based on these 3 steps, Action Plan consists of the following components.

Action 1: Expansion of Source Separation to Whole Hanoi

Action 2: Improvement/ Investment of Recycling Facilities

Action 3: Broadening of Environmental Education on 3R

Action 4: Broadening of PR and 3R Partners

Action 5: Sustainable Activities of 3R Stars and Hanoi 3R Council

Action 6: Information Management of 3R and SWM

Action 7: Strengthening of Legal, Regulatory and Financial Mechanism

Source: Materials provided by JICA, November 2009

Note: The underlined steps are added by the evaluator.

Indicator 3: Upper level organizations (HPC and DOC) will take the necessary steps to implement specific measures based on the strategic paper and action plan. Through a series of discussions at the 3R Stars meetings, all of the stakeholders gradually recognized the need to revise the Hanoi Solid Waste Management Regulation as the fundamental regulation for source separation at the municipal ordinance level from the viewpoints of clarifying the roles of individual stakeholders in the source separation system and of establishing suitable budgetary measures for the geographical expansion of source separation. For this reason, a task force composed of representatives of the DOC, DONRE, URENCO and Japanese Expert Team was established to conduct the work to revise the said Regulation. Meanwhile, the HPC instructed the DOC and the Project Team to examine and complete the draft revisions as soon as possible. In response, the DOC and the Project Team prepared draft revisions of the Hanoi Solid Waste Management Regulation, incorporating the comments and opinions put forward by various stakeholders, and submitted them to the HPC. The revised Hanoi Solid Waste Management Regulation was enforced in February, 2010, three months after the completion of the Project (November 2009) with the approval of the HPC.

Based on the above, Indicator 1 and Indicator 2 were achieved. In the case of

Indicator 3, although it was not achieved by the time of the Project's completion, sufficient measures to achieve it were implemented during the project period. Output 4 is, therefore, judged to have been generally achieved.

3.2.1.2 Achievement of Project Objective

Four indicators¹⁰ were introduced to measure the degree of achievement of the project objective: "The harmonized 3R system based on source separation programmes for organic waste is ready to familiarize to the whole area of Hanoi City". Interviews with the counterparts and the beneficiary survey confirmed the following facts.¹¹

1) Indicator 1: The source separation program continues in at least the pilot project area(s). At the time of project completion, the URENCO and residents of all four model wards continued to practice source separation.

2) Indicator 2: The budget to extend the source separation program and to implement environmental education is secured. At the time of project completion, it was hoped that an appropriate budget to introduce source collection in non-model wards in four districts in central Hanoi would be secured with the backing of the program to clean and beautify Hanoi City in preparation for the millennium anniversary of Hanoi to be held in the following 2010. Meanwhile, the 3R Stars prepared draft revisions of the Hanoi Solid Waste Management Regulation which would form the legal basis for extension of the source separation areas and the implementation of environmental education based on the achievements of the pilot project and presented them to the HPC by June 2009. It was expected that the revisions would be approved by the time of project completion to pave the way to the securing of the necessary budget for the said extension of the source separation areas and implementation of environmental education in 2009. As mentioned earlier, the revised Hanoi Solid Waste Management Regulation was only enforced in

¹⁰ Five indicators were listed on the ex-ante evaluation sheet to measure the degree of achievement of the project objective. However, in the PDM at the time of the commencement of the Project, one of these indicators, i.e. "environmental education is implemented in the pilot project area" was dropped. Another indicator, i.e. "preparations are ready to disseminate source separation and environmental education to the whole area of Hanoi City by means of achieving the improved capacity of staff members of the executing agency who are involved in the formulation of a planning manual and the source collection program for organic waste", was replaced by another indicator, i.e. "the staff capacity for source separation is strengthened". There were no records explaining the background of the deletion of one indicator and replacement by another indicator. For this reason, the present ex-post evaluation regarding the project objective is based on the four indicators listed in the latest PDM (revised version of 25th February, 2009).

¹¹ The beneficiaries survey was conducted in April and May, 2013 featuring 25 residents in each of the four model wards (100 in total) and 25 residents living outside the model area in each of the four districts concerned (100 in total). The main findings are outlined in connection with Indicator 3.

February 2010, three months after project completion. The revised Regulation approved by the HPC stipulates that the HPC is responsible for “the preparation of a draft municipal budget for solid waste management” and that the Department of Finance is responsible for “the coordination and preparation of a draft municipal budget for solid waste management while guiding and cooperating with the DOC and the Department of Planning and Investment (DPI) of the municipal government”. Such arrangements suggest that the legal and institutional frameworks for the geographical extension of the achievements of the pilot project under the Project were roughly in place at the time of project completion. However, there was no clear indication of how the HPC would finance expanded source separation operation after the completion of the Project from the medium to long-term perspective, resulting in a lack of funding specially earmarked for expansion of the source separation program in the municipal budget for solid waste management. Because of this, the degree of achievement of Indicator 2 was limited. While the URENCO budget continued to slightly increase in response to inflation, there were no special budgetary arrangements to cover the possible expansion of the source separation program in 2009 when the Project was completed and in the following 2010. Interviews with stakeholders confirmed that the URENCO on its own judgment allocated part of its budget to the procurement of containers for the fixed place collection of separated waste and to the implementation of the source separation program in the four model wards. There were no additional budgetary arrangements for the expansion of the source separation program and environmental education for other stakeholders, such as district and ward people’s committees, residential groups and women’s unions, which would play a guidance as well as educational role in these activities. In summary, even though efforts were made to secure the budget required for expansion of the source separation areas during the project period, Indicator 2 had not been achieved at the time of project completion in the sense that no actual budget was disbursed to support such expansion.

3) Indicator 3: The staff capacity for source separation is strengthened. The questionnaire survey and series of interviews conducted by the Project Team in 2009 found that of the 18 counterparts, 15 (83%) evaluated that their own knowledge, skills and capacity had improved as a result of their involvement in the Project. Especially noticed was improvement of their sense of responsibility, strict time-keeping, cooperativeness and self-motivation for their work as a result of the joint work with the Japanese experts. The fact that most of the counterparts similarly evaluated themselves at the time of project completion is confirmed by the ex-post evaluation through interviews with the counterparts and waste collection workers. Interviews with such stakeholder

organizations as the DOC, DOET, DONRE, district and ward people's committees, residential groups and women's unions confirmed that the capacity of the counterparts regarding source separation was at a somewhat satisfactory level at the time of project completion. In regard to the beneficiaries survey conducted in the four model wards, 16% of the respondents replied "highly satisfactory" while a further 55% replied "satisfactory" to the question of "Were you satisfied with the work of waste collectors in your area of residence in 2009?", suggesting a sufficient level of capacity of not only URENCO staff but also waste collectors to conduct their work. Both the Strategic Paper and Action Plan adopted a strategy of gradually extending the subject areas for source separation to other wards of the four districts of central Hanoi first, then to the five districts in semi-central Hanoi around the four central districts and further to the suburbs of Hanoi City. As far as the four central districts under the jurisdiction of the URENCO were concerned, technical arrangements were in place for URENCO staff trained under the pilot project to commence the extension of the source separation program to neighboring wards and districts. Further efforts in terms of manpower and budget are, however, necessary to consolidate the state of preparedness for the extension of source separation throughout Hanoi City, including the training of staff members of solid waste collection companies in charge of waste collection in districts other than the four central districts on the practice of source separation. Needless to say, URENCO personnel with an improved capacity through their participation in the pilot project will play a core role in such extension.

4) Indicator 4: Compost is produced from organic waste and utilized in an economically viable manner. Some 10,000 tons of organic waste were recovered¹² from the four model wards in the project period of three years and 10,000 tons of compost were produced. The annual production volume of compost in the project period was 3,828 tons in 2007, 3,390 tons in 2008 and 3,217 tons in 2009. Meanwhile, the sales volume of compost was 4,485 tons in 2007, 1,464 tons in 2008 and 2,060 tons in 2009. At the time of project completion, the fermentation facilities and equipment at the compost plant had been improved under the Project. The quality of the compost was improved with an improved system to remove such materials other than organic waste as glass and plastics and turning operation¹³ using a wheel loading newly provided under the Project. These technical improvements made the production of more compost in a shorter period of time

¹² The Cau Dien Compost Plant also processes organic waste directly collected from the fresh market in central Hanoi.

¹³ The wheel loader is used to turn the fermenting compost in order to feed fresh air. In a composting experiment involving the daily production of 40 – 50 tons, the conventional air funnel method took eight weeks to produce matured compost while the wheel loader turning method took only five weeks. At the same time, the operating cost was reduced to the level of approximately 40% of the conventional method (Material provided by JICA, November 2009)).

possible.

To summarize, the Project aimed at creating a material-cycle society in the medium to long-term period by means of focusing on the implementation of a pilot project in the four wards of central Hanoi to establish a model area for the 3R system with a view to making waste management policies reflect the achievements of the pilot project.

At the time of project completion, source separation was continuing in all of the four model wards (Indicator 1) and the capacity of the URENCO staff had been sufficient improved through the pilot project to the point that they were able to cope with the extension of the source separation program to neighboring wards (Indicator 3). In the case of the trial composting project, the quality of the compost was improved and the production capacity of the plant was increased (Indicator 4), indicating the implementation of a harmonized 3R system based on source separation in the model wards. On the other hand, any work to extend the subject areas for source separation requires appropriate budgetary funding. In the present case, although the legal basis for such extension came into force, no actual budgetary funding was made during the project period (Indicator 2). In the light of the above, the Project is judged to have largely achieved its objective as Indicators 1, 3 and 4 were achieved in the project period with the exception of Indicator 2.



The equipment provided under the Project is being fully utilized at the compost plant.



A worker is collecting waste in a narrow street using a hand cart.

3.2.2 Impacts

3.2.2.1 Achievement of Overall Goal

Two indicators were set to measure the degree of achievement of the overall goal. These were “the source separation areas are expanded” and “the next step, including project, actions and movements, based on the Strategic Paper, is started”. Interviews with

the counterparts and the beneficiary survey disclosed the following facts.

1) Indicator 1: The source separation areas are expanded. At the time of the ex-post evaluation, the source separation areas have not been expanded beyond the four model areas of the pilot project. Therefore, Indicator 1 has not been achieved. The main reasons for this are the tight municipal financial situation since the completion of the Project and the lack of a master plan for solid waste management in Hanoi City. As a result, no proactive initiatives have been introduced to expand the geographical scope of source separation in Hanoi City with neither the budgetary arrangements nor manpower deployment to realize the said expansion.

However, using its own resources, the URENCO has introduced a fixed time and fixed point collection system in some neighboring areas of the model wards as a precursor to a source separation system based on its own judgment. This new system using 240 liter containers installed at fixed points replaces the conventional system of using hand carts to collect waste with a bell to announce their arrival and was introduced in Hang Dao Ward in Hoan Kiem District (July 2009), Trang Tien Ward in Hoan Kiem District (August 2009) and Li Tai Lo Ward in Hai Ba Trung District (August 2009). A similar operation has been subsequently introduced in Bach Kho Ward and Le Dai Hanh Ward in Hai Ba Trun District.

2) Indicator 2: The next step, including projects, actions and movements based on the Strategic Paper, is started. In the ex-post evaluation, the next step products, actions and movements are interpreted as the targets listed in the Strategic Paper and the targets in the Strategic Paper (listed in the left-hand column of the table below) are compared to their implementation situation at the time of the ex-post evaluation (in the right-hand column of the table below). As shown in the table, in addition to the formulation of a master plan for waste management in Hanoi City, PR and environmental education activities are conducted even though they are restricted to the model wards. No other activities to achieve the targets in the Strategic Paper have been implemented.

Targets in Strategic Paper on 3R Initiative	State of Implementation at Time of Ex-Post Evaluation
Until 2010	
<ol style="list-style-type: none"> 1. Completion of an institutional and financial mechanism for waste management on basis of 3R implementation in Hanoi City. 2. Expansion of SS implementation to the whole of Hoan Kiem District. 3. Preparation and approval of the Master Plan for Solid Waste Management in Hanoi City. 4. More than 30% of Hanoi residents know about 3R and SS through PR and EE activities and the mass media. 	<ol style="list-style-type: none"> 1. Not yet implemented. 2. Not yet implement. However, a fixed time and fixed point collection system as a precursor to the source separation system was introduced in Hang Dao Ward in Hoan Kiem District (July 2008) and Trang Tien Ward in the same district (August, 2009). 3. As of June, 2013, the Master Plan has been approved by the HPC and is awaiting its approval and effectuation by the Prime Minister. 4. Educational activities on the 3R and guidance on source separation by the URENCO, residential groups and women's unions are continuing in the four model wards (and their districts). As described later, the DOET conducts environmental education at schools in Hanoi City while the DONRE conducts environmental education and publicity for the general public through events and the mass media. However, there is no way to measure the level of awareness of the 3R and/or source separation among the citizens of Hanoi as no relevant surveys have ever been conducted.
Until 2013	
<ol style="list-style-type: none"> 1. Implementation of the Comprehensive Solid Waste Management Plan for Hanoi City. 2. Improvement of the waste collection, transportation and treatment system in Hanoi City through a standardized model for SS and 3R activities. 3. Expansion of SS implementation to the whole of Ba Dinh, Dong Da, and Hai Ba Trung Districts. 4. More than 50% of residents in Hanoi know about 3R and/or SS through PR and EE activities and the mass media. 	<ol style="list-style-type: none"> 1 – 3: Not yet implemented. However, in connection with 3., a fixed time and fixed point collection system as a precursor to the source separation system was introduced in Li Tai To Ward in Hai Ba Trung District (August 2009) and subsequently in Bach Kho Ward and Le Dai Hanh Ward in the same district. 4. The above-mentioned educational activities and guidance on source separation are continuing in the four model areas (and their districts).

Since the completion of the Project, the HPC and DOC have made the formulation of a master plan for solid waste management in Hanoi City a priority over other targets in view of the implementation of the various activities planned in the Strategic Paper and the Action Plan. The ex-post evaluation study has confirmed the following background for this decision by the two organizations.

At the time of project completion, there was a reasonable prospect of funding for the source separation program in areas other than the four model wards in the central districts because of the planned cleaning and beautification of Hanoi in preparation for the millennium celebrations in the following 2010 and also because of the ongoing work to revise the Hanoi Solid Waste Management Regulation . In reality, however, the financial constraints faced by the HPC and the replacement of the deputy chairman responsible for solid waste management in the HPC led to a lack of budgetary disbursement to specially support the source separation program to the URENCO and other stakeholder organizations. At the time of project completion, neither the Action Plan nor the Strategic Paper produced under the Project were incorporated in municipal policies yet. Under these circumstances, the DOC and URENCO considered it essential to confirm the reality of the flow of urban waste in Hanoi City and the municipal capacity for waste management (collection, transportation, intermediate treatment and final disposal) and to prepare a city-wide master plan for solid waste management. Based on such understanding, they worked on the HPC to place an order for a study on a master plan for solid waste management in Hanoi City to a local consultant. The contents of this master plan were subsequently finalized through a series of consultations with various organizations in the city and approved by the HPC in early 2013. All of these activities aimed at the achievement of such targets as “the establishment of institutional and financial mechanisms for waste management based on the implementation of the 3R in Hanoi City” and “the expansion of the implementation of SS to the whole of Hoan Kiem District”.

Based on the National Strategy for the Integrated Management of Solid Waste Until 2025 and the Vision Towards 2050, the said master plan aims at minimizing the landfill volume through the collection, reuse, recycling and treatment using environmentally sound technologies of all types of solid waste. It proposes the construction and operation of solid waste treatment plants combining such treatment methods as landfill, incineration, composting and biogas production in collaboration with private companies. In this context, the master plan covers such targets identified in the Strategic Paper as “the development of a comprehensive waste treatment system and sanitary landfill in Hanoi City by 2015” and “the examination and introduction of modern processes and technologies for waste treatment, including incineration and energy recover, by 2020”. The master plan refers to some of the positive results of the source separation pilot project and trial composting project under the Project even though the target areas were rather limited; and indicates the city’s intention to continue the composting business with

the introduction of other technologies. The master plan also covers such issues as the extension of source separation to entire Hanoi City, improvement and expansion of recycling facilities and strengthening of the legal, regulatory and financial aspects of solid waste management and these contents are consistent with the contents of the Action Plan.

The master plan is expected to be signed off by the Prime Minister by the end of 2013 or early 2014. The establishment of an appropriate waste management system throughout the city with secured budgetary appropriation and investment in projects proposed by the master plan will be a step forward towards realizing the medium-term overall objective of “the implementation of a harmonized 3R system based on a source separation program for organic waste”. Although Indicator 1 for the overall goal was not achieved, Indicator 2 was partially achieved. Therefore, the overall goal was partially not achieved.

3.2.2.2 Situation of Various Activities Launched under the Project at the Time of Ex-Post Evaluation

The situation of the various activities introduced under the Project at the time of the ex-post evaluation is summarized below although they were not included in the indicators for the overall goal.

1) Source Separation of Organic Waste and Composting in the Four Model Wards < Source Separation of Organic Waste >

Even though there has been no budgetary backing for the continuation and expansion of source separation since the time of project completion to the time of the ex-post evaluation, the source separation of organic waste has been continuing in the four model wards. The results of the beneficiary survey outlined in the table below indicate that knowledge on the 3R has been spread among the residents of these four model wardareas compared to residents of other areas. Such knowledge underpins the high level of commitment of the residents of the model wards to the practice of the source separation of organic waste in the post-project period. The field survey and interviews with stakeholders during the ex-post evaluation study confirmed the development of a cooperative and friendly relationship between local residents, district and ward people’s committees, women’s unions and other organizations and URENCO staff and waste collectors with the advancement of the pilot project in Nguyen Du Ward and Phan Chu Trinh Ward where the state of source separation has been excellent up to the time of the ex-post evaluation.

Table 3: Beneficiary Survey Results

Knowledge of the 3R					
• Question: Do you know about the 3R?					
	Model Area				Total
	Nguyen Du	Land Ha	Thanh Cong	Phan Chu Trinh	
Don't know	4 (16%)	1 (4%)	0 (0%)	6 (24%)	11 (11%)
Have heard of them	9 (36%)	6 (24%)	1 (4%)	1 (4%)	17 (17%)
Knows	11 (44%)	12 (48%)	13 (52%)	17 (68%)	53 (53%)
Knows well	1 (4%)	6 (24%)	11 (44%)	1 (4%)	19 (19%)
Total	25 (100%)	25 (100%)	25 (100%)	25 (100%)	100 (100%)
* In wards other than the model wards, the answer “Knows well” accounts for 2% while “Knows” accounts for 18%, “Have heard of them” for 57% and “Don't know” for 23%. The results among residents of the model wards shown above suggest a much higher level of knowledge of the 3R in the model wards.					
• Question: What does 3R stand for? Please specify each R.					
	Model Area				Total
	Nguyen Du	Land Ha	Thanh Cong	Phan Chu Trinh	
3 correct answers	14 (56%)	2 (8%)	3 (12%)	18 (72%)	37 (37%)
2 correct answers	3 (12%)	3 (12%)	1 (4%)	1 (4%)	8 (8%)
1 correct answer	1 (4%)	18 (72%)	21 (84%)	0 (0%)	40 (40%)
Don't know any	7 (28%)	2 (8%)	0 (0%)	6 (24%)	15 (15%)
Total	25 (100%)	25 (100%)	25 (100%)	25 (100%)	100 (100%)
* In wards other than the model wards, “3 correct answers” account for 5% while “2 correct answers” account for 11%, “1 correct answer” for 58% and “Don't know any” for 26%. The results among residents in the model wards shown above indicate a high proportion of residents with 3 correct answers (37%).					
State of Source Separation at Individual Households					
• Question: Did you separate organic waste throughout the pilot project period (2006 – 2009) without fail?					
	Model Area				Total
	Nguyen Du	Land Ha	Thanh Cong	Phan Chu Trinh	
Not at all	0 (0%)	0 (0%)	2 (8%)	1 (4%)	3 (3%)
Not really	2 (8%)	8 (32%)	3 (12%)	3 (12%)	16 (16%)
More or less	4 (16%)	6 (24%)	16 (64%)	2 (8%)	28 (28%)
Most of the time	18 (72%)	10 (40%)	2 (8%)	12 (48%)	42 (42%)
Always	1 (4%)	1 (4%)	2 (8%)	7 (28%)	11 (11%)
Total	25 (100%)	25 (100%)	25 (100%)	25 (100%)	100 (100%)

- Question: Do you always separate organic waste as of 2013?

	Model Area				Total
	Nguyen Du	Land Ha	Thanh Cong	Phan Chu Trinh	
Not at all	0 (0%)	1 (4%)	0 (0%)	1 (4%)	2 (2%)
Not really	2 (8%)	5 (20%)	0 (0%)	4 (16%)	11 (11%)
More or less	1 (4%)	3 (12%)	6 (24%)	1 (4%)	11 (11%)
Most of the time	18 (72%)	15 (60%)	13 (52%)	11 (44%)	57 (57%)
Always	4 (16%)	1 (4%)	6 (24%)	8 (32%)	19 (19%)
Total	25 (100%)	25 (100%)	25 (100%)	25 (100%)	100 (100%)

* In wards other than the model wards, the ratio of households practicing the source separation of organic waste (most of the time or always) is higher at the time of the ex-post evaluation (76%) compared to during the project period (53%).

Source: Beneficiary survey.

< Composting >

Since the completion of the Project, the volume of organic waste taken to the Cau Dien Compost Plant from the four model wards has decreased (Table 4). According to the people concerned, the main reason for this is the decrease of generated organic waste at households due to the marketing of fish, meat and vegetables of which the inedible parts have already been removed before sale in the fresh market. During the project period, the volume of waste taken to this compost plant was as high as 40 – 50tons/day but the ratio of actual organic waste was only 25 – 30%. At the time of the ex-post evaluation, however, even though the volume of waste taken to the compost plant has dropped to some 30 tons/day, the ratio of actual organic waste is 65%, indicating a much higher level of source separation.

Meanwhile, the sales amount and sales value of compost have also declined (Table 5). Although the plant management has made efforts to keep the plant afloat, including reducing the number of employees from 100 to 42, it still faces tough business conditions. According to the people concerned, the main reasons for the sluggish business performance of the compost plant are the sales price of compost (approximately 500 VND/kg) which is substantially lower than the production cost (1,800 – 2,100 VND/kg), preference of farmers for chemical fertilizers with a quick effects, lack of a proper understanding of the soil improvement effect of compost and difficulty of expanding the market (high cost of transportation to distant farming areas from Hanoi City even though there is a potential demand for compost in these areas). The separation of the Cau Dien Compost Plant which makes the compost and the organization responsible for the marketing and sale of the compost (another subsidiary of the URENCO) is another factor

for the employment of a consistent concept through the product planning, development, production, marketing and sales stages. The fact that the HPC pays the cost of transporting organic waste to the Cau Dien Compost Plant but does not pay the cost of composting or the residue transportation cost is an obstructing factor for the continuation and strengthening of the URENCO's compost business.

According to people working at the Cau Dien Compost Plant, the turning method using a wheel loader introduced under the Project can produce more compost in a shorter period of time than the conventional air supply fan method. However, the latter is continually used because it is unnecessary to increase the compost production volume in view of the lack of expansion of the source separation areas which was expected to take place after the completion of the Project.

Table 4 Volume of Organic Waste Transported to the Cau Dien Compost Plant from Each Model Area (Unit: tons/year)

Year	Model Area				Total
	Phan Chu Trinh	Nguyen Du	Thanh Cong	Lang Ha	
2007	594	675	-	-	1,269
2008	803	1,022	1,642	1,277	4,744
2009	424	1,043	1,734	1,380	4,581
2010	405	923	1,325	1,022	3,675
2011	413	773	1,137	1,095	3,418
2012	407	733	1,095	1,010	3,245

Source: URENCO

Note: Source separation started on 1st July, 2007 in Phan Chu Trinh Ward, 1st August, 2007 in Nguyen Du Ward, July, 2008 in Thanh Cong Ward and August, 2008 in Lang Ha Ward.

Table 5 Production Volume and Turnover of Compost at the Cau Dien Compost Plant

Year	Total Production Volume (tons/year)	Unit Production Cost (VND/ton)	Sale of Compost	
			Volume (tons/year)	Turnover (VND/year)
2004	6,513	600,000	2,114	1,258,391,500
2005	5,151	600,000	2,735	1,903,402,500
2006	4,788	600,000	2,799	1,715,355,300
2007	3,828	600,000	4,485	2,919,500,000
2008	3,390	600,000	1,464	691,189,600
2009	3,217	600,000	2,060	811,098,698
2010	2,424	600,000	1,958	783,182,437
2011	2,018	600,000	1,776	710,882,090
2012	1,997	600,000	1,612	644,746,500
2013	-	800,000	-	-

Source : URENCO

The questionnaire survey and series of interviews with the people concerned conducted as part of the ex-post evaluation study has confirmed that no meetings of the 3R Council or 3R Stars have been held since the completion of the Project. The reasons cited for the lack of 3R Council meetings are (i) the HPC has not taken any initiative for the continuation of such meetings and (ii) no staff members of the DOC have been assigned to arranging 3R Council meetings as all DOC staff members have been busy with other assignments. The reasons cited for the lack of 3R Stars meetings are (i) neither the HPC nor the DOC have taken any initiative for the continuation of such meetings, (ii) difficulty of the URENCO as a subordinate body of the DOC to call people from higher municipal bodies to such meetings and (iii) failure of the URENCO to secure funding to cover the cost of 3R stars meetings.

Several respondents and interviewees have expressed the opinion that a discussion forum such as the 3R Council or 3R Stars is necessary for the promotion of the 3R and that the DONRE or DOC would be a preferred organizer of such a forum.

3) Environmental Education

The promotion of environmental education featuring the 3R was one of the activities most emphasized by the Project. The importance of environmental education in Hanoi City was recognized during the project period and such education has been enhanced and expanded since the time of project completion to the time of the ex-post evaluation. However, the actual educational activities have been conducted by several organizations without any guidelines or organization to centrally control or oversee these activities.

As the promotion of the 3R is a policy of the Government of Vietnam, both the MOET and MONRE have been implementing environmental education in accordance with the policy. According to the DOET, the textbook used for 1st through 5th grade primary education pupils already includes contents similar to those of the environmental education tool program developed under the Project (source separation at home is not referred to in the textbook). Meanwhile, the DONRE with budgetary funding for environmental education and publicity has been conducting (i) events, including the International Environment day, (ii) environmental education and publicity using such media as television and newspapers and (iii) environmental activities (cleaning volunteer program, etc.) in collaboration with student unions and women's unions. The DONRE has also been conducting educational and PR activities to promote the 3R and source separation.

At the URENCO, the Personnel Division used to handle publicity until around 2008. As it recognized the importance of environmental education and publicity under the Project, it established the 3R Communication Team in 2008 responsible for environmental education and publicity specializing in 3R-related activities. Later in November, 2012, the Publicity Division was established to be responsible for (i) the education and training of staff members of the URENCO on environmental conservation and hygiene and collaboration with external organizations on these matters, (ii) dealing with complaints made by users, (iii) contact with the mass media and (iv) management of a website. However, education and publicity on the 3R and source separation for the citizens of Hanoi City are not essential part of the duties of the URENCO but of the DONRE and MONRE. From 2009 to 2012, the URENCO received two Japan Overseas Cooperation Volunteers (JOCVs) as long-term volunteers who conducted environmental education at primary schools using the environmental education tool program developed under the Project. Since the end of the dispatch of the JOCVs, the URENCO has not been involved in environmental education and publicity at schools.

4) Activities of the 3R Volunteer Club and 3R Supporters

Although the members of the 3R Volunteer Club decreased from some 200 in 2008 and 2009 during the project period to some 100 in 2013, it is still in operation. It has been organizing the MOTTAINAI Fair twice a year and continuing the environmental education at schools. Apart from its contribution to awareness raising of the 3R among the residents of the model wards as well as citizens of Hanoi City and to the dissemination of the spirit of MOTTAINAI as a driving force for the promotion of the 3R among young people, the 3R Volunteer Club has developed a network with other environmental protection organizations to issue the Environmental Conservation Declaration for Vietnam. It has been hailed as a leading environmental protection body and has had positive impacts beyond the framework of the project-related activities.

Meanwhile, the 3R Supporters consisting of representatives of such local community groups as women's unions and the Youth League has been continuing educational activities on the 3R and source separation in the four model wards while maintaining a loose link with the 3R Volunteer Club.

3.2.2.2 Other Impacts

1) Reflection of the Achievements of the Pilot Project on the National 3R Strategy

The National Strategy for Integrated Solid Waste Management up to 2025 and the Vision 2050 adopts source separation at each household as an effective means of 3R

based on the achievement of the pilot source separation project under the Project of reducing the volume of waste to be dealt with by a final disposal site by more than 30%. This National Strategy also incorporates a program to formulate regulations to enforce source separation at households as well as workplaces.

The Committee which formulated the National Strategy included two members of the 3R Stars (a senior researcher of the research institute of the MONRE and a staff member of the Ministry of Construction) whose proposals led to the inclusion of a call for source separation at households and workplaces in the National Strategy. Interviews with committee members during the process of the ex-post evaluation have confirmed that the National Strategy was unanimously approved as all of the committee members know about the trial source separation of organic waste and composting program through publicity of the Project (television, radio, newspapers and others).

The National Strategy is one basis for the Master Plan for Solid Waste Management in Hanoi City.

2) Recognition of Hanoi City as an Advanced 3R City

Through the source separation of organic waste and composting program, the Project has attracted much attention from other cities in Vietnam and study teams from Da Nang and other major cities have visited Hanoi City to learn about Hanoi's experience of the said program. Interviews at the URENCO's Publicity Division have found that Hanoi City is perceived to be an advanced 3R city and a number of study teams (of local public bodies, universities and others) from other cities have visited Hanoi City every year in the post-project period. For example, 18 such study teams visited Hanoi City in 2012. While there have been frequent media reports on solid waste management, concrete records have not been kept.

Based on the above, the project objective is deemed to have been achieved as the preparations for a harmonized 3R system based on the source separation program are in place. This assessment is backed by the continued implementation of 3R-related activities in the four model wards and by the development of the legal and institutional frameworks to secure budgetary funding for expansion of the source separation areas. However, in terms of the financial aspect, no decision has been made regarding how to finance the medium to long-term expansion of the source separation areas to cover entire Hanoi City. As far as the overall goal is concerned, its achievement is partial because of the fact that the source separation areas have not been expanded and also because of the fact that only

a limited number of activities based on the Strategic Paper have started. In contrast, the source separation of organic waste has been continuing at a very high level in the model wards and other positive impacts have emerged, including the inclusion of source separation in the national policy and the recognition of Hanoi City as an advanced 3R city. Among the target issues identified by the Strategic Paper, a master plan for solid waste management in Hanoi City has already been formulated as it is considered to be the most important issue. Once the budget for investment in the activities/projects proposed by the master plan are realized to conduct the improvement of existing waste treatment facilities, construction of new such facilities and expansion of the source separation areas, it is expected that the URENCO and other stakeholder organizations in solid waste management will receive extra manpower as well as funding, resulting in the realization of the various activities/projects proposed by the Strategic Paper.

The Project has somewhat achieved its objective and, therefore, its effectiveness and impact is fair.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

The planned inputs and actual inputs at the completion of the Project are shown in the table below.

Inputs	Plan	Actual Performance
Japanese Side		
(1) Experts	5 experts	13 experts
(2) Trainees Received	“Environmental Management” “Recycling Technologies” “Planning of a Recycling Society	13 trainees (First Session: 7, Second Session: 6)
(3) Third Country Training Program	No entry	8 trainees (Thailand)
(4) Equipment	Waste containers, AV equipment and other	Approximately 1,5 million yen (containers for source separation; containers for household separation; computer; digital camera; digital video camera; other)
Field Work Cost	Preparation of contents for the 3R promotion project; development of trial goods for promotion of source separation at households; implementation of the pilot project; development of	No entry

	consistent media contents; other	
Local Subcontracting Cost	No entry	102 million yen (waste survey; compost analysis; PR tools; events)
Total Project Cost	Total: 326 million yen	Total: 493 million yen
Vietnamese Side		
Deployment of Counterparts	As required	21 counterparts
Arrangement of Land, Facilities and Equipment	Arrangement of an office space	Arrangement of facilities (Project Office; vehicles for separate collection; compost plant)
Local Cost	Securing of the necessary budget	Project operation cost: Approximately 1,429 million VND (source separation collection; surveys and analyses; meetings; seminars; printing and other costs)
Other	The URENCO supplies necessary information and data on the pilot project for source separation and collection of organic waste, trial composting project and target areas of the pilot project and conducts necessary coordination between stakeholder organizations and local residents.	No entry

Source: Materials provided by JICA.

3.3.1.1 Elements of Inputs

A series of interviews with Japanese and Vietnamese people involved in the Project was conducted and the response was that the quality, quantity and timing of each input were generally adequate. The Vietnamese side highly appraises the quality of the Japanese experts, timing and duration of their dispatch, contents of the training in Japan and a third country, PR and educational activities under the Project and quality and quantity of equipment provided and believes that the adequate inputs led to positive outputs and outcomes.

As far as the recruitment of local staff for the Project is concerned, the original plan was simply to recruit a secretary-cum-interpreter for the Project Team. In reality, additional staff members were recruited at the beginning of project implementation in view of the fact that not enough counterparts were assigned to the 3R activities which

were not standard duties of the URENCO and that it was essential to directly work with residents in the model wards to encourage their participation in these activities. Interviews with staff members of the URENCO and others confirmed that the local staff employed for the Project collaborated with the counterparts and follow-up activities even when the Japanese experts were temporarily absent from the scene, positively contributing to the smooth and proper implementation of various activities. Meanwhile, the original plan for the Project did not include financial analysis of the source separation of organic waste and the composting business in the post-project period when the subject areas for source separation would have been increased. This analysis was added as a new project-related activity at a meeting of the Joint Steering Committee held in February 2008 and was conducted in the final year of the Project. Moreover, the quantity was substantially increased in the course of project implementation for such inputs as the analysis and market survey for compost, financial plan and improvement and provision of equipment for the composting facility. However, the outputs and outcomes of composting do not necessarily correspond to the increased inputs at the time of the ex-post evaluation as shown in Table 4. The principal reason for this is that the planned expansion of the source separation areas has not been achieved.

3.3.1.2 Project Cost

The actual project cost was 493 million yen, higher than the planned cost of 326 million yen by 51%. The reasons for the higher project cost than planned are the extension of and additions to the dispatch periods of the Japanese experts, additional training, provision of additional equipment, etc. and increased cost of subcontracting in relation to various surveys and publicity activities.

3.1.3 Period of Cooperation

The period of cooperation was approximately three years as planned.

Although the period of cooperation was within the plan, the project cost exceeded the plan, therefore, the efficiency of the Project is fair.

3.4. Sustainability (Rating: ②)

3.4.1 Related Policy towards the Project

At the time of the planning of the Project, Vietnam was aiming at achieving the 30% recycling use of solid waste by 2020 under the National Strategy for Environmental Projection up to 2010 and Vision Towards 2020 (2003). The National Strategy for Integrated Solid Waste Management up to 2025 and Vision 2050 which came into force after the completion of the Project is another step forward and states that 85% of of the

total solid waste from households in the urban areas of cities, which have their own recycling facilities such as Hanoi City, will be collected and adequately treated by 2015, of which 60% will be recycled, re-used or converted to energy or compost. Promotion of the 3R in Vietnam has become more important in the environmental sector in general and the country's solid waste management policy in particular compared to the time of the Project's commencement and the target values have been upwardly revised.

Moreover, the Master Plan for Solid Waste Management in Hanoi City has already been passed by the HPC and is expected to be approved by the Prime Minister by the end of 2013. Improvement of the existing recycling facilities and the construction of facilities (composting, gasification, plastics recycling and other facilities) proposed in the said Master Plan will become a reality when the necessary funding for and investment in these facilities is secured. This new reality should then facilitate the promotion of the 3R and expansion of the source separation areas. In view of such prospect, the sustainability in terms of the related policies is high.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

It is recognized that the organizational capacity of the URENCO has been improved through the pilot project, trial composting project and environmental education while the continuation of activities by the newly established Publicity Division at the time of the ex-post evaluation has been confirmed. Of the 21 counterparts working for the URENCO at the time of project completion, 18 still work there at the time of the ex-post evaluation. In the case of people's committees, women's unions and other organizations in the four model wards, many of those who participated in the activities introduced under the Project are still active in their organizations. Therefore, there do not appear to be any major organizational problems to hinder the continuation of source separation. For the promotion of the 3R throughout the four central districts with the expansion of source separation, however, there are several goals which must be successfully achieved. These include (i) training of URENCO staff members who were not counterparts for the Project, (ii) establishment of a cooperative relationship with people's committees, women's unions and other organizations in those areas where the source separation system is to be newly introduced in line with the planning manual formulated under the Project for the introduction of the said system to non-model wards, (iii) educational activities targeting residents and (iv) procurement of new containers and collection vehicles for source separation. To achieve these goals, it will be necessary for the URENCO to increase its staff strength and budget size. Moreover, enhancing the organizational strength of such superior bodies as the DOC (in charge of the development of environmental

infrastructure) and the DONRE (in charge of environmental education and publicity) is essential to spread source separation throughout Hanoi City with the URENCO utilizing the knowledge and skills learned from the Project to the maximum.

For expansion of the source separation areas, the collaboration between stakeholder organizations must be further enhanced along with the strengthening of each organization. Under the Project, the introduction of a material-cycle society embracing the entire material flow from the upstream to the downstream (material input → production → distribution → consumption → source separation → collection/transportation → recycling → final disposal) was aimed at by means of establishing the 3R Stars (consisting of some 85 organizations and individuals ranging from citizens, representatives of the private sector and administrative bodies to scholars and others) for the wide promotion of the 3R through the collaboration of citizens, the private sector and administrative bodies. At the same time, the 3R Council consisting of representatives of government organizations and scholars was established to discuss policies relating to the development of a material cycle society. These two organs have been inactive since the completion of the Project and there is a strong call among the people concerned to revive their activities. It is hoped that a network which will function like the 3R Stars and/or 3R Council will be established in view of the fact that the eventual enforcement of the Master Plan for Solid Waste Management in Hanoi City will make it necessary for citizens, the private sector and administrative bodies to discuss and agree on a number of issues, including the construction of waste treatment facilities and strict enforcement of a law controlling source separation and the illegal dumping of waste (crackdown on offenders).

Based on the above, the institutional and operational aspects of the implementing agency have some problems.

3.4.3 Technical Aspects of the Implementing Agency

The counterparts of the URENCO and waste collectors acquired knowledge and skills relating to the 3R through the pilot project and are still applying these skills today. The people's committees, residential groups and women's unions in the four model wards have also acquired knowledge and much experience of the 3R through the pilot project. No technical problems are anticipated in regard to the expansion of source separation to non-model wards in the four central districts of Hanoi City where the URENCO is responsible for waste collection due to the development of the necessary technical knowledge and skills under the pilot project. In the case of the composting business, as

engineers of the compost plant have learned the wheel loader turning method under the Project, the conventional air fan method can be switched to the turning system with an increase of the volume of organic waste to be treated, boosting the compost production volume. There is, therefore, a local understanding that there are no major technical problems regarding composting operation.

However, further strengthening of the technical capability of not only the URENCO but also other stakeholder organizations, such as the HPC, DOC and DONRE, is essential for the spread of the 3R activities to the entire area of Hanoi City based on the Master Plan for Solid Waste Management in Hanoi City.

3.4.4 Financial Aspects of the Implementing Agency

The main sources of income for the URENCO are its budget (consisting of a service fee based on the actual performance of waste collection, transportation and treatment and a subsidy) allocated by the HPC and the waste collection charge payable by households and businesses. Interviews for the ex-post evaluation have confirmed that there has so far been no special budgetary allocation by the HPC for the expansion of source separation. In the midst of a lack of funding for the expansion of source separation in the post-project period, the URENCO has somehow managed to implement source separation in the four model wards. Any expansion of source separation throughout the four central districts of Hanoi in the coming years will require a certain budget level for the procurement of containers and collection vehicles for organic waste, awareness raising and environmental education activities targeting residents and an increase of the number of waste collectors. The collection charge for households is currently 3,000 VND/person/month (approximately 14 yen based on the JICA exchange rate of 1 VND to 0.0046 yen in August 2013) and has not been revised since 2007.¹⁴ As already mentioned, the business situation of the compost plant is very tough because of the substantially lower sales price of compost than the production cost and also because of the sluggish growth of the sales volume. The introduction of both a collection charge corresponding to the cost of the waste treatment and recycling service as well as a compost price which matches the production cost is necessary to secure the URENCO's own funding sources. At present, any financial shortfall of the URENCO is supplemented by the HPC, illustrating the rather unprofitable business operation of the URENCO.

The draft revision of the Hanoi Solid Waste Management Regulation discussed and proposed by the 3R Stars during the project period was endorsed several months after

¹⁴ Revision of the collection fee requires the approval of the HPC.

project completion, completing the legal and institutional framework for the geographical expansion of the achievements of the pilot project. Interviews with officials of the DOC, DONRE and URENCO have found that there is a good prospect for an increase of the waste management budget and review of the collection charge once the Master Plan for Solid Waste Management in Hanoi City is implemented. The financial aspect of the URENCO is, therefore, likely to improve.

Some problems have been observed in the structural and financial aspects, therefore, the sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The Project aimed at creating a material cycle society in Hanoi City by means of establishing a 3R (reduce, reuse and recycle) system and making waste-related municipal policies incorporate the 3R through the implementation of a source separation and composting program, environmental education and publicity activities. As the Project was highly relevant to the development plan and development needs of Vietnam as well as Japan's ODA policy, its relevance is high. The Project has generally achieved its objective. The source separation of organic waste which was conducted on full-scale basis under the pilot project for the first time in Vietnam has achieved better results than planned with the understanding and cooperation of the residents of the four model wards in central Hanoi and has become an established practice in the post-project period. With the wide publicity of such achievement, Hanoi City is now recognized as an advanced 3R city at home and abroad. In terms of the impacts on policies, the source separation of organic waste and composting are clearly stated as effective means of practicing the 3R in the National Strategy for Integrated Solid Waste Management up to 2025 and Vision 2050 (announced in 2009) while there is a good prospect of the enforcement of the Master Plan for Solid Waste Management in Hanoi City which is essential for the implementation of the 3R. The Project has contributed to the development of a system to promote the 3R as such new organizations as the 3R Council, 3R Stars, 3R Volunteer Club and 3R Supporters were established under the Project. There are, however, some pending issues, including (i) the non-expansion of the source separation of organic waste to areas other than the model wards due to a lack of funding and shortage of manpower and (ii) the discontinuation of the activities of the 3R Council and 3R Stars. Therefore, the effectiveness and impact of the Project is fair. Although the cooperation period was as planned, various surveys and publicity activities which were not originally planned were added, resulting in a significantly higher project cost than planned. Therefore, the

efficiency of the Project is fair. As promotion of the 3R is clearly stated in the environmental policy and solid waste management strategy of Vietnam, its sustainability from the policy aspect is high and there are no institutional and technical problems in regard to the continuation of activities in the model wards. Meanwhile, there are some pending issues in relation to the implementation system and finance, therefore, sustainability of the project effects is fair. Once the said Master Plan has been officially approved with a concrete prospect of budgetary appropriation for and investment in the activities proposed in the Master Plan, there is a realistic expectation of an improvement of the waste treatment facilities and strengthening of the implementation system together with increased funding, all of which are necessary to achieve an expansion of the source separation areas.

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

4.2 Recommendations

4.2.1 Recommendations to the HPC

Dissemination of the 3R to the entire area of Hanoi City should be promoted by the HPC as a municipal policy while utilizing the skills and knowledge acquired by the URENCO through the implementation of the Project. The early implementation of activities proposed by the Master Plan for Solid Waste Management in Hanoi City is desirable to achieve the overall goal of “the implementation of a harmonized 3R system based on a source separation program for organic waste”. It is recommended here to the HPC that the HPC should allocate the necessary budget and manpower to ensure such early implementation of activities while re-starting a forum such as the 3R Stars launched under the Project for improved coordination as well as collaboration between citizens, the private sector and the administration.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

1. Establishment of a Counterpart Organization(s) Corresponding to the Scope of the Project

The URENCO, the principal counterpart organization for the Project, is a public corporation supervised by the DOC and is the main implementation body for waste treatment in Hanoi City. It is responsible for (i) the collection and transportation of waste in the four central districts with the largest generation of urban solid waste in Hanoi City

and (ii) the operation and management of the final disposal site and compost plant. It is, therefore, the ideal counterpart organization for technical cooperation in the fields in which the URENCO operates. As described in 1.1 – Background, even though the source separation of organic waste was conducted in part of central Hanoi at the time of the ex-ante evaluation for the Project, it was not making smooth progress. Moreover, the concept of the 3R was not widely known among the citizens of Hanoi. Under these circumstances, the Project primarily aimed at making the citizens of Hanoi understand the concept of the 3R through environmental education and publicity activities and then feeling the significance of the 3R through their participation in the source separation of organic waste and composting program. From such viewpoint, the selection of the URENCO as the counterpart organization was appropriate as it would play a central role in the pilot project. However, not only the skills and knowledge possessed by the URENCO but also the decision-making and initiatives of the HPC are essential to make waste management policies reflect the achievements of the pilot project and to facilitate city-wide source separation as well as a 3R movement, both of which will require the policy coordination and collaboration of many stakeholder organizations and much funding.

It is true to say that the management of a project becomes somewhat complicated if more than one organization is selected as the counterpart organization. In the case of the present Project, however, the active and deep involvement of the HPC (DOC and DONRE) responsible for waste-related administration throughout Hanoi City from the very beginning of the Project as the counterpart for technology transfer in terms of policy formulation, system development and fiscal management would have ensured a higher level of effectiveness/impact and sustainability.

When planning a similar project in the future, it will be essential to determine the overall goal within the scope covered by the authority and decision-making of the selected counterpart or to select a counterpart which corresponds to the scope of the overall goal in order to achieve a higher level of effectiveness/impact and sustainability.

2. Innovative Ideas for Dissemination of the Pilot Project

Under the Project, the pilot project for the source separation of organic waste and trial composting project were implemented with the utmost care and the acquired knowledge was incorporated in a planning manual for the source separation of organic waste. The development of this useful tool for the extension of the pilot project went hand in hand with innovative ideas for the dissemination of the pilot project from the technical aspect.

In reality, however, the scale of the pilot project was extremely small compared to the area and population of Hanoi City. Expansion of the source separation of organic waste to non-model wards since project completion has not been achieved because of a lack of initiative on the part of the HPC in terms of the allocation of funding as well as manpower. In the case of a top-down administrative system such as that in Vietnam, it may be an idea to develop and utilize a process of dissemination which capitalizes on the characteristics of the administration (a dissemination model which operates along the axis of the administrative hierarchy from the HPC to district and ward HPCs) to strictly enforce educational activities and guidance on source separation from the viewpoint of securing sufficient budget and manpower allocation. Meanwhile, the procurement and installation of containers for source separation and the training of waste collectors should be left to a solid waste management body, such as the URENCO, so that these activities are implemented to a certain extent as part of the project design.

In many cases, a small and firmly structured model is difficult to apply to a wider area without modification. When a model (pilot) project is introduced as part of the main project, it is important at the time of project planning to clearly indicate the policy for the dissemination of the model project in the post-project period.

3. Essential Economic and Financial Perspectives When Examining How to Promote the 3R

The introduction of the source separation of organic waste and composting program under the Project was almost unprecedented in Vietnam at the time of its implementation. The URENCO which is responsible for waste management activities and the DOC which is responsible for waste management-related infrastructure still does not have a full understanding of the economic and financial aspects of the source separation system, including the cost of educational and practical guidance activities on source separation, recycling cost as part of waste management, cost of studies on the market demand for recycled goods and cost of expanding the sales channels for recycled goods.

When a component involving business operation is included in a project, comprehensive analysis of not only the project's technical and social aspects but also its economic and financial aspects is essential. The availability of a subsidy to make the component in question economically viable and other relevant matters must be fully examined prior to the implementation of the component.

Social Republic of Viet Nam

Ex Post Evaluation of the Japanese Technical Cooperation Project
“Traffic Safety Human Resources Development in Hanoi”

External Evaluator: Mimi Sheikh
International Development Center of Japan Inc.

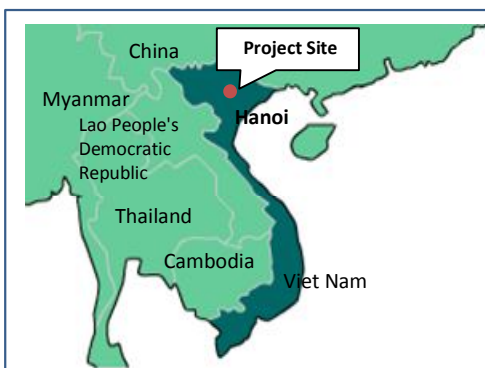
0. Summary

This project aimed at developing the human resources of traffic safety-related officers in Hanoi, namely, traffic police officers, traffic inspectors, traffic management and road facility officers, and traffic safety education-related officers in order to improve the city’s traffic safety measures and to further reduce traffic accidents in Hanoi.

This project objective is consistent with the development policy and development needs of Vietnam, as well as with the Official Development Assistance policy (ODA) of Japan. The project approach is also appropriate. Therefore, the relevance of the project is high. The study confirmed that traffic safety-related indicators and the awareness of Hanoi citizens regarding traffic safety have been improving. In light of these facts, the effectiveness/impact of the project is also high. On the other hand, the efficiency of the project is low. All the inputs were necessary to achieve the project objective and were used appropriately; however, the project period and cost have exceeded the plan. As for the project’s sustainability, the Vietnamese government still considers its policy to enhance traffic safety to be one of its top priorities, and the financing aspect of it is also positive, because traffic-related penalties and fines have been increasing. Hence, the sustainability is high.

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

1. Project Description



Project Location



A Police Officer Controlling Road Traffic

1.1 Background

As a result of rapid economic growth and motorization in Vietnam, the number of fatalities caused by traffic accidents reached a peak of over 13,000. The government of Vietnam recognized that traffic accidents were one of the most critical social issues facing the country, so, to this end, in 1997, it established the National Traffic Safety Committee (NTSC) and local traffic safety committees in each province to implement traffic safety measures. In spite of government efforts, the number of annual fatalities caused by traffic accidents still remained at over 10,000.

In Hanoi, the capital city of Vietnam, the Hanoi Traffic Safety Committee (HTSC) was established, and various traffic safety measures were undertaken. Despite a decrease in the number of road traffic accidents, there still are a high number of fatalities caused by traffic accidents. In response to this situation, comprehensive measures—including improved traffic facilities, greater safety consciousness on the part of road users and pedestrians, the operation of effective traffic safety controls, and enhanced traffic safety-related officers’ abilities—were strongly needed. It is within this context that the Hanoi People’s Committee (HPC) requested that the government of Japan conduct a technical cooperation project on traffic safety human resources development for Hanoi City. JICA and HPC started the project on “Traffic Safety Human Resources Development” in July 2006.

1.2 Project Outline

Overall Goal		Road traffic conditions are improved
Project Objective		Traffic safety measures in Hanoi are improved
Outputs	Output 1	To establish a system for the planning, implementation, and evaluation of comprehensive traffic safety measures in Hanoi
	Output 2	To improve the abilities of traffic police officers in the Hanoi Traffic Police Division
	Output 3	To improve the abilities of traffic inspectors in the Hanoi Department of Transport
	Output 4	To improve the abilities of officers in the Hanoi Department of Transport
	Output 5	To improve the abilities of officers on the Hanoi Traffic Safety Committee for traffic safety education
Inputs		Japanese Side: 4. Experts 18 for Short-Term 5. 55 Trainees received (including local cost share) 6. 16 Trainees for Third-Country Training Programs (total) 7. Equipment 25.14 million yen 8. Local Cost 103.46 million yen (including local experts’ hiring cost) Vietnamese Side: 1. 37 Counterparts 2. Local Cost (13.91 million yen)

	3. Cost for Comprehensive Traffic Safety Pilot Projects (about 28.80 million yen) 4. Land and Facilities (Project Office and 2 Training Rooms)
Total Cost	617 million yen
Period of Cooperation	July 2006 – March 2009 Extended Period: April 2009 – March 2010
Implementing Agency	Hanoi People’s Committee, Hanoi Department of Transport (HDOT), Hanoi Traffic Police Division (HTPD), Hanoi Traffic Safety Committee (HTSC), Police Academy, and University of Construction
Cooperation Agency in Japan	National Police Agency
Related Projects	<ul style="list-style-type: none"> • Study on National Traffic Accidents (Basic Survey 2001-2002) • Program on Strengthening Road Traffic Safety (2002) • Program on Strengthening Road Traffic Safety (Phase II) (2003) • Basic Study on Road Traffic Safety in Hanoi (2003-2004) • Master Plan Study on National Road Traffic Safety (2007-2009)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Overall Goal

Specific numerical indicators for the overall goal were not established at the time of the terminal evaluation. Nevertheless, project-related stakeholders believed that the overall goal would be achieved if traffic safety measures in Hanoi were improved, based on the fact that traffic accident-related indicators—such as the number of traffic accidents, deaths, and injuries—have been decreasing in the nation as well as in Hanoi City since the introduction of traffic safety measures.

Meanwhile, the Traffic Safety Campaign undertaken in the Comprehensive Traffic Safety Pilot Project raised Hanoi citizens’ awareness of traffic safety and changed their behavior at the pilot project site¹. Furthermore, it was decided that newly introduced technologies such as left-turn signals, pedestrian signals, and lane separation in the pilot project would be expanded to other places. The projects have also strengthened coordination with other educational and training institutions; and with organizations in traffic safety.

1.3.2 Achievement of Project Objective

The project objective had been mostly achieved by the end of the project period; therefore, its effectiveness is high. The test results at the end of the course and the progress of the pilot projects confirmed that the human resources of all traffic

¹ An intersection improvement was conducted at the road section at Chhua Boc – To Thant Thung, ChuaBoc – Tay Son, and Thai Ha – Trung Liet; and road section improvement was conducted at Tai Ha – Chua Boc in the Comprehensive Traffic Safety Pilot Project.

safety-related institutions undertaking Hanoi's traffic safety measures had improved. In respect to the establishment of a system for the planning, implementation, and evaluation of comprehensive traffic safety measures in Hanoi, further efforts will be required to complete the system by strengthening the cooperation among subcommittees that were established within HTSC before the project completion.

1.3.3 Recommendations

For project activities, the following were recommended: 1) to reset measurable and objective indicators, 2) to sustain training programs for traffic police officers, traffic inspectors, and traffic engineers, 3) to institutionalize the technologies and skills acquired through Capacity Development Pilot Projects, 4) to complete the remaining tasks on the Comprehensive Traffic Safety Pilot Project, and 5) to enhance cooperation in order to prepare the "Traffic Safety Plan" and the "Human Resources Development Plan."

In addition, the evaluation team recommended extending the project for one more year because Output 1, "To establish a system for the planning, implementation, and evaluation of comprehensive traffic safety measures in Hanoi," had not been fully achieved due to a lack of time for a detailed study, administrative restructuring, and so on.

2. Outline of the Evaluation Study

2.1 External Evaluator

Mimi Sheikh, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

Duration of the Study: December 2012 – December 2013

Duration of the Field Study: March 31 – April 16, 2013, and June 23 – June 28, 2013

2.3 Constraints during the Evaluation Study

Staff numbers and budget information from HDOT, HTPD, and HTSC were not provided because those represent Hanoi City's confidential information. Therefore, the evaluation on budget sustainability was determined by the information obtained through interviews with the upper-level management of traffic safety-related institutions, and by the trend of revenues collected through fines or administrative sanctions from traffic control activities that are the main budget source of HTSC. Also, there was difficulty in measuring effectiveness, because indicators to measure the achievement of the project objective at the time of the project's completion were not properly and objectively verifiable. Thus, the indicators were reviewed and redefined, and, if needed, alternative or additional indicators were established to evaluate the achievement of the project at the

time of ex post evaluation.

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

3.1 Relevance (Rating: ③³)

3.1.1 Relevance to the Development Plan of Vietnam

The government of Vietnam started in earnest to improve the nation's traffic safety by establishing NTSC and local traffic safety committees. The 8th Socio-Economic Development Plan (SEDP) (2006-2010) reviewed the result of the 7th SEDP and pointed out that the national policy's outcome for traffic safety was not satisfactory. The government described the importance of traffic safety improvement in the chapter on National Defense and Safety, one of the priority sectors of the 8th SEDP. Based on this policy, HTSC has been taking measures to improve traffic safety in Hanoi. HTSC has been producing the city's traffic safety plan every five years, in accordance with the timing of the revision of the National Traffic Safety Program. The Traffic Safety Plan (2011-2015) and the Human Resources Development Plan (2011-2015) were posited as outcomes in the project, and HPC was expecting to use these plans after the project. Therefore, the objective and the activities of the project are considered to be relevant to the development policy of Vietnam for the period from the project planning to the project completion.

3.1.2 Relevance to the Development Needs of Vietnam

At the time of the project planning (2005), the number of road traffic accidents in Hanoi was 1,122, with 539 dead and 817 injured. The number of road traffic accidents and injuries decreased from 1995 to 2004; on the other hand, the number of fatalities increased from 291 in 1999 to 532 in 2002.

As for road traffic accidents by vehicle type, 37% of total road traffic accidents involved automobiles and 56% involved motorcycles, so the incidences of motorcycle accidents were higher than those of automobiles. Looking at the four-year trend from 1999 to 2003, pedestrian-caused accidents decreased, with not much change in motorcycle accidents, while automobile accidents increased from 30.7% to 37.2% during the same period. Thus, the enforcement of road traffic controls on automobiles as well as motorcycles was urgently required.

At the time of the project completion (2010), the number of road traffic accidents in Hanoi was 1,102, with 807 dead and 478 injured. Compared to the time of the project planning (2005), the number of traffic accidents decreased from 1,122 to 1,109, and the

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

³ ③: High, ② Fair, ① Low

injured also decreased from 817 to 478. Only fatalities increased, from 539 to 807. Looking at the causes of traffic accidents, collisions of automobiles and motorcycles had risen along with an increase in the number of automobile users⁴.

Due to this situation, appropriate measures for traffic safety-related officers to further improve the city's traffic safety were still needed, even at the time of the project's completion. According to interviews with counterparts, the need for more traffic safety knowledge and skills increased, post project completion.

3.1.3 Relevance to Japan's ODA Policy

The Country Assistance Program for Vietnam (2004) gave priority to the development of transportation as one way to develop the nation's economy, and it highlighted a focus on assistance for major international and domestic transportation trunk lines. The section on policy for power and transportation in the JICA Country Assistance Program in 2004 and 2006 described growing issues with traffic problems, such as traffic congestion and traffic accidents in large cities, due to an increase in the number of motorcycle users, and it further pointed out the necessity for providing assistance to improve traffic safety. Therefore, this project is considered to be in line with Japan's ODA policy.

3.1.4 Relevance of Project Approach

The traffic safety measures in Japan are based on the 3E (Enforcement, Engineering, and Education) approach, and this concept was used in this project⁵. In Hanoi City, HTPD is responsible for "Enforcement," which encompasses traffic regulation and traffic control on roads, and traffic analysis⁶. The Traffic Inspectors of HDOT are also responsible for "Enforcement," which encompasses illegal parking and overloaded vehicles⁷. HDOT is responsible for "Engineering."⁸ The Propaganda and Education Subcommittee established in HTSC is responsible for "Education."⁹ HTSC undertakes overall management of all the institutions related to the 3Es. However, unlike Japan, where all

⁴ The number of automobile and motorcycle registrations increased year on year. Comparing 2005 with 2010, it increased by 3.4 times for automobiles and 2.8 times for motorcycles.

⁵ Traffic accidents happen when hidden risks in "vehicles" and "roads" occur by chance and are caused by the dangerous behavior of "humans," such as a driver and a pedestrian. In response to this fact, traffic safety measures pay attention to three factors, namely "human," "vehicle," and "road environment." 3E measures stand for "Enforcement," the traffic instruction, control, and traffic accident investigations to manage road environments; "Engineering," the traffic safety facility improvements such as road signs, road indications, and traffic lights to manage automobiles; and "Education," the driver education, pedestrian and road user education to manage humans. The National Police Agency centrally manages 3E and usually takes measures in combinations of the 3Es to improve traffic safety.

⁶ It corresponds to Output 2.

⁷ It corresponds to Output 3.

⁸ It corresponds to Output 4.

⁹ It corresponds to Output 5.

3Es are managed by the National Police Agency, in Vietnam the line Ministries are more than one: For example, HDOT is under the Ministry of Transportation but HTPD is under the Ministry of Public Security. Because HDOT and HTPD have different line Ministries, institutional cooperation is not easy.

This project aimed to change the project's approach from an institutional to a cross-institutional approach. To do so, first, the project made traffic safety-related officers participate in short-term training in order to improve their abilities and, second, it also made them participate in pilot projects so that they could experience the synergistic effects resulting from cooperation among institutions. Through these activities, the project aimed to shift traffic safety measures from a vertical arrangement to a horizontal arrangement. Considering the fact that the concept of 3E itself was not known in either Hanoi City or anywhere in Vietnam in 2006, when the project started, the project approach was relevant.

On the other hand, it should be pointed out that the project summary in the Project Design Matrix (PDM) was vague, and the scope of the project and the role of each institution were also not clearly stated. These created different understandings of the project objective among stakeholders. In view of the actual project situation, the project objective, "Traffic safety measures in Hanoi are improved," could have been changed to "Traffic safety measures based on the 3E concept are undertaken through the improvement of the abilities of traffic safety-related officers in Hanoi"; and the overall goal, "Road traffic conditions are improved," could have been replaced with "The number of traffic accidents will decrease as a result of improved traffic rules and manners in Hanoi." These changes make clearer what the project was originally aiming for. However, the project approach has no effect on the relevance of the project, since this is not a problem of the logic of PDM itself.

This 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 Impact¹⁰ (Rating:③)

3.2.1 Effectiveness

3.2.1.1 Project Output

1) Output 1: To establish a system for the planning, implementation, and evaluation of comprehensive traffic safety measures in Hanoi.

The Traffic Safety Plan (2011-2015) and Human Resources Development Plan (2011-2015) had not been completed at the time of the terminal evaluation; however, they

¹⁰ Sub-rating for Effectiveness is to be considered with Impact

were completed during the extended project period. The detailed outputs are as follows:

- Drafts for the Traffic Safety Plan (2011-2015) and Human Resources Development Plan (2011-2015) were prepared before the end of the third year of the project, and the reports were finalized in both English and Vietnamese during the fourth year.
- According to interviews with the project counterparts, both plans were positioned as important documents for the traffic safety policy of Hanoi City, since these were the first practical, as well as comprehensive, plans, despite the fact that Hanoi City had been preparing traffic safety plans by line offices before the project.

Considering these points, it is concluded that the system for the planning, implementation, and evaluation of comprehensive traffic safety measures in Hanoi was established.

2) Output 2: To improve the abilities of traffic police officers in the Hanoi Traffic Police Division.

Two indicators were established for Output 2: 1) the degree of improvement in the traffic enforcement abilities of the traffic police officers in HTPD and 2) the number of suggestions or actions taken to improve the traffic safety in Hanoi by HTPD. The following facts were confirmed by interviewing the project counterparts and through a questionnaire survey¹¹:

- While 120 trainees were planned for the project, 359 traffic police officers attended the short-term training course that was developed in collaboration with educational institutions such as the Police Academy and the Construction University. The course evaluation report showed that all trainees passed the final examination with a high score of more than 70 percent.
- The number of suggestions or actions taken to improve traffic safety in Hanoi by HTPD could not be counted, because those were undertaken in daily work activities. According to the questionnaire survey of traffic safety-related staff, 4 of 11 HTPD police officers answered that they proposed new projects and activities by using the skills and knowledge gained from the project during the project period.
- The Comprehensive Traffic Safety Pilot Project and Capacity Development (CD)

¹¹ Two types of questionnaire surveys were undertaken in this evaluation. One was for 95 (73 project participants and 22 nonparticipants) traffic safety-related officers from HTPD, HDOT, the Propaganda and Education Division of HTSC, and the Propaganda and Education Board of Hanoi Party Committee, and another one was for 100 Hanoi citizens, with whom an interview-based questionnaire survey was conducted.

Pilot Project were planned and implemented to improve the human resources capacity of traffic safety officers. These pilot projects gave them practical opportunities to learn new knowledge and technology, and they were highly regarded by HTPD.

- In the questionnaire survey for officers at HTPD¹², to the question, “Did you acquire new skills and knowledge through participation in the project?” all 11 respondents answered “Strongly Agree” or “Agree” (see Table 1).

Table 1 Degree of Learning by Participating in the Project (n=73¹³)

	HTPD	HDOT Inspectors	HDOT Traffic management & Road Facility Officers	Propaganda & Education
Strongly agree	2	2	1	6
Agree	9	38	11	1
Neither agree nor disagree	0	1	1	0
Disagree	0	0	0	0
Strongly disagree	0	1	0	0
Total project participants	11	42	13	7

Source: Questionnaire survey for traffic safety-related officers

From the above results, it is concluded that the traffic police officers of HTPD improved their abilities through the project.

3) Output 3: To improve the abilities of traffic inspectors in the Hanoi Department of Transport.

Two indicators were established for Output 3: 1) the degree of improvement in the traffic enforcement abilities of traffic inspectors in HDOT and 2) the number of suggestions or actions taken to improve the traffic safety in Hanoi by traffic inspectors. The following facts were confirmed by interviewing the project counterparts and through a questionnaire survey:

- The number of traffic inspectors who attended the short-term training was more than 90, almost as planned.

¹² This excludes 10 non-project participants of a total of 21 respondents from HTPD.

¹³ This is the result of 73 answers, the project participants, of a total 95 traffic safety officers who answered the questionnaire survey.

- The course evaluation report showed that more than 60% of the trainees passed the final examination with a high score.
- Traffic inspectors who participated in a pilot project commented that, “Traffic inspectors’ activities were more recognized after the project” and “It was a good opportunity to learn new practical skills and equipment for traffic regulation,” and they highly regarded the activity outcomes.
- In the questionnaire survey for traffic inspectors of HDOT, to the question, “Did you acquire new skills and knowledge through participation in the project?” 41 of 42 respondents answered “Strongly Agree” or “Agree” (see Table 1).
- The Japanese experts confirmed in interviews that the traffic inspectors who participated in the planning of the Traffic Safety Plan (2011-2015) and Human Resources Development Plan (2011-2015) improved their planning abilities.
- The number of suggestions or actions taken to improve traffic safety in Hanoi by the traffic inspectors could not be counted, because those were undertaken during daily work activities. According to the questionnaire survey for traffic safety-related officers, 32 of 42 traffic inspectors in HDOT answered that they proposed new projects and activities by using the skills and knowledge gained from the project during the project period.
- The number of arrests by traffic inspectors increased from 28,026 at the time of the project’s start to 45,587 by the time of the project’s completion. According to interviews with the traffic inspectors, it was not only the number of arrests but also the quality of traffic control that improved; for example, inspectors recognized the improvement in their parking control management skills.

From the above results, it is concluded that the traffic inspectors in HDOT improved their abilities through the project.

4) Output 4: To improve the abilities of officers in the Hanoi Department of Transport.

Two indicators were established for Output 4: 1) the degree of improvement in the abilities of traffic management and road facility officers in HDOT, and 2) the number of suggestions or actions taken to improve traffic safety in Hanoi by the traffic officers in HDOT. The following facts were confirmed by interviewing the project counterparts and through a questionnaire survey:

- The number of traffic management and road facility officers in HDOT who attended the short-term training amounts to more than 86, close to the planned amount of 90.

- The course evaluation report showed that more than 80% of trainees passed the final examination with a high score of more than 60%. The ownership of traffic management and road facility officers in HDOT in the pilot projects was high, compared to other HDOT officers.
- In the questionnaire survey for traffic management or facility officers at HDOT¹⁴, to the question, “Did you acquire new skills and knowledge through participation in the project?” 12 of 13 respondents answered “Strongly Agree” or “Agree” (see Table 1).
- The participation of HDOT officers in the Traffic Safety Standing Group Capacity Development Pilot Project was low at the beginning of the project. However, improvement in their participation and ability was observed during the last extended fourth year of the project through the preparation of the Traffic Safety Plan and Human Resources Development Plan.
- The number of suggestions or actions taken to improve traffic safety in Hanoi by the traffic management and road facility officers could not be counted, because those were undertaken during daily work activities. According to the questionnaire survey for traffic safety-related officers, 8 of 13 traffic management and road facility officers in HDOT answered that they proposed new projects and activities by using the skills and knowledge gained from the project before the project ended.
- At the time of project completion, more than 90% of drivers followed the rules of the road with lane separations, which were introduced by the Comprehensive Traffic Safety Pilot Project. Also, lane changes and road conflicts with motorbikes dropped¹⁵.

From the above results, it is concluded that traffic management and road facility officers in HDOT improved their abilities through the project.

5) Output 5: To improve the abilities of officers on the Hanoi Traffic Safety Committee in traffic safety education.

Three indicators were established for Output 5: 1) the number of cases and manuals for traffic safety education and propaganda activities, 2) the number of developed core staff, and 3) the number of suggestions or actions taken to improve traffic safety in Hanoi by

¹⁴ This excludes 9 non-project participants of a total 22 respondents from traffic management or facility officers at HDOT.

¹⁵ Project Completion Report

education- and propaganda-related staff. Because these indicators had not been measured numerically, the following facts were used for evaluation analysis:

- According to interviews with the project counterparts, they learned new ways to develop a traffic safety culture and to effectively undertake propaganda and education activities by participating in the pilot projects and short-term training, and by implementing the traffic safety month campaign in the project. Initially, the propaganda and education division of HTSC was the only counterpart in this field; however, the project later included the Propaganda and Education Board of the Hanoi Party Committee in order to expand the project outcome. This enabled the project to utilize the Committee's large community-based network.
- In the questionnaire survey for the members of the Propaganda and Education Subcommittee¹⁶, to the question, "Did you acquire new skills and knowledge through participation in the project?" 7 of 7 respondents answered "Strongly Agree" or "Agree" (see Table 1).
- The project was financially, as well as technically, supported by Yamaha, which helped produce a booklet on how to safely ride motorcycles. Also, counterparts of the subcommittee had opportunities to receive training at Yamaha's Kakegawa Technical Center and also at Hondas traffic safety education center in Suzuka. The counterparts highly regarded the knowledge and experience gained from this assistance in cooperation with the private companies¹⁷.

From the above results, it is concluded that the abilities of officers on the Hanoi Traffic Safety Committee for traffic safety education improved their abilities through the project.

3.2.1.2 Achievement of Project Objectives

In order to measure the achievement level of the project objective, a degree of improvement in traffic safety measures conducted by HTPD and HDOT—including improvements in traffic control and traffic safety propaganda activities—was established. Interviews with the counterparts and a questionnaire survey found the following:

- Based on interviews with the project counterparts and Japanese experts, the performance of traffic safety-related institutions improved by the time of the project's completion.

¹⁶ This excludes 3 non-project participants of a total 10 respondents from the members of the Propaganda and Education Subcommittee

¹⁷ YAMAHA and HONDA have been continually implementing traffic safety activities such as offering classes on how to ride a motorcycle and distributing traffic safety pamphlets as a part of Corporate Social Responsibility (CSR).

- The number of arrests by HTPD traffic officers enormously increased from 93,543 cases at the time of the project’s planning to 850,008 cases at the time of the project’s completion¹⁸.
- The number of administrative sanctions given by HDOT traffic inspectors increased from 28,026 cases at the time of the project’s planning to 45,587 cases at the time of the project’s completion¹⁹.
- In the results of a questionnaire survey of 100 Hanoi citizens, 82 respondents felt that the performance of traffic safety-related officers had improved, while 18 respondents felt it not improved at all.
- In the results of a questionnaire survey of 95 traffic safety-related officers in Hanoi, more than half the respondents answered “Extremely Improved” and “Very improved” to the improvement of institutional abilities in traffic safety (see Table 2). These abilities include 1) a system for the planning, implementation, and evaluation of comprehensive traffic safety measures; 2) the traffic enforcement ability of traffic police officers in HTPD; 3) the traffic enforcement ability of traffic inspectors in HDOT; 4) the ability of HDOT officers for traffic management and road facilities; 5) the ability of HTSC officers for traffic safety education and propaganda activities; and 6) the ability of officers at the Propaganda and Education Board of the Hanoi Party Committee for traffic safety education and propaganda activities.

Table 2 Degree of Improvement of Traffic Safety-Related Officers by Participation in the Project (Comparison of before and after the project) n=95

	a. System for planning, implementation, and evaluation of comprehensive traffic safety measures		b. Ability of traffic policemen of HTPD for traffic enforcement		c. Ability of traffic inspectors of HDOT for traffic enforcement		d. Ability of HDOT officers for traffic management and road facilities		e. Ability of HTSC officers for traffic safety education and propaganda activities		f. Ability of officers at Propaganda and Education Board of Hanoi Party Committee for traffic safety education and propaganda activities	
Extremely improved	23	24%	16	17%	16	17%	19	20%	17	18%	18	19%
Very improved	33	35%	43	45%	47	49%	48	51%	51	54%	39	41%
Moderately improved	27	28%	28	29%	25	26%	21	22%	21	22%	28	29%
Slightly improved	12	13%	8	8%	7	7%	7	7%	6	6%	10	11%
Not at all Improved	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Total	95	100%	95	100%	95	100%	95	100%	95	100%	95	100%

Source: Questionnaire survey of traffic safety-related officers

¹⁸ The improvement was achieved partially due to the project but also due to the fact that the city increased the number of police officers on the street and improved the treatment of police officers.

¹⁹ ditto

- Based on interviews with the Japanese experts and project counterparts, the results of Outputs 2, 3, 4, and 5 were incorporated into the Traffic Safety Plan (2011-2015) and Human Resources Development Plan (2011-2015).

Output 1 to Output 5 were all achieved as planned, and the performance of traffic safety-related officers improved from before the project to after the project, as the results of the questionnaire survey of traffic safety-related officers and Hanoi citizens demonstrate. This project has largely achieved its objective; therefore, its effectiveness is high.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

In order to measure the level of achievement of the overall goal, “The road traffic conditions are improved,” two indicators were established for the project. They are 1) the number of road traffic accidents, fatalities, and injuries; and 2) the improvement in the traffic manners of Hanoi citizens (monitoring study on traffic violations). The following information was gathered through interviewing the counterparts and conducting a questionnaire survey:

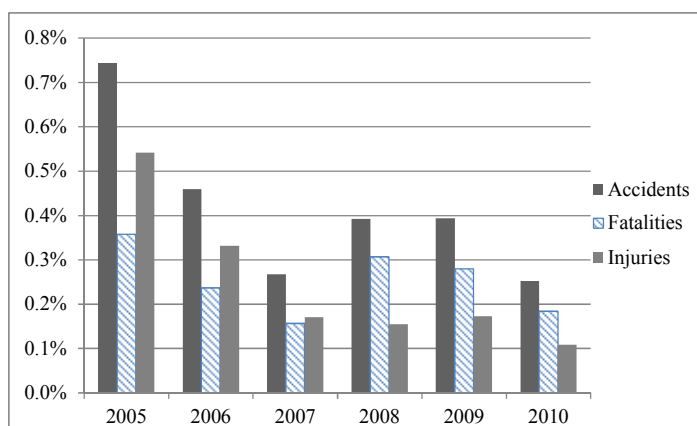
1) Indicator 1: The number of road traffic accidents, fatalities, and injuries

- As shown in Table 3, the total number of accidents has decreased from 2,478 cases in 2005 to 2,219 in 2011 (the newest data). The breakdown of this shows that the number of road traffic accidents and injuries decreased from the project planning time in 2005 to 2011 and that fatalities increased during the same period. Meanwhile, considering the fact that the number of registered automobiles increased by 3.7 times from 2005 to 2010 and motorcycles by 2.8 times, the rates of accidents, fatalities, and injuries per vehicle declined, respectively, as shown in Figure 1. Thus, it is concluded that road traffic safety in Hanoi has been improving.

Table 3 Road Traffic Accidents in Hanoi (2005-2011) (unit: persons)

	Accidents	Fatalities	Injuries	Total
2005	1122	539	817	2,478
2006	1017	522	734	2,273
2007	852	497	544	1,893
2008	1,113	868	438	2,419
2009	1,207	856	531	2,594
2010	1,109	807	478	2,394
2011	1,027	749	443	2,219

Source: HTPD provided data



Source: Evaluator based on the internal data of HTPD

Figure 1 Rate of Accidents, Fatalities, and Injuries per Vehicle (2005 - 2010) (%)

2) Indicator 2: The improvement in road traffic manners of Hanoi citizens (monitoring study on traffic violations)

- As shown in Table 4, the results of a questionnaire survey of Hanoi citizens show that most of the respondents think that the road traffic manners, behaviors, awareness, and knowledge of Hanoi citizens has improved in the last seven years²⁰.

Table 4 Question to 100 Hanoi Citizens: The Change in Awareness of Traffic Safety in the Last Seven Years (unit: person n=100)

	Did you improve road traffic safety manners/behavior improve?	Do you think that road traffic safety manners/behavior of people living and working in Hanoi have improved?	Do you think that Your awareness/knowledge has improved?	Do you think that Awareness/knowledge of people living and working in HN has improved?
Extremely improved	3	2	0	1
Very improved	54	12	44	12
Moderately improved	37	40	48	45
Slightly improved	6	35	8	34
Not at all Improved	0	11	0	8
Total	100	100	100	100

Source: Questionnaire survey of Hanoi citizens

- In the questionnaire survey of 95 traffic safety-related officers, to the question “Do you think that the road traffic manners of Hanoi citizens have improved

²⁰ Motorcycle users have been required to wear a helmet by law since December 15, 2007 in Vietnam, and this mostly has become a daily practice today. This new rule might have a positive effect on the change in awareness of Hanoi citizens in traffic safety, to some extent.

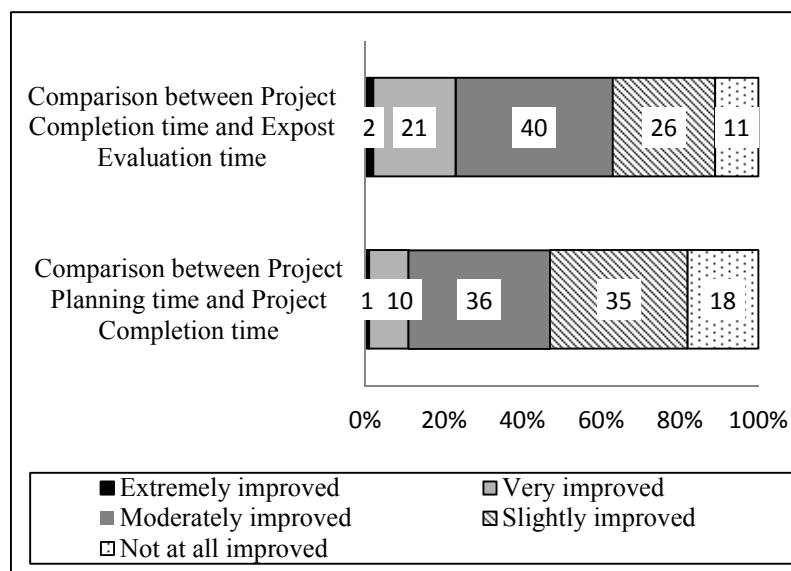
comparing today (2013) to 2006?” 22 respondents answered “Strongly Agree,” 77 answered “Agree,” none answered “Neither Agree nor Disagree,” one answered “Disagree,” and none answered “Strongly Disagree.” It shows that, much like Hanoi citizens, most traffic safety-related officers feel that the traffic safety manners of Hanoi citizens have improved.

Based on the above, the overall goal was largely achieved, according to its target indicators; therefore, its impact is high.

3.2.2.2 Other Impacts

1) Improved evaluation by Hanoi citizens on the performance of traffic safety-related officers

The results of a questionnaire survey of Hanoi citizens show in Figure 2 that the proportion of “Extremely Improved” and “Very Improved” ratings between the project completion time (2010) and the time of the ex post evaluation (2013) was larger than that between the project planning time (2005) and the project completion time (2010). Answers of “Not At All Improved” decreased from 18 persons at the time of the project implementation to 11 at the time of the project completion. Therefore, the evaluation by Hanoi citizens on the performance of traffic safety-related officers had improved even after the project.



Source: Questionnaire survey of Hanoi citizens

Figure 2 Question to 100 Hanoi Citizens: Assessing the Performance of Traffic Safety-Related Officers (unit: person) (n=100)

To the question, “What improvement in the ability of traffic-related officers do you

notice?” most respondents gave “The number of traffic lights increased” as the biggest improvement during the project implementation period (2006-2010). However, after the project in 2010, the number of positive opinions on “Traffic control of police officers improved,” “The road flow also improved” and “The traffic safety-related announcements improved” increased, as shown in Table 5. The evaluation of Hanoi citizens on the quality and reliability of police officers did not change over time.

Table 5 Question to 100 Hanoi Citizens: Improved Aspects of the Performance of Traffic Safety Officers (unit: person)
(n=100 multiple answers allowed)

	Police officers are more visible on streets	Police officers are stricter in terms of enforcement of traffic rules and regulations.	Police officers manage road traffic flow on roads better	Quality of police officers in general has improved	Policemen are more reliable	Road condition is improved	More traffic signs are set up on roads	More traffic safety education related announcements (newspaper, road posters, radio, propaganda, etc.)	Others
Project Implementation Period (2006-2010) valid answers = 82	30	33	33	8	1	46	32	28	6
After Project Completion (after 2010) valid answers = 89	44	60	44	15	2	48	59	42	5

Source: Questionnaire survey of Hanoi citizens

2) Increase in the number of arrests

The number of road traffic arrests by HTPD traffic officers was 93,543 cases in 2005, and it increased to 986,640 in 2011. Administrative sanctions given by HDOT traffic inspectors more than doubled, from 28,026 in 2006 to 72,384 in 2012. Based on interviewing the project counterparts and Japanese experts, the reasons behind the increase in the number of arrests are that the government of Vietnam, in considering the importance of strengthening traffic safety, increased the number of traffic officers and traffic inspectors, and it introduced a reward system that reflects the results of the traffic control activities of traffic officers and inspectors.

3) Nationwide expansion of project activities

Arrest Recording Forms software developed by the project counterparts were adopted as a common form in Hanoi city and then it is used as national forms nowadays. Although the size of traffic safety culture promotion activities was reduced after the project, the activities continue today. The traffic safety campaign of the month, which was experimentally implemented during the project, was later adopted nationally. It made September the national traffic safety month and created a traffic safety campaign distributed through mass media such as TV, radio, and newspapers. Opinions suggest that a series of such activities helped to raise Hanoi citizens' awareness of traffic safety and

caused a behavioural change in following traffic rules.

Considering the points above as the project objectives, a degree of improvement in traffic safety measures conducted by HTPD and HDOT, including improvements in traffic control and traffic safety propaganda activities, was achieved. From the following positive facts, the overall goal as initially planned was: the rates of accidents, fatalities, and injuries per vehicle all decreased; the number of arrests by traffic police officers and traffic inspectors increased; the results of pilot projects were expanded to other locations; and the traffic manners of Hanoi citizens improved. Thus, this project has largely achieved its objectives; therefore its effectiveness is high.

Column: Action to Improve People’s Awareness and Understanding of Traffic Safety

The lane separation to divide automobile and motorcycle traffic, one of the technologies transferred by the project, was introduced on Trang Kath Chan street ~ Dai Co Viet street for the first time in Hanoi, and is today installed in eight locations. The Department of Transport of Ho Chin Minh visited Hanoi City to observe the new system and started to introduce it in Ho Chin Ming City as well.



A permanently installed lane-separation in Hanoi City; automobile on the left and motorcycle on the right.

The reason why the introduction of the lane separation spread rapidly was because the project objective fully introduced the system in the middle of the city. At the time when the system was introduced, there were opinions that the pilot project should be installed in a suburban area, because it is rather dangerous when automobiles and motorcycles cut through the lane separation road to go over to small roads on the roadside in the city area. Sometimes, temporary separation zoning accessories and signs were stolen at night. Nevertheless, the project team intentionally introduced it in an urban area, on the city’s most heavily travelled road, because the project team believed that, if more people experience and recognize the outcome and effectiveness of the lane separation, it would eventually lead to changes in Hanoi citizens’ behaviors. Today, four years after the project’s completion, the lane separation is highly recognized by Hanoi citizens and the effect is widely accepted, as the project team anticipated.

3.3 Efficiency (Rating: ①)

3.3.1 Inputs

Inputs	Plan	Actual Performance
Japanese Side		
(1) Experts	0 for the Long-Term 6 for the Short-Term	0 for the Long-Term 15 for the Short-Term
(2) Trainees received	3 – 5 persons per year (determined by discussions) Fields of training: N/A	Total 55 persons Fields of training: traffic safety planning, traffic enforcement, regulation system, traffic accident analysis, and traffic safety study / development
(3) Third-Country Training Programs	Fields of training: N/A	Total 16 persons Fields of training: traffic safety culture (Thailand), traffic accident analysis (Korea), and traffic planning in urban areas (Philippines)
(4) Equipment	Training equipment and office equipment, etc.	About 25.41 million yen (office equipment and various equipment for traffic enforcement and regulation)
(5) Local Cost	Expenses for training/seminars, printing for training materials, intersections and road construction, and traffic safety campaign activities	103.46 million yen (expenses for local experts, document printing, car rental, and sub-contract (Project Completion Report))
(6) Others	N/A	Construction cost for Comprehensive Pilot Project ²¹ : about 71.73 million yen
Total Project Cost	389 million yen	617 million yen
Vietnamese Side		
(1) Counterparts	Accordingly	37 persons from HTSC, HDOT, HTPD, and Propaganda and Education Board of Hanoi Party Committee
(2) Land, building, equipment	Work space, utilities, allowance for training	Facilities (project office and 2 training rooms)
(3) Local Cost	Budget necessary for the project	About 13.91 million yen
(4) Others	N/A	About 28.80 million yen

²¹ The cost was for improvement of intersections and roads at the pilot project site.

		for Comprehensive Pilot Project ²² , shared cost for the second- and fourth-year training in Japan ²³
--	--	---

Source: JICA documents

3.3.1.1 Elements of Inputs

Problems with the quality of inputs were not found in the results of interviews or answers from the project counterparts. Local experts were hired in addition to the Japanese experts for this project. Some of the local experts were retirees from HDOT and HTPD, therefore they were familiar with the political environment in which the project counterparts operated and were highly trusted by the project counterparts. These local experts supplemented the abilities of the Japanese experts to maintain and improve communication with the Vietnamese side and proposed ways to transfer Japanese technology and knowledge taking into accounts the local context of Hanoi City. This cooperative arrangement between the Japanese experts and the local experts was highly regarded by the Vietnamese side.

3.3.1.2 Project Cost

The actual project cost was approximately 617 million yen. This was significantly higher than the planned cost of 389 million yen (159% of the original plan). One of the reasons for the increase was the increase in project inputs as a result of the project extension. Furthermore, the budget for the project at the time of the project planning, especially the cost estimates for the pilot projects, was insufficient, since there were no relevant aims to improve traffic safety in the technical cooperation project conducted by JICA in the past. A common opinion of the project counterparts was that the overall project budget was not enough, even though the project actually spent more resources than the initial plan envisioned. The counterparts pointed out that the Vietnamese side partially paid the expenses for the construction of the pilot projects and for traveling costs for training in Japan, and they also felt that the equipment for traffic regulation and enforcement provided in the project was not enough to achieve the project objective.

3.3.1.3 Period of Cooperation

The project period was longer than planned because the project was extended for one

²² Vietnam partially paid the construction cost for improvement of intersections and roads at the pilot project site because the pilot project cost increased more than planned.

²³ Of 55 trainees, the cost for sending 15 trainees to Japan was shared between Japan and Vietnam.

year. The reasons for the extension was a delay in the allocation of counterparts, which affected the smooth implementation of the project and consequently caused delays in all activities, especially the Traffic Safety Plan (2011-2015) and Human Resources Development Plan (2011-2015) of Output 1—“To establish a system for the planning, implementation, and evaluation of comprehensive traffic safety measures in Hanoi”—which were not prepared within the planned period.

From the above, all elements of inputs were necessary and appropriately used, however, both the project cost and period of cooperation significantly exceeded the plan, therefore efficiency of the project is low.

3.4 Sustainability (Rating: ③)

3.4.1 Related Policy toward the Project

The 9th SEDP (2011-2015) described the importance of traffic safety in regard to the gradual increase in traffic volume in urban areas under the infrastructure development section. An international conference on Vietnam’s traffic safety was held on November 22, 2012, in Hanoi. At the conference, Mr. Nguyen Xuan Phuc, Deputy Prime Minister of Vietnam, stated, “The Vietnam government took multiple measures to improve traffic safety in an exhaustive manner in the last few years and developed infrastructure focusing on the development of a transportation network.” And he further announced, “The government of Vietnam will aim to reduce the number of deaths and injuries caused by traffic accidents by 50% by 2020 to achieve the ‘10 years Action for traffic safety from 2011 to 2020’ which was advocated by the United Nations.”

The Traffic Safety Plan (2011-2015) and Human Resources Development Plan (2011-2015) prepared in the project were considered among Hanoi City’s most important documents for traffic safety strategy at the time of the ex post evaluation, and they are referred to when the five-year plan and annual traffic safety plans are prepared by traffic safety-related administrative organizations.

It is also confirmed that Hanoi City also prepares five-year plans and annual plans for each safety-related administrative organization in line with the National Road Safety Strategy (2020-2030), and the two plans produced by the project are used as references. Thus, the sustainability of policy toward the project is high.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

Hanoi’s traffic safety is still managed by HTPD, HDOT, and the propaganda and education division of HTSC as of today, and institutional change has not been found since the time of the project planning. As a result of merging the Ha Tai province into Hanoi City in December 2008, HTSC was restructured and the role of the 3Es—

Enforcement, Engineering, and Education—was further clarified within the committee. HTSC, in charge of the preparation and implementation of traffic safety policy, established three subcommittees based on the 3E concept: 1) a road user traffic control subcommittee formed by HTPD and traffic inspectors in HDOT, 2) a road traffic safety infrastructure subcommittee formed by the management and facilities of HDOT, and 3) a propaganda and education subcommittee formed by the propaganda and education division of HTSC and the Propaganda and Education Board of the Hanoi Party Committee. These three subcommittees meet once a month and exchange their opinions and coordinate their activities²⁴.

All project counterparts commented that the communication and coordination among traffic safety-related institutions had largely improved. For example, citizens' opinions obtained through propaganda and education activities were transferred to the road traffic safety infrastructure subcommittee, and this resulted in the installation of new pedestrian traffic lights and a lane separation. On the other hand, not many such examples were found, and counterparts believe that these efforts should be further encouraged.

3.4.3 Technical Aspects of the Implementing Agency

In the initial plan at the project's design, the officers from HDOT and HTPD were to be trained to become lecturers, and these trained lecturers would continue the training courses after the project. However, this was changed to short-term training in cooperation with external institutions such as the Police Academy and the Construction University. The reason was that the project faced difficulties in selecting people to become lecturer candidates because most of the traffic safety officers did not have basic knowledge and skills in traffic engineering.

It is confirmed in this evaluation study that the transferred technology and knowledge, partially modified or upgraded, are still taught today at the Police Academy for HTPD officers and at general training courses for HDOT officers. Also, based on the questionnaire survey of traffic safety-related officers, the officers who gained technical know-how from the project shared it with their colleagues and their subordinates.

In addition, some of the Japanese experts have been members of “The Project for Strengthening the Traffic Police Training in Various Police Colleges of Vietnam (2010-2013)”²⁵ and/or “The Project for Improving Public Transportation in Hanoi

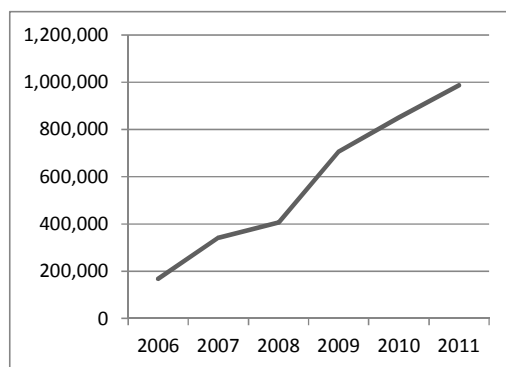
²⁴ HTSC is a subsidiary body of HPC. Three subcommittees, 1) a road user traffic control subcommittee, 2) a road traffic safety infrastructure subcommittee, and 3) a propaganda and education subcommittee, were established under HTSC. The operation of HTSC is managed by the secretariat of HTSC.

²⁵ The project aims to improve the quality of instructors of traffic police officers at the Police Academy by reviewing training curricula and training methods for 1) road traffic law and traffic safety education, 2) traffic regulation and traffic management, 3) traffic control, and 4) traffic accident data collection and analysis. The project also assists in preparing the action plans to strengthen policy for traffic safety measures. This is the success of the three pilot projects for capacity development, “Traffic Accident Analysis (Traffic

(2011-2014)²⁶ and continue to give technical advice to project counterparts even today. This continuous relationship with the project counterparts after the project is an important factor in increasing the sustainability of the transferred technology and knowledge and bringing about positive impacts, such as the decrease in the number of road traffic accidents and the performance improvement of traffic safety officers as discussed in 3.2.2.

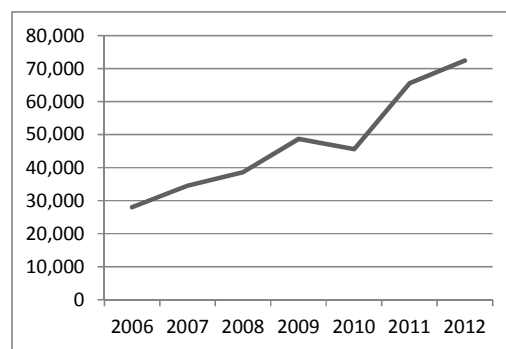
3.4.4 Financial Aspects of the Implementing Agency

The budget of HDOT, HTPD, and the Propaganda and Education Division of HTSC is supported by the budgets of multiple institutions such as HTSC, Hanoi City, and central governments including the Ministry of Construction and Ministry of Public Security. The evaluator attempted to extract the budget strictly related to traffic safety from the counterpart institutions to see the budget trend; however, it was impossible. Alternatively, the results of interviews with the counterparts and the trend of fines and penalties from administrative sanctions collected by traffic control activities, which become the HTSC budget, were reviewed for this evaluation²⁷. As a result, the budget of the counterparts has been increasing from the time of the project completion, and the number of arrests by HTPD and the penalties imposed by traffic inspectors have both been increasing as well²⁸. Thus, it can be concluded that no problem is observed in regard to financial aspects.



Source : Internal document of counterpart

Figure 3 The Number of Arrests for Traffic Violations by HTPD (2006-2011) (unit: case)



Source : Internal document of counterpart

Figure 4 The Number of Arrests for Road Violations by HDOT Inspectorate (2006-2012) (unit: case)

accident data management and analysis)” stated in Output 2 of this project.

²⁶ The project aims to propose measures to shift Hanoi citizens’ travel mode from personal vehicles to public transportation in order to reduce heavy traffic congestion within the city area. The project does not relate to this project directly, however, the project is known as “TRAHUDII,” which is named after this project “TRAHUDI.”

²⁷ The revenue from traffic control is allocated according to the following ratios: 10% for Secretariat of HTSC, 70% for subcommittees and 20% for other administrative and treasury activities.

²⁸ The number cannot be publicly disclosed since this is an internal document, however, the evaluator checked the document and confirmed the amount of fines and penalties collected have been continuously increasing.

In light of the above, no major problems have been observed in the policy background, or in the structural, technical, or financial aspects of the executing agency; therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

This project aimed at developing the human resources of the traffic safety-related officers in Hanoi, namely traffic police officers, traffic inspectors, traffic management and road facility officers, and traffic safety education-related officers in order to improve the city's traffic safety measures, and, further, to reduce traffic accidents in Hanoi.

This project objective is consistent with the development policy and development needs of Vietnam, and with the Official Development Assistance policy (ODA) of Japan. The project approach is also appropriate. Therefore, the relevance of the project is high. The study confirmed that the traffic safety-related indicators and the consciousness of Hanoi citizens toward traffic safety have been improving. In light of these facts, the effectiveness/impact of the project is also high. On the other hand, the efficiency of the project is low. All the inputs were necessary to achieve the project objective and were used appropriately, however, the project period and cost exceeded the plan. As for the project sustainability, the policy to enhance traffic safety is still considered by the Vietnamese government as one of its priorities, and the financial aspect is also positive because traffic-related penalties and fines have been increasing. Hence, the sustainability is high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Further strengthening 3E through implementing pilot projects

Based on the traffic safety concept of 3E (Enforcement, Engineering, Education), HTSC monthly meetings have been organized with the traffic safety-related agencies to increase institutional cooperation among HTPD, HDOT, HTSC, the Propaganda and Education division of HTSC, and the Propaganda and Education Board of Hanoi Party Committee. An improvement is observed: The communication among subcommittees improved, and an annual plan is prepared. However, actual project cases and cooperation plans are still limited.

The project final report produced by the project team in March 2010 recommended

identifying comprehensive traffic safety projects and then implementing them on the selected road sections as pilot projects every year. This project confirmed that lecture-type training in combination with onsite practices is effective in developing the human resources of the traffic safety sector. Once again, it is suggested to strengthen 3E through the implementation of pilot projects aside from the monthly meetings currently organized by HTSC.

Traffic accident analysis is expected to be improved due to the outcome of the Project for Strengthening the Traffic Police Training in Various Police Colleges of Vietnam, which is currently being undertaken by JICA. It is important that the improved traffic safety-related data generated from the project are shared with HDOT, HTSC, and the Propaganda and Education division of HTSC, and the Propaganda and Education Board of Hanoi Party Committee under the leadership of HTPD. One idea is for HTSC to coordinate a series of planning procedures. For example, HTPD can organize a workshop and invite the related agencies to share traffic analysis results before the preparation of each agency's annual plan for traffic safety. Then the related agencies can include specific measures in the annual plan based on discussions during the workshop.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

1) Effectiveness of applying the 3E approach and lecture-type training in combination with onsite practices to improve human resources development in traffic safety

The 3E approach is effective in countries where the traffic safety culture is still underdeveloped. Individual Es can be strengthened where necessary after the 3E concept is widely adopted in the country. Furthermore, it is important to use both lecture-type training and onsite practices in the activities.

2) Conditions for cooperation with external educational agencies as an option in training

Although lecture-type training is one of the important activities that strengthen the abilities of traffic safety-related officers, developing a new training curriculum and training lecturers in the project is not always realistic in terms of limited human resources and the time constraints on counterparts. This was realized in the early stages of the project, so the curriculum was developed in the project but the lecturers were brought in from external institutions. The lecturers' teaching materials were modified and some were newly developed, if necessary, in cooperation with the Japanese experts. As a result, this approach produced a great result.

As lecture-type training is conducted to develop human resources in traffic safety in other countries' training, the possibility of cooperating with existing training institutions should be considered at the project-planning phase. When the project decides to cooperate with external educational institutions, the training routine plan should be prepared before the project ends to ensure the sustainability of training courses after the project.

3) Clearly identifying project scope and sharing it among project stakeholders

As was pointed out in the analysis on Efficiency, although the actual project budget and period greatly exceeded the plan, project counterparts felt that the overall inputs for this project from JICA were limited, especially the amount of equipment provided for traffic control. One of the reasons for this is that the counterparts did not properly understand the characteristics of the project type and the technical cooperation. In order to avoid such a situation, it is important to build a common understanding between the Japanese side and the counterpart side about project scope: the project goals and how much of the goals are expected to be achieved during the early stages of the project period. Furthermore, when multiple stakeholders are involved, as in this project, it is better to put the agreement on the project scope in writing.

4) Describe specific and clear goals and indicators in PDM

As was pointed out in the analysis on Relevance, the existing Project Design Matrix (PDM) did not clearly explain the scope of the project. For example, "A degree of improvement in traffic safety measures conducted by HTPD and HDOT" is established as an indicator of the project objective "Traffic measures in Hanoi are improved." From this project objective and indicator, it is not clearly understood what and how much to improve, despite the fact there are various issues to undertake in traffic safety measures. As an alternative idea, "The performance of traffic safety-related agencies are to improve and traffic safety measures are undertaken based on the 3E approach" can be established as a project objective with indicators such as 1) the number of pilot projects identified based on the 3E concept, 2) the number of traffic accidents at pilot project sites, 3) the degree of change in the awareness of traffic safety-related officers, and 4) the degree of change in the awareness of Hanoi citizens of traffic safety. The indicators should be compared before and after the project. Likewise, the overall goal, "The road traffic conditions are improved," can be replaced with "The number of traffic accidents will decrease as a result of improved traffic rules and manners in Hanoi," and indicators should be established accordingly.

5) Consider the possibility of cooperating with private companies in the traffic safety sector

The Propaganda and Education Board of the Hanoi Party Committee received financial support from Yamaha to produce traffic safety booklets for motorcycles. Also, they had opportunities to attend training at the training centres of Yamaha and Honda in Japan. Such cooperation with a private company can be applied to similar projects in other countries where the market share of Japanese automobiles and motorcycles is considerable. It may be worth looking into this possibility with the Japanese experts at the beginning of the project.

